DRAFT
ENVIRONMENTAL IMPACT REPORT
TRACT 2026-4
MANDALAY BAY, PHASE IV
CITY OF OXNARD, CALIFORNIA

EIR No. E-76-15

APPLICATION FOR ZONE CHANGE NO. 592

DECEMBER, 1977

PREPARED FOR:

City of Oxnard
Planning Department
305 West Third Street
Oxnard, CA 93030

PREPARED BY:

Atlantis Scientific
9015 Wilshire Boulevard
Beverly Hills, CA 90211

(213) 274-2211

Atlantis Scientific

TABLE OF CONTENTS

Table of Contents, Cont.

Table of Contents, Cont.

Table of contents, cont.

Table of contents, cont.

LIST OF EXHIBITS

Figures, continued

CHARTS

TABLES

Tables, continued

INTRODUCTION

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I

INTRODUCTION

This Environmental Impact Report (EIR) was prepared in accord with the State of California Guidelines for implementation of the California Environmental Quality Act (CEQA), as amended.

The proposed action discussed in this EIR is the conversion of ±82.7 acres of land from agricultural to residental use. (Zone Change No. 592) The prospective project site lies within the jurisdiction of the City of Oxnard. The City of Oxnard is designated as the lead agency for preparation of the EIR.

The most recent CEQA amendments have been aimed at enhancing the planning value of EIRs by focusing the documents toward discussions of the "significant impacts." The City of Oxnard performed an in-depth review of the proposed project description and conferred with other affected jurisdictional entities (Ventura County, State and Regional Coastal Commissions, etc.) to identify the potentially significant impacts associated with this development plan.

As a result of this analysis, the following factors were determined to have the highest impact potential in terms of local and regional considerations:

- LAND USE CONVERSION
  - ¶ Depletion of agricultural lands
  - ¶ Augmentation of residential lands
- COASTAL ZONE CONSIDERATIONS
  - ¶ Compatibility with local and regional plans
  - ¶ Public access to recreational areas
  - ¶ Impact of contiguous development
  - ¶ Aesthetic values and view sheds
- WATER AND RECREATIONAL BOATING ASPECTS
  - ¶ Waterways excavation and disposal of materials
  - ¶ Water quality maintenance
  - ¶ Water circulatory systems
  - ¶ Increased boat traffic

- ENVIRONMENTAL FACTORS

  - ¶ Geology/Hydrology
  - ¶ Traffic and Circulation
  - ¶ Socioeconomics

This document is organized to emphasize these areas of potentially significant impact. The EIR is divided into the following major sections:

Chapter	I	INTRODUCTION	- Definition of purpose of study, contents of report
Chapter	II	SUMMARY OF IMPACTS	- Description of primary considerations, overview of findings and conclusions presented in report
Chapter	III	PROJECT DESCRIPTION	- Detailed presentation of the proposed development plan
Chapter	IV	ENVIRONMENTAL SETTING	- Description of the existing conditions (locally and regionally)
Chapter	V	ENVIRONMENTAL IMPACT	- Discussions of potential impacts which would be attributed to the proposed project, and the presentation of mitigating measures
Chapter	VI	PERSONS AND REFERENCES	- List of persons, organizations and source materials consulted during preparation of the report
Chapter	VII	SUPPORTING INFORMATION	- Various attachments cited in the text containing detailed and/or technical information in support of findings presented

SUMMARY OF IMPACTS

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II

SUMMARY OF IMPACTS

PROPOSED PROJECT

The project, as proposed, would convert approximately 83 acres of agricultural land to residential use. Specifically the project, identified as Mandalay Bay Phase IV, would involve the construction of 401 attached and detached single family residential units, and would extend the existing Mandalay Bay Marina to provide additional waterways consisting of approximately 32.6 acres of water surface area.

The proposed residential development with waterways amenity would be located approximately one-half mile west of Victoria Avenue, southerly and adjacent to Wooley Road and northeasterly and adjacent to the existing Southern California Edison Canal (Mandalay Canal).(1)

PRINCIPAL IMPACT

The principal impact which would be associated with the development plan, as proposed, would be the decision to convert the subject property to residential use. This is a land use planning decision which could affect the future growth and development of the City of Oxnard in numerous ways.

Land Use Influences

The property is surrounded by diverse land uses and each distinct land use category is imposing pressures upon this acreage for conversion to comparable uses. A graphic presentation of this situation is presented in Figure 1, Land Use Influences. The land pressures may be summarized as follows:

- AGRICULTURAL

  The project site, as identified by the diagonal pattern on Figure 1, is presently in agricultural production. The

(1) Refer to Vicinity Map, Figure 3, for project location.

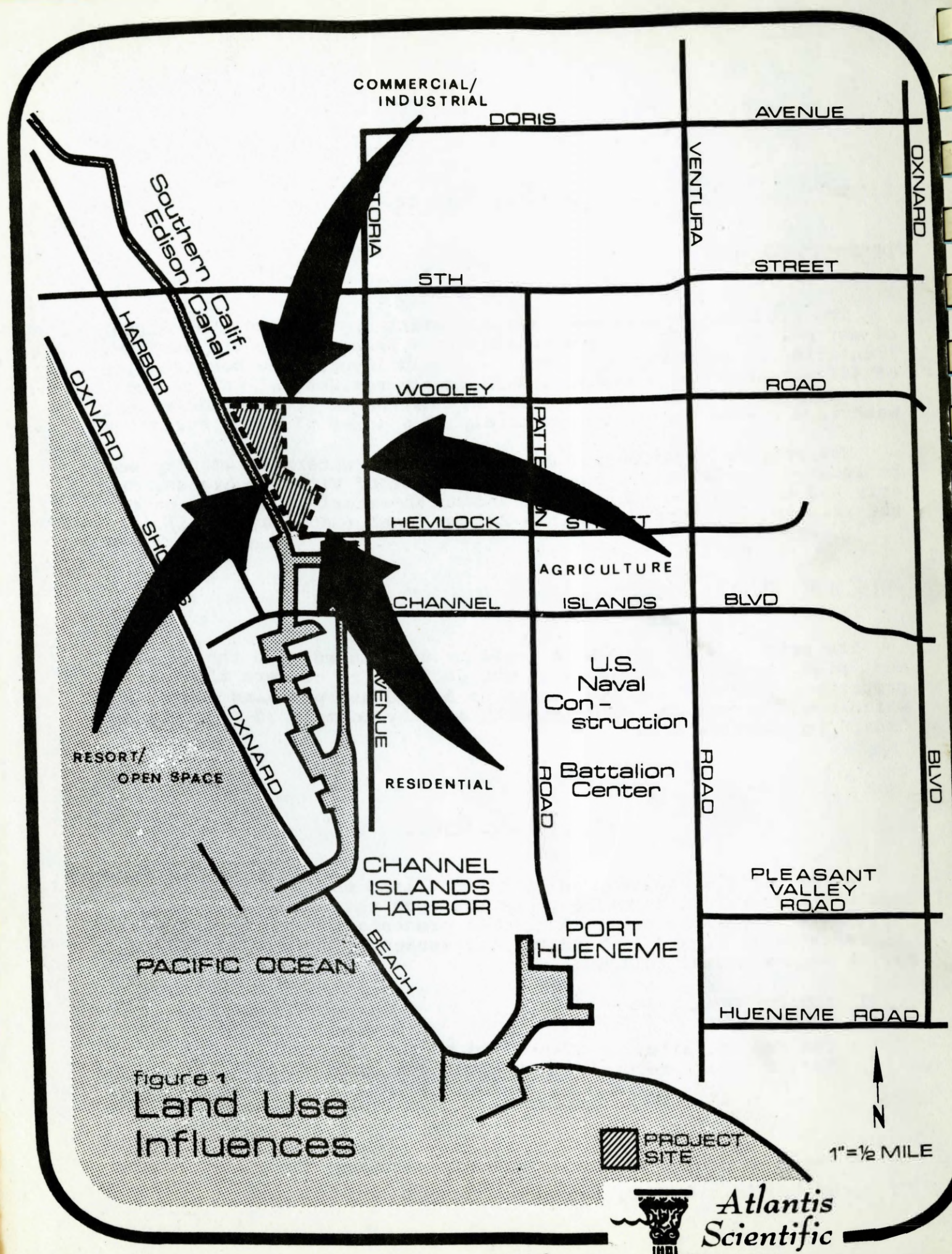

figure 1
Land Use
Influences

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adjoining 130 acre parcel (east of the site, west of Victoria Avenue, between Wooley Road and Hemlock Street) is also in agricultural production, as is the land area immediately north of Wooley Road, adjacent to the project site.

Conversion of the subject property to a use other than agricultural would diminish the amount of local acreage available for cultivation. The remaining agricultural acreage in this vicinity could be considered to be below the accepted standard for economic viability of agricultural production.[2]

¶ RESIDENTIAL

The acreage immediately to the south of the project site has been previously converted to residential use and supports Mandalay Bay Phases I-III. This development consists of upper-income residential dwelling units with waterway amenities. The land area east of the project site, along Victoria Avenue and surrounding streets, is also developed as residential. The dwelling units along this access corridor are generally of the townhouse configuration and are designed for the middle income group.

Extension of the residential development to this property would provide additional housing options for Oxnard's growing population. Specifically, it would provide housing alternatives for the upper income group which the City is desirous of attracting.

¶ COMMERCIAL/INDUSTRIAL

The Ventura County airport exists to the northeast of the site and there is scattered commercial development in the intervening area.

If the airport is to be developed as a hub for industrial/commercial activity in the County, development of industrial commerical uses on this acreage could be considered a logical extension if the acreage remained undeveloped. It is noted that due to General Plan designations and the current status of industrial/commercial developments in the City this pressure is presently not as evident as others, but could materialize in time.

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(2) Disagreement exists -however 160 acres is considered by many to be the lower limit of economic viability for agricultural production. Personal communications: Tom McGrath, Property Owner (July, 1977); Todd Collart, Ventura County Agricultural Zoning and Preserves (October, 1977).

¶ RESORT/OPEN SPACE

The property is directly adjacent to prime coastal zone frontage land and coastal oriented land available for public use is at a premium throughout California.

If it were compatible with local and regional coastal zone policies, a development proposed for resort orientation or open space (park uses) could be incorporated into this area.

COASTAL ZONE MANAGEMENT

Questions regarding the management - appropriate use and allocation - of coastal lands and resources is an overriding consideration in the evaluation of the proposed development. The federal and coastal states' interests in the judicious and equitable use of coastal margins, as well as the maintenance of coastal ecosystems, environmental qualities and aesthetic values was established with the passage of the Coastal Zone Management Act of 1972.(3)

The State of California passed a unique form of coastal zone management with the enactment of the Proposition No. 20 referendum: Coastal Zone Conservation Act of 1972.(4) The several Regional/State Commissions formulated and published a conceptual plan in 1975: "California Coastal Plan." In addition, precedents were established for future development with a series of permit procedures during the intervening period, 1972-1975. The California enactment was extended with the Coastal Act of 1976.(5)

There is, therefore, a hierarchy of public interest which defines the constraints imposed on the prospective development. This residual interest extends from national to state to regional (Coastal Commission jurisdiction) to the County of Ventura to the City of Oxnard. The reconciliation of these interests with the rights, duties and privileges associated with and exercised by the ownership of private property are resolved through exposure to administrative procedures, political decisions and legal actions.

In the context of this proposed development, the main issues of concern in relation to coastal zone management are:

- Conversion of agricultural land
- Compatibility with coastal planning guidelines
- Public access

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(3) Public Law 92-583, § 3507

(4) Section 1, Division 18, § 27000, Public Resources Code.

(5) Section 1, Division 20, § 30000, Public Resources Code.

Environmental Impacts

The potential environmental impacts which would be associated with conversion of the subject property to residential use are critical issues and are reviewed within the context of land use planning and coastal zone management in the later Chapters of this EIR.

The focus of this EIR is on the conversion of the property to residential uses for the development of 401 water-oriented single-family homesites. The environmental and economic consequences which would be associated with this action are examined in detail. However, attention has also been given to the various alternative land uses and the consequences of their implementation.

This EIR presents a discussion of the impacts which would be associated with the development of Tract 2026-4 as an extension of the residential-marina immediately south of the site. Descriptions are provided of existing conditions; impacts of the proposed action are quantified to the degree practicable. Measures which would mitigate potentially adverse impacts are presented.

The significant environmental and economic impacts which would result from residential conversion of the land according to the specifications detailed in the proposed development plan are summarized below in synoptic form.

Land Use

BENEFICIAL IMPACTS

- The proposed project would introduce a low density residential development to the site, consistent with zoning designations for the site as stipulated by the 1969 General Plan and the Proposed General Plan.

- The development would be an extension of the existing residential/marina development to the south, providing needed upper income housing and marina capacity to existing inventories.

- The proposed project would provide a visually attractive development compatible with adjacent development in terms of physical appearance. The appearance of the development (i.e. waterways and residences would also add to the overall city image.

ADVERSE IMPACTS

- The development plan would remove ±82.7 acres of land from the City's agricultural rolls. This impact is assessed to be irreversible.
- The development would involve the entire ±82.7 acre parcel due to the planned linear configuration and very little open space (other than waterways) would be provided. The massing relationship evidenced by the development would be in partial conflict with General Plan recommendations.
- The development could increase the probability that the adjoining 130 acre agricultural parcel would be converted to residential use; however, this could provide a more effective buffer zone for remaining agricultural land.
- Proximate residents and passers-by would experience an adverse aesthetic impact during the construction phase.
- Cumulatively, the development will contribute to the attainment of zone holding capacity within Neighborhood 8.
- The phasing plan for the development would extend the unpleasant aesthetic impact of the construction period over a larger time increment.

Coastal Zone

BENEFICIAL IMPACTS

- Development of the land could be considered as logical extension of existing development and contribute to the establishment of an urban limit in this vicinity.

ADVERSE IMPACTS

- The proposed development plan does not exclusively constitute a coastal-dependent land use and would convert prime agricultural land to residential use. Both of these factors go contrary to recommendations made by the California Coastal Act.
- There would be no retail rest or boat launching facilities available to the general public.
- Public access on the property would be unrestricted, but there would be only a limited view of waterways and Marina activity available to the public from the many small waterfront areas which are planned.

Biology

ADVERSE IMPACTS

- Excavation of land for hammerheads would involve the total destruction of east bank vegetation.
- Removal of earth materials during excavation and construction would create a significant amount of dust which could have a damaging effect upon plant life in the vicinity. The increased dust would result in a lower rate of photosynthesis and thus create a reduction in plant biomass production. These two above factors could reduce agricultural crop yields in the vicinity.
- Deposition of earth materials on agricultural lands could remove that area from further agricultural production.
- Removal of east bank vegetation would result in a concomitant reduction of faunal populations and create a potential imbalance in the ecosystem causing forced migration of wildlife.
- Bridging of the Canal at Wooley Road would result in additional disturbance of biological resources of the sand dunes area.
- Residential development with introduced vegetation, street lights, etc. could attract additional insect population which could pose problems to agriculture.
- Landscaping could also attract many new species to the site, many of which would be considered pests.

Water

BENEFICIAL IMPACTS

- There would be a decreased runoff of nitrogen and phosphorous from agricultural fertilizers currently used on the site due to conversion from agricultural to residential land use.

ADVERSE IMPACTS

- Algae growth on concrete surfaces would create a nuisance until the ecosystem develops to support herbivores which would eat the algae and create a ecological balance.
- Water quality could deteriorate as a result of a red tide or the closing of the Mandalay Bay Steam Generating Plant, however, neither of these factors would be directly attributable to the development.

- There would be increased turbidity and debris in the water during some construction phases; marine biology offsite may be disturbed.

- There would be a potential for odors near the waterways from decaying green algae during the first few months after construction.

- There would be a long-term increase in inputs of copper, lead, organics, and debris into the marina/harbor complex, but this would create no discernable decrease in water quality.

- There would be a long-term increase in harbor debris, especially floating litter, due to the expanded development.

GEOLOGY/HYDROLOGY

ADVERSE IMPACTS

- A severe topographic change would result from excavation and aesthetic impact of the excavation would be considerable.

- Excavation would also affect ground water hydrology, partially removing the "semi-perched acquifer."

- Erosion of earth material could result if effective measures (such as bulkheads or rip rap) are not introduced to all waterways and canals.

- There would be additional erosion of bulkheads exterior to the site.

- Potential impacts from placement of excavated earth materials would depend on the (yet unspecified) method of disposal; possibilities include:

  - (from dewatering and recycling as fill) high energy consumption, air pollution, and ambient dust levels.

  - (from removal to a remote site) high energy consumption, air pollution, and dust levels; other unknown adverse effects.

  - (from ocean dumping) high turbidity at the dump site with accelerated degradation of the local marine ecosystem.

  - (from excavation of the entire site followed by recompaction to reform dry land areas) higher local noise levels, higher energy consumption (but positive mitigation of some or all geological hazards.

- There would be a potential for differential subsidence from dewatering during excavation.
- The potential earthquake induced hazards would include lurching, subsidence, liquefaction, slumping of banks, and water damage from seiche or tsunami; if not fully mitigated by use of excavated earth materials to reinforce and elevate the site.

Traffic

ADVERSE IMPACTS

- Provision for hammerhead type cul de sacs could create congestion or access problems.
- Placement of up to 262 dwelling units on roadways with one outlet could create undesirable impacts.
- Limited roadway improvements planned could create congestion or access problems on site.
- Additional boat traffic would create congestion problems if mitigating measures (such as limiting tacking) are not implemented.

Air

ADVERSE IMPACTS

- There would be additional air pollution from vehicular and water traffic which would downgrade regional air quality.

Noise

ADVERSE IMPACTS

- Locally high noise levels during construction would probably annoy and irritate local residents at the northwest and southwest corners of the site.
- There would be adverse noise impact from dry stack and other ski boats.

SOCIOECONOMICS

BENEFICIAL IMPACTS

- The development would produce City revenues higher than other forms of residential alternatives discussed in this report.
- The development would attract upper income professional people to the City.

ADVERSE IMPACTS

- The development would add incremental demands to several already over-taxed municipal services causing adverse cumulative impacts including
  - Sewage - present treatment plant is over burdened and development moratoriums are in effect
  - Waste disposal - land fill is near capacity and a suitable new site has not been located
  - Fire - present facilities could be over-taxed with additional development
  - Police - force is presently under staffed and any additional development will further heighten this problem
  - Schools - Oxnard schools are presently in need of expansion but funds are not available.

PROJECT DESCRIPTION

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III

PROJECT DESCRIPTION

SITE LOCATION

The proposed project site is identified as Tract 2026-4. It comprises ± 82.7 acres of land and is located within the jurisdictional boundaries of the City of Oxnard, County of Ventura, California. Oxnard is the most heavily urbanized City in the vicinity of the project location; other nearby communities include Port Hueneme, Camarillo, El Rio and Montalvo, as illustrated on the Regional Map, Figure 2. The City of Ventura is situated northwest of the project site.

The proposed project site is located southerly and adjacent to the intersection of Wooley Road and the Southern California Edison Canal (also referred to as the Mandalay Canal). It is approximately 2,200 feet westerly of the intersection of Victoria Avenue and Wooley Road. The southern boundary of the site is formed by Hemlock Street. To the south of Hemlock, the completed units of the Mandalay Bay development exist. The major north/south corridor to the west of the site is Harbor Boulevard. The beach frontage to the west of Harbor Boulevard is known as Oxnard Shores. The property is irregular in configuration, as shown on the Vicinity Map, Figure 3.

GENERAL DESCRIPTION

The property is currently in agricultural production. The proposed development plan would convert the land to residential uses. The development is designated as Mandalay Bay, Phase IV, and is proposed as an extension of the existing water-oriented residential community which is located to the south of Hemlock Street. The existing Mandalay Bay development was completed as Tracts 2026-1, 2026-2 and 2026-3, City of Oxnard.

The proposed project would extend the Mandalay Bay Marina by providing additional waterways encompassing approximately 32.6 acres of water surface area. This proposed waterway system would connect directly to the waterway system completed for Tracts 2026-1, 2026-2 and 2026-3.

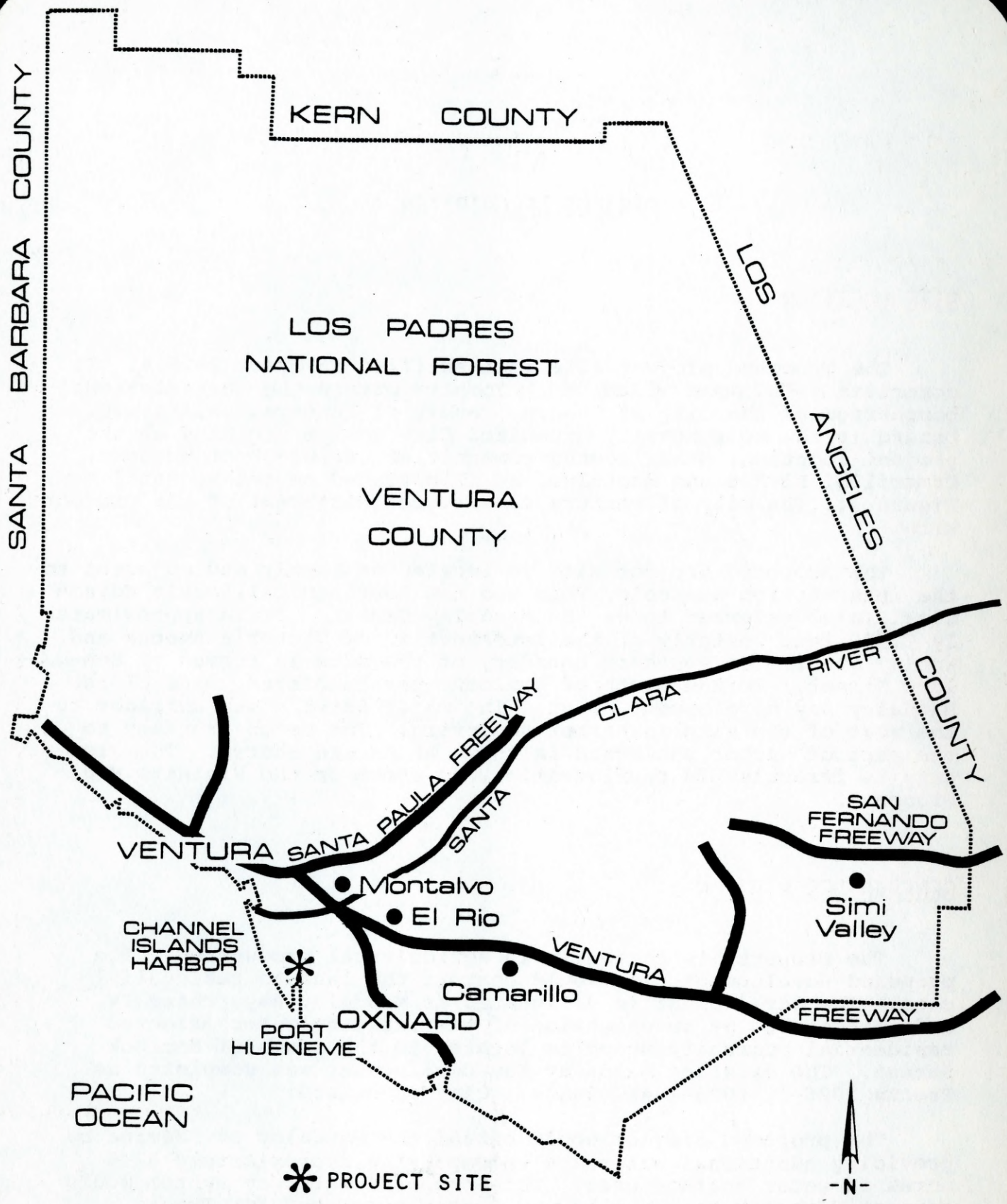

figure 2 Regional Map

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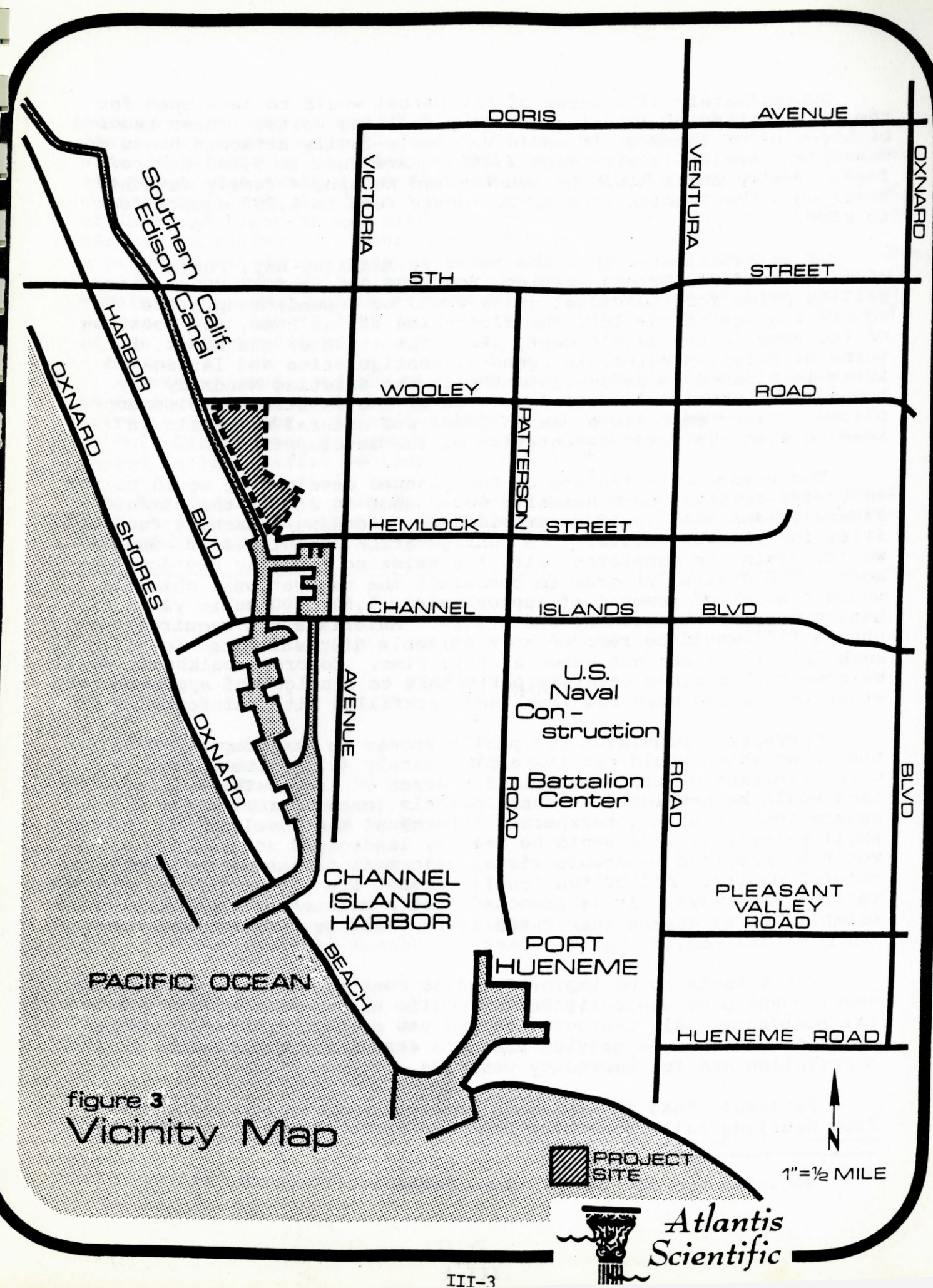

figure 3
Vicinity Map

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Approximately 32.4 acres of the parcel would be developed for the construction of 401 single-family dwelling units. Three hundred eighty-nine of these units would be single-family attached homes on homesites ranging in size from 2,860 square feet to 5,500 square feet. Twelve units would be constructed as single-family detached homes on sites ranging from 4,730 square feet to 6,250 square feet in size.

It is anticipated that the homes in Mandalay Bay, Phase IV would be sold for prices ranging from $100,000 to $250,000. The selling price for individual units would be dependent upon the square footage of the lot, the floor-plan of the home, the location of the home in the development, etc. The style of the homes, in terms of exterior materials, general configuration and landscaped areas is planned to be consistent with the existing Mandalay Bay homes. The theme and motif expressed by the existing development places a heavy emphasis on earth tones and natural materials in keeping with the water-orientation of the development.

The predominant feature of the planned development would be the waterways system. Each homesite would abut to one of the planned waterways and each would be provided with docking/launching facilities for pleasure boats. The configuration of this water amenity would, again, be consistent with the existing Mandalay Bay development. The grading program to construct the navigational channels would consist of removal of approximately 1,500,000 cubic yards of native material by loaders and trucks. Materials not required for onsite fill would be removed to a suitable disposal site. Location of such fill sites are not known at this time. Concrete bulkheads would be constructed along waterway perimeters to a height of approximately eight feet above mean sea level and backfilled with reinforced earth.

There is a provision for public access in the proposed development plan which would provide approximately 4,240 linear feet of water frontage on approximately 3.6 acres of land. The 3.6 acres of land would be developed as small parcels (each approximately 2,500 square feet in area) interspersed throughout the development. These small parcels of land would be heavily landscaped and parking areas would be provided to enable visual enjoyment of the waterways by the general public. All of the "public areas" are planned to abut to the various waterways. It is proposed that a maintenance district be established to assure that these areas would be properly and consistently maintained.(6)

The streets to be improved and/or constructed as a part of the development plan would all be for public use as well as for use by the residents. All improvements and new construction of roadways would be designed to provide adequate access for anticipated traffic circulation and for emergency vehicles.

Peninsula Road (north/south internal roadway providing access from dwelling units to Wooley Road, refer to Figure 22) would have

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(6) Detailed Project Description, Tentative Tract No. 2026-4.

an improved right-of-way of 84 feet with a landscaped median of 14 feet. Two travel ways 27 feet wide, and two parking areas eight feet wide would also be provided, as well as two five feet wide sidewalks for pedestrian traffic. A frontage road would be constructed adjacent to Wooley Road. This roadway is proposed to consist of 48 feet of improved right-of-way with 32 feet of pavement, and an eight foot parkway inclusive of a four foot sidewalk on the southerly side. A proposed landscaped area of eight feet would provide a visual buffering effect between Wooley Road and the proposed frontage road. The remaining internal access streets would be standard 52 feet improved rights-of-way and 48 feet improved rights-of-way forming cul-de-sacs of the hammerhead type.

Primary access to the proposed development's frontage road and to Peninsula Road would be provided off Wooley Road which would require improvements. Specific elements of the development's impact on this City street and other proximate existing roadways are discussed in the Traffic section of the EIR, Chapter V.

The development plan for Mandalay Bay, Phase IV is illustrated on Figure 4 in relation to the adjacent area. Project data is summarized in Table 1.

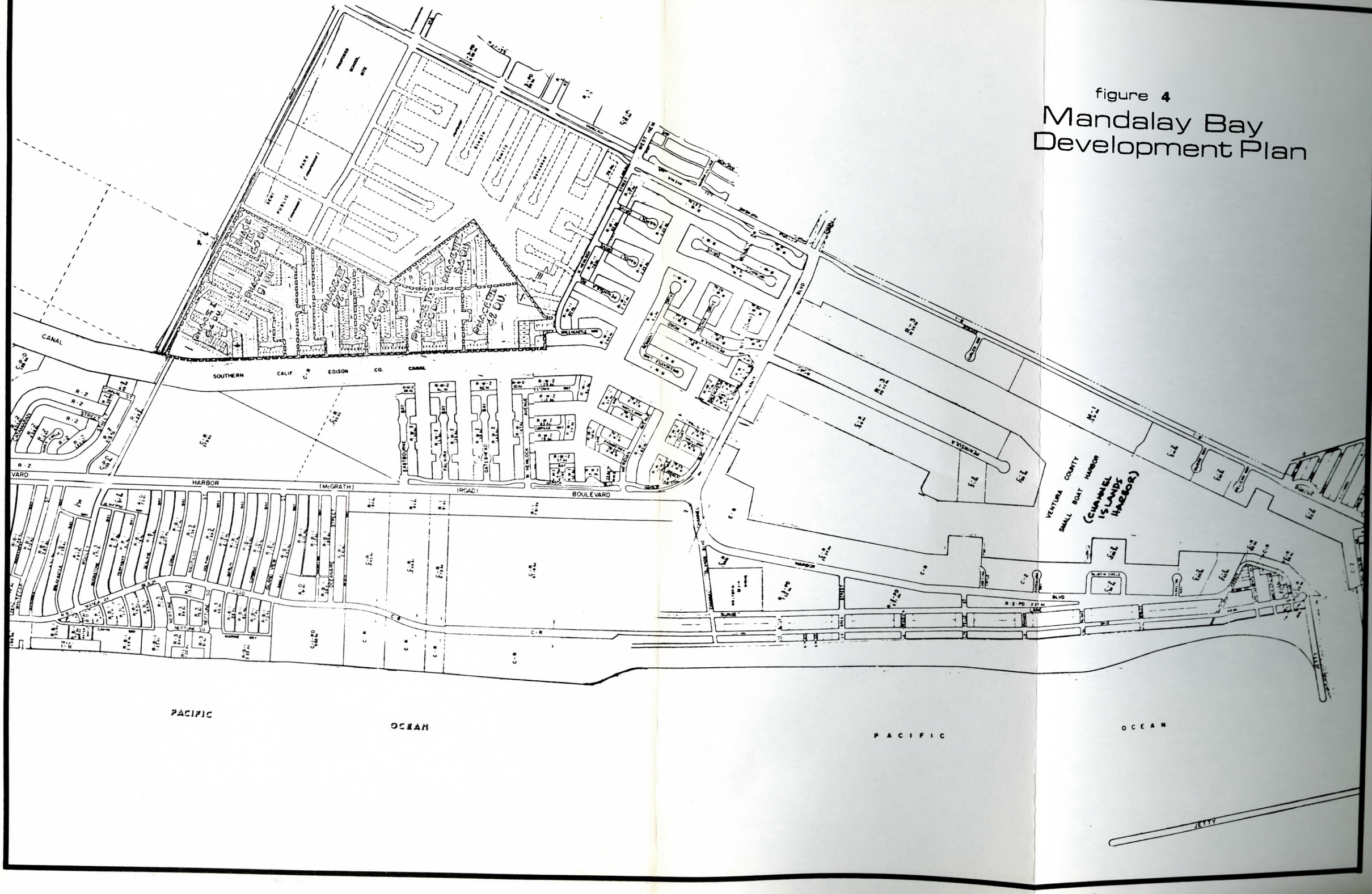
TABLE 1

PROJECT DATA

Total Acreage			82.7
	Homesites	32.4	
	Waterways	32.6	
	Interior Access	14.1	
	Landscape and Parking	3.6	
Total Homesites			401
	Detached	12	
	Sq. Ft. Lot	4730-6250 sq. ft.	
	Sq. Ft. Dwelling	1800-2600 sq. ft.	
	Sq. Ft. Open Areas	2980-3650 sq. ft.	
	Attached	389	
	Sq. Ft. Lot	2860-5500 sq. ft.	
	Sq. Ft. Dwelling	1200-2300 sq. ft.	
	Sq. Ft. Open Areas	1660-3200 sq. ft.	

figure 4

Mandalay Bay Development Plan



The development is proposed to be completed in eight phases. Preparatory activities including portions of the dredging and leveling of the site would occur first. The phasing schedule would divide the actual construction of homes into eight nearly equal increments as follows:

PHASE	DWELLING UNITS TO BE CONSTRUCTED
Phase I	64
Phase II	51
Phase III	60
Phase IV	52
Phase V	43
Phase VI	35
Phase VII	42
Phase VIII	54

Figure 5 displays the phased development plan. The phasing, as proposed, would direct initial construction to the northern extremity of the site, the location most distant from existing development. Infilling from that point would proceed easterly and southerly in a systematic pattern.

PROJECT NEED

Mandalay Bay, Phase IV, would add 401 single-family residences to the inventory of available dwelling units in the City of Oxnard. The development would provide housing alternatives for individuals desiring to live in a water-oriented community. Due to the anticipated selling prices of the proposed homes, residents would be restricted to persons in the upper income categories.

HOUSING NEED

Oxnard is a growing community which is projected to experience a ± 45,000 increase in population between now and 1990. The strength of the community in the future will be based upon diversity. Diversity of the City's economic base [together with . . ."such amenities as environmental quality and the visual and social character of the City" . . . .(7)] are considered to be the key to future development. [Ref: 67.] Contingent to the distinct elements of the economic base, the City will require a housing inventory representative of the differing socioeconomic groups who will be moving into the community in support of new business, industry and public service.

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(7) Planning Department response to Preliminary Draft. Donn Hineser (October 11, 1977).

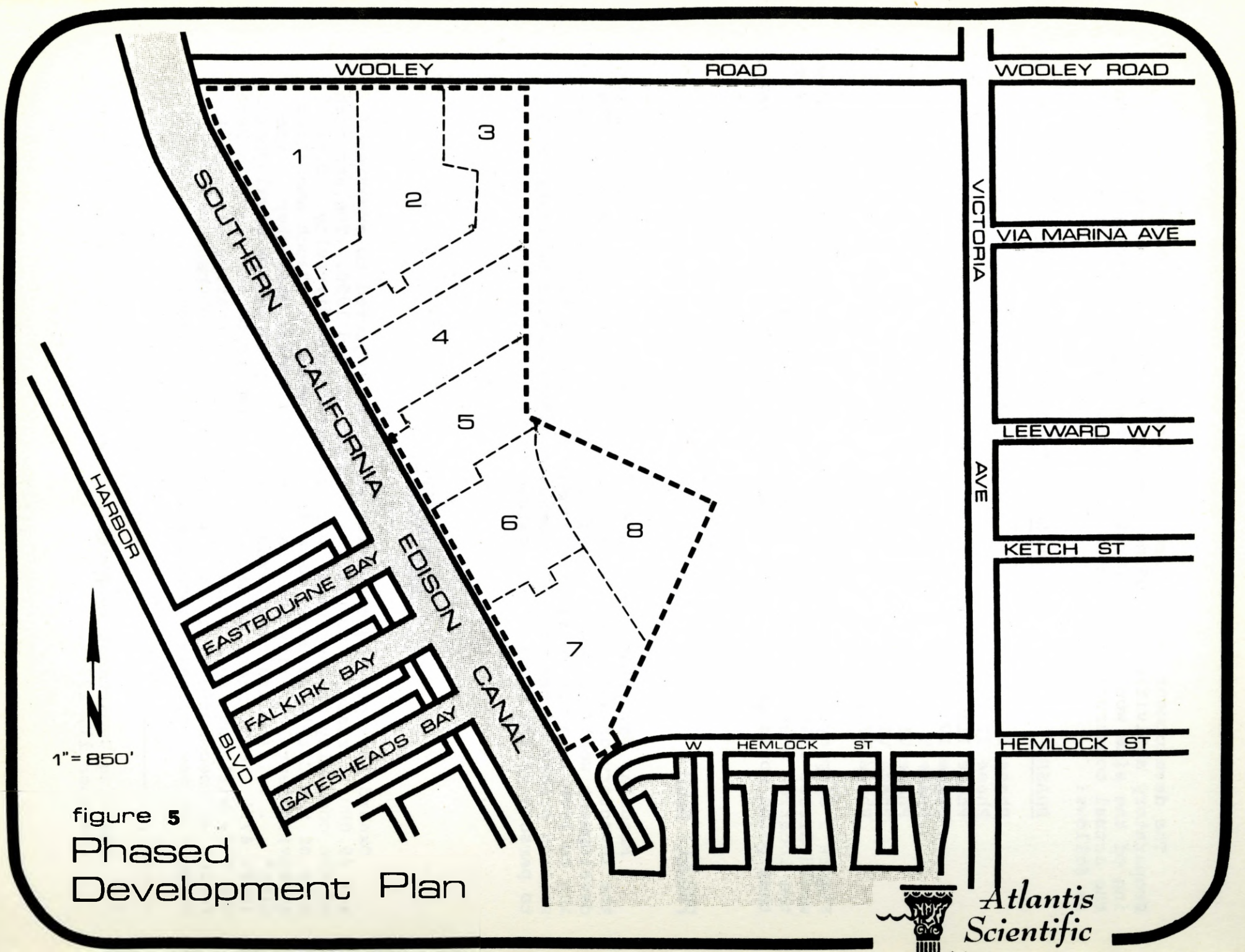

figure **5**

Phased Development Plan

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The need for additional housing units in the City is not disputed. Varying estimates have been made for the number of new units which will be required by 1990. According to one City projection, up to 6,000 new housing units would be required by 1980, and up to ± 14,000 additional new units by 1990. [Ref: 67.] The study anticipates that single-family units will compose ± 50 percent of the total housing stock if the demands of the 1990 population are to be met. Table 2 presents statistics related to expected housing growth.

On the basis of these estimates, Mandalay Bay Phase IV, would supply slightly less than ten percent of the 1990 single-family housing need. In terms of providing housing alternatives for new residents, this development would provide an important increment of required new housing. Specifically, the type of housing units proposed for the Mandalay Bay development would be consistent with two housing goals set forth by the City's General Plan: [Ref: 40.]

- The encouragement of low-density neighborhoods with high shares of single-family housing.
- The attraction of a higher proportion of "white collar" (i.e., higher income) individuals to the City.

Need for Recreational Boating

Boating is an increasingly popular recreational alternative for Southern California. The natural setting of mild climate and extensive coastal frontage encourage outdoor, water-oriented recreation throughout the Southland. More and more families are becoming boat owners and desire to locate their homes in close proximity to a navigable waterway. The increased availability of leisure time has strengthened this desire for many individuals.

As an indication of the desire for boating facilities, a 1973 study projected that by 1980 there would be a demand for 22,861 additional berths and moorings in the South Coast Region of California (San Diego, Orange, Los Angeles and Ventura Counties).(8)

Over the last several years, many developments of the nature of Mandalay Bay have been constructed and they have been continued successes in terms of market demand. There is every indication that the additional availability of waterfront homesites in the Oxnard area would be equally well accepted by the buying public.(9)

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(8) Arthur Young and Company, "Boating Resources Development, Planning Study."

(9) Personal Communication: Joseph Keating, California Department of Navigation and Ocean Development (August, 1977).

TABLE 2

COMPOSITION OF HOUSING GROWTH

	Five Year Increment	New Units			Total Housing Units					
		Single Family	Multiple Family	Mobile Homes	Single Family		Multiple Family		Mobile Homes	
					No.	%	No.	%	No.	%
1975	7,500	1,425	4,725	1,350	18,400	57.0	11,200	34.7	2,700	8.4
1980	6,140	2,030	3,190	920	20,430	53.1	14,390	37.4	3,620	9.4
1985	7,020	2,320	3,650	1,050	22,750	50.0	18,040	39.7	4,670	10.3
1990	7,520	2,480	3,910	1,130	25,230	47.6	21,950	41.4	5,800	7.2

Source: City of Oxnard, Basis for Planning - Economic Potential

ENVIRONMENTAL SETTING

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IV

ENVIRONMENTAL SETTING

INTRODUCTION

To properly assess all potential impacts of the proposed Mandalay Bay project, a thorough and comprehensive analysis of the project site's present environmental status was conducted. The following Chapter presents discussions of the various environmental disciplines important to this analysis. They include:

- Land Use
- Coastal Zone
- Biology
- Geology/Hydrology
- Water Quality
- Traffic
- Climatology
- Air Quality
- Noise
- Socioeconomics
- Public Services
- Archaeology/Paleontology

Oxnard Planning Commission
305 West Third Street
Oxnard, California 93030

Dear Sir or Madam:

Notice is hereby given that Environmental Impact Report E-76-15 is released for public review, and a public hearing will be held before the Oxnard Planning Commission in the Council Chambers of City Hall, 305 West Third Street, Oxnard, California, at 7:30 p.m. on February 9, 1978, to consider Environmental Impact Report E-76-15 for:

> Tentative Subdivision Map of Tract 2026-4, for that approximate 80.2 acres located immediately east of the Edison Canal between Wooley Road and Hemlock Street, approximately 1700 feet west of Victoria Avenue. Filed by Diamond West Development, c/o Bill Collins, CC & R Engineering, 32123 Lindero Canyon Road, Westlake, CA 91361.

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, 305 West Third Street, Oxnard, California, and the Oxnard City Library, 214 South "C" Street, Oxnard, California.

Very truly yours,

Gene L. Hosford
Secretary
Planning Commission

GLH:RF:jrh

Existing Land Use

The proposed project site, designated as City of Oxnard Tract 2026-4, is currently being utilized for agricultural production. This land area has been in cultivation for many years and the use is compatible with the present zoning of the site - C-R (Community Reserve). The project site is an 82.7 acre parcel which extends from West Hemlock Avenue on the south to Wooley Road on the north and is located directly east of the Southern California Edison Canal. The property is immediately north of the existing Mandalay Bay marina development. The Mandalay Bay project is a recreational, boat-oriented, waterfront housing development situated as an extension of the Channel IslandsHarbor in Oxnard. The general area of the project site is shown in the aerial photograph, Figure 6, which follows. The project site is visible in the upper right hand corner.

The subject parcel is a portion of Neighborhood 8 of the Southwest Community of the City. Neighborhood 8 is comprised of a total of 465 acres of which approximately 83 percent has been identified for residential land use by the 1969 General Plan. The 1969 Plan has designated the site as "upper low-density residential," with an allowable 7.0 dwelling units per acre. This category provides for some clustering and townhouse units within the neighborhood. The proposed General Plan (not available for review during the preparation of this EIR) designates the site for medium low density which would decrease the allowable density from 7.0 to 6.0 dwelling units per acre(du/acre).

Surrounding Land Use

The proposed site of Mandalay Bay Phase IV falls within the area referred to as the Oxnard Harbor. The Oxnard Harbor area encompasses the Channel Islands Harbor, and is located directly west of the City, along the coast. The land uses surrounding the Mandalay Bay project site are generally oriented toward beach and boating activities. West of the parcel is the Oxnard Beach area which is dominated primarily by beach-oriented, single-family and resort housing. There is considerable open space, as well as a mobile home park.

North of Mandalay Bay the existing land use is primarily agricultural or open land, toward the Ventury County Airport. To the east, across Victoria Avenue, land uses are primarily higher density residential including single-family, rental apartments, and four-plex ownership units. To the south of Mandalay Bay lies the Channel Islands Harbor, with additional beach-oriented single-family units, new boat-oriented apartment units, a yacht harbor, and assorted commercial uses.

figure **6** Aerial Photograph

The land uses surrounding the Mandalay Bay project site reflect the current zoning designations. To the west, the zoning is primarily residential (R-1, R-3, R-B-1 referring to beach housing, and R-3-PD referring to multiple-family planned development). In addition, there is a large open space designated C-R (Community Reserve) located immediately west of Mandalay Bay across Harbor Boulevard. To the north, the zoning designations are almost entirely C-R. The zoning to the east of Mandalay Bay is primarily residential (R-1, R-2-PD, and R-3-PD), mixed with an appropriate amount of commercial (C-2 and C-R), with a limited amount of multiple-family residential (R-2-PD and R-3). Land use/zoning classifications prescribed for the area in the 1969 General Plan are illustrated on Figure 7.(10)

Less than one mile northeast of the proposed site, the Ventura County Airport lies on relatively flat terrain about 43 feet above sea level. The Ventura County Airport is located between Teal Club Road on the north, Fifth Street to the south, Ventura Boulevard to the east, and West Road to the west, with access from Fifth Street. The site encompasses an area of 205 acres.

The major thrust of future development in the Channel Islands Harbor area appears to be northward due to the lack of available land elsewhere. However, the Ventura County Airport, representing an aggregate of noise and air hazard zones, limits land uses involving large assemblages of people and presents a logical barrier to further residential development. A government installation to the southeast, Port Hueneme to the south and the coastal margins to the west encompass the Channel Islands Harbor area and limit the thrust of expansion to a northerly direction. The land available for expansion is currently in agricultural production.

Land Use Alternatives

Agriculture

Since World War II, shifts in land use patterns have caused fundamental changes in Southern California's agriculture. Residential, commercial and industrial building activity in and around urban centers has diverted large parcels of prime agricultural land to other uses. Striking examples of land use shifts due to urbanization can be found throughout Southern California. The vast majority of Los Angeles County's dairies have moved to western Riverside and San Bernardino Counties or to the San Joaquin Valley. In Orange

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(10) As previously described, the proposed General Plan recommends a density reduction for the area of the project site from 7 du/acre to 6 du/acre.

LEGEND

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

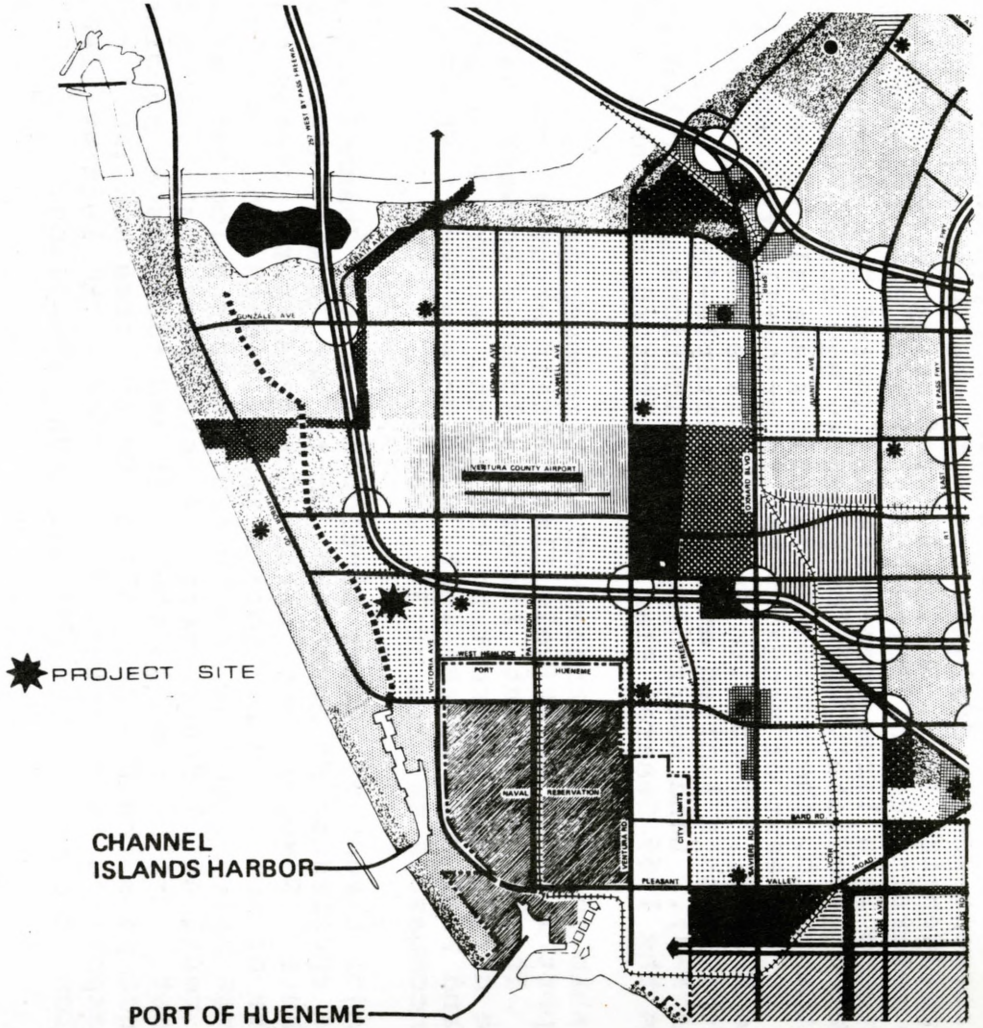

figure 7 General Plan Map

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County, homes and shopping centers now occupy most of the land on which orchards once stood, and San Diego and Ventura Counties have experienced significant declines in prime field crop acreages.(11)

Urbanization generally results in increases in both land values and the costs associated with land ownership. Higher costs, in turn, induce owners of agricultural land to increase their returns on the land - either by shifting to higher valued agricultural commodities (nursery plants and cut flowers, citrus, vegetable crops, and avocados) or by directing the land to nonagricultural uses, such as residential or commercial development. The largest declines in agricultural lands have been registered in Los Angeles, Orange, Ventura and San Diego Counties - areas in which growth in population and building activity have exerted the greatest presssures on available land.

Agricultural land ownership in California is provided a potential form of tax relief through the provisions of the Land Conservation Act (LCA). This law enables land owners to apply for a special tax rate based upon their commitment to retain their lands in agricultural production. The rationale being that this tax incentive would slow the trend for conversion to higher uses. The proposed site is not currently being taxed under the LCA, a factor which may or may not have contributed to the owners' decision to sell. The tax structure is discussed further in Chapter V.

The proposed development would pre-empt prime agricultural, Class I, lands. However, these lands are surrounded by urban development and are subject to increasing pressures for land use conversion. There is some question as to whether viable and integrated agricultural production can be sustained under existing pressures.

The agricultural processes of land preparation, fertilization and harvesting are imposing upon the environs with dust and odors while, at the same time, proximity to urban development exposes crops and equipment to theft and vandalism. Taxes, appreciated land carrying costs and the economics of contiguous development are inhibiting continued agriculture use. The inevitability of future lower density, residential and "marina-waterway" development, as indicated in the Oxnard General Plan, further accelerates the evolutionary processes of land use conversion.

The proposed 257 West By-Pass Freeway would lead to disruption of agricultural production during construction and would reduce the land available for cultivation. The "viability" of the West By-Pass Freeway is beyond the scope of the present EIR. It is presumed that the routing selected is one appropriate to traffic flow. Certainly, its proximity to the proposed development increases public access and minimizes surface street congestion. It also suggests a

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(11) Although statistics indicate that some additional acreage is being placed in agricultural production, the new acreage is generally not considered to be prime land and is available for cultivation only because of increased technology such as drip irrigation systems. [Ref: 105]

predeliction toward future development of surrounding agricultural land. However, our firm is in no position to comment as to whether or not the proposed freeway is appropriate or its prospective routing the most advantageous. The proposed installation of the Elk Hills pipeline would have a similar impact on agricultural use of the prospective site. (See Alternatives, Chapter V for further discussion.)

Alternatives to the Mandalay Bay project consist of allowing the area to succumb to one or more influences of surrounding land use - residential from the south, east and west or commercial/industrial from the north. There is always the alternative of "no project" which commits the land to diminishing agricultural potential or to the possible acquisition for public facilities.

COMMERCIAL

The project site could accommodate a regional commercial center. However, the more important question is whether the Oxnard area is capable of economically supporting another regional shopping facility. Oxnard is rapidly shifting agricultural lands to urbanized uses, representing population increases in addition to commercial and industrial support. This type of urban growth could warrant an additional shopping center of regional magnitude, but it is questionable as to whether the Mandalay Bay site is the optimal location. The site's proximity to the coastal shores may have value in attracting potential shoppers; however, the site also represents a location at the periphery of the commercial center's "service area."

From a marketing theory standpoint, locating in the center of a potential service area refers to optimal customer drawing power in that the shopping facility is capable of attracting shoppers from every direction. However, locating at the periphery of a potential service area not only suggests limiting market drawing power by almost one-half, but also necessitates an increase in drawing power in the remaining service area. The justification of a regional shopping center depends much upon its confidence in attracting customers, and it is questionable as to whether the Mandalay Bay site represents the optimal location in securing customer attraction.

This is not to say that commercial activity on a smaller scale - neighborhood shopping center - could not locate at this site. This type of shopping center is highly dependent upon residential development in relative close proximity. It would be difficult to anticipate this scale of commercial activity in the absence of any residential growth on the Mandalay Bay site.

INDUSTRIAL

Industrial development seeking to locate at the proposed site should be coastal-dependent, and preferably contiguous to existing industrial sites. Existing land uses surrounding the Mandalay Bay site consist of marine-oriented recreational facilities, residential development and agricultural activities. Although no industrial development exists adjacent to the proposed site, less than one-quarter mile southeast is the United States Naval Construction Battalion Center in the incorporated City of Port Hueneme.

However, any anticipation of industrial activity at the proposed site may find difficulty arguing for its location on the basis of its proximity to the naval shipyard installation. Both areas are regulated under different jurisdictions. The Mandalay Bay site is surrounded by non-industrial use, and moreover, environmental considerations tend to be the most important issues rather than proximity to existing industrial activity. Extension of the industrial/commercial uses evolving from the Ventura County Airport could eventually bring developing lands into conflict with residential properties.

PUBLIC USE/OPEN SPACE

The acquisition of the site for public facilities or the creation of a marine-oriented park would add to the amenities of the City. However, such public expenditures involve a substantial investment and incur continued costs for maintenance.

The 1969 General Plan utilized a standard of ten acres of park/open space land per each population increment of 1,000 to develop proposed criteria for future acquisition and development of park lands. The existing inventory of park lands is inadequate for the City population and, depending upon which population projection proves to be most accurate, designations for future park lands may also be deficit. The development plan, as proposed, includes a provision for approximately 3.6 acres of land to be developed for public access and visual enjoyment of the marina development.

RESIDENTIAL

If the marina-residential development is approved for this site, the adjacent agricultural lands immediately to the east of the property would present an opportunity for subsequent expansion. By all indications, including the site plan provided for this phased development, a similar project is on the horizon. Alternative forms of

residential development for this location (i.e., lower density, higher density, etc.) are discussed in Chapter 5 under "Alternatives to the Proposed Project."

Coastal Zone Management

Introduction

The prospective development site is located within the sphere of influence of existing coastal zone legislation. As such, there is a hierarchy of public interests which define the constraints imposed on the prospective development. The reconciliation of the interests of federal, state, regional and local concerns with the rights and privileges associated with the ownership of private property is accomplished through administrative procedures, political decisions and legal actions. It is not the purpose of this discussion to prejudice these interests. The intent is to add perspective to the deliberations. The medium available is the preparation of this EIR.

An EIR is prepared under the California Environmental Quality Act of 1970, as amended.(12) It is prepared for the jurisdiction responsible for evaluating the consequences arising from the discretionary act of rezoning the property from Community Reserve to Residential. It is, therefore, more limited in scope than those factors considered under the state and federal coastal enactments and does not allow for the broader regional, state and national perspective. It was, however, requested that a section be included in this EIR which took an expanded view of the multiple interests involved in the decision-making processes. The primary entity, policies and procedures with which this document is concerned are those established by the California Coastal Act of 1976.(13)

The California Coastal Act

The Coastal Act is a reaffirmation that the ". . .coastal zone is a distinct and valuable natural resource . . [of] concern to present and future residents . . ."(14) The basic goals of the enactment are to ". . .protect and maintain. . .the overall quality of the coastal zone. . .assure balanced utilization and conservation

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(12) Division 13, § 21000, Public Resources Code.
(13) See note (5).
(14) Ibid.

. . .maximize public access. . .and public recreational opportunities. . .consistent with. . .resource conservation and. . .the rights of private property. . ."[15] Two other factors were given added emphasis in the re-enactment, to "assure priority for coastal-dependent development over other forms of development. . .[and to] encourage. . .local initiatives. . .cooperation [and] coordinated planning and development for mutually beneficial uses. . ."[16]

The EIR format treats specifically with those environmental factors (air and water quality, biology, noise, etc.) which would define the impact upon ". . .the overall quality of the coastal zone."[17] Of primary concern would be those factors listed under Article 4 - Marine Environment - which include: Biological productivity, waste-water discharges, controlling runoff, preventing depletion of ground water supplies, erosion and geologic instability. In addition, the proposed development should be consistent with Article 6, "The scenic and visual qualities of coastal areas. . . [and] visually compatible with the character of the surrounding areas . . ."[18] All of these factors are discussed within the body of the report under their respective headings. The remaining questions are concerned with appropriate land use

Coastal Land Use

Various sections of the EIR discuss present and proposed land uses, alternatives and the option of no development. The specific property is currently under agricultural cultivation. The Coastal Act emphatically states: "The maximum amount of prime agricultural land shall be maintained in agricultural production. . ."[19] However, the Act also infers that pockets of agricultural land created by surrounding urban development may be converted to other appropriate uses. ". . .Where the viability of existing agricultural use is already severely limited by conflicts with urban uses and where the conversion of the land would complete a logical and viable neighborhood. . ."[20]

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(15) Ibid.
(16) Ibid.
(17) "Guidelines for Implementation of CEQA" - State of California.
(18) Ibid.
(19) Section 1, Division 20, Public Resources Code, Article 5, §30241.
(20) Ibid.

In addition, the California Coastal Act presents several recommendations for new development which stress the importance of locating new coastal development in areas which are contiguous with or in close proximity to existing development.(21) Qualification is added to state that new development should be located only in areas where:

- public services are adequate
- the scenic/visual qualities of the area would not be severely impacted
- public access to the coast would be maintained and enhanced
- the project would not contribute significantly to
  - erosion
  - geologic hazards
  - air pollutants
  - energy consumption

A priority is established in the Act for the use of coastal lands for the siting of "coastal-dependent"developments.(22) The proposed development is residential with a water-orientation or amenity. Housing is not coastal dependent; however, the amenity associated with it is a recreational activity not readily available at inland sites. The Coastal Act states that: "Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses . . .unless (Section 30221). . .demand for [such] recreational activities. . .is already provided for in the area."(23) The proposed development is an extension of the present Mandalay Bay Marina which provides access to offshore recreational boating -- a recreational experience which is not readily available at inland water areas. According to the California Department of Navigation and Ocean Development (DNOD) there are insufficient coastal facilities for this form of recreation and there is a present demand for marina expansion. Again, the Coastal Act states: "Increased recreational boating use of coastal waters shall be encouraged. . .by . . .providing additional berthing space in existing harbors. . . and by providing for new boating facilities. . ."(24) Provision for additional boating facilities is also consistent with another stated goal to protect and upgrade facilities serving the recreational boating industry when feasible.(25)

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(21) Ibid, Section 30250.
(22) Ibid, Section 30255.
(23) Ibid, Article 3, Section 30220.
(24) Ibid, Section 30224.
(25) Ibid.

Public Access

Another of the goals of the California Coastal Act is to: "... maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone. . ."[26] Public access is discussed under Chapter 3, Coastal Resources Planning and Management Policies, Article 2. These policies are concerned with (1) not limiting public access to the sea and shoreline, and (2) provision for public facilities within prospective coastal developments.

Development shall not interfere with the public's right of access to the sea. . ."[27] The Act also recommends that. . ."Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects. . . ."[28] The proposed project's compatibility with this policy and the other recommendations identified here is discussed in the following Chapter.

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(26) Ibid. Chapter 1, Section 3001.2
(27) Ibid, Section 30211.

TERRESTRIAL BIOLOGY

The discussion of the terrestrial biology of the Mandalay Bay project is based on actual field assessment and analysis, conducted during July, 1977, coupled with a careful review of pertinent literature and discussions with involved governmental agencies and nearby residents.

VEGETATION

The ±82.7 acres of the Mandalay Bay project site consists primarily of agricultural land (see Figure 8) with its concomitant crops. Representative crops identified during the field survey for this EIR were green beans (Phaseolus Vulgaris), tomatoes (Lycopersicon esculentium), and stock.

The green beans, during the time of the field survey, comprised most of the acreage. There are normally three growing seasons on the Mandalay Bay site. In addition to the crops mentioned above, there is one growing season of broccoli (Brassica oleracea) and cauliflower (B. oleracea) and another season of spinach (Spinacia oleracea). Every few years a crop of tomatoes and celery (Apium graveolens) is planted by the grower for regeneration of the soil.

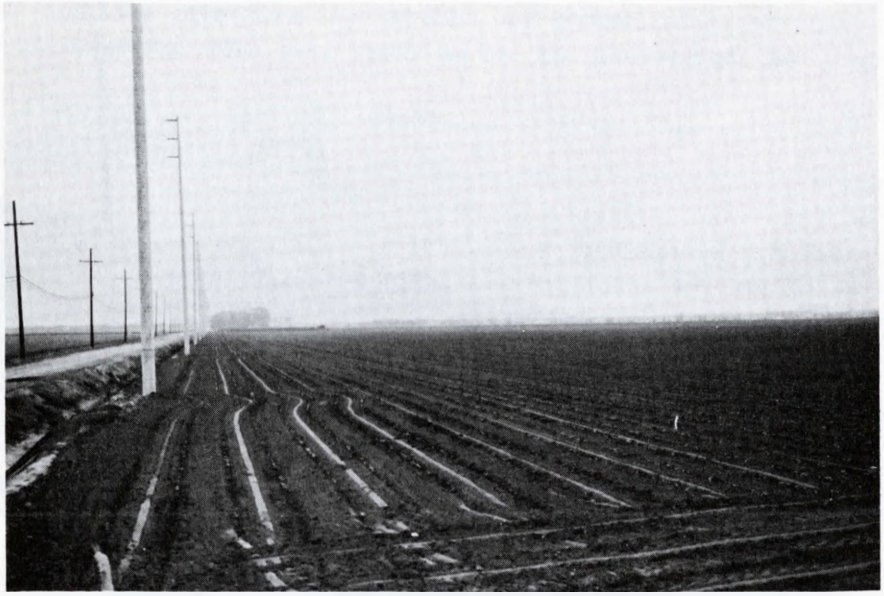
In the agricultural portions of the project site and along the Wooley Road and Victoria Avenue boundaries, most vegetation (other than agricultural crops) has been either removed mechanically or destroyed by repeated applications of herbicides.

The only natural vegetation found on the project, apart from some minor weedy vegetation along Wooley Road and Victoria Avenue was on the Southern California Edison Canal bank (see Figure 9). This bank vegetation consists of some California native plants mixed with introduced varieties. Many of the plant varieties present, both native and introduced, can be considered of the weedy or ruderal type. This is to say, the species present on the bank of the Canal are indicative of previous (and continuing) human disturbances. A list of these species is provided in Supporting Information.

Obvious plant species of the bank vegetation include: Coyote brush (Baccheris pilularis), Mule fat (B. glutinosa), several species of Mustard (Brassica spp.), Sage (Salvia spp.), Buckwheat (Eriogonum spp.) and several introduced grasses (Family Gramineal).

Another area of vegetation which, although it is across the Canal, might fall under the influence of the project is the sand dunes area. These sand dunes have and are continuing to

Agricultural Cultivation ON Project Site



Northwestern project boundary,
adjacent to Wooley Road

View from Wooley Road, looking southwest

figure 8

Vegetation Photographs

Typical
Bank Vegetation

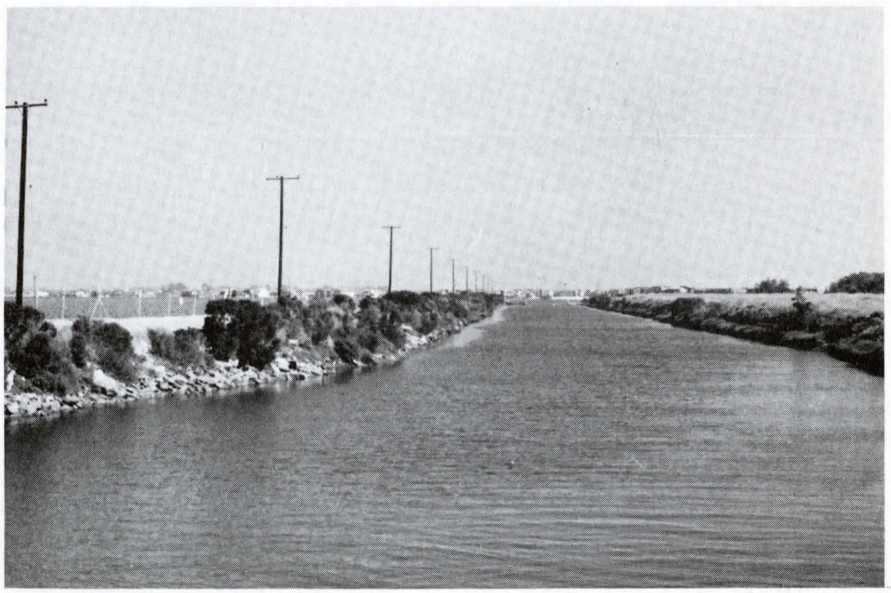


figure 9

Vegetation Photographs

experience human disturbances, such as vehicular traffic, human habitations, some hunting pressures, grazing by horses, hunting by domesticated pets, playing children, disposal of landfill and encroaching development. The vegetation of these dunes range from native species to areas of undesirable weedy species. A vegetation map of the project site is provided as Figure 10.

Rare and Endangered Plants

No rare or endangered plants were observed on the project site during the field studies. Furthermore it is unlikely that any exist on the project site due to the past and continuing disturbances by humans, both in original excavation of the Canal and continuing agricultural practices.

Fauna

Several factors severely limit the animal populations on the Mandalay Bay project site. Foremost among these factors is the fact that nearly all the project site is intensely cultivated agricultural land. Secondly, the project site is surrounded by more agricultural and urbanized land. In addition, the Canal creates an effective barrier to most non-avian fauna which might reside in the sand dunes and associated lands west of the Canal. Therefore the project site only supports a remnant of non-avian fauna present in earlier times.

Only the Wooley Road bridge over the Canal allows access from the sand dunes for non-avian fauna. However, due to the exclusionary pressures created by the residences (with their associated humans and domestic pets) found near the western portal of the Wooley Road bridge most non-avian fauna would be prohibited from migrating to the project site.

As mentioned in the preceding Vegetation section, 'natural' vegetation does exist along the eastern bank of the Canal and does afford habitat for several faunal species. These species are listed in Table B, Supporting Information. It should be noted that several of these species may range at times into the agricultural portions of the project site in search of prey or vegetation for consumption. Of particular interest is the influence of domestic dogs and cats on the project site's wildlife. Although it is undeterminable at this point in time, it must be regarded as a definite influence.

Nearly 80 percent of the wildlife species which might occur in the project site are avian species. Many of these avian species are

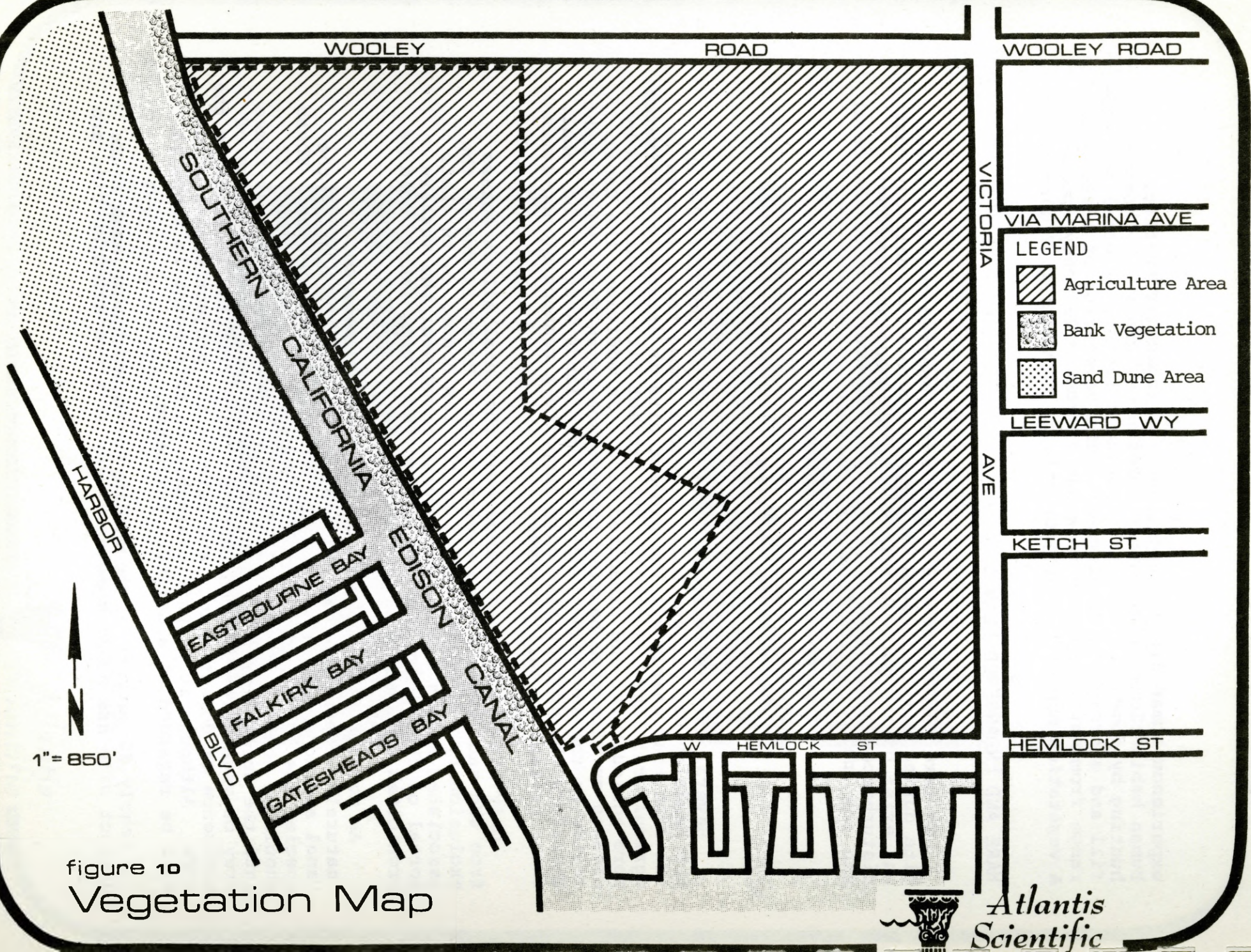


figure 10

Vegetation Map

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merely visitors which use the Canal for resting and feeding. Many of these waterbirds may enter the bank vegetation in search of food or cover. Terrestrial birds are commonly seen in the bank vegetation and freely move back and forth across the Canal to the sand dunes located there. The agricultural portions of the project site may provide some sustenance for bird species. Numerous gulls were consistently seen among the agricultural crops during the field study.

Gulls are the most frequently represented bird in the project area. Being opportunists, they feed on everything from small invertebrates and fishes to garbage deposited by humans. Gulls are found in the project site area throughout the year and are among the few groups of wildlife that have adapted to, and probably benefitted from the presence of humans.

Rare, Endangered and Protected Fauna

Although no rare or endangered wildlife species are reported to inhabit the project site, there are several species whose range may include the project site and areas within Ventura County. These species are recognized as rare and/or for endangered species and fully protected by both state and federal laws.

- Light-footed clapper rail (Rallus longirostris levipes)
- California least tern (Sterna albifrons brownii)
- Belding's savannah sparrow (Passerculus sandwichensis belingi)
- Brown pelican (Pelecanus occidentalis)
- Peregrine falcon (Falco peregrinus)
- Southern bald eagle (Haliaeetus leucocephalus)

Of the above species, two are known to inhabit nearby beaches and salt-marshes. The light-footed clapper rail has been reported in the salt marsh near McGrath Beach, the marshy area around McGrath Lake, and the Mugu marsh area. The California least tern has been reported in the sandy areas near the mouth of the Santa Clara River.

All marine mammals, which may enter the Canal from the Pacific Ocean, are fully protected by federal law. Of such aquatic species, only the sea lion has been observed in the Canal

directly adjacent to the property site.

Raptors, which include kites, hawks, falcons and owls are all protected by federal and state laws. These birds play a role in limiting rodent and other small animal populations. Although none of the raptors listed were observed during the field study their range could include the project site.

MARINE BIOLOGY

Previous studies dealing with the marine life of Channel Islands Marina located in the City of Oxnard, California, are limited to one published paper [Ref: 75] and one Environmental Impact Report [Ref: 77] Reish (1964) [Ref: 75] studied the marine succession on the intertidal rock jetties at the entrance to the marina. The earliest inhabitant was the sea lettuce (Ulva lactuca). As carnivores appeared, for example, the shore crab (Pachygrapsus crassipes) or several species of snails, the algae was eaten which reduced the amount present drastically. Later the typical inhabitants of the rock jetties appeared. The high tide horizon was characterized by the barnacles (Chthalmus fissus and Balanus glandula), the snails (Littorina scutulata), the shore crab (Pachygrapsus crassipes) and the rock louse (Ligia occidentalis). The mid-tide and low-tide horizon was characterized by one or two species of mussels, either (Mytilus californianus or M. edulis). Many species of animals were found living within this association.

Turner [Ref: 77] conducted three transects within the Channel Islands Marina; he recorded six species of algae, 39 species of invertebrates, and four species of fish (Embiotoca jacksoni - the black perch, Paralabrax clathratus - the kelp bass, Racochilus toxotes - the rubberlip perch, and Xystreurys liolepis - the fantail sole) and seven species of echinoderms which was an unusually large number of this animal group to be found in a marina area. He concluded the marine water quality in the Channel Islands to be in a good condition; however, he stated that the continual withdrawing of cooling water for the Mandalay Bay Steam Generating Plant was essential to maintain good water conditions.

PHYSIOGRAPHY

The proposed project site is located approximately 3,300 to 3,500 feet (0.6 miles) from the shoreline and within the Oxnard Plain (a portion of the larger Coastal Plain of Ventura County California). The Coastal Plain is a relatively flat area which has developed as the result of intermittent flooding and associated deposition of alluvium by the Ventura River, Santa Clara River, and Calleguas Creek. [Ref: 20] This alluvium-filled Coastal Plain reaches approximately nine miles inland where it is bounded by foothills of Sulphur Mountain on the northwest, the Santa Monica Mountains on the southeast, and South Mountain and the Camarillo Hills on the northeast. The southwest facing shoreline of the Coastal Plain extends for nearly 18 miles along the Pacific Ocean. The relatively flat nature of the Oxnard Plain portion of the Coastal Plain is locally interrupted by the presence of low sand dune hills which extend ± 2,500 to 3,000 feet inland from the beach between the Santa Clara River and Port Hueneme. [Ref: 90]

The site of proposed development is typical of most of the Oxnard Plain. It is a nearly flat parcel of land that is currently undergoing cultivation. Elevation of the site ranges from ± 10 feet to ± 15 feet above sea level. Although the site is relatively flat, the Southern California Edison Canal exists along the entire southwest side of the property. This canal is a ± 100 feet wide trough which extends down below sea level. Consequently, the site is bounded on the Southwest side by a near vertical, 10 feet high descending slope.

EARTH MATERIALS

The Oxnard Plain, including the site area, is underlain by ± 2,000 feet thick accumulations of Quaternary (± 0-2 million years old) alluvium [Ref. 20,21] and/or deltaic deposits [Ref: 98] derived predominately from the Santa Clara River. Figure 11 is a geologic map of the region. These earth materials which consist of unconsolidated to poorly consolidated, interbedded and course and fine grained sediments, have been accumulating within a subsiding basin. These Quaternary sediments comprise the aquifers (water bearing zones) and intervening aquitards (impervious zones) which form the Oxnard Plain ground water basin. Underlying the Quaternary sediments are ± 40,000 feet of sedimentary rocks which accumulated within an ancient basin during the Tertiary (± 2 to ± 65 million years old) and late Cretaceous (± 65 to ± 120 million years old) periods. [Ref: 44,92] Underlying the sedimentary rocks is a basement complex of igneous and metamorphic rocks. [Ref: 54] However, due to the very thick section of sedimentary

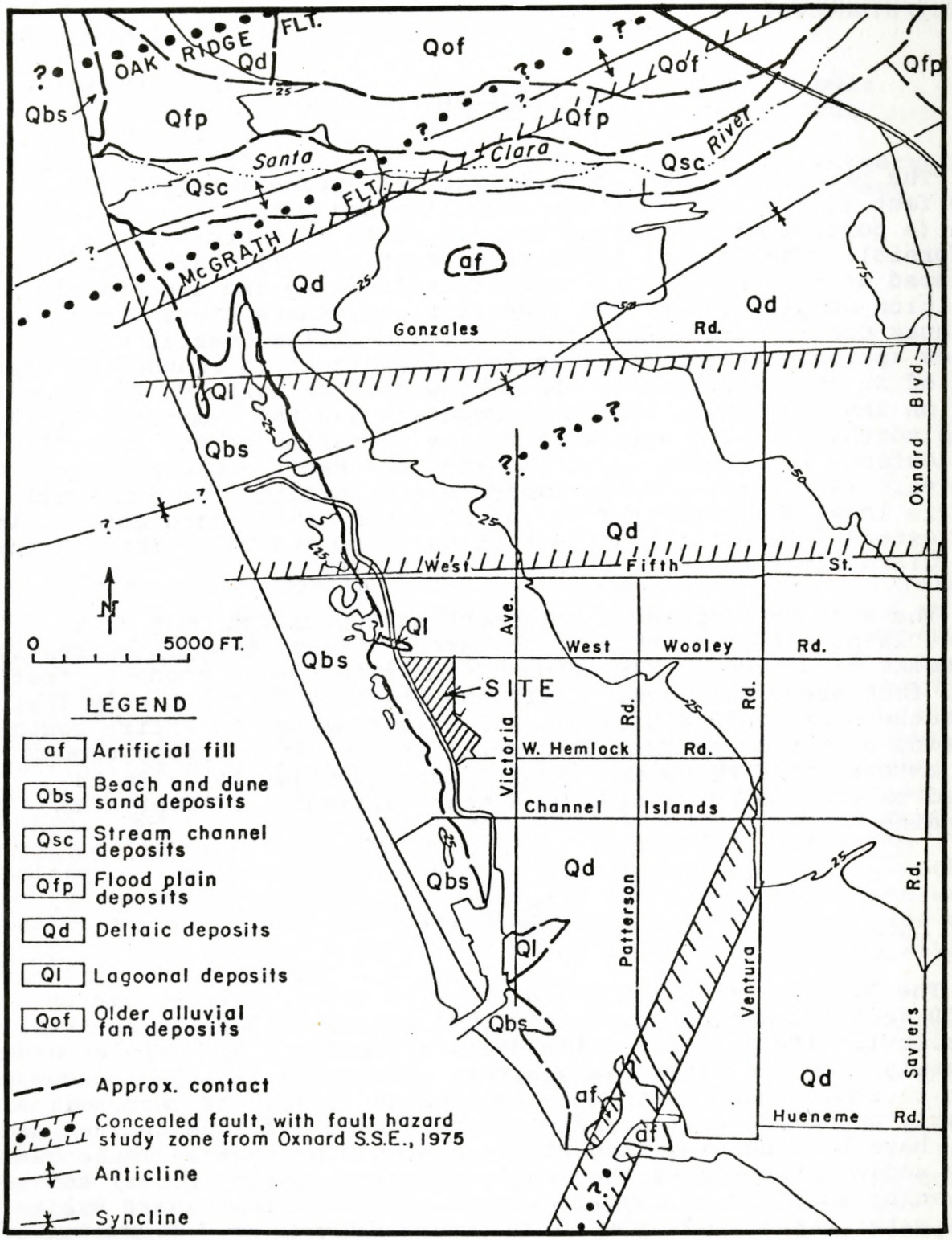

figure 11 Geology Map

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rocks, the basement complex has not been encountered even in the deepest oil wells. [Ref: 12,44]

The Quaternary sediments have been the subject of several investigations because of their importance as a ground water resource. [Ref: 23,19,20,21,24]The following is a brief description of the materials within the site vicinity. These materials consist of soil, a "semiperched" aquifer, a "clay cap" aquitard, the Oxnard aquifer and underlying aquitard, the Mugu aquifer and underlying aquitard, the Hueneme aquifer and underlying aquitard, the Fox Canyon aquifer and underlying aquitard, and the Grimes Canyon aquifer. [Ref: 20,21]

The most recent deposits of earth materials [soil] which directly underlie the site consists of ± 20 to 90 feet of poorly to moderately sorted sand and silt with some clay. [Ref: 22,98,95] Where this material was observed in subsurface exploratory borings and in the steep banks of the Southern California Edison Canal, it was found to be unconsolidated and porous with minor quantities of organic debris. Interbedded with and underlying the "soil" are unconsolidated to poorly consolidated medium gained and coarser sands and gravels which comprise the "semiperched" aquifer. [Ref: 20] As with nearly all of the Quaternary deposits underlying the vicinity and site, the "semiperched" aquifer varies in depth and thickness. Depth to this "semiperched" aquifer may vary considerably within the site area. Wells and exploratory borings drilled on and adjacent to the site encountered the "semiperched" aquifer at depths of 20 to 34 feet. [Ref: 20,22,96]

The "clay cap" aquitard which separates the "semiperched " aquifer from the underlying Oxnard aquifer consists of a varying thickness of poorly consolidated silty to sandy clay with many sand lenses. [Ref: 20] This "clay cap" typically ranges in thickness from 10 to 100 feet within the Oxnard plain. [Ref: 20] but may be very thin locally. A water well located within 1300 feet of the site apparently encountered "gravel with clay streaks" between a depth of 26 and 140 feet and "gravel" between 140 and 227 feet. The log of this well (28) is noted as being "from Memory" but the description tends to indicate that if the "clay cap" does exist, it is thin. [Ref: 22,95] Other wells in the vicinity indicate a 50 to 70 feet thick clay cap. [Ref: 95]

The Oxnard aquifer occurs beneath the entire Oxnard Plain at a depth ranging from 60 to 200 feet. Within the site area it apparently occurs at a depth of 140 to 150 feet and has a thickness of 90 feet. [Ref: 20] The earth materials which comprised the Oxnard aquifer are fine to coarse sand and gravel ranging in size from 1/4 to 6 inches in diameter. Locally, interbedded within the coarse materials are lenses of silt and clay.

Underlying the Oxnard aquifer is a 10 to 100 feet thick aquitard which consists of silt and clay followed by sand and gravel of the Mugu aquifer. This sequence of permeable sand and gravel interbedded with relatively impermeable silt and clay is repeated

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(28) Boring 1N/22W-7.11

several times with the permeable materials forming the Hueneme, Fox Canyon, and Grimes Canyon aquifers.

Aeolian (wind blown) sands have been deposited in unconsolidated dunes along the coastal portion of the Oxnard Plain. These sand dunes are located west of the site opposite the Southern California Edison Canal. These sand dunes have developed in a manner typical of many of the coastal sand dunes in Southern California. Sedimentary material is carried to the coast by the Santa Clara River. The sand sized grains of this material, deposited near the mouth of the river, is subjected to reworking and longshore transport by wave action. This sand sized material is eventually deposited forming broad beaches. The upper dry layer of sand on these beaches is subjected to the prevailing onshore winds which blow this sand to form dunes. [Ref: 64]

Structural Geology

The Oxnard Plain is located within a structural basin bounded by several east-west to northeasterly trending fault zones (see Figures 12 and 14). A regional stress pattern, which is apparently related to north-south compressional forces, has resulted in the formation of both the fault zones and the basin. [Ref: 98,99] Because of relatively rapid accumulations of sediment on the Oxnard Plain, the geologic structures which developed within the older Quaternary (Pleistocene) sediments are masked by the most recent (Holocene) sediments. The Pleistocene sediments and older sedimentary rocks have been subjected to moderate to intense folding and faulting. With increasing age, these materials tend to become more deformed. "Although the lower Pleistocene and to a lesser extent, upper Pleistocene deposits have been tilted and folded by earth pressures, no principal faults are known within the coastal Oxnard Plain. . ." [Ref: 20] Although no faults have been recognized that have ruptured the Holocene sediments, it is generally difficult to recognize the effects of faulting within these poorly consolidated materials and, therefore, late Quaternary faulting within the Oxnard Plain cannot be ruled out. Weber and Kiessling [Ref: 99] detected several photo lineaments on the Oxnard Plain which, when correlated with the configuration of alluvial earth materials and with magnetic geophysical data, suggest the possibility of late Quaternary faulting (see Figure 12). The Seismic Safety Element for the City of Oxnard has projected several faults into the Oxnard Plain.(29) On the basis of these projections, fault hazard study zones have been designated within this Element (see Figure 11).

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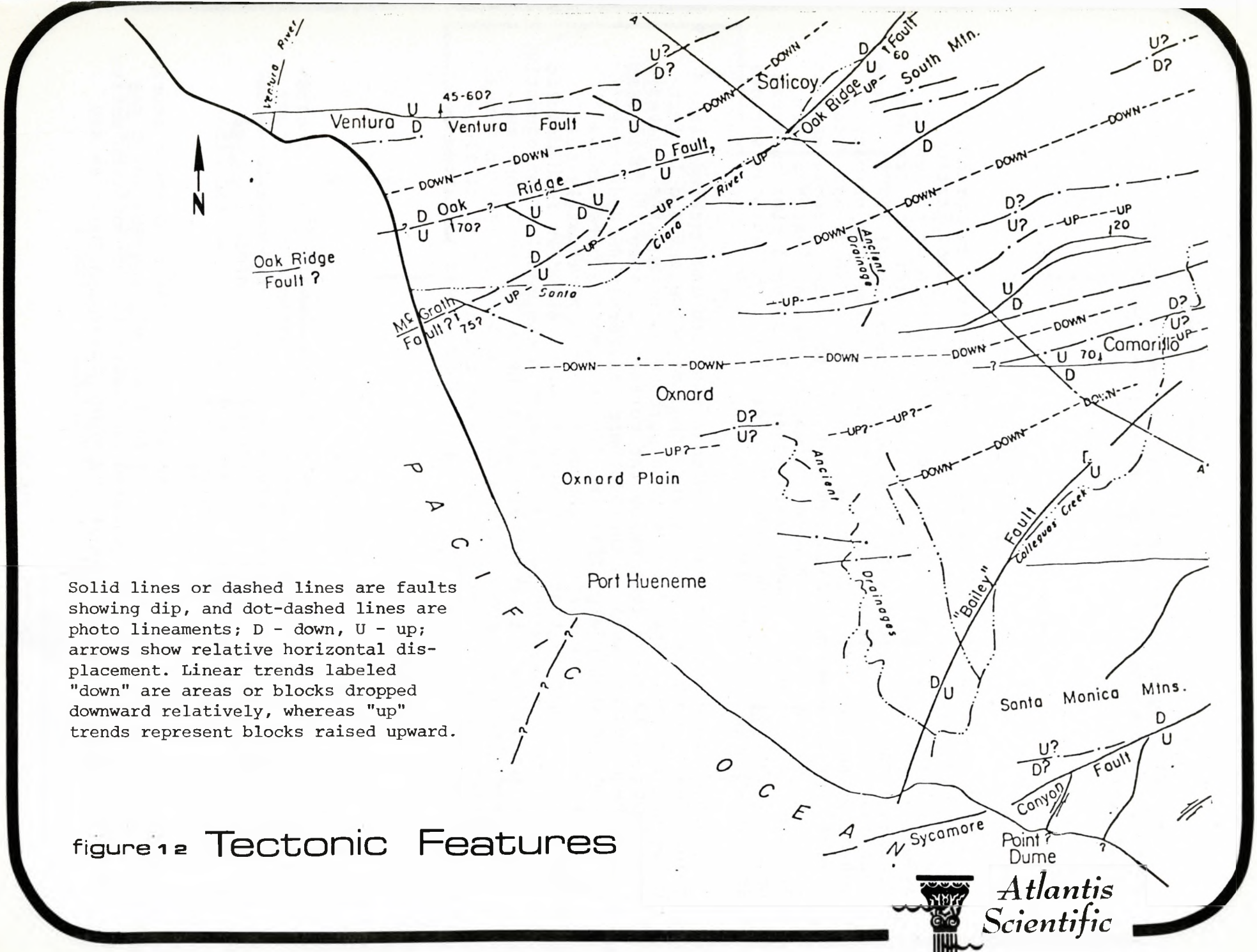
(29) Photolineament is defined as any line on an aerial photograph that is structurally controlled, including any alignment of separate photographic images such as streams, trees or bushes that are so controlled. The term is widely applied to lines representing beds, lithologic horizons, mineral bandings, veins, faults, joints, unconformities, and rock boundaries.



Solid lines or dashed lines are faults showing dip, and dot-dashed lines are photo lineaments; D - down, U - up; arrows show relative horizontal displacement. Linear trends labeled "down" are areas or blocks dropped downward relatively, whereas "up" trends represent blocks raised upward.

figure 12 Tectonic Features

The folding of these Quanternary sediments suggests that tectonic forces are still active and that continued folding and fault activity should be anticipated.

Drainage

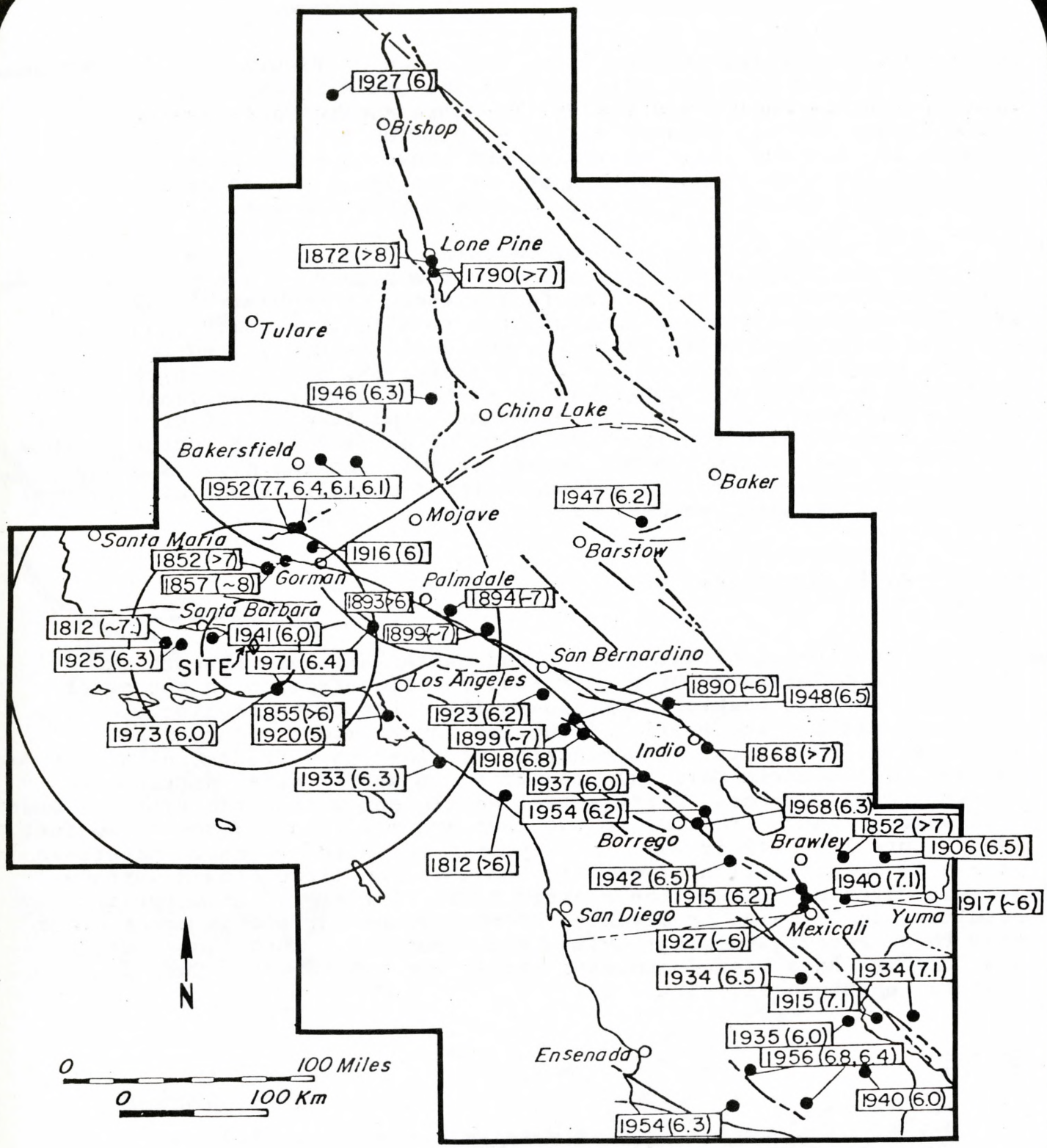
Surface water accumulates within the site from two principal sources, rainwater and irrigation water. Direct precipitation on the site typically soaks into the soils with little or no runoff except during intense or prolonged periods of rainfall. Drainage ditches along the north, west, and south boundaries of the site prevent most offsite drainage from reaching the site. The primary source of surface water within the site currently is ground water pumped for irrigation. Although most surface water percolates into the soil, excess irrigation water flows to the small earthen farm drainage ditches which convey this water into several pipe culverts which discharge into the Southern California Edison Canal at various locations where it mixes with seawater.

Exploratory borings drilled within the site encountered minor quantities of water and locally wet zones at between 5 and 10 feet below the surface. The "semiperched" ground water aquifer located at a depth of 20 to 25 feet below the surface, is some 10 to 15 feet below the seawater level in the Southern California Edison Canal. Exploratory borings placed into the "semiperched" aquifer found ground water which rose within the borings to approximately sea level. This suggests that the "semiperched" aquifer is in hydraulic continuity with the existing seawater within the canal. Consequently, drainage within the site which percolates below the soil zone may eventually flow underground to the Southern California Edison Canal. Observation of water level fluctuations as related to tidal fluctuations may verify the above hypothesis; but it was not attempted.

Seismicity

Seismicity and seismic hazards within the Oxnard Plain, including the site area, are covered in detail in "Seismic Hazards Study of Ventura County, California," prepared by the California Division of Mines and Geology. [Ref: 27]. The following information was derived from the above report. Where more detail is wanted, the above report should be reviewed.

The site has been moderately to intensely shaken in the historic past by several earthquakes. Larger historic earthquakes which may have affected the site are indicated on Figure 13. Recognized active and potentially active faults, along which future earthquakes may



Modified from Allen and others, 1965.

figure 13 Historic Earthquake Magnitudes

Atlantis Scientific

occur that may be felt at the site, are shown on Figure 14. The most important faults near the site include the Oak Ridge-McGrath Fault System, Ventura Fault, and the Malibu-Santa Monica Fault System. These faults are all located within ± 10 miles of the site [see Figures 11, 12, and 14]. No faults are known to exist beneath the site; and the site is not within any of the fault hazard study zones designated in the City of Oxnard Seismic Safety Element. [Ref: 70]

The site, as well as the entire Oxnard Plain, could be subject to strong earthquake-induced shaking in the future resulting from larger earthquakes on any of the faults shown on Figures 11, 12 and 14. The maximum earthquake anticipated to affect the site [magnitude 7 on the Oakridge-McGrath Fault System] could result in bedrock acceleration beneath the site of 0.6 ± g. [Refs: 38, 80] The thick layer of poorly to moderately consolidated earth materials overlying the bedrock may result in moderate to intense amplification of propagation seismic waves. Although the likelihood of surface fault rupture within the site is considered remote, severe seismic shaking may result in liquefaction and lateral spreading, seismic consolidation, differential compaction, lurching, seiche, and/or tsunami. [Ref: 27]

Effects of Liquefaction

The poorly consolidated saturated earth materials beneath the site have a moderate to high potential for liquefaction in the event of severe seismic shaking (see Figure 15). Lateral spreading of earth materials which overlie liquefied layers might occur adjacent to steep walled canals. Liquefaction may lead to differential compaction of the earth materials resulting in differential settlement of the ground surface. Differential settlement within the site has been estimated to range from one to two feet and may locally exceed two feet (see Figure 16). [Ref: 27] Where poorly consolidated earth materials result in amplification of seismic shaking, the large ground surface seismic waves may exceed the elastic limit of these earth materials resulting in lurching or breaking of the ground surface in areas other than those associated with fault surface rupture. Both liquefaction and lurching have been documented within the Oxnard Plain during historic earthquakes. [Ref: 27]

Seiche

The effect on water by severe seismic shaking includes agitation of the water resulting in the formation of waves. Where the water is confined, such as in a marina or lake, a standing or oscillating wave of relatively large amplitude may travel back and forth within the confined water body resulting in rapid water level changes and in repeated inundation along the shoreline. Although no seiche

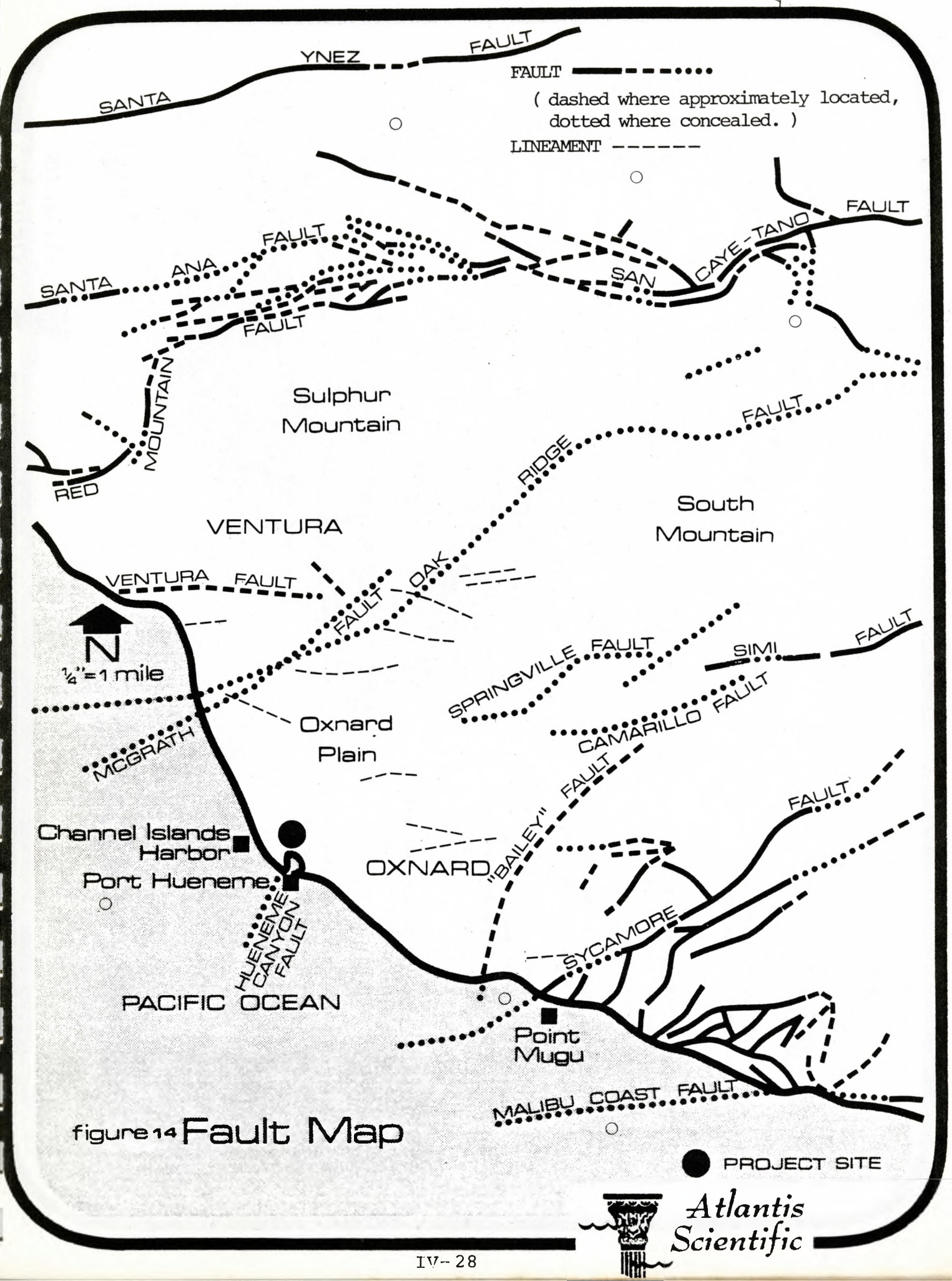


figure 14 Fault Map

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LEGEND

- Potential for liquefaction estimated to range from high to moderate
- Potential for liquefaction estimated to range from moderate to low
- Potential for liquefaction estimated to range from low to non-existent
- Isopach of approximate thickness, in feet, of Holocene sediments
- Approximate boundary of areas within which ground water levels have been within 15 feet or less, and 40 feet respectively, of the ground surface
- Areas of exposure of pre-Holocene rocks, including Pleistocene sediments
- Approximate location of faults extending into Holocene sediments
- Boundary of forebay

Source: Sprotte, 1975.

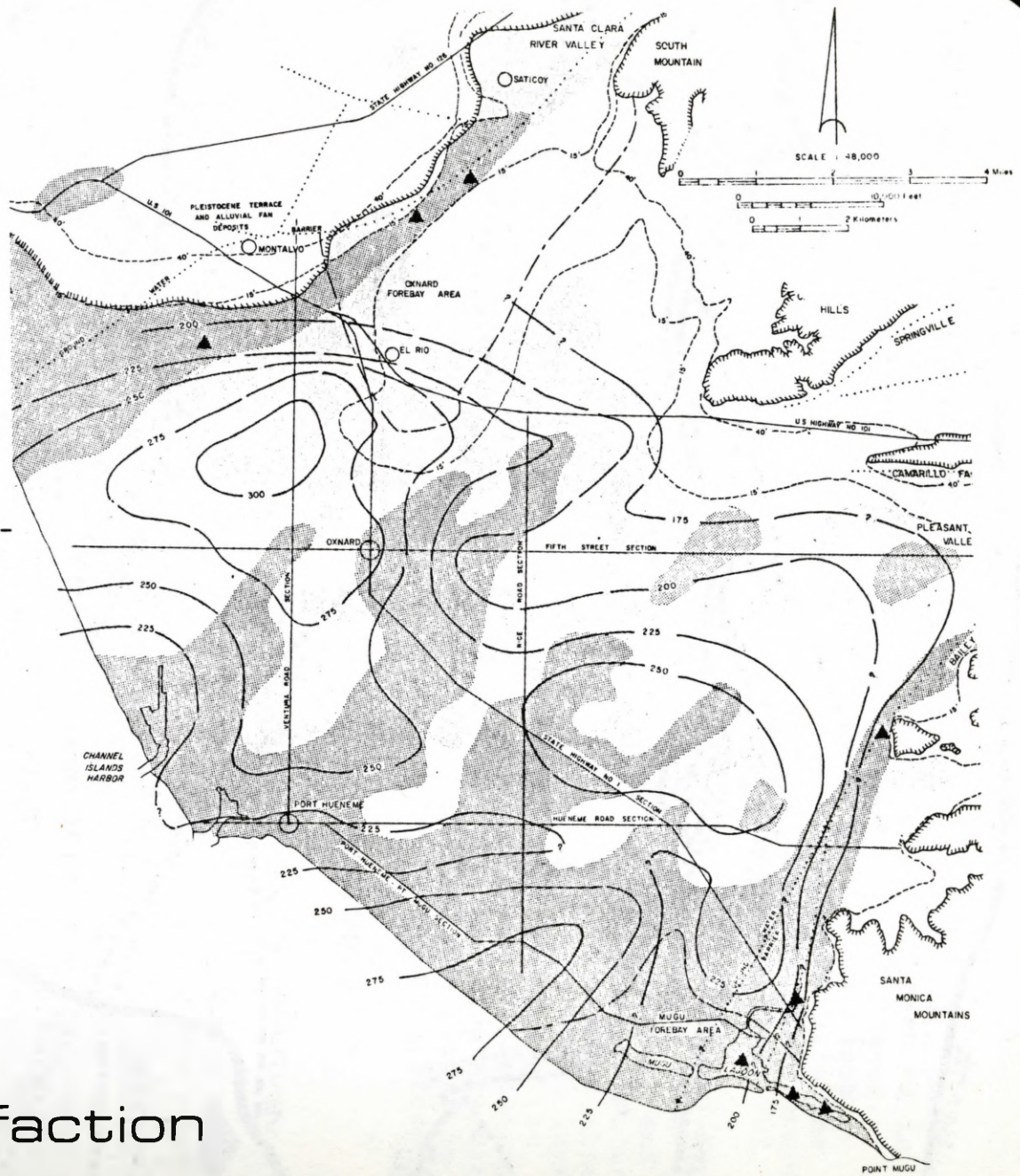


figure 15 Map of Potential Liquefaction

LEGEND

- Estimated potential differential settlement - two feet or more
- Estimated potential differential settlement - one foot or more
- Estimated potential differential settlement - one foot or less
- Isopach of approximate thickness, in feet, of Holocene sediments
- Approximate boundary of areas within which ground water levels have been within 15 feet or less, and 40 feet respectively, of the ground surface
- Areas of exposure of pre-Holocene rocks, including Pleistocene sediments
- Approximate location of faults extending into Holocene sediments
- Boundary of forebay

Source: Sprotte, 1975

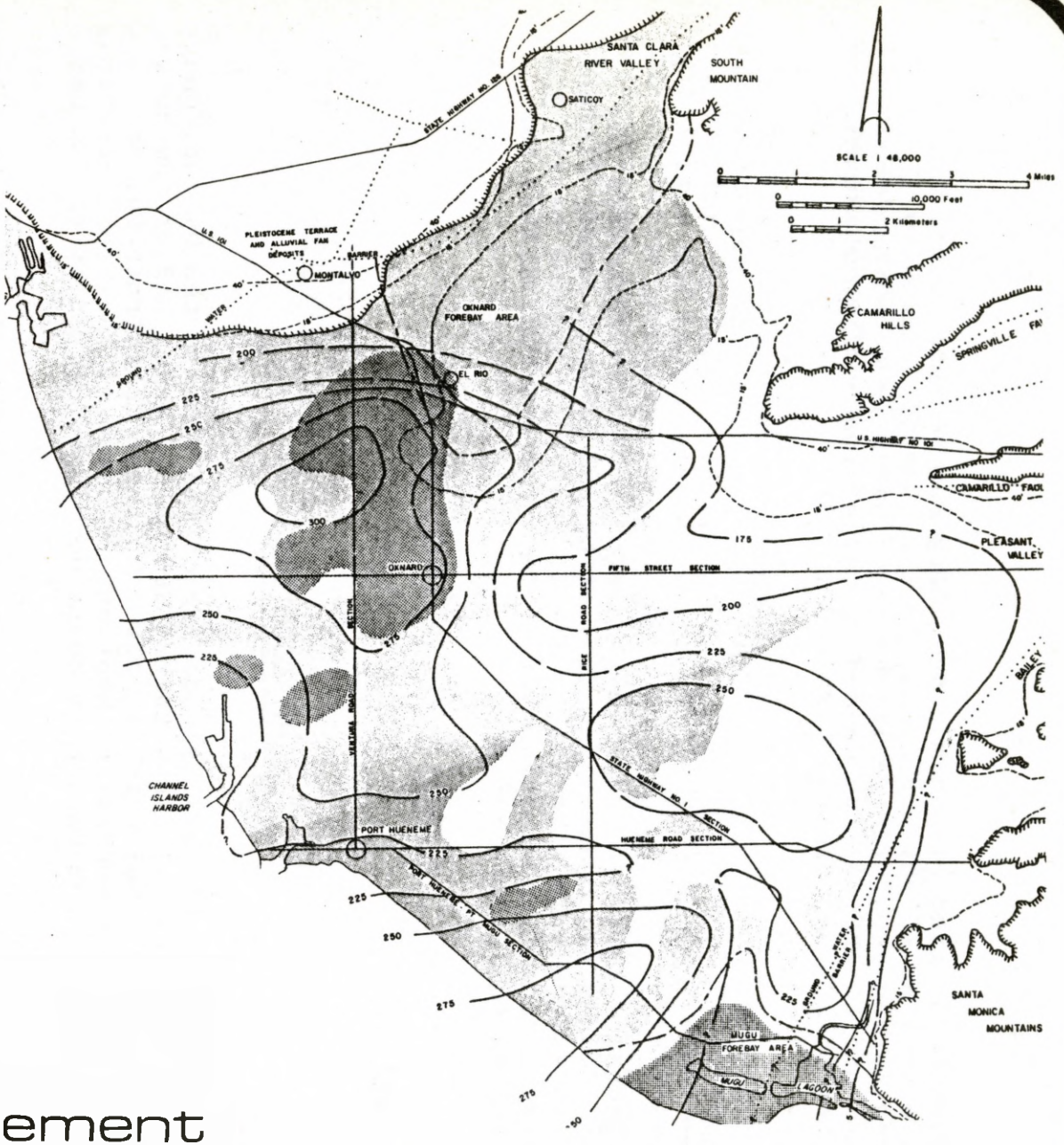


figure **16** Map of Differential Settlement

Atlantis Scientific

has been documented within marinas along the Ventura County Coastline, a similar effect was caused by the tsunami induced by the 1964 Alaskan Earthquake. The rapid change of water level within the Ventura and Oxnard Marinas caused by the approach of this tsunami resulted in $35,000 damage. [Ref: 27] (30)

Tsunami

Tsunamis (seismic sea waves) have periodically inundated the Ventura County sea coast. The City of Oxnard Seismic Safety Element [Ref: 70] places the site within the 15 foot high tsunami hazard zone. A maximum tsunami runup height of 35 feet for most of Ventura has been estimated. [Refs: 70,98]

WATER QUALITY

Introduction

The original Channel Islands Harbor was constructed by the County of Ventura in 1961. It is situated around the inlet end of the cooling water intake canal which supplies Southern California Edison Company's Mandalay Generating Station. Because of this configuration, tidal flushing in the harbor is continuously augmented by the pumped flow to the Edison plant.

Enlargement of the existing waterway system will affect the rate of exchange of harbor water with the ocean, while development associated with expansion will yield an increased number of harbor users. Both of these factors will influence the introduction and retention of pollutant substances. It is important that the marina waters retain qualities appropriate for beneficial uses of boating, water contact recreation, and aesthetics.

Background Data

Water quality in the harbor historically has been good. This is attributed in part to the facility's relative newness and in part to

(30) Personal communication: Cliweck, 1977

its efficient flushing characteristics. Assessment of the proposed project's effects on marina and ocean waters has been based on a determination of existing ambient and in-harbor conditions, together with knowledge of the physical and biological processes occurring there.

Ambient, or open water, samples in the vicinity of the Channel Islands Harbor have been collected and analyzed at random intervals for coliform bacteria. Coliform data presented in Table 3 were obtained from the Ventura County Health Department. All samples were non-composite grab type. No regular sampling interval was used. Analyses were carried out by the Bureau of Sanitary Engineers in Santa Barbara.

TABLE 3

COLIFORM COUNT IN OCEAN WATERS
(MPN/100 ml)*

Date	Extension of 5th St., Oxnard	Lajanelle Pier	Port Hueneme
March 1976	-	-	4.5
Jul	-	-	6
Aug	-	-	13
Dec	7	5	2
Jan 1977	22	5	2
Feb	11	-	2
Mar	110	2	2
Apr	8	5	2
June	21	7	7

Note: *MPN/100 ml = most probable number per 100 milliliters.

Conditions within the harbor have recently been monitored by the Ventura County Harbor Authority. Samples are taken at monthly intervals in three locations:

A - the entrance
B - the east branch
C - the west branch.

Data from the most recent 12 months of record is tabulated in Table C in the Supporting Information Chapter. Figure A provides locational

orientation for these data. The sampling program conducted in conjunction with this report is also outlined in the Supporting Information Chapter (Appendix A, Tables D and E).

Pollutant Inputs

Polluting substances find their way into the estuarine water in a variety of ways. Storm runoff emptying into the harbor and marinas is a major carrier of pollutants, as are wind and rain. Boating activities are responsible for the introduction of much floating debris, oil, and other chemical and biological substances.

Direct Rainfall

National Weather Service records indicate that the yearly rainfall for Oxnard is 14.25 inches. The rainwater brings down with it measurable quantities of atmospheric pollution, including some sulfates and ammonia and considerable nitrates and lead. Analysis of Huntington Beach rainwater by the Orange County Flood Control District laboratory is the source of pollutant concentrations in Table 4. Because Huntington Beach is an area with much greater levels of air pollution than Oxnard, the use of these concentrations is considered conservative, and conclusions may represent an "upper limit" case. These concentrations are projected upon annual Oxnard rainfall and harbor/marina area. Total waterway area is 136 acres, including the harbor entrance.

Table 4

ESTIMATED ANNUAL

DIRECT RAINFALL POLLUTION

Parameter	Concentration	Annual Input
Nitrogen	1.15 mg/l [1)]	504 lbs/year*
Lead	87 mg/l	38 lbs/year

Note: 1) Miligrams/liter

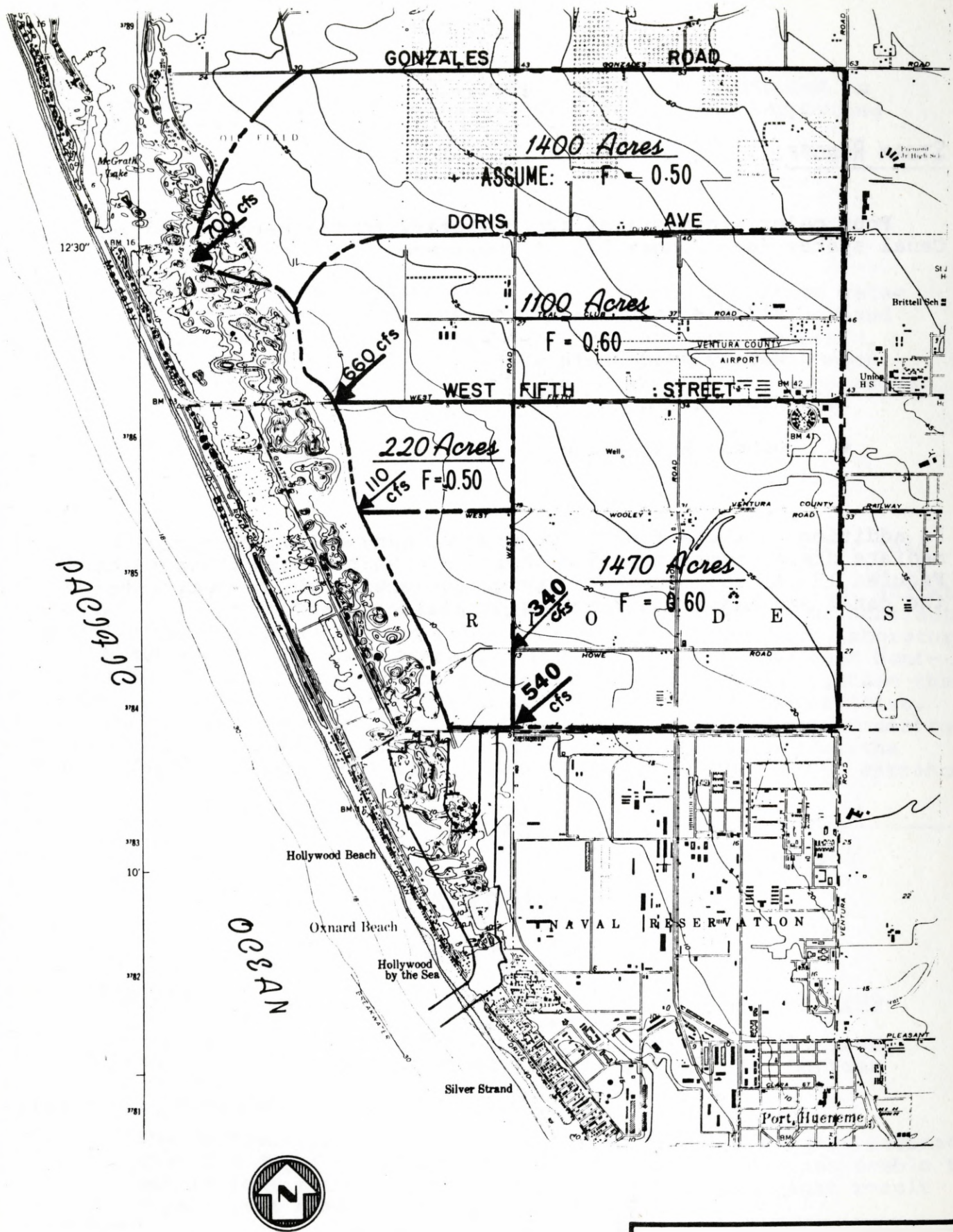
*The Southern California Coastal Water Research Project estimates that the dry fallout rate of lead may be greater than double the wet fallout rate. Thus an additional 76 lbs/yr might result from direct atmospheric fallout.

Storm Runoff

Four major storm drains are tributary to the Harbor - Edison Canal system (see Figure 17). These are:

1. Fifth Street Drain
2. Wooley Road Drain
3. Hemlock Drain
4. Oxnard West Drain

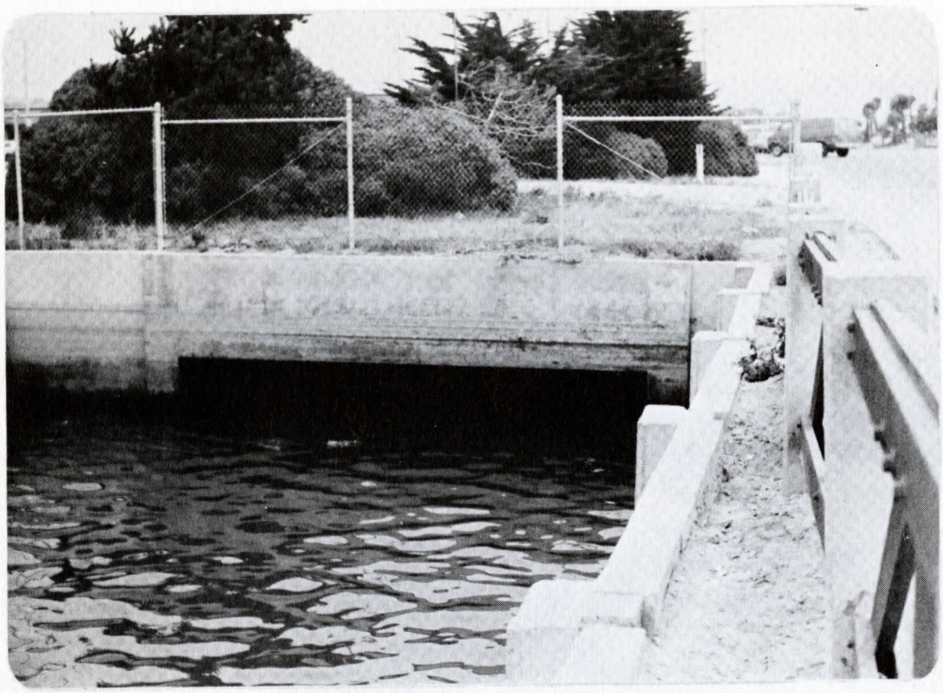
In addition to these four large drains, many local and intermediate drains empty into the marina and harbor (see photographs, Figures 18 and 19. Numerous irrigation drains which empty into the canal are major contributors of pollution and silt.



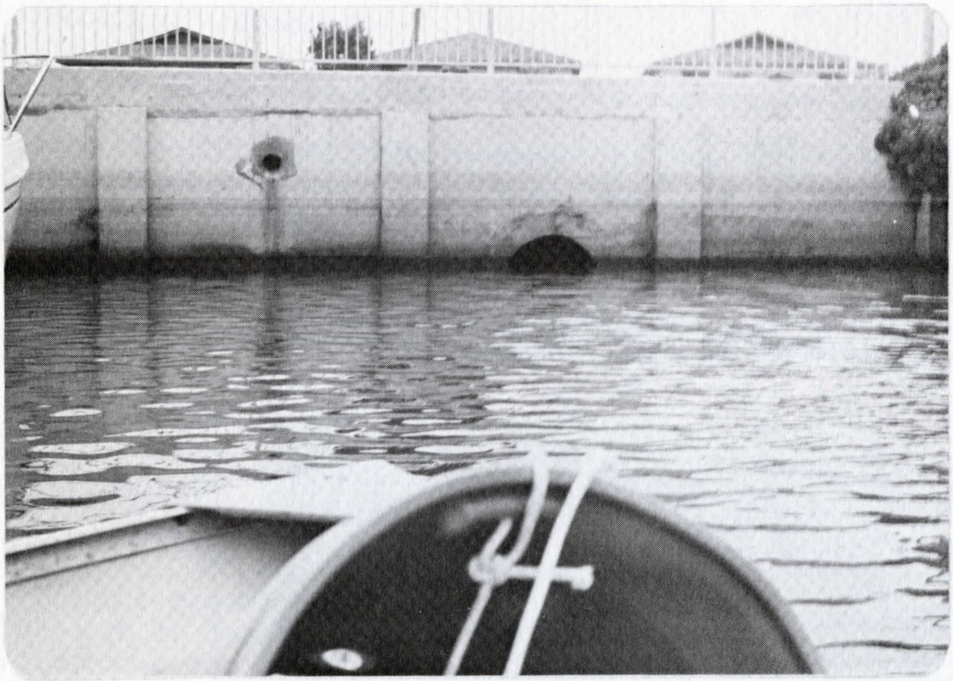
CHANNEL ISLANDS MARINA

STORM RUNOFF

FIGURE 17



Major drain at Channel Islands Boulevard looking east

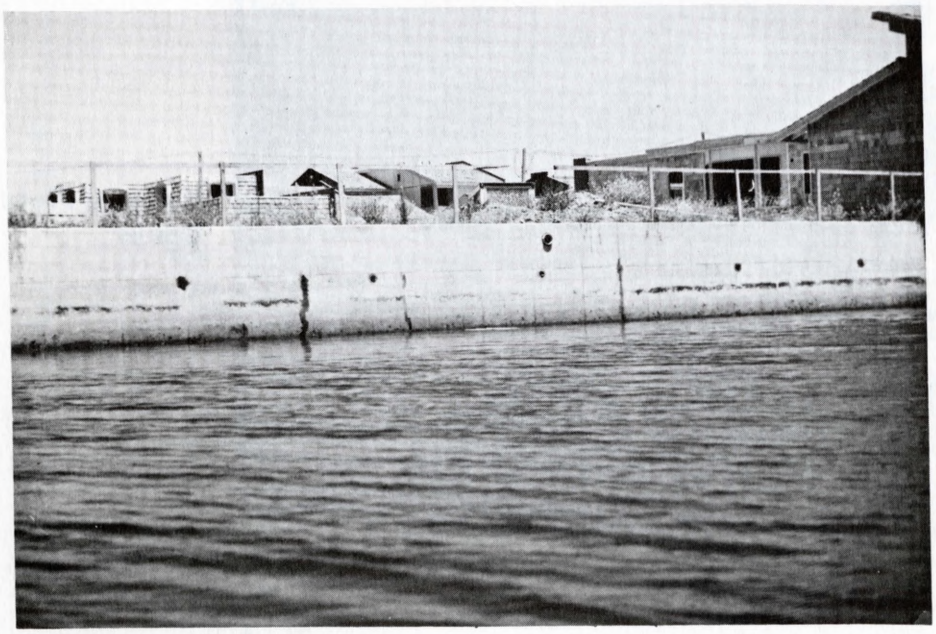


Intermediate drain

figure **18**

Waterway Photographs

Intermediate drain on east side of Edison canal (near sampling station #7)



Local drain and weepholes on Falkirk bulkhead, looking north (near sampling station #6)

figure **19**

Waterway Photographs

TABLE 5

OXNARD 10-YEAR RUNOFF

Surface	Runoff
Undeveloped	0.50 cfs/acre[1)]
Semi-developed	0.75 cfs/acre
Developed-commercial	1.00 cfs/acre

1) Cubic feet second/acre

Note: Data are useful in making rough estimates of volume. This is very helpful in projecting orders of magnitude of runoff related pollution. Accurate design of storm conducts must, of course, consider such things as soil type, basin configuration, and time of concentration.

Source: Runoff factors obtained from City of Oxnard Engineering Department.

The runoff factor for all areas has been weighted to the proportion of each surface type present as ascertained from City of Oxnard aerial photography. (Table5)

Storm runoff is potentially an important source of polluting substances. Its volume is large and it can pick up surface materials in addition to those already present in the rain water. No sampling has been done on storm runoff as such but the quality can vary widely. In 1968 and 1969 the Oxnard area was hit by back-to-back storms approaching 100-year intensity. The aftermath saw much silt deposited in the canal and marina waterways. Much of this silt was agricultural in origin as a good portion of the land east of the canal is used for crop raising. Dredging operations ensued and samples of the removed dirt were analyzed. The silt was reportedly very high in nitrates, phosphates, and organic matter and had to be disposed of in a Class 2 sanitary landfill. In contrast to this, paved area runoff is consistently clean after the first flush. Pollutants carried in this type of runoff include grease, oil, paper, plastic, and other debris, as well as chemical and organic impurities.

Runoff presently entering the Edison Canal north of the developed marina and at less than 500 cubic feet per second (cfs) is generally drawn up the canal and away from the marina. As Edison withdrawals approach the projected peak of 3000 cfs, the marina should be spared many of the side effects of even 10-year storms. Of course pollutants

carried in the Channel Islands Boulevard drain and local drains will still enter the harbor waters.

Studies done in other Southern California harbors, notably Huntington Harbour, give an indication of what concentrations of pollutants may be expected in Oxnard storm runoff. Precipitation in Oxnard averages 14.25 inches per year. Based upon measured Huntington concentrations and Oxnard annual rainfall, the estimates of pollutant inputs presented in Table 6 may be associated with ultimate annual runoff into the marina.

TABLE 6

ESTIMATED ANNUAL STORM RUNOFF POLLUTION

Parameter	Concentration (mg/l) Flow Weighted Avg.	Input	
Suspended Solids	900	3000	tons/year
C.O.D.	62	200	"
Nitrogen	4.4	15	"
Oil and Grease	8.0	25	"
Lead	0.285	1	"
Zinc	0.320	1	"
Phosphorous	0.1	700	lbs/year
Copper	0.064	400	"
Chromium	0.062	400	"
Chlorinated HC	0.004	3	"

Boating Activities

Boating activities are responsible for introducing pollution into harbor waters in a number of ways including:

- Anti-fouling paints
- Boat engines
- Heads and galleys
- Debris

It is possible to estimate total annual input from each of these sources.

ANTI-FOULING PAINTS. Anti-fouling paints used on the bottoms of permanently moored boats act against marine organisms by releasing copper at a slow rate. Estimates on the use of anti-fouling paint in Oxnard Harbor will be based upon a study by Young et al [Ref: 104]. Paint is assumed to have a copper content of 600 grams per liter and to be used at the rate of one gallon of paint per boat per year. The rate of release of copper to the marine environment is more uncertain but it must be substantial since such paints lose their repellant effect in less than a year's time. For purposes of this report a release rate of 50 percent is considered appropriate. With almost 2,000 boats now permanently moored in the harbor/marina, the copper input is 5,000 pounds annually.

BOAT ENGINES. The operation of boat engines puts certain quantities of lead and other fuel residues into the marine environment. For outboard motors, the following approximate outputs have been measured [Ref: 46]:

1.	Oil	10.0	grams/liter of fuel consumed
2.	COD	60.0	"
3.	Lead	0.05	"

These values may also be assumed as upper limits for inboard boat engines. In Marina del Rey the Southern California Coastal Water Research Project (SCCWRP) has correlated gasoline consumption to the number of moored boats at 0.25 gallons/boat/day. At this rate and assuming that 50 percent of the fuel is used within the harbor/marina system, the

following annual inputs are expected for 2,000 moored boats:

1.	Oil	4 tons
2.	COD	23 tons
3.	Lead	40 pounds

HEADS AND GALLEYS. The operation of boat heads and galleys while in the harbor is strictly prohibited. Two pumping facilities are maintained for public use. One is at the Harbor Administration dock and the other is at Peninsula Park in the northwest branch of the harbor. Although this type of ordinance is difficult to enforce, boat owners are sympathetic to the restriction and follow it voluntarily. Pumping of heads and galleys is estimated at several tons of biological oxygen demand (BOD) per year and for purposes of this report it shall be assumed that the portion of this waste entering the environment is negligible.

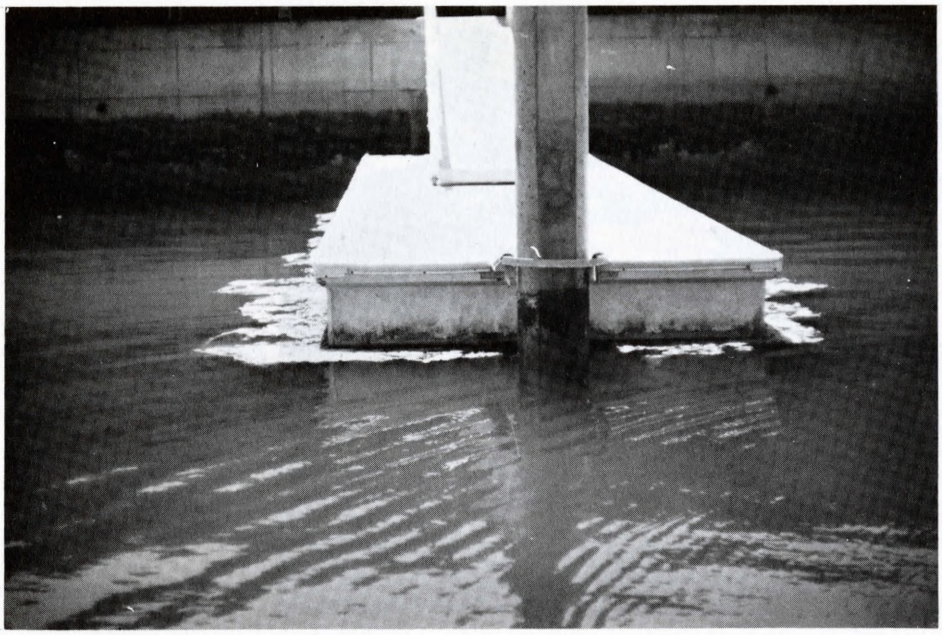
DEBRIS. Floating debris in the form of paper, styrofoam cups, and miscellaneous material is many times inadvertently introduced into harbor waters by boaters. Some refuse of this type was observed, although portions of it are thought to have originated in waterfront construction activities. The problem was pronounced only in a few westerly cul-de-sac areas of the residential marina where prevailing winds tend to trap the material against west bulkheads.

Ocean Transport

High concentrations of heavy metals and pesticides have been associated with municipal wastewater outfalls [Ref: 104]. A subsurface current, moving northward from the Los Angeles area at a depth of approximately 200 meters, serves as a vehicle for transporting and dispersing pollutants from several major submarine outfalls. Under these circumstances, some of the pollutants such as toxic metals and chlorinated hydrocarbons found in Channel Islands Harbor bottom sediments are likely to have been deposited by flood tide waters.

Summary of Pollutant Inputs

Table 7 summarizes local pollutant inputs estimated for all sources.



A pier off
Gateshead Bay

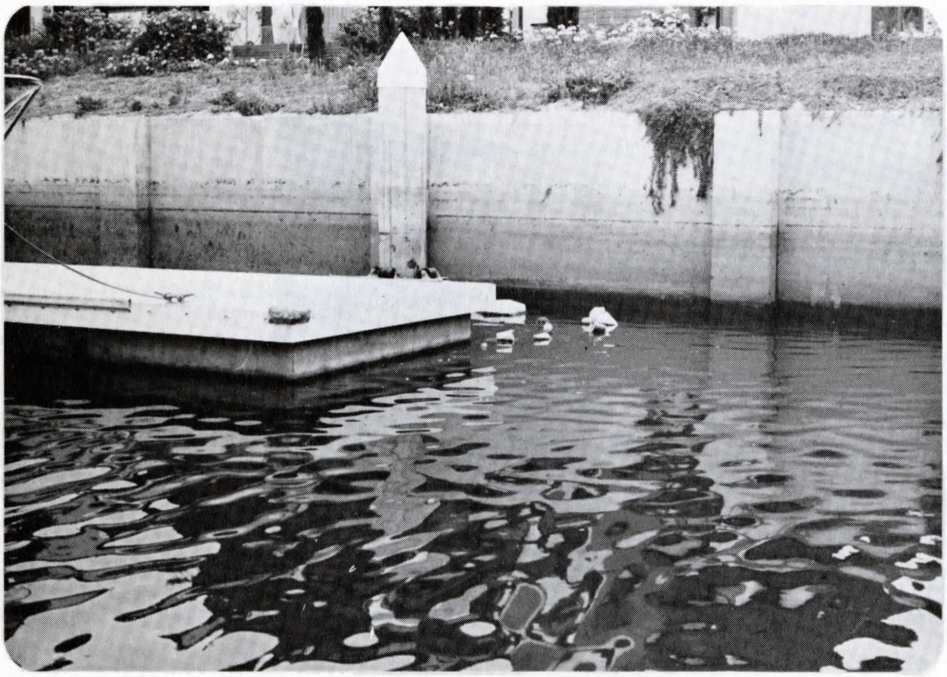
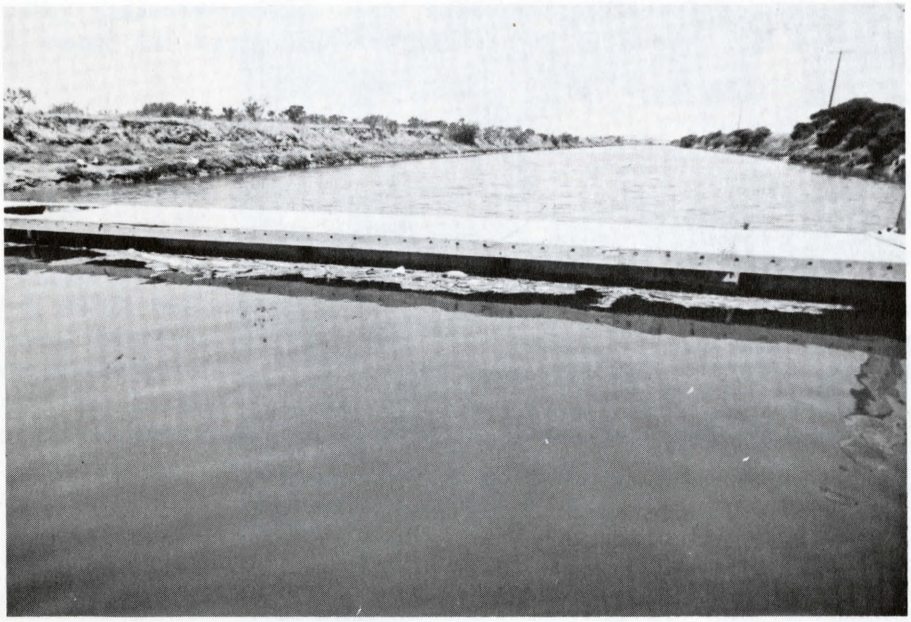


figure **20**

Waterway Photographs

Sampling Station #4



Looking north at unimproved Edison canal

figure **21**

Waterway Photographs

TABLE 7

SUMMARY OF POLLUTANT INPUTS

Parameter	Annual Input
Suspended Solids	3000 tons
COD	223 tons
Nitrogen	15 tons
Oil and Grease	6 tons
Lead	1 ton
Zinc	1 ton
Phosphorus	700 pounds
Copper	400 pounds
Chromium	400 pounds
Chlorinated HC	3 pounds
Debris	Minor Accumulation

TRANSPORT AND DISPERSAL

The mean replacement time for most lateral channels is several days. Most particulate matter entering these channels in dry-weather flow settles out locally. Various degrees of other pollutants are trapped in the process and become part of the bottom sediment.

During periods of storm runoff seawater is somewhat purged from these channels. The discharge from drains can create significant channel velocities at peak flow and, in these instances, sedimentation does not occur locally. The particulates are swept along until the channel encounters an increase in section and a corresponding decrease in current velocity. Preferential settling occurs at these increases in waterway cross section.

For purposes of rough estimation, it can be assumed that sediment is distributed evenly throughout the waterway system. If the sediment has a density of 80 pounds per cubic foot, then the average deposition

is on the order of several hundredths of an inch per year throughout the marina. Of course certain channel bottoms will contain much greater amounts than this, while others will be nearly free of sediment altogether.

The methodology utilized for the tidal flushing analysis conducted during this study program is presented in the Supporting Information Section, Appendix B.

VEHICULAR TRAFFIC

EXISTING ACCESS

At the present time, the area proposed for development is unimproved flat acreage which is being farmed with row crops. Access to the site is provided by a 16 foot road, Wooley Road, which extends west of Victoria Avenue. Wooley Road is planned to cross the Southern California Edison Company Canal to Harbor Boulevard, however, at this time, the crossing does not exist, nor does any paving between the Canal and Harbor Boulevard.

The major arterial streets leading into and out of the area are Victoria Avenue, Fifth Street, Harbor Boulevard, Wooley Road, and Channel Islands Boulevard (see Figure 22). The existing characteristics of these roads are as follows:

Victoria Avenue is planned as a major north/south arterial street which will provide access between the Cities of Oxnard, Port Hueneme and Ventura. It presently interchanges with the Santa Paula and Ventura Freeways. Portions of this road are now under construction to extend this road southerly across the Santa Clara River to Gonzales Road. This contruction will be completed by approximately August, 1977. The portion of Victoria Avenue south of Gonzales Road to Doris Avenue does not exist. Ventura County Department of Public Works staff indicate that this portion will be completed in two to three years.

Victoria Avenue south of Doris Avenue exists and varies in width from 20 feet of pavement north of West Fifth Street to 94 feet of pavement south of Hemlock Street to Channel Islands Boulevard. It presently is signalized at West Fifth Street, Hemlock Street and Channel Islands Boulevard. (This street would serve as access for Mandalay Bay generated traffic which is oriented toward Ventura, Ojai, Santa Barbara, Santa Paula, Filmore and Piru.) The present 24 hour traffic volume at Wooley Road is 8,300.

West Fifth Street is planned as a major east/west arterial street. It presently extends from Harbor Boulevard easterly to the Camarillo area varying in width from two to four lanes. This street is presently signalized at Harbor Boulevard, Victoria Avenue, and Ventura Road. (It may serve as access to Harbor Boulevard for a modest amount of project-generated traffic.) The present 24 hour traffic volume is 5,000.

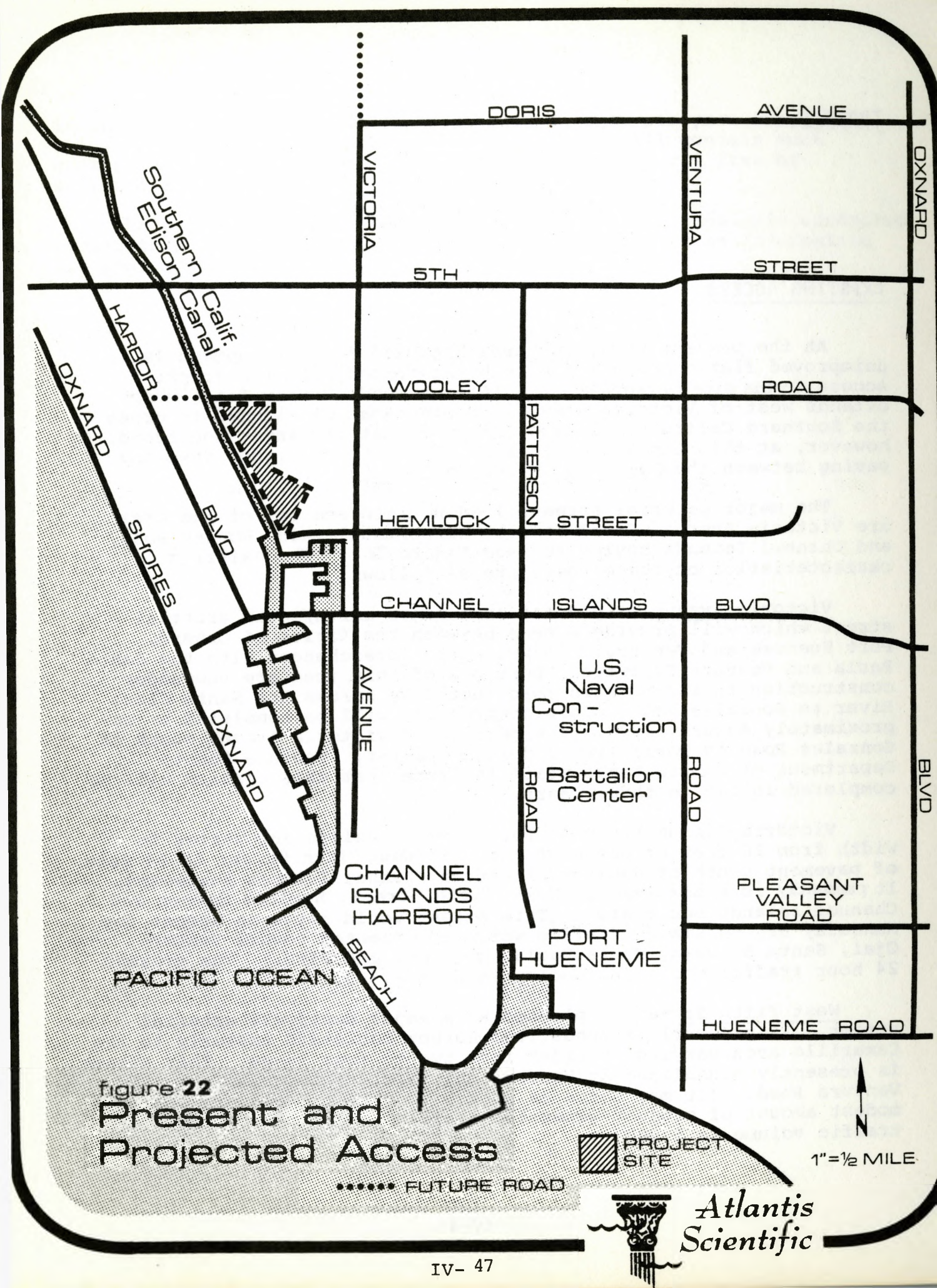


figure **22**

Present and Projected Access

Atlantis Scientific

Harbor Boulevard is planned as a major north/south arterial street. It presently extends from the Channel Island Marina area to the City of Ventura. At this time, it essentially has two lanes with signals at Channel Islands Boulevard, West Fifth Street and Gonzales Road. (This route would ultimately serve as access for project-generated traffic to areas such as Ventura, Santa Barbara, and Ojai.) The present 24 hour traffic volume is 12,100.

Wooley Road is planned as a major east/west arterial street. It presently extends east of Victoria Avenue into the central area of the City of Oxnard varying in width from two to four lanes. Wooley Road also extends west of Victoria Avenue to the Southern California Edison Canal. This section of Wooley Road is approximately 16 feet wide with a pavement surface which is in very poor condition. This road is controlled by two-way boulevard stops at Victoria Avenue.

Wooley Road is planned for extension across the Edison Canal to Harbor Boulevard; however, at the present time, this section does not exist. (This route would ultimately serve as access to Harbor Boulevard for project generated traffic which is oriented to Ventura, Santa Barbara, and Ojai. Access would also be provided to Victoria Avenue and points to the north, south and east.) The present 24 hour traffic volumes east of Victoria are approximately 2,200. The volumes west of Victoria Avenue are negligible.

Channel Islands Boulevard is classified as a major east/west arterial street. It has two lanes in each direction and extends from Harbor Boulevard easterly through the City of Oxnard. It is signalized at Harbor Boulevard and Victoria Avenue. (This street would serve as area access for project-generated traffic which has orientation to the south and east.) The present 24 hour traffic volume in the vicinity of Victoria Avenue is 13,800.

WATER TRAFFIC

The Channel Islands Harbor entrance is currently used for ocean access by both the ocean-going vessels docked in the harbor proper, and by vessels from the residential marina north of the harbor. These latter boats pass under the Channel Islands Boulevard bridge and through the west arm of the harbor enroute to the ocean. [Figure A, Supporting Information]. Currently, a new development is proposed for the residential marina, which will increase the marina's boat population in the course of the next few years.

TRAFFIC PROJECTIONS

A report by Moffatt and Nichol was published in April 1970 on the effects of waterway expansion in the Channel Islands Harbor. [Ref : 58] From the perspective allowed in 1970, this report anticipated an ultimate ocean-going boat population of 2,400, consisting of single occupancy in 2,000 slips with an additional 400 boats in dry-storage. Development of the residential marina north from Channel Islands Boulevard to Wooley Road was estimated to add another 1,650 to the ocean-going fleet, for a total of 4,050.

A detailed mathematical analysis of the Channel Islands Harbor entrance was made in order to determine levels of traffic congestion resulting from various boat populations and use rates. It was assumed that only tacking sailboats create interference problems serious enough to be treated as a major cause of channel congestion. The frequency of interference between tacking sailboats and parallel-lane traffic was calculated; and the results indicated the various levels of congestion which would result from increasing harbor entrance traffic.

Important assumptions were made regarding the percentages of the harbor population expected to use the entrance during peak periods. Traffic counts made at Newport Harbor over a seven year study period revealed certain recurring use patterns for various classes of boats, and these trends were then used to project patterns for a fully developed Channel Islands Harbor.

VESSEL POPULATION

It is now apparent that the ultimate boat population of the Channel Islands Harbor and adjacent residential marinas will exceed

1970 projections. The harbor now has a total of 1,660 slips with an occupancy of 1,400 boats, plus another 400 boats in dry-storage. With the addition of approximately 800 slips in the upcoming Phase III of planned harbor expansion, the ultimate population (at full occupancy) will be 2,460 boats moored and, conservatively, another 600 in dry-storage. Add to these figures the expected traffic from the marina residences already completed or approved for construction (400 boat current population with an estimated ultimate total of 800), and the existing/approved facilities represent a potential ocean-going population of 3,860 vessels. Population data from the various harbor components are summarized in Table 8.

TABLE 8

HARBOR/MARINA VESSEL POPULATION

EXISTING AND APPROVED

COMPONENT	INCREMENT	TOTAL
EXISTING HARBOR		
Slips	1,660	
Dry dock	400	2,060
HARBOR EXPANSION		
Slips	800	
Dry dock	200	3,060
RESIDENTIAL MARINA		
Existing	400	
Under construction	400	3,860

CONGESTION

The "Waterway Expansion" report lists a population of 3,000 ocean-going vessels as the beginning point for concern over traffic at the harbor entrance, with serious congestion projected for a population of 4,000 vessels. Serious congestion is characterized by a specific value for a calculated "congestion index." Since the number of tacking sailboats as a percentage of the outgoing fleet

is the most important factor in assessing harbor congestion, a comparison was made between observed boating trends and previously projected characteristics.

The "Waterways Expansion" report made the projection that 57 percent of traffic in the Harbor would consist of tacking sailboats. Various factors are summarized in the following Table.

TABLE 9

PROJECTED HARBOR USE

BOAT CLASS	PROJECTED POPULATION	SUMMER SUNDAY USE FACTOR	TRAFFIC	% OF TOTAL
Power	1100	12.5%	138	20%
Sail	1300	30.0%	390	57%
Outboard	(160)	(100.0%)	160	23%
			688	100%

Source: Moffatt and Nichol Engineers, A Study of the Effects of Waterway Expansion, Channel Islands Harbor, 1970.

OBSERVED USE HABITS

A preliminary field count was made at the harbor entrance on Sunday, July 3, 1977. Observations were made between 1:00 p.m. and 6:00 p.m. in order to observe peak system characteristics during a holiday weekend. A more exhaustive boat count was conducted on Sunday, July 10, 1977.

In the limited observations made during July 3, 1977 the total sailboat population, including both boats tacking and boats under auxiliary power, also comprised 57 percent of the total number of vessels exiting the mouth of the harbor. Of these sailboats, 17 percent were under auxiliary power, while the remaining 83 percent were classified as tacking sailboats. The "Waterways Expansion" study had projected 20 percent and 80 percent, respectively, for these two classes. However, the above figures reflect only data taken between 1:00 p.m. and 6:00 p.m.

The Sunday, July 10, "hard count" is thought to be more indicative of average Summer Sunday conditions in the harbor than the July 3 count, as the latter was made during one of the "big three" boating weekends (Memorial Day, Fourth of July, and Labor Day). July 10 data were taken between 8:00 a.m. and 6:00 p.m. and then projected for a twenty-four-hour period.

The observed harbor use on July 10 was well below that on July 3. The 1:00 p.m. to 6:00 p.m. harbor use[31] on July 3 was 368, and on July 10 was 288. Data for July 10 are summarized in Table 10 in a form similar to the projections in Table 9. Refer to the Supporting Information chapter for vessel traffic counts and hourly distribution.

TABLE 10

HARBOR USE

BOAT CLASS	POPULATION	SUMMER SUNDAY USE FACTOR	TRAFFIC	% OF TOTAL
Power	1000	25.2%	252	42.4%
Sail	1200	24.6%	295	49.7%
Outboard	(47)	(100.0%)	47	7.9%
			594	100.0%

Although power boats were running at double the projected use factor in the report (25.2 percent instead of 12.5 percent), sailboat use was less than projected and the number of outboards observed was drastically below the projection. As a result, overall traffic was lighter than had been anticipated. But the most striking finding is the makeup of the sailboat fleet. The July 10 count showed that 36 percent of all sailboats leaving the harbor were under auxiliary power. Seventeen percent of the sailboats entering the harbor were under auxiliary power, resulting in a weighted overall average of 26 percent under auxiliary power.

[31] Harbor use is defined as 1/2 (outgoing + incoming) traffic counts.

CONGESTION CALCULATIONS

Data collected in field observations have been used to determine the harbor's "congestion index." This number describes the difficulty of navigating the entrance and has units of interferences per acre per hour. It represents the number of times two boats must make evasive maneuvers in order to avoid a collision in the entrance channel. This method of calculation has been derived by Allen L. Ely and John M. Nichol and considers each boat to be a blockading area of specified rectangular size moving along a specified path at a specified speed.[Ref.35] It can be shown that, as a sailboat tacks back and forth across the entrance channel, it creates a path of potential interference to parallel traffic. Any power boat crossing this path may encounter an interference if the timing is right.

A detailed presentation of the derivation of the congestion index formula can be found in the referenced study and is not included here. The index itself is defined as follows:

$$C_I = KQQ_sL_p/W^2V_p$$

where

K = a dimensionless constant obtained from Figure 23

Q = sum of inbound + outbound powerboats per unit time (boats/hour)

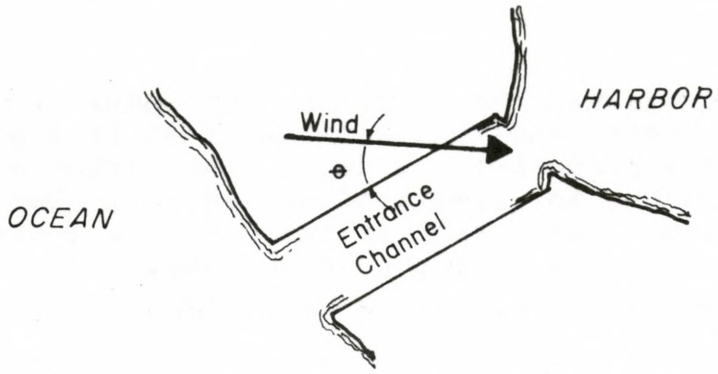
Q_s = number of sailboats per unit time (boats/hour)

L_p = length of powerboat blockading area (feet)

W = navigable width of channel (feet)

V_p = velocity of powerboat (knots)

The congestion index was calculated for various boat populations and wind angles. Note that the wind angle is extremely important in determining the level of congestion. The Channel Islands Harbor entrance is aligned SW to NE, and the wind is generally out of the west. No extensive wind data is available for the area; but an assumed angle of 30° to 40° is a conservative value for calculation of the congestion index. Congestion indices for various wind angles are presented in Table 32 (as part of the discussion of impacts). The index was found to range from 3, for a wind angle of 40°, to 7 when the wind is parallel to boat traffic. These values will increase to 10 and 23, respectively, upon full development of approved facilities.



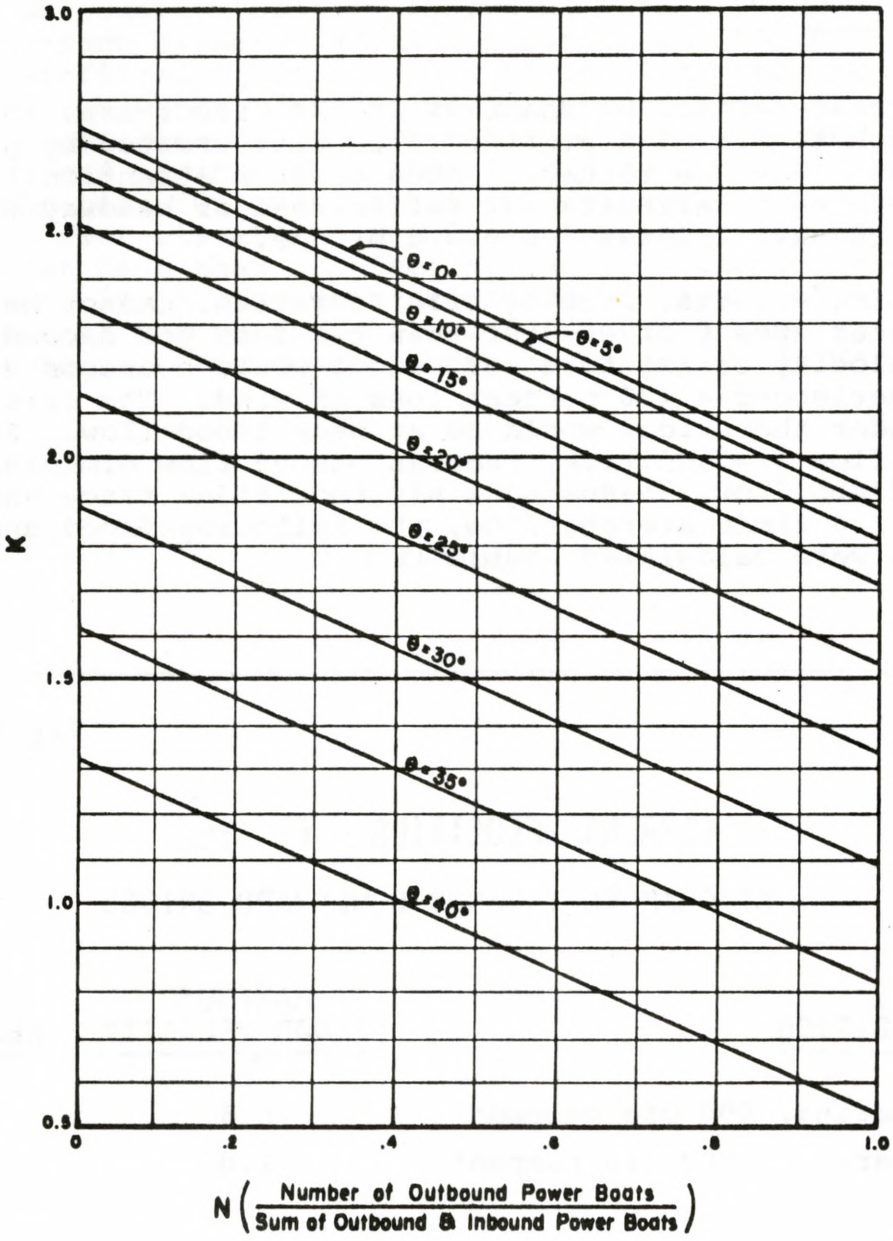


figure **23**

CHANNEL ISLANDS MARINA

'K' AS A FUNCTION OF 'N' AND 'θ'

Reproduced from "Congestion in Small-Craft Harbor Entrance Channels"

It has been suggested that a congestion index of ten indicates the beginning of concern and that a value of 15 is a serious condition. The 800 new slips being added to the harbor's west branch are largely responsible for predicted congestion. The congestion in the harbor at the present time is low but will increase steadily with time and the maturation of the facilities.

Current Velocities

The cross section of channels in the harbor are, in general, large enough to minimize current velocities created by pumped and tidal flows. But one situation does deserve attention. There has been concern that sailboats may suffer loss of headway when passing under the Channel Islands Boulevard bridge.

Paddling efforts, even of brief duration, cannot be expected to produce water speeds of greater than two feet per second. Thus a current velocity of two feet per second would overcome a sailboat having experienced a 100 percent loss of wind. The critical point in time under the bridge would be at peak flood flow. Pumped flow and flood flow are additive, whereas pumped flow diminishes the effects of ebb flow. Assuming a six foot tidal range and a peaking factor of 1.6 times average flow, the following flood and ebb flow velocities were calculated (Table 11).

Table 11

CURRENT VELOCITIES - FT./SEC.

AT CHANNEL ISLANDS BOULEVARD BRIDGE

CONDITION	MAXIMUM FLOOD VELOCITY	MAXIMUM EBB VELOCITY
Existing marina, 500 cfs pumped*	0.5	-0.2**
Existing marina, 3000 cfs pumped*	1.0	0.3

Notes: *Cubic feet per second (cfs). Current and projected maximum powerplant cooling input rates.

**A negative value indicates flow out of the marina

It is interesting to note that when the Edison flow reaches 3,000 cubic feet per second, it will be greater than ebb tide peak flow. Given this situation, the current under the Cannel Islands Boulevard bridge will always be towards the residential marina and away from the harbor proper. Even with expansion of powerplant under usage, current velocities should be less than the two feet per second considered critical to sailboats passing under the bridge.

The bridge channel current was drogue measured on July 15, 1977. The drogue consists of a 30-gallon plastic trash container with numerous one-inch diameter holes cut out of the bottom and sides and a plastic airfilled float attached by cords to the open top. When placed in the water, the drogue is submerged except for the float. Current velocities can be estimated to a fair degree of accuracy by measuring and timing the drift of this apparatus. The tide measured was an ebb tide following a 3.9 feet elevation high tide and preceding a 2.1 feet elevation low tide. Current under the bridge was measured at less than 0.1 feet per second out of the marina. This measurement is in line with predicted ebb flows of 0.2 feet per second out of the marina while a 6.0 feet change in tidal elevation, and corroborates the corresponding computation in Table 11.

CLIMATE

The Oxnard Plain experiences mild weather, described as Mediterranean or dry subtropical. Seasonal differences are minor, but the differences are of sufficient degree to result in greater smog during the months of May through October.

The average annual temperature difference is 12°F (6.6°C); the diurnal range is small, 20°F/11°C, owing to the ability of the Pacific Ocean to act as a local heat sink. The annual mean temperature averages 50°F (15°C). Mean annual precipitation is 14 inches, most of which occurs between November and April.

Large-scale meteorological factors over the Pacific Ocean and the continent determine the climatic factors affecting the ability of the area to disperse air pollutants. From May through October, westerly winds predominate during the day, see Figure 24. (There is a generally incoherent reverse flow at night.) This seasonal period is also noted for the more frequent occurrence of a thermal inversion layer(32) capable of confining air pollutants close to the ground. Typical elevation of the layer is 1,000 to 2,000 feet, but during this generally warmer season, the inversion layer is often found at a lower elevation, further confining air pollutants. Data from weather stations in Santa Monica and Santa Barbara indicate that temperature inversions occur 33 and 41 percent, respectively. [Ref: 33] From November through April, easterly winds are typical, and higher wind speeds also occur. Easterlies blow off the interior deserts. These desert winds can be either hot or cold and they generally have a cleansing effect. Westerlies are relatively moist winds off the ocean and are frequently accompanied by fog conditions. When westerly conditions occur, relative humidity usually decreases with distance inland.

AIR QUALITY

Air quality in coastal regions of California results principally from interaction between climatic factors and local emissions. To a small degree air quality is affected by air pollutants which migrate from more distant areas. The City of Oxnard is under the jurisdiction of the Ventura County Air Pollution Control District.

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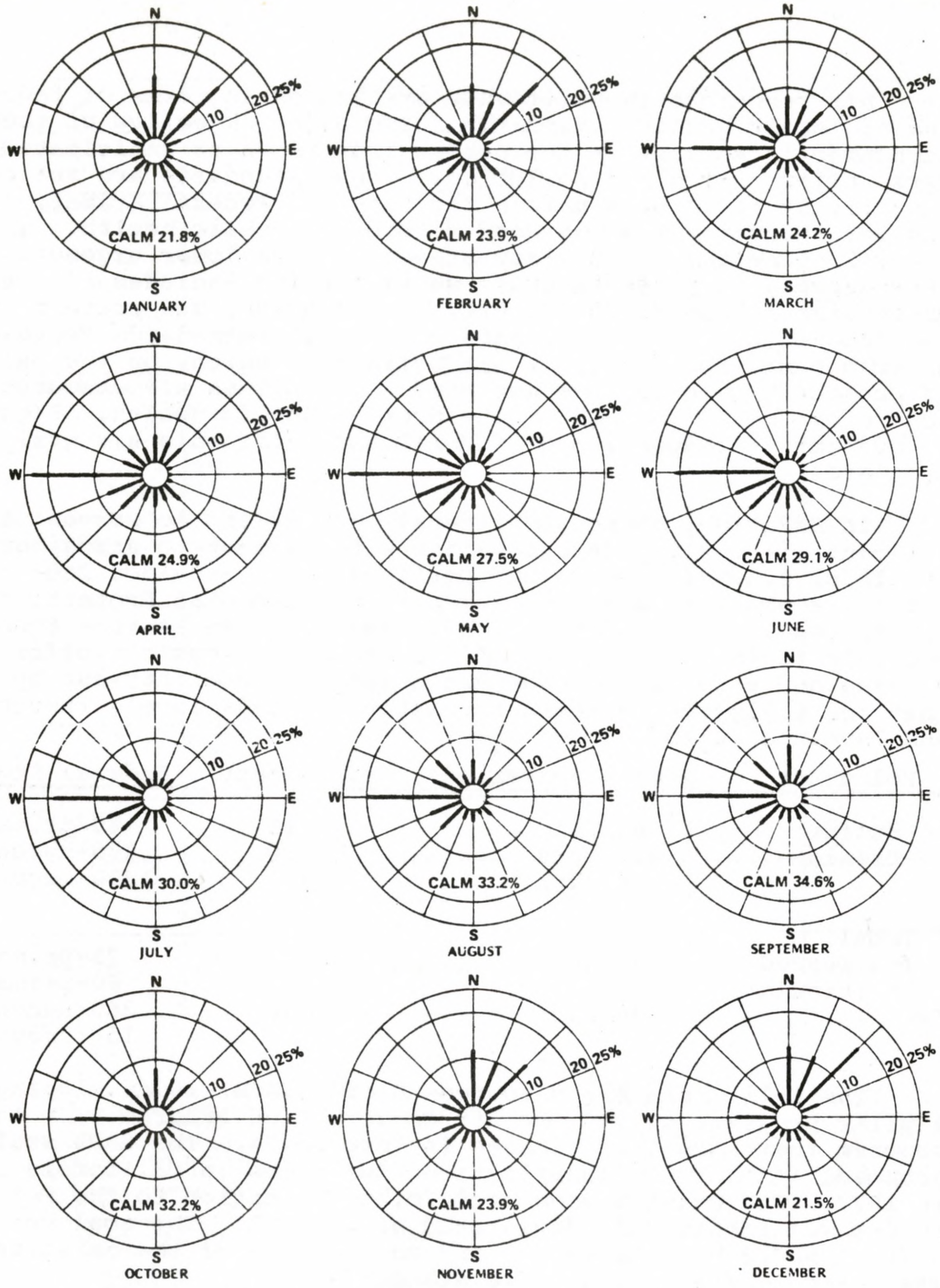
(32) A sudden rise in temperature, contrary to the general decrease in temperature with increasing height above the ground. The thermal inversion layer has a typically low density; polluted air below the layer is too dense to easily penetrate the layer.



Source: Brown and Caldwell, 1974

figure **24**

Wind Roses for Point Mugu

Air resources in California are judged in terms of federal and state air quality standards. The major objective of these standards is to protect the public from known or anticipated adverse effects from air pollution. These standards are set conservatively to allow a margin for safety. Federal Primary Air Quality Standards are designed to protect public health. The Federal Secondary Air Quality Standards have lower urgency. They are designed to protect public welfare which includes, for example, prevention of damage to property by corrosion, and prevention of reduced aesthetics. California air quality standards represent desirable maximum levels of air pollutants which, on the basis of present knowledge, are expected to result in air resources of sufficient quality to generally protect public health. Figure 25 presents a compendium of federal and California air quality standards.

In addition, there are federal regulations to prevent significant air quality deterioration with respect to atmospheric levels of sulphur dioxide and particulates. Provided federal standards are not exceeded, current Environmental Protection Agency regulations allow growth in emissions in Ventura County but only to the point that ambient concentrations of sulfur dioxide and total suspended particulates do not increase by more than the following increments relative to 1974 levels (increments and levels in ug/m^3). (33)

Pollutant	Averaging Period	Increment	Federal Standard
Sulfur Dioxide	Annual	15	80-primary
	24-hours	100	365-secondary
	3-hours	700	1300-secondary
Total suspended particulates	Annual	10	75-primary 60-primary
	24-hours	30	260-secondary 150-secondary

The California Air Resources Board (CARB) is developing a similar program, called the Air Conservation Program. In this program there are four classes (A through D). The CARB staff proposed tentative classifications for areas in California early in 1977. The coastal area from Point Conception to the Mexican Border was tentatively designated as Class D. The goal for Class D areas would be achievement and maintenance of the existing state and federal air quality standards

(33) ug/m^3: millionths of a gram per cubic meter (of air), a unit of concentration by weight measure.

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Oxidant (Ozone)	1 hour	0.10 ppm (200 ug/m³)	Ultraviolet Photometry	160 ug/m³ (0.08 ppm)	Same as Primary Std.	Chemiluminescent Method
Carbon Monoxide	12 hour	10 ppm (11 mg/m³)	Non-Dispersive Infrared Spectroscopy	–	Same as Primary Standards	Non-Dispersive Infrared Spectroscopy
	8 hour	–		10 mg/m³ (9 ppm)		
	1 hour	40 ppm (46 mg/m³)		40 mg/m³ (35 ppm)		
Nitrogen Dioxide	Annual Average	–	Saltzman Method	100 ug/m³ (0.05 ppm)	Same as Primary Standards	Proposed: Modified J-H Saltzman (O_3 corr.) Chemiluminescent
	1 hour	0.25 ppm (470 ug/m³)		–		
Sulfur Dioxide	Annual Average	–	Conductimetric Method	80 ug/m³ (0.03 ppm)	–	Pararosaniline Method
	24 hour	0.04 ppm (105 ug/m³)		365 ug/m³ (0.14 ppm)	–	
	3 hour	–		–	1300 ug/m³ (0.5 ppm)	
	1 hour	0.5 ppm (1310 ug/m³)		–	–	
Suspended Particulate Matter	Annual Geometric Mean	60 ug/m³	High Volume Sampling	75 ug/m³	60 ug/m³	High Volume Sampling
	24 hour	100 ug/m³		260 ug/m³	150 ug/m³	
Sulfates	24 hour	25 ug/m³	AIHL Method No. 61	–	–	–
Lead	30 Day Average	1.5 ug/m³	AIHL Method No. 54	–	–	–
Hydrogen Sulfide	1 hour	0.03 ppm (42 ug/m³)	Cadmium Hydroxide Stractan Method	–	–	–
Hydrocarbons (Corrected for Methane)	3 hour (6–9 a.m.)	–	–	160 ug/m³ (0.24 ppm)	Same as Primary Standards	Flame Ionization Detection Using Gas Chromatography
Ethylene	8 hour	0.1 ppm	–	–	–	–
	1 hour	0.5 ppm				
Visibility Reducing Particles	1 observation	In sufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70%		–	–	–

Source: California Air Resources Board

NOTES:

1. California standards are values that are not to be equaled or exceeded.
2. National standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of Hg (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the Air Resoruces Board to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency (EPA).
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after implementation plan is approved by the EPA.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.
8. Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

figure **25** Ambient Air Quality Standards Applicable to California

Data for 1975 from the Ventura County APCD indicate that 75 percent of reactive hydrocarbons (RHC) and 35 percent of nitrogen oxides (NOx) come from mobile sources. This represents a significant change from 1972 data when 63 percent of RHC and 59 percent of NOx were attributed to mobile emission sources. The major stationary sources of air polluting emissions are two electric power generating stations, petroleum production and storage facilities, and mineral and metallergical industries.

Particular matter and oxidants (ozone) are significant atmospheric contaminants in the Oxnard area. Air pollution concentration levels are monitored at several stations in Ventura County. The closest monitoring station to the proposed development are at Oxnard, Port Hueneme, Point Mugu, and Ventura. Table 12 summarizes available oxidant data for these stations. Table 13 summarizes suspended particulate data. Nitrogen dioxide, sulfur dioxide and carbon monoxide levels have been too low to be considered current problems.

Particulate matter can be traced to stationary source emissions, airborne dust, and secondary aerosols (formed from reactions involving other air pollutants). Mobile sources play only a minor roll in ambient particulate levels.

Oxidants are formed during photochemical reaction involving many air pollutants. Reactive hydrocarbon gases and nitrogen oxides are the key ingredients. Therefore, the automobile is a principal factor in observed oxidant levels. Mobile source emissions in coastal communities give rise to high oxidant values recorded inland; westerly sea breezes carry coastal emissions inland as they react to give peak levels three or four hours later (typically 1-3 p.m.). The maximum oxidant level in 1975 recorded at the Simi Valley Monitoring Station (0.28 ppm) was considerably higher than the maximum level recorded at the coastal stations (0.16 ppm at Ventura and Point Mugu). The assessment is complicated by movement of oxidants from Los Angeles County into Ventura County. Nevertheless, the federal and California oxidant standards allow exceedance of the stated levels (Figure 25) only once each year; these standards will not be met until hydrocarbon emission levels in coastal communities of the county are reduced through automotive control programs.

TABLE 12

DATA ON OXIDANTS (OZONE)*

MONTH/YEAR	PORT HUENEME DSE/DM	PORT HUENEME HVR	POINT MUGU DSE/DM	POINT MUGU HVR	VENTURA DSE/DM	VENTURA HVR
Jan. 1975	- -	- -	1/31	0.16	0/30	0.07
Feb. 1975	- -	- -	0/28	0.07	0/28	0.08
Mar. 1975	- -	- -	1/31	0.08	0/31	0.07
Apr. 1975	- -	- -	0/30	0.07	1/30	0.10
May 1975	- -	- -	1/31	0.10	2/29	0.10
Jun. 1975	- -	- -	1/28	0.10	4/30	0.12
Jul. 1975	- -	- -	4/29	0.11	3/31	0.10
Aug. 1975	- -	- -	0/31	0.08	7/31	0.11
Sep. 1975	- -	- -	4/30	0.11	3/30	0.16
Oct. 1975	- -	- -	6/31	0.12	3/31	0.10
Nov. 1975	- -	- -	3/30	0.10	1/30	0.08
Dec. 1975	- -	- -	1/31	0.09	0/30	0.08
Jan. 1976	- -	- -	5/31	0.10	2/30	0.13
Feb. 1976	- -	- -	5/29	0.12	1/28	0.10
Mar. 1976	- -	- -	4/31	0.18	4/30	0.15
Apr. 1976	- -	- -	1/30	0.13	1/30	0.14
May 1976	- -	- -	2/31	0.10	1/31	0.11
Jun. 1976	4/22	0.21	4/22	0.21	4/30	0.19
Jul. 1976	6/31	0.11	2/31	0.11	2/31	0.10
Aug. 1976	1/30	0.11	2/31	0.13	2/31	0.11
Sep. 1976	4/30	0.11	5/30	0.10	4/30	0.17
Oct. 1976	4/31	0.14	10/31	0.13	7/31	0.14
Nov. 1976	5/30	0.12	4/30	0.13	5/15	0.12
Dec. 1976	6/30	0.12	2/31	0.09	2/31	0.12
	30/204	0.21	68/719	0.21	59/709	0.19

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Notes: * Daily one-hour average maximum reading in parts per million (ppm)

Abbreviations - DSE - Days (0.08 ppm) standard exceeded
DM - Days Monitored
HVR - Highest value recorded, during month

Source: Data collected by Ventura County APCD

TABLE 13

DATA ON SUSPENDED PARTICULATE MATTER*

MONTH/YEAR	OXNARD DSE/DM	OXNARD HVR	PORT HUENEME DSE/DM	PORT HUENEME HVR	POINT MUGU DSE/DM	POINT MUGU HVR	VENTURA DSE/DM	VENTURA HVR
Jan. 1975	2/5	129	- -	- -	0/5	92	2/4	118
Feb. 1975	0/4	96	- -	- -	0/4	84	1/4	122
Mar. 1975	2/6	130	- -	- -	1/5	103	0/6	97
Apr. 1975	1/4	112	- -	- -	0/5	82	0/5	97
May 1975	1/5	114	- -	- -	0/5	84	1/5	102
Jun. 1975	0/6	83	- -	- -	0/5	69	0/5	93
Jul. 1975	0/5	80	- -	- -	0/5	70	0/4	93
Aug. 1975	0/5	69	- -	- -	0/5	72	0/5	96
Sep. 1975	0/5	95	- -	- -	0/5	92	0/5	76
Oct. 1975	0/5	99	- -	- -	0/4	80	0/5	81
Nov. 1975	2/5	109	- -	- -	0/5	95	2/5	146
Dec. 1975	3/5	151	- -	- -	0/5	94	0/4	75
Jan. 1976	5/6	269 (1)	- -	- -	0/6	96	3/6	125
Feb. 1976	1/4	100	- -	- -	0/4	68	1/3	105
Mar. 1976	2/6	115	- -	- -	0/6	93	0/5	99
Apr. 1976	0/5	86	- -	- -	0/4	86	0/5	91
May 1976	0/4	92	- -	- -	0/5	73	0/4	67
Jun. 1976	1/4	105	2/4	153	0/5	88	1/4	108
Jul. 1976	0/5	86	0/4	88	0/5	78	0/5	99
Aug. 1976	0/4	87	1/5	129	0/5	71	0/4	68
Sep. 1976	2/5	127	2/5	134	1/5	104	1/5	123
Oct. 1976	1/5	114	2/5	145	0/5	84	1/5	106
Nov. 1976	0/3	78	1/5	120	1/5	106	0/5	82
Dec. 1976	0/5	82	1/5	103	0/5	91	0/4	84
	23/116	269 (1)	9/33	153	2/118	106	13/112	146

Notes: * Twenty-four hour averaging time
(1) Data may be suspect. The next highest reading was 159.

Abbreviations - DSE - Days (100 ug/m^3) standard exceeded
DM - Days Monitored
HVR - Highest value recorded (during month)

Source: Data collected by Ventura County APCD

NOISE

An ambient noise level audit has been carried out at the site of the proposed development. Ambient noise level recordings were made on the site and at several locations adjacent to the roadways near the site. All measurements were made with a B&K 2209 precision sound level meter calibrated before use. A-weighting and slow meter response were employed for the audit. The sound level meter microphone was fitted with a windscreen and was positioned at an elevation of four feet for all readings.

All sound level measurements were recorded at a distance of 100 feet from the center of each roadway. The acoustic environment was sampled every 10 seconds over a period of approximately 20 minutes to determine an equivalent sound level (leq) for the appropriate time period. A typical urban hourly distribution of total daily vehicle traffic was then used to correct the measurements for the time of day at which they were recorded. These corrected equivalent sound levels were then used to calculate Community Noise Equivalent Level (CNEL) values for each of the measurement locations. The Community Noise Equivalent Level is the average (i.e., average on an energy basis) noise level measured in A-level for a 24-hour period with different weighting factors for the noise levels occurring during the day, evening and nighttime period. Evening (1900-2200) and nighttime (2200-0700) events are increased in level by 5 and 10 dB respectively to account for the lower tolerance of people to noise during those time periods. The results of this audit are shown in the following Table.

TABLE 14

COMMUNITY NOISE EQUIVALENT LEVELS

AT 100 FEET FROM ROADWAY CENTERLINE

ROADWAY	CNEL-dB
Victoria Avenue	58.3
Channel Islands Blvd.	68.0
Harbor Blvd.	69.6

Once the basic CNEL values were determined for distances of 100 feet from each roadway, propagation calculations were carried

out to determine distances from each major roadway to CNEL values of 65, 60 and 55 dB. The results of these calculations are given in Table 14. No shielding from existing terrain was assumed in the calculations. A standard propagation loss of 4.5 dB per distance doubling was used to account for geothermal spreading loss and ground attenuation. (This propogation loss rate applies to level ground with average sound absorption by ground surface and coverage. [Los Angeles City EIR Manual For Private Projects])

TABLE 15

DISTANCE TO CNEL CONTOURS - FEET*

ROADWAY	CNEL 65	CNEL 60	CNEL 55
Victoria Avenue	35	73	166
Channel Islands Blvd.	159	343	741
Harbor Blvd.	203	439	948

Notes: *All distances measured from centerline of roadway.

The results of the audit established that the primary source of noise impacting the proposed site is traffic along Harbor Blvd. Existing traffic volumes on Victoria Avenue and Channel Islands Boulevard generate noise levels at the site well below those from traffic on Harbor Boulevard. This is primarily due to the relatively large distances separating the site from Victoria Avenue and Channel Islands Boulevard. CNEL contours, based on the distances given in Table 14 are shown on the composite site plan in Figure 26. As can be seen from the contours shown in the figure, noise levels at the site resulting from existing traffic conditions are well below CNEL 55.

The EIR on Mandalay Beach prepared for the City of Oxnard by Haworth/Anderson/Lafer in April of 1977 indicates that the present traffic volume on Harbor Boulevard of 11,000 ADT will increase to an estimated volume of 24,400 ADT in 1980. This increase in traffic volume will increase noise levels by 3.5 dB. At the assumed propagation loss constant of 4.5 dB per distance doubling, this would have the effect of increasing the distance from the roadway to each constant noise level contour by a factor of 1.7.

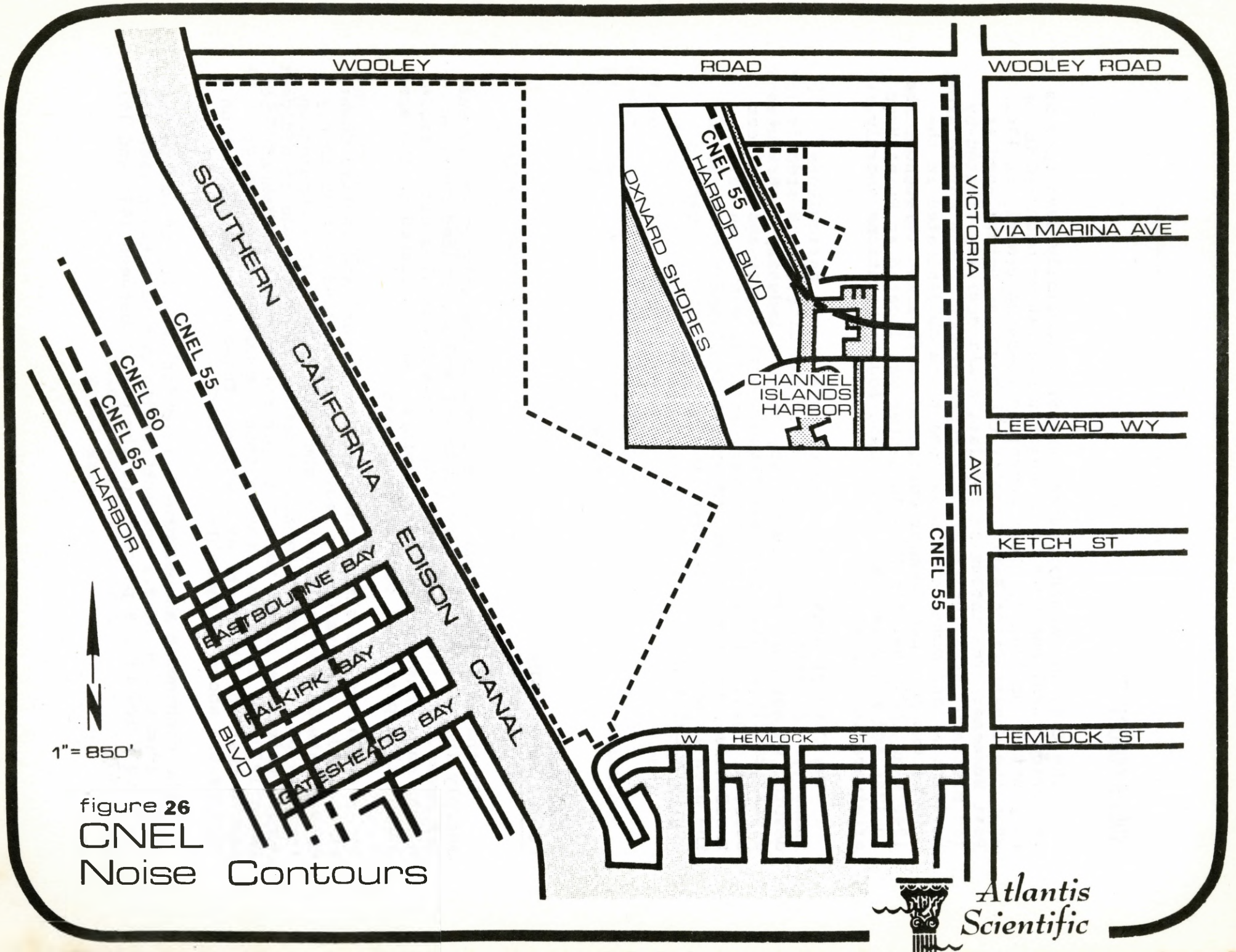

figure **26**

CNEL Noise Contours

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The City of Oxnard, founded in 1898, initially developed as an agricultural community. No major urbanization occurred in the City until the 1940's. Development accelerated greatly in 1942 when the Construction Battalion of the Navy was established at Port Hueneme. The influx of population and activity created by the military installation brought rapid growth to the entire area. Residential and commercial development was concentrated in the City of Oxnard. Development continued to flourish throughout the 1940's as the Naval Air Missile Center was located at Point Mugu in 1946 and the Oxnard Air Force Base began operations shortly afterward in Camarillo.

The City of Oxnard still supports a strong agricultural industry. Slightly over 50 percent of the City's land area is devoted to agricultural production, and the industry contributes significantly to City revenues through both direct and indirect sources. Oxnard today is, however, an urban center as well. Residential, commercial and industrial development continue and the area is one of the fastest growing population centers in Southern California.

DEMOGRAPHICS

POPULATION TRENDS

In the 1940's the population level in the City of Oxnard was sharply increased by military personnel and associated civilian employees. A significant population growth was also attributable to the many construction trade employees who relocated to the area during this period of construction boom.

Population has almost quadrupled in Oxnard and Ventura County since 1940. Ventura County registered the second fastest county growth rate in the state during the 1960's, showing a population increase of 89 percent. Oxnard's population growth was significant during this same period with a 77 percent increase evidenced. Between 1970 and 1974, the Ventura County growth rate was still double that for the state as a whole. These historic population figures are shown in Table 16.

The compounded annual growth rate for the City of Oxnard has varied from a high of 8.1 percent for the period between 1960 and 1964, to a low of 3.9 percent for the period between 1970 and 1975. [Ref: 67]

TABLE 16

HISTORIC POPULATION TRENDS

VENTURA COUNTY/CITY OF OXNARD

	1950	1960	1970	1975
Ventura County	114,647	199,138	375,497	440,459[1]
City of Oxnard	21,567	40,265	71,225	85,400

Note: [1] 1974 figure
Source: U.S. Department of Commerce, 1972; County of Ventura, 1974; California Department of Finance, 1976.

Oxnard is within Ventura County's Regional Statistical Area Three (RSA III) which encompasses the Cities of Port Hueneme, Camarillo, and adjacent unincorporated areas as well. The City's population growth rate is compared to RSA III in the tabulations which follow:

	1970	1975	Annual % Increase
City of Oxnard	71,225	85,400	4 %*
RSA III	136,540	155,400	3 %*

* Percentages rounded to nearest whole number.

POPULATION PROJECTIONS

Population increases on a reduced scale are forecast for both Ventura County and the City of Oxnard. Estimates for future population increases range from 3.0 to 4.0 percent per annum and are indicative of several trends including:

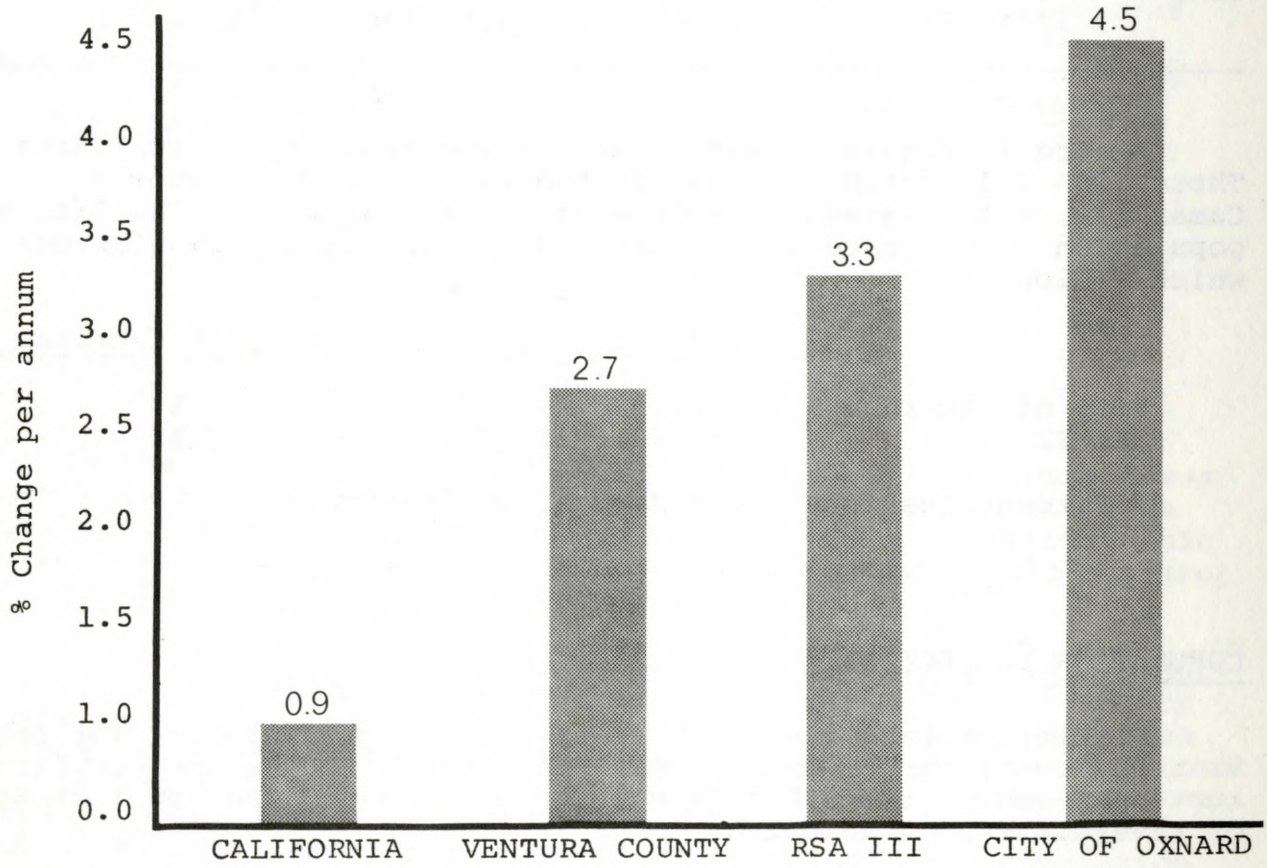
- Lower net in-migration
- Lower birth rates (decreased family size)
- Increased migration to rural areas

The population projections prepared by the Ventura County Planning Division show that the County will continue to grow more rapidly than the state as a whole. The County is expected to represent ± 2.7 percent of total state population by 1990, as compared to a 1.89 percent share of state population in 1970. RSA III is expected to exhibit a growth rate comparable to the County projections, with the City of Oxnard accounting for a major portion of the increase. Population growth projections for California, Ventura County, RSA III and the City of Oxnard are displayed in Chart 1.

CHART 1

COMPARISON OF POPULATION GROWTH PROJECTIONS

(ANNUAL PERCENTAGE INCREASE 1975-1990)



Source: California Department of Finance, 1976; Ventura County Planning Department

Population Characteristics

Typical of most growing areas, the median age of Oxnard's population is comparatively young. Median age for California residents as a whole, Ventura County residents and residents of the City of Oxnard compare as follows:

California	28.4 years
Ventura County	25.1 years
City of Oxnard	23.4 years

The age distribution of the population has remained relatively consistent during the last several years. The most notable change has been registered in the 30-39 year old age bracket which showed an increase of 32 percent between 1970 and 1975. Comparison of population levels by age category are presented in Chart 2. Sexual distribution of the population is nearly balanced.

Population density in Oxnard remains below the County figure despite the continued urbanization which is occurring. Density levels are presented in Table 17 for Oxnard and slected areas.

Table 17

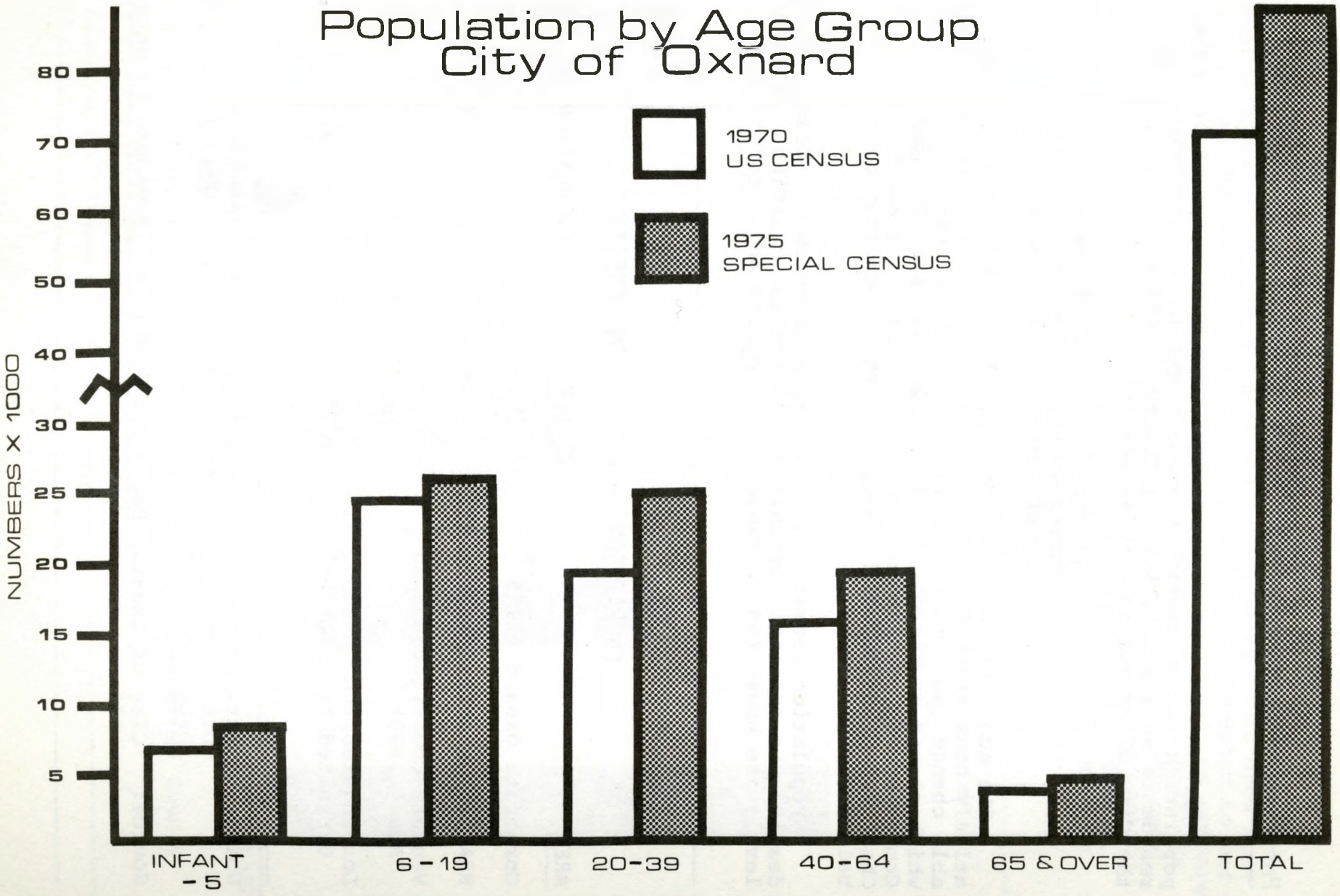
COMPARISON OF POPULATION DENSITIES

AREA	SIZE (SQ.MILES)	POPULATION/SQ. MILE
Corporate Oxnard (1975)[1]	22.8	3,733
RSA III Urbanized Area (1973)[2]	2 .8	6,253
Ventura County Urbanized Area (1970)[2]	71.9	5,776
Los Angeles/Long Beach Urbanized Area (1970)[2]	1572.0	5,313

Notes: [1] Data from City of Oxnard, 1975 State Special Census
[2] Data from U.S. Department of Commerce, County and City Data Book, 1972

Source: City of Oxnard, Basis for Planning: Economic Potential, 1975.

Population by Age Group
City of Oxnard



Channel Islands Census Tract

The Mandalay Bay (Phase IV) development would be within census tract number 36.01 designated as the Channel Islands Tract. The 1970 Federal Census recorded the population of this Tract at 3,774. In 1975, the State Special Census listed population of the tract at 4,917. This increase is equal to a per annum rise of 6 percent during this five year period.

The increase in the number of housing units has been more rapid than population gains for the Channel Islands Tract. In 1970 there were approximately 1,835 housing units existent within the tract. By 1975, this number had risen to ± 3,092 for a 68 percent gain in housing inventory.

Economics

Business Activity

The economy of the Oxnard region is based principally upon agriculture and agri-business. However, during the last decade a growing trend toward commercial/industrial development has occurred which promises to diversify and strengthen the City's economic base in keeping with the goals of the General Plan.

Oxnard and Ventura County have consistently had unemployment levels lower than the state average. For example, in 1975, the County's 9.3 percent unemployment compared to the state level of 10.2 percent.

Total employment in nonagricultural industries in Ventura County has shown steady increases since 1970. Employment in the service industries, including trade, the finance group, services and government has risen the most dramatically showing a 20 percent increase from 1970 to 1974.

City Revenues

Property taxes represent the single most significant source of revenue for both the Ventura County government and the City of Oxnard. For the County as a whole, current assessed valuation is approximately $1.6 billion, a figure $256 million higher than the valuation represented in the 1973-1974 tax year. Total combined property tax rates in the Oxnard area have increased from $10.72 per $100 assessed valuation in the tax year 1973-1974 to $10.95 in the 1975-1976 tax year.

Assessed valuations, tax rates and revenues for the County and City are compared in Table 18

TABLE 18

COMPARISON OF PROPERTY TAXES

	Assessed Utilities ($000)	Valuation Total ($000)	Total Tax Rate (Per $100)	Total Revenue by Taxes[1] ($000)
Ventura County[1]				
1975-1976 adopted	124,389	1,609,410	2.7993	44,778.4
1974-1975 actual	123,331	1,498,574	2.4939	35,321.0
1973-1974 actual	117,027	1,353,099	2.4091	30,866.3
Oxnard[2]				
1975-1976 adopted	55,456	288,853	1.6900	4,774.2
1974-1975 levy	52,854	270,254	1.5981	4,297.5
1973-1974 actual	52,000	249,708	1.5900	4,007.7

Notes: [1] Data from County Auditors Office, County of Ventura.
[2] Data from Annual Operating Budget and Capital Improvement Program, Oxnard, 1975-76.

Source: Socio-Economic Systems Inc., Environmental Impact Report for the Proposed Oxnard LNG Facilities, 1976.

Sales tax subventions are an important revenue source for the City of Oxnard. One cent of the six percent sales tax collected by the State of California is returned to the City. As retail activity in the City has escalated, this source of revenue assumes increasing proportions. In the six year period from 1970 through 1975 this revenue source has increased by over 50 percent from $1.8 million to $2.9 million.

Personal Income

Income statistics are generally compiled on a household basis regardless of the number of wage earners who may be contributing to the total income figure. Within the City of Oxnard, median household income for 1975 was recorded at $10,390. This figure represents a 25 percent increase over the 1970 median income for City households. However, during this same period the National Consumer Price Index rose by 35 percent; therefore, net buying power of Oxnard residents diminished. Median household income in Oxnard is more than $4,000 below the County median.

The comparatively low family income in Oxnard does not translate to reduced expenditure patterns. On the contrary, the low income level means that the majority of income is expended on durable and non-durable consumer goods. Less than 25 percent of the figure is directed to federal taxes, savings and investments for the average Oxnard family. On a per capita basis it is estimated that Oxnard residents spent $3,018 on retail sales during 1972. Using the Oxnard average of 3.76 persons per household, this would translate to an average annual household expenditure of $11,347, a figure higher than average household income. If inflationary factors are considered in adjusting this figure to 1977 levels, it can be estimated that the average household expends over 90 percent of their yearly income on consumer items.

PUBLIC SERVICES

Public services are well developed throughout Oxnard. In the vicinity of the project site, a full range of services is represented. The Table which follows presents a brief overview of the public service systems which would be required by the proposed development. The following Chapter provides a detailed description of each service category.

TABLE 19

OVERVIEW OF PUBLIC SERVICES

- CITY OF OXNARD -

SYSTEM	PRINCIPAL RESPONSIBILITY
Utilities:	
Electrical	Southern California Edison Company
Gas	Southern California Gas Company
Water	Oxnard Utilities Division
Maintenance:	
Sewage	City of Oxnard, Department of Public Works, Wastewater Division
Solid Waste	City of Oxnard, Department of Public Works, Refuse Division
Storm Drains	Ventura County Flood Control District
Communications:	
Telephone	General Telephone Company of California
Public Protection:	
Health Care	St. Johns Hospital, Oxnard-plus others
Police	City of Oxnard, Police Department
Fire	City of Oxnard, Fire Department
Other Services:	
Schools	Oxnard School Districts, Ventura County Community College Division
Transportation	South Coast Area Transit
Community Facilities	Ventura County and City of Oxnard (libraries, parks, etc.)

The project site, Mandalay Bay Tract 2026-4 is situated in the western portion of the City of Oxnard, California. The property is roughly rectilinear in shape, grossly oriented in a north-south direction. Its western boundary is formed by the Southern California Edison Canal. The northern project border is Wooley Road and the southern boundary is in proximity to Hemlock Street. A major traffic arterial, Victoria Avenue, is located approximately one-half mile to the east of the proposed development. The eastern extent of the site is poorly defined since it is presently under cultivation. The exact boundary was not identifiable, so additional area was surveyed to ensure total coverage of the project site.

Physiographically, the property lies within the Transverse Mountain province called the Ventura Basin. [Ref.34] A sub-component of the basin is the Ventura-Oxnard Plain which extends from near Calleguas Creek on the south to north of the City of Ventura. The subject property is located within the Oxnard Plain, the southern half of the Ventura-Oxnard Plain. The Santa Clara River serves as the geographic boundary between the Ventura and Oxnard units.

The area which encompasses the subject property is flat and undissected by creeks or intermittent streams. It is also not in proximity to the coastal exploitive area; therefore, theoretically, it is not to be expected that the area would contain a high probability for discernable archaeological resources. Any aboriginal activity on the property would probably have been limited to that of a transhumance or temporary exploitive nature.

Archaeological And Historical Setting

Since the 1920s scientific research has been directed toward the reconstruction of California's culture history. In 1929 Rogers authored his reference Prehistoric Man on the Santa Barbara Coast [Ref:78] based upon extension excavation within coastal Santa Barbara County. [Ref:55] Numerous attempts have been made since that time to organize cultural and temporal sequences and to understand the subsistence and settlement patterns, economy, and general cultural sequences of the Southern California region.

Based upon the currently available information there is no evidence which would support an "Early Man" or Paleo-Indian phase of cultural history in and around the Oxnard Plain. These sites, though, have been proposed to exist in San Diego and Imperial

Counties and on Santa Rosa Island [Refs: 65 and 8]. The earliest known sites in Ventura County, or expected in the Oxnard area, represent the Millingstone Horizon and are sites which, on the coast, represent a hunting-gathering subsistence mode. Research on Millingstone Horizon sites has been undertaken at Zuma Creek [Refs: 72 and 79] Parker Mesa [Ref:52], the Tank Site [Refs: 85 and8], and the Browne Site [Ref: 96]

Permanent aboriginal occupation on the Ventura County coast began about 7000 B.P. (years before the present), and continued until California became permanently settled by European settlers. The archaeological cultures which occupied the Ventura coast have been termed the Millingstone Horizon, Intermediate Cultures, and Late Prehistoric Cultures by Wallace [Ref: 39]. Each has distinctive archaeological traits.

The oldest, the Millingstone Horizon (Wallace's Early Milling Horizon) dates from 7500 years B.P.-3000 B.P. and is found throughout coastal Southern California [Ref:29] and Baja California [Ref: 59]

The Millingstone Horizon peoples (such as those at Little Sycamore, Oak Grove, Malaga Cove II, Scripps Estates, Rancho Park North, and the Browne Site) shared a mano-metate grinding stone technology, produced few projectile points, buried their dead by inhumation, and practiced a semi-rota system of resource exploitation. Economic dependency was based upon shellfish and plant gathering rather than hunting [Ref: 97]

About 4500 B.P. extensive exploitation of maritime resources (shellfish plus the addition of fishes) began in earnest. The resultant archaeological record indicates that tool technology responded to different exploitive needs and became more specialized [Refs: 5 and 39]

By the advent of the Late Horizon cultures diversified subsistence exploitation occurred. As Leonard [Ref:55] states "The Late Horizon represents the greatest density of occupation...on the coast, village sites occur at the mouths of large canyons such as those located at Malibu, Arroyo Sequit, Big Sycamore, and Mugu at the mouth of Calleguas Creek."

The Late Horizon is concomitant with the linguistic term Chumash as applied by Kroeber to the people who primarily inhabited western Ventura County and the three northern larger islands of the Santa Barbara archipelago [Ref: 53]. Kroeber subclassified these people as the Ventureno Chumash, indicating that they were associated with the mission of Buenaventura, after Spanish contact.

The Chumash had developed a complex social system which maintained reciprocal trade with the Channel Islands [Ref:29] and

based upon collections observations from the Batiquitos Lagoon area, may have traded steatite to the San Diego County Coast. Recently burials overlain with whale bone and containing steatite have been located on Camp Pendleton and have been dated at 2070 B.P. [Refs: 50 and 37] This would tend to indicate that during the Late Horizon the Chumash had developed an extensive and elaborate trade network outside their linquistic domain. The group also developed skilled techniques for working bone, shell, and wood, used asphaltum as a mastic, and lived in rank-status oriented communities.

In 1542 Juan Rodriguez Cabrillo sailed into the waters off Point Mugu and began the era of Euro-aboriginal contact. Vizcaino again foraged into the Mugu area in 1602 [Ref: 32]. After that it was nearly 150 years before recorded contact was made between the Europeans and the Chumash. In 1769 Portola passed along the northern foothills of the Santa Monica Mountains [Ref: 82] On August 13 his party explored the area drained by the Santa Clara River looking for a mission site [Ref: 82]. Two Spanish expeditions led by Anza passed through the area in February and August 1977 [Ref: 9].

Based upon Portola's recommendations, and those of Father Serra, the Mission San Buenaventura was established in 1782 near the mouth of the Ventura River.

For nearly 40 years the Mission San Buenaventura was a prosperous community. By using the local Chumash as servants, laborers, and domestics, the missionaries were able to develop a self-sufficient mission at a time when limited assistance was coming from Spain.

After the Mexican revolution, between 1825 and 1850, huge land grants were awarded as rewards for political favors throughout California. One of these encompassed the subject property. It was the 45,000 acre Rancho El Rio de Santa Clara o La Colonia [Ref: 7]

During the Early American period, from 1850 to 1900 towns were built where Indian rancherias had been situated. Most of Southern California developed in this manner as can be seen in some of our city place names. Ventura County was utilized for agricultural production. In 1897 the Oxnard brothers built a sugar beet refinery in present Oxnard. Two years later the community was begun and incorporation as a city occurred in 1903 [Ref:77]. Throughout the twentieth century Oxnard has slowly been modified from an agriculturally-oriented community to one which now has a diverse community structure.

The subject property, though, is still devoted to agricultural pursuits. A house, built approximately 80 years ago and moved to the McGrath Ranch approximately 30 years ago is located nearly

one-half mile east of the property. It serves as farm headquarters for agricultural production on approximately 500 acres of adjacent cultivated land.

Survey Results

Two archaeologists walked the ±82 acre parcel of agricultural land beginning at the northwest corner of the property and terminating at the southwest corner. Due to agricultural cultivation, care was taken so as not to disrupt the field crops. A modified survey course was followed. The two surveyors spaced themselves four furrows apart and walked in a generally east-west direction. All of the ±82 acres were surveyed in this manner which insured that a complete ground survey was completed. All drainage ditches, canals, berms, and the surface of all access roadways were also carefully inspected for any cultural resources.

Presently beans, tomatoes and flowers are cultivated on the subject property and have been so cultivated during most of the twentieth century. Bees are also maintained on the property for the purpose of pollination. Due to this activity only a limited array of cultural resources were found on the property, and all of these are recent. Along the Southern California Edison Canal and Wooley Road a few cans, paper, beverage bottles and miscellaneous trash can be seen. Occasionally similar types of material was found in the agricultural field.

No aboriginal sites or artifacts were found on subject site. In discussing the history of the property with Mr. Jim McGrath, it was learned that approximately ten years ago a single, small, portable mortar had been recovered from the area near the subject property, but he could not recall if the artifact had indeed been located on the project site, however, in all the years his family has had the farm he does not remember having found any other artifacts on the entire 500 acres under McGrath ownership. It is unlikely that any artifacts or any site does now or has ever existed within the Mandalay Bay Tract 2026-4 property. The project would, therefore, impose no impacts on archaeological/paleontological resources.

Results of the Institutional Record Check

A record search was requested from the Institute of Archaeology at the University of California, Los Angeles. The letter indicated that the nearest aboriginal site is approximately seven kilometers

east of the subject property. Mr. Robert Hoover indicates that the Rancheria de Ishgoa (Jysha or Igsha) was located three to four kilometers north of the project area.

"There are currently no archaeological sites recorded within the boundaries of the project area. One site, Ven-506, was recorded by R. Lopez this year. The site is a cemetery located in an orchard. This is the only archaeological site recorded on the Oxnard topographic quadrangle. The site is situated some 7 kilometers east of the project area. The Olivas Adobe is located 6 kilometers north of your study site. The adobe is a California Historical Landmark, and dates to the American era (ca. 1848-1900) in the Oxnard area. The only other reference of interest is a notation by Robert Hoover to the Rancheria de Ishgoa (Jysha or Iqsha) in an area some 3-4 kilometers north of the project site." (34)

(34) Letter from Martin D. Rosen, Survey Archaeologist, University of California, Los Angeles. Archaeological Survey.

ENVIRONMENTAL IMPACT

Atlantis Scientific

V

ENVIRONMENTAL IMPACTS

INTRODUCTION

The principal impact associated with the proposed Mandalay Bay, Phase IV development plan would be the conversion of agricultural land to residential use. The potential ramifications of converting the property to a higher use in terms of the future growth and development of the City are examined in depth in this Chapter.

Data is also provided on other measurable impacts which would occur on the site and within the surrounding region if the residential development plan for Mandalay Bay, Phase IV were implemented. Quantification is provided whenever possible. Mitigating measures are presented for impacts assessed to be potentially adverse. Identified impacts which could not be effectively mitigated are also discussed.

LAND USE

Agricultural Conversion

The viability of continuing agricultural activity on the Tract 2026-4 property would be diminished by several factors affecting short and long-term productivity. Such factors would include:

- Decreased crop yield
  - loss of fertility
  - crop damage due to environmental factors
- Economic loss through theft or vandalism
- Diminished economic return due to acreage size

¶ Increased tax burdens to land owners

There is no evidence to suggest that the acreage is diminishing in productivity due to general climatic factors or lack of soil fertility. The soils throughout the Oxnard Plain are well suited for agricultural production. (It is also important to note that crop damage due to air pollution is comparatively low in the Oxnard region.) Climatic conditions are unique and ideal for agricultural production due to the relatively stable temperature and the virtual absense of frost. The agricultural significance of the moderate temperatures and 365-day growing season of the Oxnard Plain is two-fold.

(1) harvesting of certain crops can take place throughout the late fall, winter and early spring, which in effect expands the annual yield per acre, and

(2) harvesting of both warm season crops and cool season crops is possible during the late summer and fall, which makes it possible to supply markets at periods when other agricultural acres are not producing. [Ref: 105]

The climatic conditions also result in a lower rate of evapotranspiration so that water requirements are less than that on a comparable amount of acreage, growing the same crops, at an inland location. [Ref: 105] However, the status of water supplies throughout California is a critical question. There is documentation to support the conclusion that the quality of water available for agricultural irrigation is diminished and water supplies have been significantly decreased due to drought conditions. Many measures can be implemented to reduce agricultural water consumption and/or improve the quality of available water (deep water wells, use of reclaimed water, drip irrigation systems, etc.) (35) However, these measures require increased investment and may involve continued higher costs not easily absorbed by the agricultural community. [Ref: 105]

Agricultural acreage maintained within an urban area is subject to special problems. The proximity of residential development is believed to be the basic causative factor leading to an increased incidence of minor theft and vandalism at the site. Although individual incidents are generally minor in terms of property damage and/or monetary loss, the cumulative impact is more significant.

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(35) Drip irrigation systems can be used to decrease damage due to drought conditions.

Similar patterns have been reported in many agricultural areas of the County when more intensive forms of development are sited immediately proximate to agricultural lands. (36)

The amount of contiguous acreage available for agricultural production at a given site is especially important in terms of economic viability. The parcel is currently assessed to be marginal in terms of return on investment and conversion of the 83 acre Tract 2026-4 land to residential use would certainly diminish the feasibility of maintaining the adjoining 130 acre parcel in cultivation. In this context, approval of the development plan could be considered as determining the future use of over 200 acres of agricultural land rather than of only 83.

All of the factors enumerated here are closely linked to economics, and indirectly associated with the tax burdens placed upon agricultural land. The economics of land use is, therefore, an issue in determining the viability of continuing agricultural production on the site.

Economics of Proposed Land Use

Introduction

The purpose of this section is to explore the economic consequences of development or non-development and alternative forms of land use. The alternatives considered include:

- Agriculture
- Coastal Recreation and Coastal Dependent Industry
- Residential Development
- Non-Devlopment
- Residential/Marina Development

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(36) Personal Communication: Ventura County Farm Bureau (October, 1977)

AGRICULTURE

Agriculture has exerted a predominate influence on the development of the Oxnard Plain. Agricultural activity in Ventura County began to accelerate in the early 1900s when large-scale irrigation systems became available. As urbanization increased, the character of agricultural production changed. The pattern changed from extensive (low yield/acre) to intensive (high yield/acre) production. Within the area identified as the Oxnard Plain, 70 percent of total acreage (66,836 acres) is currently devoted to agricultural land use, according to the recent study conducted by the South Central Coast Region, California Coastal Commission. [Ref: 105]

The Oxnard Plain has contributed significantly to agricultural production in the State of California and was a leading State producer in several crops as shown in Table 20.

TABLE 20

PRINCIPAL CROPS, OXNARD PLAIN

COMMODITY	STATE RANKING	% OF NATIONWIDE PRODUCTION
Beans, Fordhook green lima	1	73
Beans, Snap (fresh)	2	*
Broccoli	3	*
Cabbage	1	*
Cauliflower	4	*
Celery	4	26
Cucumbers	1	*
Lemons	1	29
Peas, green	2	8
Peppers, bell	1	N/A
Peppers, chili	2	N/A
Spinach, fresh	1	20
Strawberries	2	5
Tomatoes, fresh	6	*

NOTES: * less than 5%
N/A - not available

SOURCE: California Coastal Commission, Analysis of Agriculture on the Oxnard Plain, 1977.

The value of Ventura County agriculture business is significant as seen by the following Table.

TABLE 21

VENTURA COUNTY AGRICULTURAL PRODUCTION DOLLARS

($ THOUSAND)

CROP	1968	1972	1973	1974
Fruit and Nuts Crop	91,318	105,000	144,835	142,244
Vegetable Crops	35,027	73,300	75,918	83,303
Field Crops	12,262[1]	5,700	9,139	9,018
Livestock, Poultry, and Dairy	22,219[2]	26,700	34,942	55,252
Nursery Stock		7,300	9,275	12,658
Cut Flowers		2,100	3,168	3,209
Apiary Products		200	547	355
Total	160,826	220,300	275,027	306,039

Source: Security Pacific National Bank, Economic Research Division

[1] Includes nursery stock and cut flowers.

[2] Includes apiary products.

Total estimated employment within Oxnard and vicinity, as reported on the Ventura County Environmental Resource Agency report was 80,303. Of this total, 18.59 percent were employed in agricultural and directly related agricultural services.

The Ventura County Planning Department conducted a 1970 study to determine the impact of converting agricultural land to alternative patterns of growth through a cost/benefit analysis. Their study concluded that "---in terms of costs and revenues to be derived from an acre of land, agriculture is more of an asset to local government than the other land uses," (37) which included residential, industrial and commercial. "It can be seen that agriculture is the only land use that pays for itself when industrial and commercial property is given

(37) Ventura County Planning Department. The Economics of Conserving Agriculture in Ventura County, 1970.

a cost based in total urban expenditures by government," the report concludes.(38) The report arrives at this conclusion based upon an assumed "multiplier" of through-put production which has the effect of deriving income in the various stages of cultivation to consumption of agricultural products.

The conclusion ignores several important factors such as an individual resident's contribution to Federal and State taxation during their productive life. As a source of revenue, this contribution offsets some incremental burdens. Residential development - although a prime contributor to educational costs - is a major source of educational funding. Whereas agriculture has no direct costs to schools and contributes some revenues to this fund. Presumably, education is a positive contribution to social welfare which would necessarily continue regardless of conversion or non-conversion of agricultural lands.

A more recent study prepared under the direction of the California Coastal Commission, South Central Coast Region measured the economic interdependence of agricultural sectors within the regional economy by the means of an input-output (I-O) model. [Ref: 105] It was determined that agricultural services, strawberry, citrus, multiple crop vegetables, processed fruits and vegetables and specialty crops had the greatest impact on the regional economy. The highest input multipliers were attributed to citrus, multiple crop vegetables, specialty crops and strawberries.(39)

This economic interdependence may be termed as an "associated benefit" of agricultural land use. The benefit being support of related services and industries, induced employment, etc. Although residential development may produce an equally important associated benefit to the regional economy, it could not be considered so in the broad sense of land use. For example, a new resident to the community could establish a business or industry creating jobs for local residents and increasing the local economic base. However, this same new resident could seek employment within the agricultural service industries drawing upon the established strength of this sector of the economy and providing no associated benefits to the regional economy by virtue of his/her residency.

Another important factor, in terms of the land use economics associated with the subject property, is the amount of acreage involved. If the amount of land devoted to cultivation falls below accepted limits, production/management costs outweigh farm income and property/personal tax obligations produce extreme financial

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(38) Ibid.

(39) A full explanation of the method of analysis may be found in the referenced study. [Ref: 105]

burdens on land owners. In conjunction with the Coastal Commission report cited previously, a study was conducted to determine the minimum acres of land required by commercial growers to profitably grow various crops. The results of their analysis are summarized in the following Table.

TABLE 22

MINIMUM ACREAGES FOR CROPS

CROPS	LAND USE	VALUE PER ACRE	COST PER ACRE	INCOME PER ACRE	MINIMUM ACRES
Cabbage	5 months	$1386.89	$1666.11	$(279.22)	****
Cannery Tomatoes	7 months	1178.83	1021.16	157.67	51.80
Cauliflower	5 months	2005.77	2168.66	(162.89	****
Celery	6 months	4070.80	3988.62	82.18	85.18
Green Lima Beans	6 months	552.25	459.60	92.65	75.55
Head Lettuce	4 months	1686.27	1533.35	152.92	30.52
Large Lima Beans	7 months	559.60	427.73	131.87	61.93
Lemons	12 months	3484.24	2861.00	623.24	22.46
Pole Tomatoes	7 months	5249.40	6035.25	(785.85)	****
Processed Broccoli	5 months	636.42	761.62	(125.20)	****
Processed Spinach	3 months	435.39	398.53	36.86	94.95
Strawberries	12 months	14,500.55	12,200.00	2,300.55	6.09
Sugar Beets	8 months	825.04	720.07	104.97	88.91

Source: California Coastal Commission, South Central Coast Region. Analysis of Agriculture in the Oxnard Plain and the Urban/Rural Interface. 1977

The acreage in question (approximately 83 acres) is near to the limit of economic feasibility for several crops. And, it should be noted that the estimates tabulated here do not take into account management costs which are estimated at $14,000 yearly for the commercial grower. Extraordinary costs (losses through theft or vandalism, etc.) are also not considered here, and would measurably increase the production costs. Certainly, if the property is converted to residential use, the adjoining 130 acre agricultural parcel would exhibit diminished economic feasibility. In fact, according to the property owners, 160 acres is the smallest profitable farming increment under current economic conditions.(40)

Agriculture is, of course, a renewable resource with the expectation of continuous yields. The net income to be derived from farming varies, subject to market conditions, weather, commodities and methods. This area has a history of high productivity and has been profitable under current rents and taxes. It is difficult to compare the net contribution to local jurisdictions between various forms of land use. However, the gross differences between agricultural and residential land use are provided in Table 23 in a cost/revenue format. In order to make the figures as meaningful as possible, a one acre parcel of land located in the coastal zone is assumed in both cases. The agricultural area is in cultivation and the residential area supports a single family residence, comparable to the residences proposed for Mandalay Bay.

Coastal Recreation and Coastal Dependent Industry

Section 30222 of the California Coastal Act places recreational boating and coastal dependent industry as priority uses for privately owned coastal lands if such lands cannot reasonably be utilized for agricultural production.

The various uses which could be categorized as coastal recreation or coastal dependent industry are enumerable. The Mandalay Bay site would preclude certain uses because of its location away from the ocean frontage, but many such uses would be logistically feasible at the site.

The site's proximity to the existing Mandalay Bay Marina and the Channel Islands Harbor Marina would make a recreational boating facility a logical alternative. Such a project would be in conformance with the coastal zone recommendation by ". . .enhancing public opportunities for coastal recreation. . ."(41) The development, as proposed,

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(40) Personal Communication: Tom McGrath (July, 1977). Although this is recognized as a subjective judgement it is included in this discussion as evidenceofthe diversity of opinion on this issue.

(41) Section 1, Division 20, Public Resources Code, Article 3, §30222.

TABLE 23

COST/REVENUE COMPARISON
AGRICULTURE VS: RESIDENTIAL LAND USE

	AGRICULTURE	RESIDENTIAL
PRINCIPAL REVENUES		
Property Taxes [1]	273.75 [1]	11,282.00
Sales Tax Subventions	n/a	821.32
Other Taxes	negligible	142.36
Total	273.75	12,245.68
PRINCIPAL COSTS: [2]		
Protective Maintenance Services	150.00	1,817.28
Schools	n/a	6,233.76
Other Services	negligible	556.48
Total	150.00	8,607.52
Net Contribution	123.75	-(3,638.16)

Notes: 1) See property tax discussion later in this Chapter

2) For basis of tax figures, refer to Methodology in Appendix. Residence is assumed to house 3.76 persons, four lots per acre.

would increase coastal recreational activities, but only residents of the development would be able to take advantage of the recreational boating facilities. The general public would have access to the development, but not to the boating facilities themselves. Presumably, if the site were to be developed as a commercial marina, many more slips would be available. However, in the final analysis, it would still be regarded as a preferential development for only those individuals able to afford boat ownership/rental and slip rental would be provided the opportunity to enjoy the facilitiy. To determine any potential advantages of providing a commercial recreational boating facility at the site, a full marketing/feasibility analysis would be required.

The marketing feasibility of a commercial marina would be the pivotal issue in determining the facility's economic contribution to the local jurisdiction as well, because in addition to property taxes (on the marina and the vessels) the local government would receive revenues based upon vessel use (gas taxes).

Coastal dependent industry presents many potential uses. Hypothesizing as to type of industry is beyond the scope of this presentation. It can be stated that commercial development generally contributes a higher share of revenues to local governments (proportionately) than it requires expenditures in support of it.

Residential Development

The economic considerations associated with suburban growth extend beyond the geographic boundaries of a single city, school district, county, or arbitrary zone. The fact is, in some instances, solutions to local problems may impact on the overall economy of the State and conceivably the nation. This widespread and far-reaching impact is particularly true with respect to coastal zone development and its ramifications on commerce, urban migration and employment.

Local governmental units in California derive their revenues from four main sources: Local taxes, shared taxes, grants-in-aid, and non-tax receipts. The major sources of revenue for the City of Oxnard are summarized in Table 24.

At the local level, property taxes is the largest revenue source and accounts for over one-third of the local government revenue dollar. Although revenue sharing is becoming increasingly more significant, property taxes are and will continue to be the prime source of revenue.

The local community participates heavily in revenues paid into the State General Fund. Approximately two-thirds of the California State General Fund is allocated for local assistance, with local education assistance receiving the largest share.

TABLE 24

SUMMARY OF REVENUE SOURCES
CITY OF OXNARD

REVENUE SOURCES	ACTUAL 1975-76	% OF TOTAL REVENUE
Property Taxes	$ 4,578,623	35.7
Taxes Other than Real Property	3,115,828	24.3
Licenses and Permits	662,009	5.2
Fines, Forfeits and Penalties	101,536	0.8
Use of Money and Property	445,636	3.5
Revenues from Other Agencies	2,574,568	20.1
Current Service Charges	350,262	2.7
Inter-fund Transfers and Abatements	1,008,916	7.9
Total General Government	$12,837,378	100.0%

Source: City of Oxnard. Annual Operating Budget and Capital Improvement Program, 1977.

It is reasonable to anticipate that social welfare would continue to take an increasingly larger share of the General Fund. In absolute dollars, the amounts spent for education and operations will increase with time, but at a slower pace than welfare requirements. State income taxes have been increased substantially and represent a larger contribution to the Fund. It is important to note that the individual taxpayer and consumer is by far the major source of tax revenue for the State.

The Motor Vehicle Fund also makes major apportionments to the counties and cities. Recreational boating and motor vehicle revenues from gasoline and fuel taxes, registration fees, transportation fees, are only used in part by the State for law enforcement, highway construction facilities development, and maintenance. The balance is shared with county and city governments.(42)

MOTOR VEHICLE FUND REVENUE APPORTIONMENTS

- State Expenditures - 60%
- Apportionments to Counties - 23%
- Apportionments to Cities - 17%

The conclusion that can be drawn from the above is that State financed subventions provide a significant portion of the local government receipts in California. The fiscal welfare of Southern California is inextricably bound into the State's revenue system, and to a lesser degree, the Federal. Conversely, the economic consequences of developing a community is a function of the contribution that community makes to city, county, State and even the Federal revenue system, less the capital, operating and service costs of establishing and maintaining that community. The net contribution may be either positive or negative, particularly when viewed on a periodic basis. In the final analysis, the economic consequences must be evaluated in the same light as any other investment in terms of return on investment, pay-back period and so forth.

The municipal operating costs attributable to a moderately priced development in the City of Oxnard would include the following:

Administration
Community Social Services
Public Transportation
Solid Waste System
Wastewater Treatment
Water System
Urban Development Services
Street Maintenance
Street Lighting

(42) Over $1,000,000 for Oxnard in the 1975-76 fiscal year [Ref: 106]

Street Cleaning
Storm Drain Maintenance
Library Operations and Maintenance
Police Protection
- traffic regulation
- law enforcement
Fire Protection
- prevention/training
- combat and emergency assistance
Housing Code Inspections
Building Permit Processing
Parks and Facilities
Recreational Services

Public works improvements associated with the same type of development may include:

Streets (linear feet)
Street Lights (linear feet)
Signalized Intersections (units)
Storm Drains (linear feet)
Parks (acres)
Recreation Centers (acres)
Libraries (units)
Police Substations (units)
Fire Substations (units)
Elementary Schools (units)
Junior High Schools (units)
Senior High Schools (units)

How a community is developed therefore, becomes a key factor in the economic equation. First, and most important, is the amount of the private investment made in the area. This investment directly determines the amount of property taxes which the area will generate annually and continously. Development procedures are designed to place the cost of streets, water, storm drains, sewerage systems, grading and utility installations to the responsibility of the developer.(43) These costs could then become amortized into the cost of the resulting lots. All of these development costs, if paid by the developer and passed on to the eventual purchaser would be considered private investment.(44) On the other hand, similar kinds of expenditures outside the development area are paid by the public sector, although they also are passed on to the local resident by assessments and bond issues.

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(43) It should be noted that presently the City of Oxnard subsidizes "...many of the costs of the developer in various ways, particularly related to storm drain facilities, sewerage systems and the treatment plant facility." Planning Department response to Preliminary Draft. Donn Hineser (October 11, 1977).

(44) "...only if the price elasticity of demand is perfectly inelastic (which it is not)." Ibid.

Per capita income of the resident population is an equally important consideration, since it determines the amount of personal income taxes and, to a lesser degree, sales taxes paid by the inhabitants of the zone. For example, the higher the level of personal income, the more recreational boating, the more automobiles, the more mileage, the more license fees, gas taxes, and so forth. The same applies to sales and other taxes.

A comparison of incomes for the population of Oxnard shows a lower per capita income and a larger percentage of families with income less than the poverty level.

A comparison of income statistics based upon Census data is provided in Table 25. A further discussion of retail sales activity may be found in the Socioeconomic Section of this Chapter.

These characteristics affect the positive or negative flow within the jurisdiction (i.e., contributions of tax revenues at all levels). On the other hand, a major negative characteristic is the age mix of the population.(45) Educational needs, which are a function of the population age mix, is the largest cost to the community. Close behind the cost of education is the cost of charities and correction at the county level. These costs, again, are affected by the age mix of the population.

There are, of course, other considerations which also influence the input-output equation. Such items as ethnic mix, educational level, and other social characteristics have an effect. The local government structure will also determine revenue cost sharing and influence local operating costs. These last considerations have a relatively minor effect.

Although most of the land development costs for roads, drainage, sewers, lighting, and so forth are borne by the developer, there are also expenses incurred by the public sector for service buildings, upgrading of highways, and the like.

Non-Development

The most obvious impact of nondevelopment is the loss of contribution through property taxes and sales tax subventions to the local economy. The tax base would be smaller and, therefore, the tax burden higher on the remaining population.(46) City expenditures would be proportionately less for certain categories; however,

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(45) Refer to Socioeconomics section in Chapter 4, Environmental Setting.

(46) Reduced tax rates are possible because "...new development is expected to provide more tax revenues..." [Ref: 106].

TABLE 25

INCOME OF FAMILIES AND INDIVIDUALS

	CALIFORNIA	VENTURA COUNTY	OXNARD
Families (total)	5,001,255	91,366	16,436
Median Family Incomes (all families)			
1959	$ 6,726	$ 6,466	$ 6,471
1969	10,732	11,162	9,852
% Increase*	59.6%	72.6%	52.9%
Mean Family Incomes (all families)			
1969	12,227	12,054	10,751
Unrelated Individuals (total)	2,327,499	26,267	5,301
Median Income	3,221	3,075	3,560
Mean Income	4,736	4,457	4,792
Families With Income Less Than Poverty Level			
No. of Families	421,200	6,744	1,780
% of Total Families	8.4%	7.4%	10.8%
Mean Family Income	1,873	1,834	2,052
Per Capita Income of All Persons	3,632	3,252	2,912

Note: *unadjusted for price inflation.

Source: U.S. Department of Commerce, 1970

police and fire protection, road maintenance, etc. would continue through government programs. Expenditures of this nature are categorized as "contingent liabilities." Contingent liabilities exist with every form of development but greater burdens are imposed on the local jurisdiction, the lesser the level of development. For example, if the site were to revert to open space (no agricultural production) tax revenues would substantially decrease but the City would still be responsible for providing maintenance/protective services which may be required. In many instances, undeveloped sites provide safety/fire hazards which provide definite liabilities to the responsible jurisdiction.

The cost of upgrading life styles and rehabilitating areas will continue to burden the local taxpayer and the impact of losing an addition to the tax rols can add to the burdens of the remaining population. In addition, since the area is already partially developed, the present costs related to the vicinity will continue. Fire and police protection needs in the area would not decrease, but would increase, particularly with increased public recreational use.

An extensive waste disposal system has been proposed and should be implemented independent of additional development. However, that plan assumes that a private developer would be a major contributor toward construction of the system. Without development, the entire cost of any required improved system would be borne by the local taxpayers with the potential support of aid through higher jurisdictions.

It is difficult to estimate what the economic impact of any non-development would be. However, coupling the loss of revenue with the added out-of-pocket costs and continuing operating costs, the economic significance of non-development could increase the burden to the remaining taxpayers.

RESIDENTIAL/MARINA DEVELOPMENT

Current trends indicate that more of the cost of governmental services and education now borne district by district will be shared across districts and may be charged more on an ability-to-pay basis rather than on benefits received. Therefore, those areas having above average personal incomes and assessed property valuations will be bearing more of the costs than those areas which are below average. This sharing will be particularly true in financing education where financial support for operation of public schools is the joint responsibility of the State government and local school districts.

The characteristics of the "new" population with respect to the total, is important in evaluating whether the area makes a contribution or drain on the remaining population. In meeting financial needs,

the more high income families subject to progressive taxation, the higher their assessed property values, the greater the benefits that accrue to the average.

As previously noted, there are problems in comparing the net contribution of agricultural land use to the alternatives of residential development - not the least of which is the problem of comparing the net yield from productive acreage to the net contribution of life cycle, residential productivity. A generalized comparison has been made on a per capita basis between the proposed form of residential marina development and the General Plan designation of Lower Density Residential Development.

The analysis was performed to compare City costs and revenues which would be associated with two alternative forms of residential development.

Alternative 1 - Residential Marina Development Mandalay Bay, Phase IV, as proposed.

Alternative 2 - Low Density Residential Hypothetical Development Plan

Using the two development plans, City revenues and expenditures were projected for the year 1980. A complete discussion of the methodology employed to develop this comparison may be found in Appendix C, Supporting Information.

The Mandalay Bay development would produce City revenues 44 percent higher than the hypothetical development plan. In terms of net contribution or loss to the City's economic base, both plans would result in a net cost to the City but the Mandalay Bay development would require City expenditures of ± $30,000 less than would be required in support of the hypothetical development plan. The variances between the two alternatives are schematically represented in Chart 3.

Land Use Impact of Proposed Plan

Mandalay Bay Phase IV, as proposed, would be compatible to existing and proposed land use designations for this vicinity. It would be developed adjacent to a similar development and would be in conformance with the future land use plans for the area as described in the 1990 General Plan for the City. It is believed that the plan, in terms of land use guidelines, would also be in conformance with the proposed General Plan, however this document was not available for review during preparation of this EIR.

TABLE 26

COST/REVENUE COMPARISON

GENERAL PARAMETERS	MANDALAY BAY-PHASE IV		MEDIAN RESIDENTIAL	
Acreage	± 82.7		± 82.7	
Land Use	Upper-Income Residential with Waterway Amenity		Median Income Residential	
Total Dwelling Units	401		385	
Total Project Residency	1,404		1,448	
Selling Price/Units	$150,000.00	average	$50,000.00	average
Average Family Income	58,500.00		24,000.00	
PRINCIPAL REVENUE SOURCES				
Property Taxes	$933,077.00		$579,665.00	
Sales Tax Subventions	82,337.00		48,048.00	
Other Taxes	128,260.00		14,726.00	
Total		$1,143,674.00		$642,439.00
PRINCIPAL EXPENDITURE SOURCES				
Protective/Maintenance Services	$169,585.00		$174,913.00	
Schools	940,072.00		902,563.00	
Other Services	51,929.00		53,576.00	
Total		$1,161,586.00		$1,131,052.00
Net Contribution		(-17,912		(-488,613.00)

Note: See Methodology, Appendix C, for explanation of the figures used in this comparison.

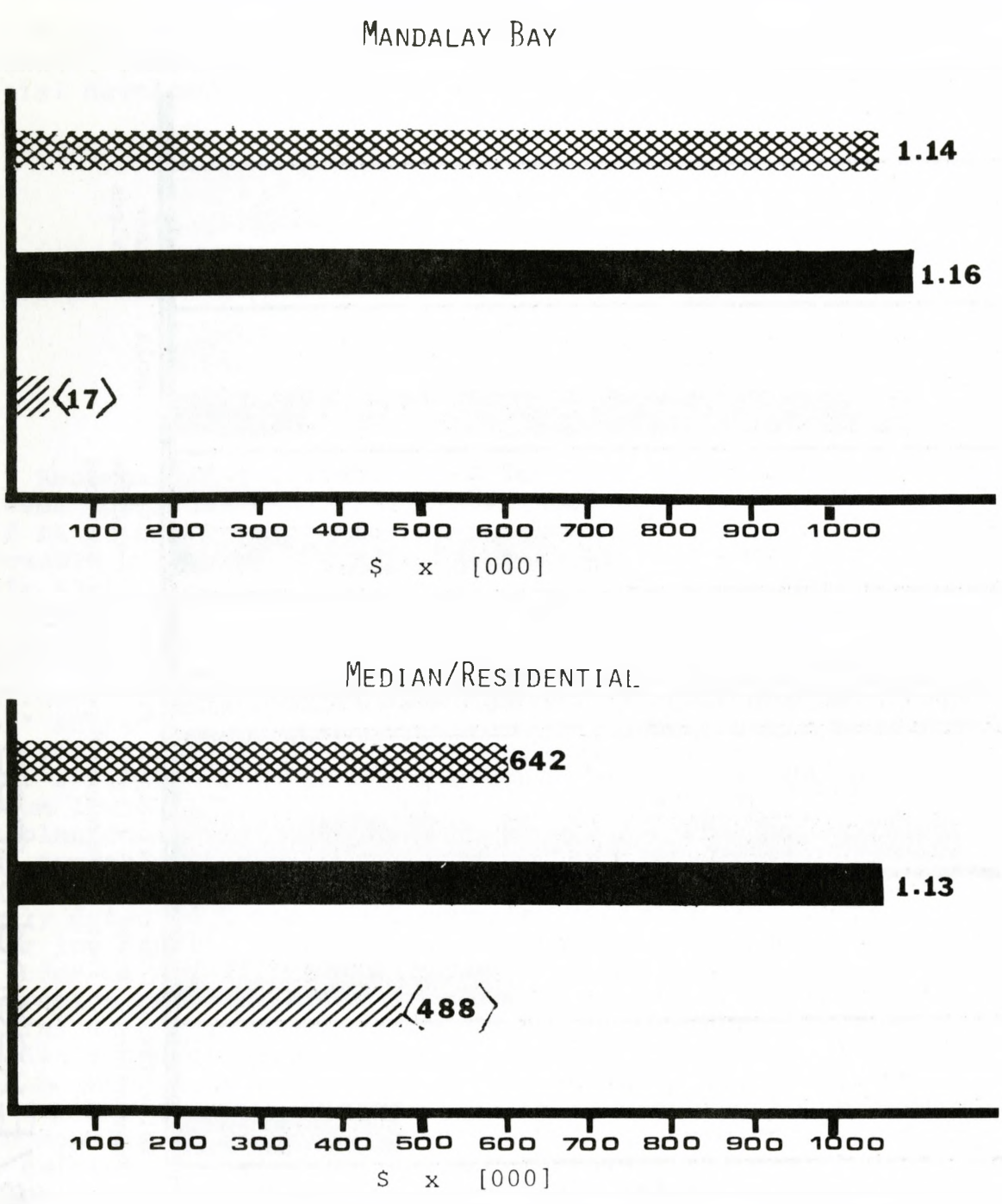

Chart **4**

Revenues/Expenditures Summary Presentation

Atlantis Scientific

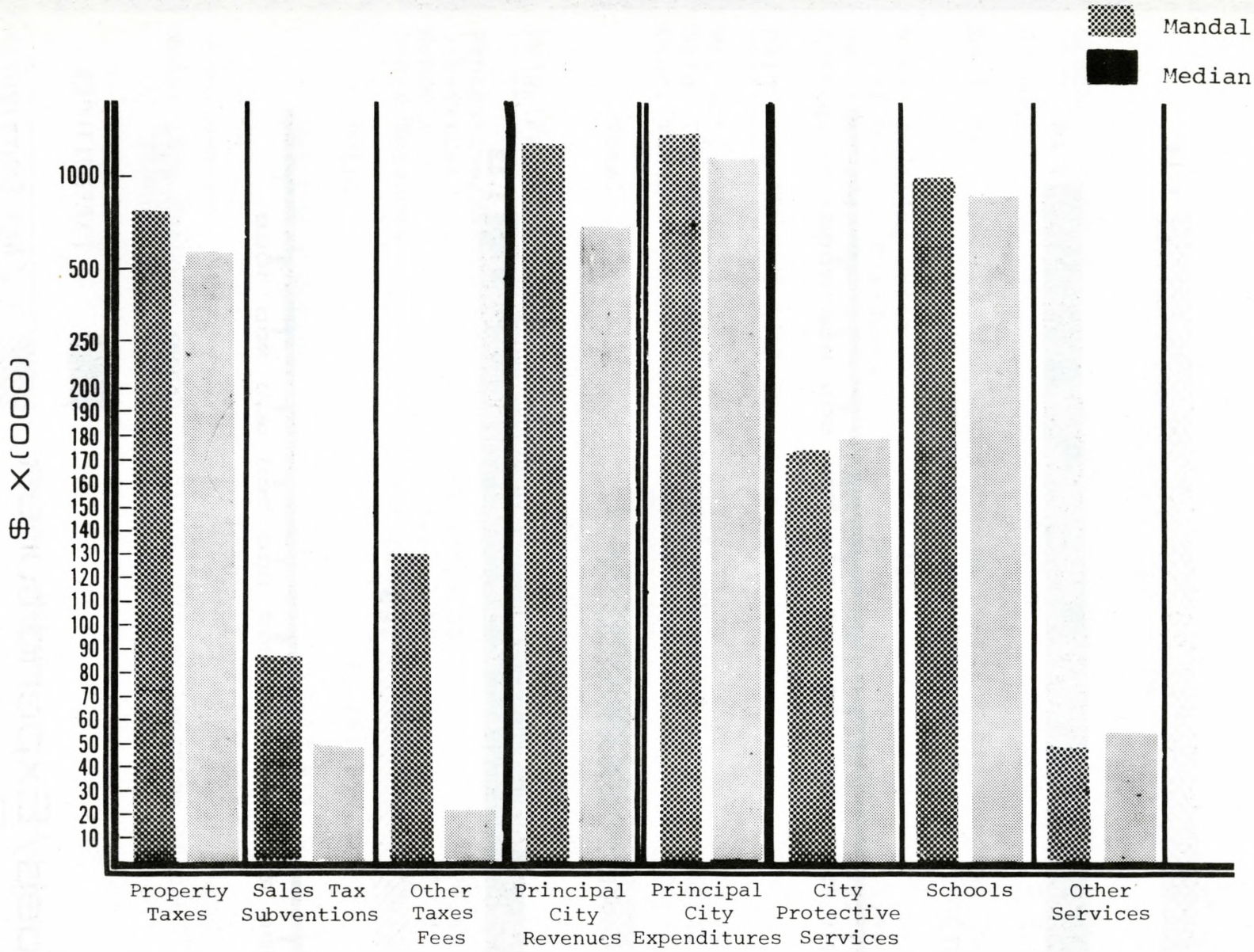

Chart **3**

Revenues / Expenditures Comparitive Overview Per Annum

Atlantis Scientific

Proposed land use for the site and vicinity, Neighborhood 8, Southwest Community, is heavily weighted towards low density residential development, as shown in the tabulation which follows:

Neighborhood 8 - Southwest Community

Total Acreage	465
Residential Use	388
Park	12
Commercial	5
School	25
Other Public	35

Recommended residential use for this neighborhood is divided between upper low density and lower medium density. The site itself is within the area designated for upper low density with an allowable build-out density of seven dwelling units per acre. [Ref: 40.] The 1969 General Plan, however, was developed around the premise that the City would become fully urbanized and support a population of over 500,000 persons. This estimate has been revised substantially downward on the basis of other planning projections. The "1990 Projected Population and Employment Distribution" adopted by the City Council in October of 1975 projects a 1990 population of 147,500 with an ultimate population level of under 200,000. This plan designates the Mandalay Bay site for medium low density at six dwelling units per acre. The Mandalay Bay plan conforms to the general population/dwelling unit distribution for this zone as stipulated by the 1969 General Plan and the 1975 Plan. According to the adopted document it is expected that single-family detached homes would comprise approximately 75 percent of the upper low density dwelling units within each Neighborhood. However, in order to alleviate "monotonous massing" produced by a heavy concentration of one kind of development within a Neighborhood, the General Plan also provides for introduction of some multiple type dwellings and/or cluster subdivisions or townhouses within each Neighborhood unit. [Ref: 40.] The Mandalay Bay development would not further this planning goal as it is proposed to be developed with housing units of the same general size and configuration as the existent Mandalay Bay homes. In this sense, it would increase the potential for "monotonous massing" within Neighborhood 8.

The Mandalay Bay Neighborhood is split between newly developed and undeveloped acreage. The placement of the Mandalay Bay development is not expected to place the Neighborhood over its designated zone holding capacity, nor would it create the impetus to improve existing structures to be compatible to this new development.

Projecting forward, the most significant impact associated with future land use patterns within Neighborhood 8 is the possibility that the adjacent 130 acres of land which is to remain agricultural

and not be converted to residential use at this time, would be converted following the completion of Phase IV construction. The cumulative impacts of an action such as this could be substantial in terms of both zone holding capacity and Neighborhood massing relationships. Historically, development perpetuation of this nature has occurred repeatedly and is particularly prevalent in the coastal margins where residential land is at a premium.

If it is agreed that the viability of continuing agricultural production on the reduced parcel of 130 acres would be diminished by the development of Phase IV, the conversion of this land to residential use becomes a more likely probability. Although the planning guidelines stress the importance of maintaining land now under cultivation for agricultural use, specific planning for Neighborhood 8 can be interpreted as encouraging the residential development of the Mandalay Bay site and the contiguous 130 acre parcel. "It would be possible to extend the existing development pattern [i.e., waterfront homes built on dredged and diked materials] northward for enough distance to develop an additional tier of waterfront homes as the means of separating urban and agricultural uses." [Ref: 105, page V-24.] The quantifiable basis of "an additional tier" is clarified in the succeeding statement which identifies the area in question as being bounded by Victoria Avenue, Wooley Road and the Edison Canal. [Ref: 105.] Since both Victoria and Wooley are presently developed roadways and both are slated for improvements, development extended to these limits would provide a more effective interface between the residential/marina use and the agricultural lands across Wooley Road than the buffer which presently exists between existing Mandalay Bay and the subject agricultural lands. While it is noted that residential use is not the preferred use for full interface with agricultural lands, the existence of the identified roadways and the Edison Canal could create a more effective buffer.

Aesthetic Impact Of Proposed Plan

Aesthetics is a subjective issue. Perceptions of visual compatability and any visual assessment of pleasantness/beauty are molded by personalized concepts. For the purposes of this discussion it is assumed that aesthetic impact would be less if:

- the development is compatible with surrounding developments
- the development is compatible with the existing natural features.

The proposed plan consists of a series of "finger" waterways radiating from the Edison Canal with single family detached housing units placed lineally along the waterway frontages. This structural

siting pattern is consistent with the previously developed residential marina development and is logistically consistent with the waterways amenity proposed. The visual impact of the development would be dominated by the waterways rather than the structures, i.e., passers-by viewing the waterways and vessels in preference to the homes. The residences of the development would be oriented towards the waterways also. Due to the low profile design of the proposed structures, no residences would block the views of other residents or severly restrict vistas from nearby roadways or pedestrian corridors.

The massing relationship of the proposed development has been described in the preceding section. By virtue of the plans similarity to existing proximate development the aesthetic impact would be diminished. However, some observers could assess this additional increment of sameness as producing a visual monotony which would be perceived as unpleasant.

The visual impact of the proposed development would not be expected to create adverse impact for the current residents of the marina complex to the south once it is completed; however, during construction activities the appearance of the site would be altered to a degree significant enough to cause visual imbalance and adverse aesthetic impact. The phasing plan of the proposed project would increase this impact since initial development is planned for the northernmost point and then infilling between this point and the existent Mandalay Bay development. The temporary duration of this visual disruption would lessen the impact.

The development would not alter any significant topographic features because the site is currently in agricultural production and is level terrain. The development would introduce a series of waterways which could be assessed as an equally pleasant aesthetic feature.

Mitigating Measures

- The potential for reaching zone holding capacity could be lessened by reduced densities.
- The potential for cumulative land use impacts resulting from conversion of the adjoining 130 acre parcel would be lessened if the project incorporated a buffer strip on the eastern side nearest to the agricultural lands.

The principal impacts associated with the proposed development plan by virtue of its location within the coastal zone are:

1. Conversion of agricultural lands
2. Compatibility with coastal plans
3. Public access

Conversion Of Agricultural Lands

The long range ramifications of converting the acreage from agricultural to residential use have been discussed in some detail in the preceding sections of this report. In terms of coastal planning, agriculture is considered as a priority land use which should be surrendered to higher, more intense land uses only if:

- The viability of existing agricultural use is severely limited by conflicts with urban uses, and
- The conversion of the land would complete a logical and viable neighborhood.(47)

The question of 'severe limitation' is a value judgment. The individuals currently farming the property have drawn the conclusion that agriculture is no longer a viable alternative for them. The City of Oxnard has designated the area for future development of residential units. It has also been stated that development of an additional tier of waterfront homes to the north of existing Mandalay Bay would provide the means to establish an effective buffer between the residential use and adjacent agricultural lands. [Ref: 105] There is no question that the area is subject to increasing development pressures. Certainly some form of development would contribute to the establishment of a stable limit to urban development and would complete a logical and viable neighborhood.

Simply stated, the options consist of the time valued alternatives which include leaving the land in agricultural production or converting it to some other more intensive use. If the acreage

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(47) Refer to Note (19).

were to remain in agricultural production it is likely that some measures would have to be implemented to increase the viability of the acreage. Perhaps the most effective measure in terms of economics would be to have the land placed under the California Land Conservation Act of 1965 (Williamson Act) which provides tax relief to agricultural land owners through a preferential taxation and restrictive agreement program. A program of this type is administered in the City of Oxnard and allows lesser taxation on the basis of an agreement with the landowner not to develop his land for a specific time period (generally ten years).

Residential development is not a priority use for the coastal margins, but the economic feasibility of the marina extension may be contingent upon the return on investment and maintenance cost derived from the sale of residential properties. The investment and costs associated with the proposed development would also preclude housing opportunities for persons of low and moderate income as recommended by Section 30213 of the Act. The question of providing public recreational opportunities as a desirous use for coastal lands is also a value judgment dependent upon how the 'public' or segments of the public are defined.

Coastal Plan Compatibility

The California Coastal Act of 1976 states: "Each local government lying, in whole or in part, within the coastal zone shall prepare a local coastal program for that portion of the coastal zone within its jurisdicition."(48) No local element is required to be submitted prior to July 1, 1978, or later than January 1, 1980. The County of Ventura and the City of Oxnard have not submitted their coastal elements to the commission review process. In discussions with the staff of the Regional Coastal Commission, this procedural and jurisdictional requirement may impose rather severe constraints on the proposed project.

It is believed that unless and until the local jursidictions prepare, and the Regional and State Commissions approve a coastal planning element, the proposed development would be considered as a single entity rather than as an extension of an existing facility. In other words, the Commissions must, by necessity, view the proposal as a prospective residential development which will pre-empt prime agricultural production. In addition, and perhaps more limiting, the commission would be inclined to impose stringent requirements for public access and public facilities on this singular entity rather than consider the development as an extension of the Mandalay

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(48) Section 1, Division 20 Public Resources Code, Chapter 6. Article 1, Local Coastal Program, Section 30500.

Bay Marina with its current provisions for public access and public facilities. According to the staff members interviewed, the Commission cannot take a regional or broader perspective on the entire marina development without an approved local coastal program.(49)

The developer and the City of Oxnard must either wait upon the approval of a coastal element or face the possible imposition of lower density development as a result of providing additional lands and facilities for public access. There is, of course, no guarantee that an approved coastal element which included this prospective development would also not include the necessity for pre-emption of densities for public facilities. But, the probabilities are increased that the Commission would then view the entire Mandalay Bay Marina and the proposed extension as one integrated development. The question would then be: Is there sufficient provision for public access and public facilities within the entire complex so that the extension would not necessitate an additional allocation of lands and resources to those purposes.

It is possible for a local jurisdiction to submit its coastal program ". . .In separate geographic units consisting of less than the local government's jurisdiction. . .provided, that the Commission finds that the area or areas proposed for separate review can be analyzed for the potential cumulative impacts of development on coastal resources and access independently of the remainder of the affected jurisdictions.(50)

Public Access

This particular development does not restrict or inhibit public access to the sea or shoreline. Harbor Boulevard to the West is a public roadway paralleling the shoreline and provides proximity access to the beach frontage. The Southern California Edison Canal between the roadway and the development currently prohibits east/west access to Harbor Boulevard from Wooley Road and Hemlock. Cross traffic can reach the beach frontage from Fifth Street to the north and Channel Islands Boulevard to the south. The improvement of Wooley Road and bridge overpass across the Edison Canal would provide additional access to Harbor Boulevard.

The extension of the Mandalay Bay Marina does enhance or facilitate access to the sea from adjacent channel properties for recreational boating. However, the residential development lining the

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(49) Personal Communications: Steven F. Scholl, Staff Analyst, South Central Coast Regional Commission. (August, 1977 and October, 1977)

(50) Ibid, Section 30510.

channels restricts this access, with the exception of 3.6 acres of allocated viewpoints, to the resident public. Providing additional public access across residential property would be inconsistent with public safety and impose contingent liabilities on private property. Trespass is considered an illegality. However, personal injury resulting for a so-called "attractive nuisance" or from the property owners negligence (e.g., a misplaced garden hose) may offer exposure to legal action.

There is limited provision for public access, but there are no public facilities proposed for this incremental extension of the Mandalay Bay complex. Landscaped and parking areas which intermittently buttress the waterways offer viewpoints for residents, guests and the public - should they desire to take advantage of these confined open spaces and vistas. However, these open spaces are of irregular shape and size, offering no apparent boat launching or docking facilities. Undoubtedly, swimming from these access points within boating channels would not be encouraged.

A "semi-public" area is proposed for a future marina expansion adjacent to Phase IV, progressive development, of this particular extension. The "semi-public" area, a park and a proposed high school site border Wooley Road toward the east to Victoria Avenue in an as yet undefined, subsequent marina expansion.

The Coastal Act states: "Whenever appropriate and feasible, public facilities, including parking areas . . . shall be distributed throughout the area. . ."(51) It would certainly be possible to make additional provision for parking and/or public facilities on this incremental extension of the marina from Wooley Road. Feasibility, of course, is dependent upon the economics of pre-empting a portion of the Wooley Road frontage for these purposes and reducing densities within the development.

As to whether a provision for public facilities and additional parking is "appropriate," is again a value judgment, dependent upon the mitigating circumstances of either: (a) Provision for future public facilities in the subsequent development, or (b) provision for existing public facilities and parking in the entire Mandalay Bay Marina complex. If the procedural constraints of limiting consideration to this singular element of development prevail, then it would be impossible to view this project as an incremental unit or extension of the Mandalay Bay Marina. Under these circumstances, provision for public facilities would be non-existent. However, the State and Regional Coastal Commissions must also decide whether the introduction of public facilities in the northern extension of the marina complex would detract from existing facilities already established in the entire marina complex and what impact such facilities would have on the land to the north, above Wooley Road or the induced traffic along the access route.

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(51) Ibid, Section 30212.5

Potential Impacts Upon Terrestrial Biology

Development of the Mandalay Bay project will involve the complete removal of the vegetation along the east bank of the Southern California Edison Canal. The excavation of land for the hammerheads (waterways) and the construction of concrete bulkheads directly facing the Canal will essentially involve the complete destruction of the east bank vegetation.

During the excavation and construction of the hammerheads, the removal of 1.5 million cubic yards of earth materials may create a substantial amount of dust. This dust created during construction activities could have a damaging effect on plant life in the vicinity of the project site.

The deposition of dust upon the foliage of plants would result in a lower rate of photosynthesis, thus creating a reduction in plant biomass production. In addition, dust depositing on flowering plants may inhibit effective insect pollination. These two factors as described above, could be important factors in the reduction of agricultural crop yields in and around the project site.

The deposition of excavated earth materials in the area presents another adverse impact created by the proposed project. The deposition of any earth materials on the adjacent agricultural areas would remove that area from any further agricultural production. The amount of agricultural land removed can be found in the Geology/Hydrology Impact section of this report.

The proposed project would also involve the removal of approximately 82 acres of prime agricultural land. The Oxnard Plain is known for its rich agricultural soils and its unique climatic advantage which combine to form a year-round growing season with a high productivity rate. With the excavation of the waterways, grading and compaction of the soil, and construction of homes and streets, this ± 82.7 acres of agricultural land will be permanently and irreversibly lost.

If the land materials were deposited on the adjacent agricultural land, a dust problem would be created during windy conditions. The impact upon vegetation from this dust would be similar to that described above.

As previously stated, no rare and endangered plant species were found on the project site, and none are suspected of being on the project site.

The major, immediate impact upon the project site fauna would follow from vegetation removal by construction of the proposed development. Vegetation forms the basis of wildlife habitat, providing food and cover. Any reduction of vegetation would result in a concomitant reduction in wildlife.

The loss of habitat disturbs the balance between wildlife population and the presently existing environment. For example, with the removal of the east bank vegetation the wildlife species present will either be destroyed or will migrate across the Canal (if possible) or to the north along the Canal (where similar vegetation is found). This impact of forced migration into adjacent areas represents a secondary impact on adjacent, undeveloped areas. It is unlikely that wildlife species will migrate permanently into agricultural areas, because of the intensity and amount of mechanical cultivation.

The removal of vegetation will mostly affect land animals, such as mammals and reptiles. Several avian species, particularly waterbirds, will be affected only to a minor degree.

Noise from construction activity might have an adverse impact on wildlife in the vicinity of the project site. The amount and species of wildlife which would be affected is indeterminable at this time, but should be considered.

The proposed project would include street lights. The street lights,in combination with house lights, may attract an increased number of flying insects. The increased number of insects could have an adverse impact on nearby agricultural vegetation (i.e. the consumption of foliage by insects). This effect has been known to occur in agricultural areas where subdivisions were constructed.

One of the final stages of the proposed project will involve landscaping. Landscaping may create artificial habitat for many animal species, some of which would be considered pests. The proposed project will also introduce additional domestic dogs and cats to the area. Although this would have no real impact on the project site, these "part-time predators" could have an impact on adjacent areas, including the area to the west of the canal if Wooley Road were to be extended across the canal.

Although numerous rare, endangered and protected animal species have the potential of visiting the project site, none are known to inhabit or breed within the project site. However, the proposed project is another increment in the rapidly urbanizing Oxnard Coast and will subtract the project site and areas under its influence for use as habitat by any rare, endangered or protected species.

An area of concern which is not directly in the project site but might be adversely impacted by the proposed project is the sand dunes area across the Southern California Edison Canal. The sand dunes offer a wide diversity of plant and animal life but have

already been heavily disturbed by human influences.

The proposed project might possibly add to the existing impacts on the sand dunes west of the Canal. However, it must be noted that access from the proposed project site is limited and would trespass on private property, unless a bridge dedication on Wooley Road would result from the project.

Mitigating Measures

- The dust created by the removal of surface earth materials during excavation of the hammerheads may be mitigated by watering dust control. It is anticipated at this time that only the top layer of earth materials will create the dust. Upon reaching a depth of 5 to 10 feet the earth will become moist to wet, effectively eliminating further dust impacts (from excavation of the hammerheads).

- Deposition of excavated earth materials may occur on adjacent agricultural land. The amount of land covered by the earth materials could be reduced to a minimum, effectively saving as much agricultural land as possible. This is basically an engineering decision and is discussed in detail in the Geology/ Hydrology section of this report.

- Dust from the deposited earth materials could be reduced by revegetating the deposits. It might even be possible to plant some agricultural crops if the topsoil from the areas excavated is removed beforehand and stockpiled for later re-use.

- Vegetation removal and its concomitant reduction of wildlife is the most immediate adverse impact on fauna in the project site. Landscaping around the proposed dwellings will offset this to a degree. The amount is indeterminable at this time. It can be stated that the wildlife which will be present will probably be species which are well adapted to human encroachment and urbanization.

- The adverse impacts upon the area wildlife due to noise during construction are difficult to determine and therefore mitigate. Sensitive species will avoid the area during construction activity but most wildlife species will return to adjacent, undeveloped areas when the noise abates.

- Street lights, which may attract insect pests, should be of non-attracting type.

- Domestic pets, such as dogs and cats, should be controlled in a manner suitable to keep them from invading the sand dunes across the Canal and preying on wildlife there.

- The sand dune area across the Canal can be considered under indirect influence of this project. Further disturbances by human intrusions originating from the project site can be reduced to a large degree by eliminating access. From the project site the only direct access is across the existing Wooley Road bridge. Prohibiting access at this bridge would reduce nearly all of the intrusions by humans (particularly children) from the project site to the sand dunes area.

MARINE BIOLOGY

Appendix D and inclusive Tables in the Supporting Information Chapter provide data on the benthic survey which was conducted for this report.

The impacts on intertidal and subtidal marine life in the proposed expansion of Channel Islands Marina in the Mandalay Bay area will follow a succession pattern. These proposed pattern changes have been observed by the author for nearly all major marinas constructed in Southern California over the past 25 years.

Construction of new concrete retaining walls, new concrete pilings, and boat floats will provide a new surface for the settlement of marine organisms. Settlement will take place in a series of stages, or succession, in which one stage, with a characteristic group of organisms, is followed by a second stage with its characteristic group of organisms. This process continues until a biological equilibrium or climax community is reached. In Southern California protected waters, the length of time required for the development has been observed to be two or three years.

The first macroscopic marine organisms to appear on these concrete surfaces or boat floats will, in all probability, be the green algae Enteromorpha and Ulva (sea lettuce). The growth of these species will undoubtedly become a nuisance within a few months because of their rapid growth and the absence of any herbivores (algal eating animals). As these algae grow, large quantities will break off, float or sink, and later decompose which leads to odors and perhaps dissolved oxygen depletion especially within areas of limited water circulation. As the herbivores (i.e, snails, limpets, chitons, crabs, and small crustaceans) appear, the algae will be eaten which will lead to a state of equilibrium or ecological balance. The

growth of these green algae will then be controlled by the herbivores. During the initial period of heavy green algal growth which lasts two or three months, it may be necessary to remove by hand the algae floating on the surface. It should be emphasized that the surface of the new construction should not be scraped because it will remove any newly settled young herbivores. In other words, scraping will perpetuate the green algal problem by preventing the herbivores from settling.

Animals begin to settle on these structures during the algal growth period so that within two to three years the following conspicuous organisms will be present in the following zones as related to the tidal cycle:

Concrete Walls and Pilings:

Splash zone: Ligia occidentalis (rock louse) and Pachygrapsus crassipes (striped shore crab).
High-tide zone: Chtalmus fissus (small acorn barnacle), Littorina spp. (periwinkle snails - not too common if the area is far from channel entrance), and Acmaea spp. (limpets).
Mid-tide zone: Balanus glandula and Balanus amphitrite (acorn barnacles), Acmaea spp. (limpets), and occasionally, clumps of the bay mussel Mytilus edulis will be seen.
Minus-tide zone: the bay mussel Mytilus edulis is the dominant organism in this zone. Other types of animals will be noted between clumps of the mussel such as the tunicates (sea squirts) Styela plicata and Styela montereyensis. In among the mussels, a myriad of animals will be found such as flatworms, sea anemones, polychaetes, small crustaceans and bryozoans. The accidentally introduced brown seaweed from Japan, Sargassum muticans, will undoubtedly form an extensive belt in this zone. This algal was present throughout the Channel Islands Marina in July 1977. The branches of this brown alga will break off and float on the water. It is possible that these branches will become entangled within the props of boats, thus creating a nuisance. It may become a necessity to pick or collect this species of alga to minimize the problem.

Boat Floats:

Since the boat floats rise and fall with the tides, there is no tidal zonation. The community of marine organisms on a boat float is dominated by the bay mussel Mytilus edulis, the green algae Ulvaand Enteromorpha, and the tunicates Styela plicata and Ciona intestinalis. Many species of smaller animals are found in among these organisms. Once these organisms become established they will become permanent residents of these zones.

Subtidal Benthos:

The type of sediment present on the bottom of the marina determines in part what species will inhabit the area. Within the proposed Mandalay Bay Marina the sediments will be composed of silts and clays. If the water quality is good, the productivity will be high. It will be dominated by many species of polychaetes, clams, and crustaceans.

In summary, construction of the new marina in Mandalay Bay will have little or no impact on the existing marine life in the Channel Islands Marina. The water quality in July 1977 as measured by the dissolved oxygen concentration, is good both within the main channels and blind-ending channels. These are indications of a stressed benthic condition, especially at station 6, but there is still a diversity of marine life present. However, water quality could deteriorate as the result of a red tide outbreak or the closing of the Mandalay Bay Steam Generating Plant. It is extremely unlikely that the latter will occur but if it did, much of the Channel Islands Marina would become highly polluted. In the event of a red tide outbreak, the cause of which is unknown, the water quality would deteriorate as the result of the die-off of these one-celled organisms. The decomposition of these organisms will utilize dissolved oxygen and if the red tide is a serious one, there could be a serious dissolved oxygen depletion which would lead to the death of additional organisms leading to further dissolved oxygen depletion. A serious red-tide cycle usually lasts about one month; however, if extensive die-offs of other organisms occur, it will take one or two years for the area to recover.

MITIGATING MEASURES

Two possible solutions to a serious red-tide outbreak in Channel Islands Marina are avilable. Whether either one is economically feasible is unknown.

- The easiest solution would be for the steam generating plant to increase the amount of water taken into the plant (if only to by-pass the cooling operation and discharge directly into the ocean). This would effectively increase water circulation and hopefully bring an adequate supply of oxygenated water.
- The second solution, which is perhaps more difficult to initiate, involves the use of portable oxygenators. One or two of these should be placed within blind-ending channels to reoxygenate these waters. This particular practice has never been tested.

Potential impacts should be considered in light of the impact of the proposed project on the geologic environment as well as the impact of the geologic environment on the proposed project. Impacts of the proposed project on the geologic environment would result from the proposed construction of the waterways and enlargement of the existing canal. This grading would involve removal of 1-1/2 million cubic yards of earth material. Thus, a considerable modification of the existing topography would result -- both onsite and offsite where this material would be placed. Groundwater would also be affected since excavation would penetrate the "semiperched" aquifer. The geological environment could impact the site through seismic effects, including liquefaction, subsidence, lurching, seiche, and tsunami.

Excavated Earth Materials

The applicant has no firm proposals for disposal of the displaced earth materials. He expects to use five to ten percent onsite. The applicant is also considering purchase of agricultural land west of Victoria and south of Wooley. This agricultural site contains up to ± 130 acres. Disposal of earth materials on the site could follow three procedures:

- General dumping
- Layering with compaction
- Spreading to dewater, followed by gathering for resale as fill

General dumping would result in very slow dewatering of the moist earth materials (see next section). The topographic change resulting from this operation would be the most severe. Aesthetic impact would be considerable. The total fill from all areas to be excavated, if not removed gradually, would cover ± 130 acres to a depth of ± 7 feet; 93 acres (70 percent of the site) to a depth of ± 10 feet; or 31 acres to a depth of ± 30 feet.

Layering with compaction would expel most of the intergranular water content, resulting in about a 25 percent reduction in bulk volume.

The acreage required to dewater by evaporation would depend upon the rate of excavation and the meteorological conditions at the time. Optimum depth for dewatering would range around eight inches with 24-hour cycling of earth materials. The daily bulk rate of

excavation would probably be somewhere between three acre-feet and 12 acre-feet. Assuming that on each working day a layer is removed from one part of the agricultural site for piling while new earth material is spread on another site, between nine and 40 acres would need dedication to this operation. This option would pose the most serious dust problem (see Air Quality in this Chapter). Each of the options would remove acreage from agricultural use (see Biology in this Chapter, and Land Use).

There is little available landfill capacity in Oxnard. Another dump site for the soil materials would result in similar impacts elsewhere. Additional vehicular air and noise pollution emissions could be involved if a more distant disposal site were used.

An alternative would involve disposal in an Environmental Protection Agency (EPA) approved ocean disposal site. The EPA is responsible for assessing the impacts upon its approved disposal sites prior to final assignation. The Los Angeles #2 site is currently an interim disposal area which has been used mostly for dredge materials. The bottom sediments, therefore, have been distributed from their original natural condition, and would be further disturbed if this alternative were actualized. The excavated material is expected to meet EPA Region IX pollutant concentration limits for shallow marine disposal. The excavation material, however, would contain fine silty particles which would result in greater clouding of the water at the disposal site than from usual dredge materials. It is likely that EPA would not approve of ocean disposal of these earth materials.

The lack of specific information on the location and method of placement of this fill compels additional analysis in an addendum to this EIR or the preparation of a new EIR for the area of placement of fill, once a site and method are chosen.

Effect Of Excavation Upon Groundwater

In addition to alteration of the topography, proposed excavation of waterways would also affect the groundwater geology. The "semiperched" aquifer which exists within 25 feet of the existing ground surface would be partially removed. This would result in a significant area (approximately 32 acres) of hydraulic continuity between this aquifer and seawater.

Although grading and excavation of the waterways is proposed to be done with loaders and trucks, the specific methodology of the excavation has not been supplied by the developer. Construction technique can have a significant impact on the geology; and the local geology can have a major impact upon the proposed construction if the geology is not adequately understood and taken into account.

Because excavation would necessarily be to depths below sea level, either dewatering of the area or dredging should be anticipated. Dredging was not given as an excavation technique. If dewatering is planned, the dewatering would involve the "semiperched" aquifer. Thus, the groundwater table and groundwater pressure levels within the "semiperched" aquifer would be affected. It is possible that dewatering may result in consolidation of the earth materials and, therefore, in differential subsidence of the ground surface. Upon filling of the waterways,seawater would fill the dewatered portions of the "semiperched" aquifer and would re-establish the groundwater pressure levels to approximately sea level.

Erosion

Subsequent to development, a continuing minor impact on the geologic environment could result from use of the waterways. Waves generated by boat traffic would erode inadequately protected banks along the canal or any that are left without bulkhead protection. Specifically, the portion of the canal southwest of the proposed development could be subjected to continual erosion. Material eroded from these banks would accumulate as sediment along the bottom of the canal. (See page V-56 for additional discussion).

Resources

Available evidence indicates that the proposed project would not result in the loss of any scarce mineral resources nor disturb any areas of unique geologic or paleontologic significance.

Seismic Effects

Impacts of the geologic environment upon the proposed project are associated with the potential for earthquake damage and foundation instability. The site is located in a seismically active area of Southern California. The entire site could be subject to strong ground-shaking from earthquakes as noted in the Environmental Setting Chapter. Such shaking, unless specific mitigation measures are incorporated into design and construction of the project, could cause structural failure; settlement of poorly consolidated natural earth materials or poorly compacted fills; liquefaction of underlying poorly consolidated, saturated earth materials, and associated lateral spreading; ground lurching; and slump or landslide failure along canal banks. Severe local ground shaking may induce seiche within the waterways and main canal. A seiche may result in extensive damage to docking facilities and boats. In addition, minor flooding of the residential areas would occur if seiche waves exceed a height of eight feet.

Differential compaction unless mitigated through grading may result in damage to roads, or various utilities. Roads could become moderately to severely cracked and may break. It should be noted that most of the Oxnard Plain will be subjected to similar differential settlement resulting in similar effects to roadways and utilities.

Large local and distant earthquakes located offshore can generate tsunamis or seismic sea waves. Historic evidence indicates that the site is within a tsunami hazard zone. [Refs: 25,95] A tsunami with a runup exceeding 10 to 15 feet would result in inundation of the entire site. Larger tsunamis could result in damage ranging from minor flooding to nearly total destruction of both the marina and housing facilities. The City of Oxnard Seismic Safety Element (1975) and the California Division of Mines and Geology estimate a maximum tsunami would result from a major earthquake and sea floor displacement within the Santa Barbara Channel. [Refs: 27,70] The rapid arrival of a tsunami generated in the Santa Barbara Channel would allow very little or no time for evacuation of the site area. Thus potential loss of both property and lives would be high in the event of a larger locally generated tsunami.

Mitigating Measures

- Detailed soils engineering and geologic/seismic studies of the site should be performed by a licensed soils engineer and a certified engineering geologist, per Chapter 70 of the Uniform Building Code. These professionals should evaluate the site with respect to foundation suitability and seismic potential and make recommendations to assure that the proposed structures or connecting utilities are not adversely affected by seismic shaking. All structures and connecting utilities should be designed with consideration of potential earthquake effects. Bulkheads should be designed to resist lateral spreading, subsidence, and other seismic hazards.

- All waterways and canals onsite should be lined with non-erodable devices such as concrete bulkheads or riprap in order to prevent erosion of earth materials along the canals. These devices should also be placed wherever water waves caused by boat traffic would encounter erodable earth materials including the edges of the Southern California Edison Canal that may be offsite.

- Marina facilities should be designed to withstand relatively rapid eight to ten feet fluctuations in water level in order to minimize the affect of seiche.

- Both tsunami warning systems and adequate emergency escape routes should be implemented in order that rapid evacuation is possible in the event of tsunamis generated at more distant points. This system is not expected to provide sufficient warning of a locally generated tsunami or seiche.

- The potential exists for seismically induced lurching, liquefaction and consolidation with resulting subsidence of the ground surface results from the poorly consolidated nature of the underlying earth materials. These seismically induced hazards can be partially mitigated by excavation and recompaction of the surficial materials. Excavation of all earth materials within the site during proposed grading down to the depth of the proposed waterways (15 to 20 feet below sea level) followed by recompaction beneath the areas of proposed structures and streets would provide an approximately 30 feet thick layer of engineered fill. Well compacted engineered fill is generally not subject to significant lurching, liquefaction, or consolidation. In addition to providing some safeguard to seismic hazards, recompaction would utilize much of the earth materials excavated from the proposed waterways. If all of the excavated material were to be recompacted onsite, the elevation of the structures above sea level would be raised, thus reducing the impact of potential seiche and tsunami flooding and damage. Soils analysis indicates that following compaction, bulk volume would be reduced about 20 percent; there would also occur about 0.2 foot subsidence of underlying earth materials during grading.(52) Use of all excavated materials onsite would raise the site ± nine feet; if the elevation were not raised (to avoid aesthetic problems or to avoid potential access problems to boat docks), use of engineered fill would dispose of 590,000 ± cubic yards of earth materials (40 ± of the 1 - 1/2 million cubic yards requiring removal from the site).

(52) Personal communication, Lynn Mc Knerney, Gorian and Associates 1977.

Construction Related Impacts

Turbidity

Waterfront construction creates high levels of local turbidity through disturbance of earth banks on channel bottoms. The turbidity is a short term problem and the particulate matter settles out after the excavation is halted. The siltation of suspended solids can at times occur in channels remote to the construction area itself if the problem is uncontrolled. That is, water moving rapidly past the construction site can provide a vehicle by which soil particulates are carried to a point of lesser current velocity.

Debris

Floating debris has been observed in waterways fronting ongoing construction in the marina. The debris consists largely of paper cups and other food packaging waste. This refuse has apparently been discarded around the construction site and then carried by wind into the water. This problem is also temporary and can be expected to subside after the halting of construction activities. (53)

Pollutant Inputs After Expansion

Expansion of the existing marina will have certain long term effects on embayed water quality. The causes of this shift in quality include:

- Increased land development
- Increased waterway area
- Increased boat population
- Increased human population
- Increased tidal prism

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(53) The Edison Company intercepts floating debris at their canal intake. The debris screen is visible in the foreground of the photograph, Figure 21.

Storm Runoff

Storm runoff from a residential tract can be expected to differ appreciably in composition from undeveloped agricultural area runoff. Paved areas will contribute to an increased total of grease and oil. Paper, plastic, and other urban debris will also be found in greater amounts. Soil particulates from the developed area are expected to decrease appreciably because of the extensive new ground cover. The total suspended solids in tract runoff should be in the range of 100 mg/l, as compared to an estimated 900 mg/l now. Thus the reduction in suspended solids due to development of 82.7 acres of Tract 2026-4 would be 107 tons annually. As agricultural areas are developed into residential areas, the decreases in nitrogen and phosphorus pollution from agricultural fertilizers are somewhat offset by input of the same pollutants from residential landscape and garden areas. Because the structures associated with urban development are impervious, a greater proportion of rain falling on three areas will be diverted into runoff. Total runoff may actually decline, however, since roughly half of the area will become waterway.

Direct Rainfall

Approximately one-half of the area set aside for proposed Tract No. 2026-4 will be dedicated to waterways. This means that rainfall in these areas will enter marina water directly, rather than as runoff. This is not expected to have a pronounced effect upon the totals of lead and zinc which find their way into the marina waters. Other pollutants which were previously introduced by storm runoff will of course be absent.

Boating Activities

The various pollutants associated with boating activities can be expected to increase in proportion to the number of boats. These pollutants include:

- Copper from antifouling paints
- Oil, COD, and lead from engines
- BOD from heads and galleys
- Jetsam debris

The entire marina expansion planned for Tract 2026 will house about 800 permanently moored vessels. About one ton of copper ions will be added to the marina waters annually from these 800 boats. Because this input will be to additional masses of water in the expanded marina, the total copper concentration in the harbor/marina will remain essentially unchanged (copper concentration has been determined to be less than 0.1 mg/l). No toxic effects from copper have been discovered in the harbor. Any effects resulting from the additional boats would be small and quite difficult to detect. It is probable that some species would be inhibited by the increased copper input but most unlikely that there would be any observable effect on any beneficial use.

Applying the same linear increase to boat engine inputs, we may expect to see an annual increase of 2 tons of oil, 9 tons of COD, and 16 pounds of lead. Again, the experienced concentrations should remain at present levels by virtue of the expanded marina waterways and increased water mass. The good overall water quality and aesthetic appearance of the existing marina should not be diminished.

Although overboard head discharge has been prohibited in the Channel Islands Harbor since its inception, forthcoming Coast Guard regulations will provide further clarification. The regulations will affect all new boats and replacement fixtures on existing boats. Three types of heads will be specified:

1) Type I: Overhead discharge

2) Type II: Overboard discharge, with pretreatment

3) Type III: Holding tanks (no overboard discharge)

Anti-discharge regulations will be enforced up to three miles offshore. There are still no prohibitions against discharge in the open sea (beyond three miles), except in areas where circulation might be minimal, such as island coves.

Average pump-out time at the harbor facilities is about five minutes. Queuing has never been observed at the pump station adjacent to the Coast Guard headquarters. The relatively short pumping time gives the harbor's two pump stations a large capacity.

Flushing After Expansion

The construction of Tract No. 2026-4 will increase the overall volume of tidal flow in the estuary system. Replacement times in the initial channel areas will be hastened, as shown on Table 27,

TABLE 27

MEAN REPLACEMENT TIME
EXISTING AND EXPANDED CONDITIONS

(all values in days)

Node #	Description	Existing Marina Edison Flow 500 cfs	Existing Marina Edison Flow 3,000 cfs	Expanded Marina Edison Flow 3,000 cfs
2	Sample Station #2	1	1	1
5	Sample Station #3	2	1	1
47	Sample Station #4	3	2	2
46	Sample Station #5	3	2	2
29	Sample Station #6	3	2	2
12	Sample Station #7	1	1	1
58	New Tract, major channel	-	-	1
79	New Tract, Intermediate	-	-	2
117	New Tract, worst case	-	-	5

but in the smaller branch and cul-de-sac channels any effects will not be felt. That is, the replacement times at these critical points will remain unchanged.

Increases in Edison cooling water withdrawal will have a beneficial effect upon marina water quality but existing flushing characteristics will be little affected by waterways expansion itself. Investigation of expansion-related impacts should probably focus on the quality of water within the new tract.

Calculated replacement times for existing and proposed waterways are a valuable tool in water quality projections. Water sampling in the existing marina can be correlated to proposed areas with like replacement times.

Flushing characteristics are less than optimum in some of the backwater areas of the marina. Dissolved oxygen concentrations are nevertheless high and present no problem at this time. But it is possible that maturation of the waterways from a biological standpoint could depress current high levels of dissolved oxygen. When calm weather and high temperatures coincide, the respiration rate of benthic organisms goes up while surface reaeration and downward transfer of oxygen by turbulent motion are retarded. It should be pointed out, however, that conditions throughout the Channel Islands Marina are excellent in comparison to most other Southern California harbors. In Huntington Harbour, for instance, tidal flushing rates are commonly 10 to 20 days and longer in back channels. Compare this with the 5-day worst case for the proposed waterways.

Edison Operations

Of most concern to Edison from the standpoint of equipment tolerance are oil and petroleum product pollutants. These substances can vaporize in the condensers and possibly explode. This type of pollution can arise from direct boat spillage, but is more frequently seen following heavy rains.

A persistent problem from the Edison Company is the difficulty in meeting State Water Quality Control Board ocean discharge requirements. In many cases water in the intake canal already exceeds safe discharge levels. Thus the power company finds itself in a position of cleaning up non-process-related pollutants before they can discharge the water. One example of this was a case in which quantities of agricultural insecticide were inadvertently introduced into the canal by a helicopter operating over adjacent land. The Edison Company does not want to be involved in an extensive policing action to safeguard the intake canal. This problem would be aggravated if the project results in a bridge dedication at Wooley Road.

MITIGATING MEASURES

- Turbidity: In order to limit the drifting of turbid water in the vicinity of waterfront construction operations, the contractors on recent harbor projects have utilized containment curtains made of woven plastic cloth. The curtains are suspended from log booms surrounding the area being disturbed by construction. Although the mesh size of the plastic cloth is much larger than the diameter of the turbidity parcels, the system has been fairly effective. This type of system or an equivalent method will be used in future waterfront construction operations in order to comply with orders of the Water Quality Control Board.

- Debris: Very little of the observed construction related debris was construction debris per se. The bulk was litter from food packaging. The most effective mitigation of this floating debris is to encourage proper disposal at its source. However, collection of floating materials must be accomplished from the water because access from adjacent land is quite limited. Normal water circulation does little to move this litter through the maze of channels as it is readily trapped against bulkheads by prevailing winds.

LONG-TERM IMPACTS

The Channel Islands Harbor is not now being affected by significant continuous sources of pollution. However, the intensified boating activity, increased waterfront dwellings, and greater public access to the shore will bring proportionate increases in the incidence of floating litter and local nuisances. Steps should be taken to counteract this tendency and to preserve or improve the aesthetic qualities of the harbor's waterways. The following mitigation measures are suggested:

Boat Pump-Out and Holding Facilities. Ordinances against the discharge of boat heads into harbor waters can be bolstered by encouraging the installation and use of pump-out devices. In one Southern California harbor, it has been suggested that boats in slips be continuously connected to a pump sump by means of a hose coupling. The

arrangement would adequately assure compliance, since non-connections are detectable by simple external inspection. Enforcing head discharge prohibitions for boats under way is probably not practical. If it should develop that there is a problem of nuisances or high bacterial readings from this source, a solution might be to require the installation of holding tanks and visible sealing devices. It is probable that the Coast Guard will eventually adopt uniform regulations along these lines that will render Ventura County action unnecessary.

- Baffled Catch Basins. The introduction of floating oil and coarse litter to the harbor via urban storm drains can be suppressed by provision of interception devices located on storm drains above their discharge points. A suitable arrangement consists of a chamber separated into two or more compartments by baffles extending from above the water surface to an elevation near the bottom. Oil and floating debris are trapped behind the baffles. These devices will function effectively during dry weather, provided they are occasionally cleaned. Oil carried by heavy flows during storms will be washed through, but control of local urban runoff sources at such times is futile anyway.

- Artificial Aeration. Concern has been expressed that dissolved oxygen levels may occasionally fall as the marina waterways become biologically mature. Artificial aeration is one way of counteracting this tendency in a cul-de-sac or lateral channel area. Many types of aeration equipment are available. Some types are aesthetically undesirable in a recreational area because of noise, spray, or excessive turbulence. Compressed air distributed through a bubbling system would be most suitable for the marina application. Such a system is economic and inconspicuous.

- Artificial Recirculation. Artificial recirculation of water through dead-end areas also provides relief from stagnant conditions. Effective pumped recirculation should be designed for a two-day minimum replacement time of the stagnant water. In areas where debris accumulation is also a problem, skimming intakes can be incorporated into the recirculation system.

Although the water in Channel Islands Harbor is exchanged with the ocean rather rapidly, there are local cul-de-sac waterways where stagnation and quality degradation could occur. Methods of improving circulation should be investigated thoroughly and implemented in backwater problem areas. Artificial aeration may be held as a reserve measure in case of future problems related to low dissolved oxygen. Since siltation in the vicinity of storm drain outlets has been great enough to obstruct navigation, it is recommended that depths be checked

regularly and that remedial dredging be carried out as necessary.

Low coliform levels indicate that boat owners are satisfactorily complying with head-pumping regulations at the present time. Emphasis on this point should be continued. Maintaining boaters' awareness of the need for proper litter disposal is likewise desirable. It is assumed that all construction activity will be closely regulated for institution of turbidity and debris mitigation measures.

TRAFFIC

Vehicular Traffic

The Mandalay Bay, Phase IV project would contain 401 single family attached and detached dwelling units, all with frontage on water channels which would provide access to the Pacific Ocean via the Southern California Edison Canal and the Channel Islands Marina.

The basic internal street system is proposed as a series of cul-de-sacs feeding into Peninsula Road, a street with two lanes in each direction separated by a 14 foot landscaped median. [Figure 27] The cul-de-sacs would be of the hammerhead type varying in length from 250 to 1,000 feet with 19 to 58 fronting residential dwelling units. The pavement widths would be 32 to 36 feet. Peninsula Road would be approximately 2,500 feet long and would also be a cul-de-sac in the sense that it would have only one outlet. It would serve 262 dewelling units with 20 units directly fronting the road. Most of the other units would front on the adjoining cul-de-sacs. Peninsula Road would lead into Wooley Road. Wooley Road, which presently is 16 feet wide would ultimately be constructed, in accordance with the City's General Plan, as an arterial street with two 32 feet roadways separated by a 16 feet raised median.

The City of Oxnard standards do not provide for a hammerhead type cul-de-sac, thus such a design must be considered as non-standard. The more common type cul-de-sac and one provided for in the City Standards is the circular type with a 40 foot radius. This radius allows a motorist to make a 180 degree turn in a continuous forward motion. The disadvantages with the hammerhead are that a motorist must back up to make such a maneuver, thus they are not as desirable.

The length of the cul-de-sacs vary, however, there are three which are 750 to 9050 feet long, thus exceeding the City's policy restricting the length to a maximum of 600 feet. The additional length of 350 feet, however, does not appear to be so excessive that a problem would be created.

The number of dwelling units on most of the cul-de-sacs does appear to be excessive. Normal design requirements usually restrict cul-de-sacs to serving from 15 to 20 units. In this project, some cul-de-sacs serve up to 59 units. This will result in creating higher traffic volumes than normally expected on cul-de-sacs.

Traffic Generation and Distribution

The traffic generation factors that were used in estimating peak afternoon traffic are:

- 1.15 trips per dwelling unit
- 60 percent of the trips oriented toward the development and 40 percent away from the development

Refer to the first line in Trip Generation Factors in the Supproting Information chapter for the statistical basis in choosing these factors. The traffic distribution factors which were used are summarized in Table 28.

Table 23

TRAFFIC DISTRIBUTION

DIRECTION	PERCENT
Northwest	6.3
Northeast	27.7
East	31.8
South	34.2

The traffic distribution factors were based upon an analysis of the work location of the principal wage earners in the City of

Oxnard as indicated in the Ventura County Special Census of 1975.(53)

Traffic oriented to the northwest; that is, Ventura, Santa Barbara, and Ojai, accounts for 12.6 percent of the total peak hour trips. There are two routes leading to the northwest: Harbor Boulevard and Victoria Avenue. One-half, or 6.3 percent of this traffic, was assigned to Harbor Boulevard, a northwest direction. The other half was assigned to Victoria Avenue, and thus was included on the northeast 27.7 total. The traffic oriented toward Oxnard (61.9 percent) was assigned to an easterly direction on Wooley Road to Victoria Avenue, at which point this traffic was assigned one-third (20.6 percent) equally to the northeast, east, and south. Therefore, the 61.9 percent was equally included in the factors for these three directions.

All other traffic was assigned in the direction of its orientation.(54) The resulting afternoon peak hour traffic volumes and their direction on the periphery of the proposed development, based upon the ultimate road system, are indicated in Figure 27. The resulting volumes at the intersection of Victoria Avenue and Wooley Road are indicated in Figure 28.

Projected peak p.m. traffic volumes are compared to existing peak p.m. volumes in Table 29.

In comparing the projected peak hour traffic to the existing peak hour traffic, it can be seen that the proposed development will result in an approximate 15% increase of traffic on Victoria Avenue

With respect to this street, the critical locations will be the intersections of Victoria Avenue and Wooley Road and Victoria Avenue and Channel Islands Boulevard.

At the present time, these intersections are operating at a level of service of B, with very stable flows with load factors of less than 0.1.

The expected increase in traffic volumes (approximately 15%), due to the proposed development, will not exceed the excess capacity presently available. Therefore, it can be anticipated that upon the construction of the proposed development, both intersections will continue to operate at a level of service of B which is superior to levels C and D.

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(53) See Traffic Distribution in Supporting Information Chapter.

(54) See Traffic Directional Distribution in Supporting Information Chapter.

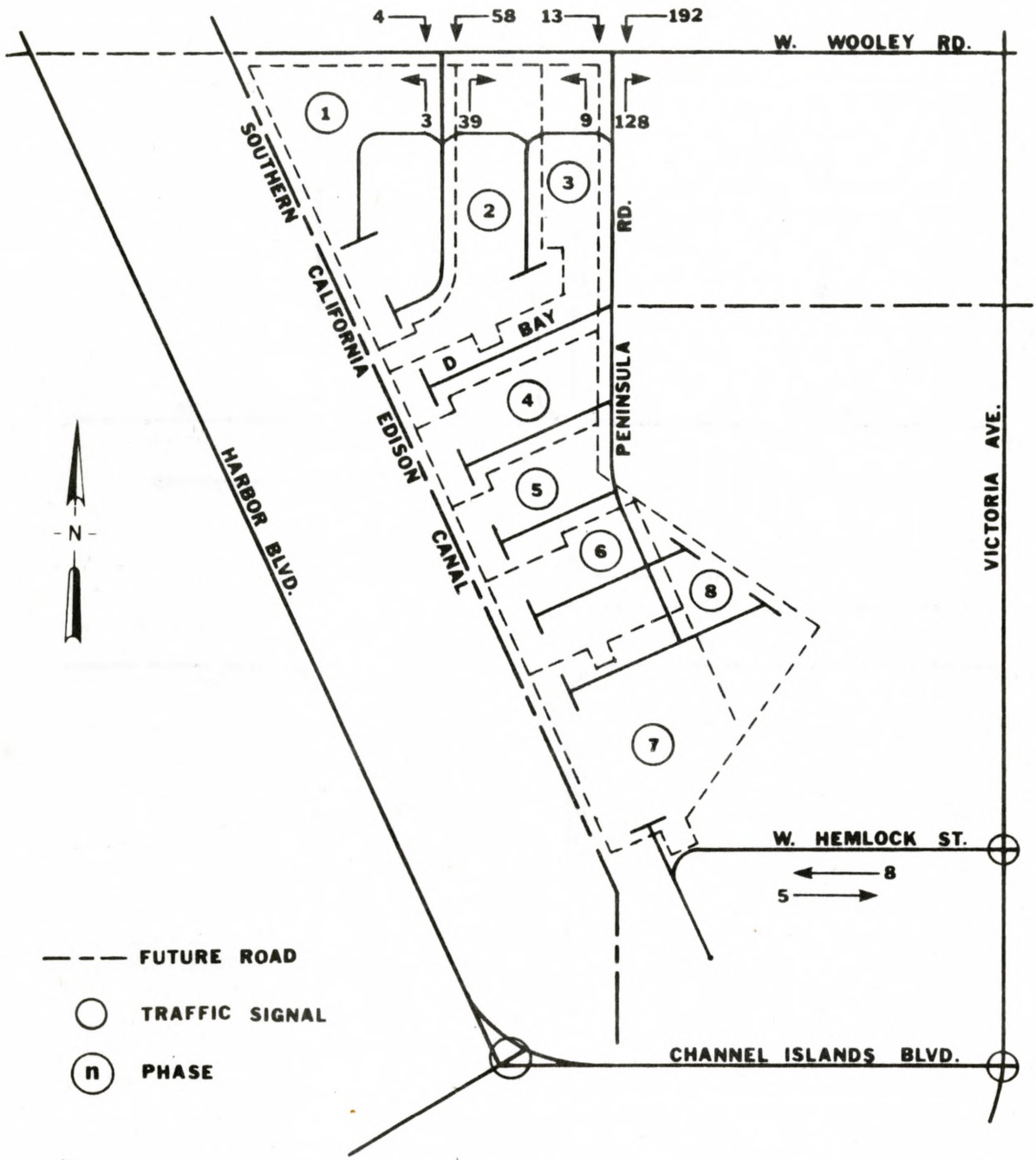

figure **27**

Traffic Map

P.M. Peak Hour Traffic Volumes

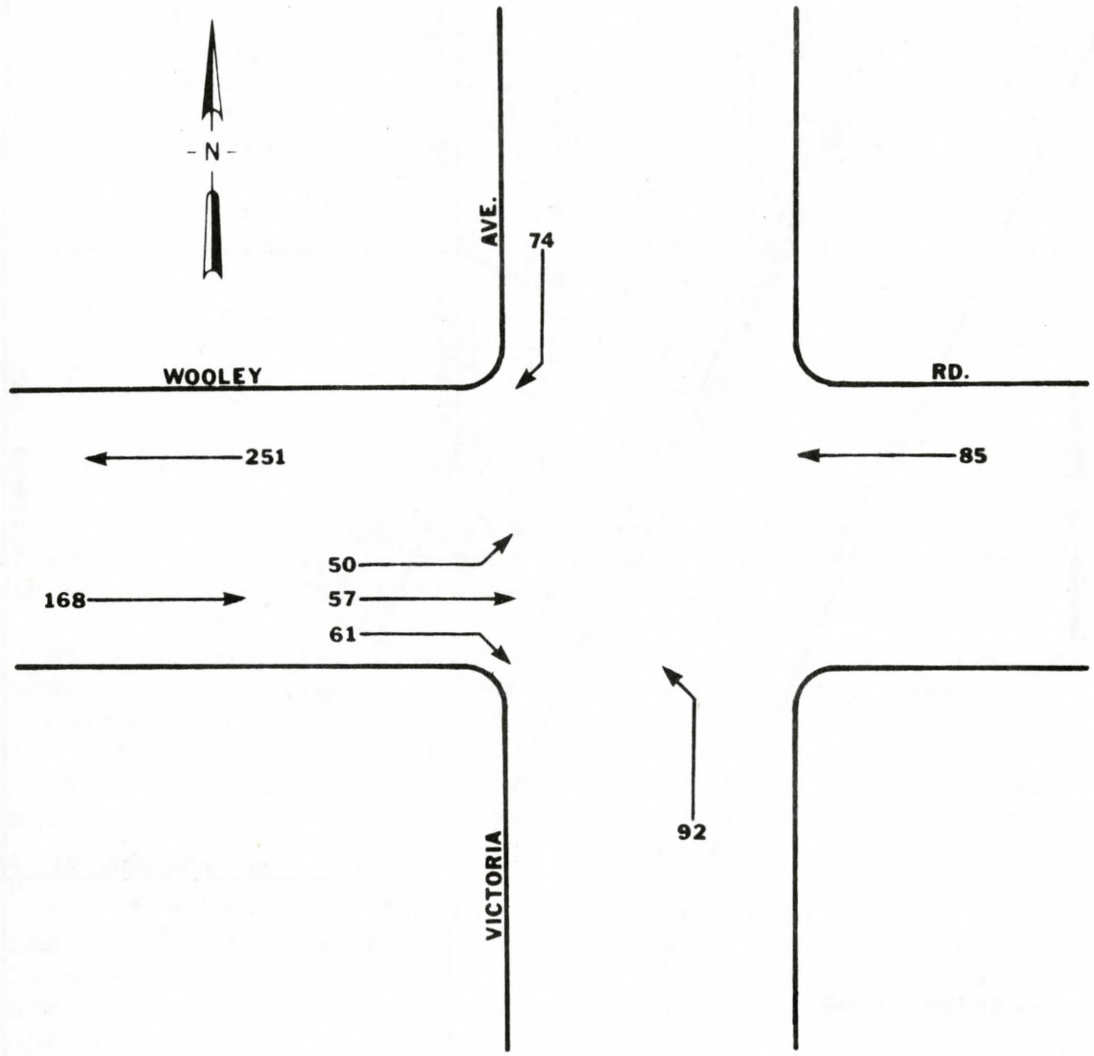

figure **28**

Traffic Distribution

P.M. Peak Hour Traffic Volumes

Atlantis Scientific

TABLE 29

PEAK P.M. HOUR TRAFFIC VOLUMES

	PROJECTED P.M. PEAK HOUR TRAFFIC VOLUMES	EXISTING P.M. PEAK HOUR TRAFFIC
Victoria Avenue		
a. North of Wooley Road		
Northbound	50	344
Southbound	74	344
b. South of Wooley Road		
Northbound	92	469
Southbound	61	469
Wooley Road		
a. East of Victoria		
Eastbound	85	210
Westbound	57	209
b. East of site		
Eastbound	168	14
Westbound	251	15
c. West of site		
Eastbound	17	14
Westbound	12	15

The average daily traffic (ADT) for a 24-hour period generated by the development would be 4,620. The ADT by street would be as follows:

Wooley Road	West of Tract	290
	East of Tract	4,190
	East of Victoria Ave.	1,420
Hemlock Street		140
Victoria Avenue	North of Wooley Rd.	1,240
	South of Wooley Rd.	1,520

Environmental Impact

The traffic volumes as indicated above were based upon the extension of Wooley Road across the Edison Canal and the extension of Victoria Avenue from the Ventura Freeway to Fifth Street - the ultimate road system.

Volumes of the magnitude projected on Victoria Avenue could be easily accommodated by a two lane facility. Wooley Road, however, because of its present poor state, could not handle such traffic. The highest afternoon peak hour volume that would occur on Victoria Avenue would be 92 vehicles in a northbound direction south of Wooley Road. This volume is equivalent to approximately ten percent of the capacity of one lane. Such volumes would have little impact upon this street. The volume on other streets in this area would be minimal.

There would, however, be considerable turning movements created at the intersection of Wooley Road and Victoria Avenue. These turning movements and their conflict with Victoria Avenue traffic could not be adequately controlled by the existing boulevard stops.

As previously indicated, it was assumed that Wooley Road and Victoria Avenue had been extended. The question arises as to how the impact would be modified if Wooley Road and Victoria Avenue were not extended. This would involve 13.4 percent of the total traffic, or 61 vehicles during the afternoon peak hour. The 6.3 percent northwest traffic (29 vehicles) assigned to Harbor Boulevard would divert to Victoria Avenue and Fifth Street to reach Harbor Boulevard. Their increased travel distance would be 0.9 miles. The other 6.3 percent and the 0.8 percent representing traffic oriented toward Santa Paula, or 32 vehicles in all, would be diverted to Ventura Road. Their increased travel distance would be 2.6 miles.

The traffic volumes generated by the Mandalay Bay development would not be significantly affected by either the extension of Wooley Road over the Edison Canal or by the extension of Victoria Avenue

south of Gonzales Road. The reason for this is the heavy orientation of traffic, 86.6 percent, to the east toward Oxnard, Port Hueneme, Thousand Oaks and Los Angeles. Traffic in these directions does not depend upon the extensions of Wooley Road or Victoria Avenue.

The internal street system would have limited circulation with access available only to Wooley Road. Most of the units, 262, would only have access through one outlet, Peninsula Road. The maximum traffic volumes anticipated for this road are quite light, with afternoon peak hour volumes of 192 inbound and 128 outbound. The proposed two lanes in each direction could easily accommodate such traffic. From an emergency service standpoint, however, 262 dwelling units on a street with only one outlet is undesirable. This adverse impact, to an extent, is mitigated by the proposed street width.(55)

The proposed width for Wooley Road is 32 feet of pavement on a 48 foot right-of-way. This is a substandard section when compared to the City's street standards for a local street with 40 feet of pavement on a 60 foot right-of-way. Wooley Road, however, is classified as a secondary arterial. The street section proposed is one-half of the street section required by City Standards for a secondary arterial. This is a common procedure; to have one-half of an arterial street constructed by the abutting development. This would seem to be satisfactory in this case since the 32 foot pavement proposed has adequate capacity to accommodate the traffic to be generated by this development and since the other half of Wooley Road would be constructed when the property to the north is developed.

With respect to the single access for the tract, it should be pointed out that 189 units south of "D" Bay would only have Peninsula Road as a point of entry or exit. This is not uncommon. For instance, the County of Ventura allows 250 units to be served by a 40 foot collector street. Peninsula Road will have two 27 foot roadways, thus the 189 units do not appear to be excessive on a street such as Peninsula Road.

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(55) In disucssing the proposed street system with Mr. Conley of the Oxnard Fire Department, he pointed out that construction will begin soon on a new Fire Station to be located at Channel Islands Blvd. and Peninsula Road. If Wooley Road is constructed across Edison Canal to Harbor Blvd., emergency units responding from this new station will have two approach routes to the proposed tract; Harbor Boulevard and Victoria Boulevard. If Wooley Road is not extended across the Edison Canal, then only one route will be available, i.e, Victoria Boulevard. Mr. Conley considers this as a significant disadvantage. The ultimate street width of Wooley Road and Peninsula Road will be a mitigating factor, however, such will not be as desirable as the construction of an additional access point.

The cul-de-sacs, in some instances, would also have an excessive number of units - up to 58. Typically, 15 to 25 units are considered as the maixmum number of units for a cul-de-sac. However, again this would be offset by the generous pavement width of 36 feet.

The construction of a raised median divider on cul-de-sacs is not recommended. The purpose of a median is to restrict access and to separate two relatively high speed traffic streams. Such features as medians are not appropriate for cul-de-sacs since speeds are low and access is one of their major functions. Emergency vehicles also find them a significant deterrent.

With respect to traffic controls, boulevard stops on the cul-de-sacs would be adequate. At the intersection of Peninsula Road and Wooley Road, traffic signals may eventually be required; however, their need would appear to be quite some time in the future.

Parking would be ample. There would be no large parking generators and thus no need for any significant off-street parking. The street widths which would be provided would allow street parking without any real interference with moving traffic.

Mitigating Measures

- The installation of traffic control signals at the intersection of Wooley Road and Victoria Avenue would eliminate the anticipated vehicular conflict at this location.

- Wooley Road west of Victoria Avenue is in such poor condition that reconstruction would be required if adequate access is to be provided. This could be accomplished by constructing one-half of the ultimate section of Wooley Road from the Edison Canal to Victoria Avenue.

- Extension of Wooley Road to Harbor Boulevard would reduce the project's access problems and improve emergency vehicle access.

The harbor/marina boat population is at a much greater level than had been predicted for the present stage of marina development. An additional 800 slips, which are being built in the west branch of the harbor, have been included in the calculation of ultimate congestion without Tract No. 2026-4. These slips have contributed largely to the high levels of congestion predicted.

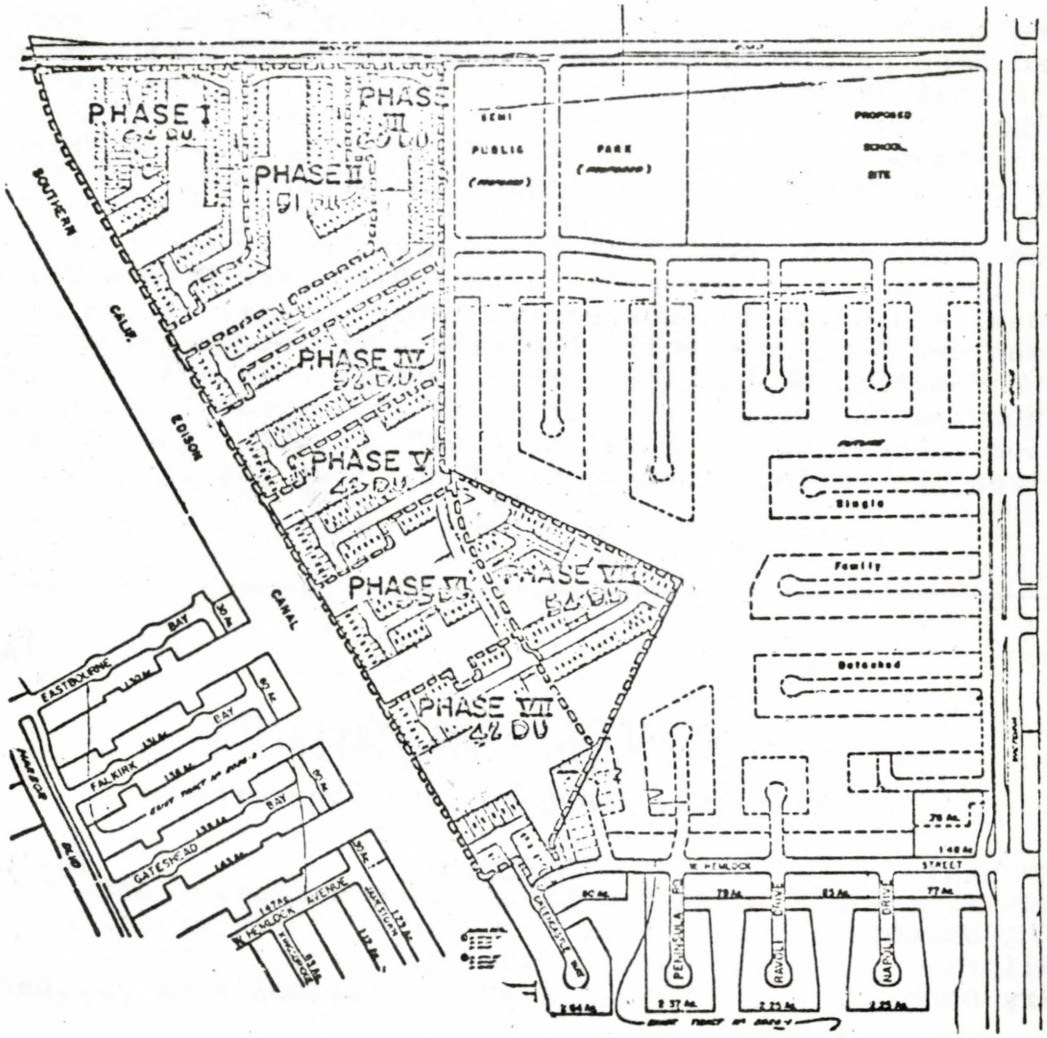
The proposed Tract 2026-4 development would add to the marina 401 dwelling units in Phases I through VIII (see Figure 29) and, an additional 400 units in prospective later phases. It is estimated that each dwelling unit would contribute one ocean-going vessel to the harbor-marina population. Thus immediate expansion would put the harbor/marina vessel population at approximately 4,260 with later expansion increasing the total to 4,660 vessels. The Table below summarizes the various increments of the boat population.

TABLE 30

HARBOR MARINA VESSEL POPULATION

EXISTING, APPROVED, AND PROJECTED

COMPONENT	INCREMENT	TOTAL
Existing Harbor		
Slips	1,660	
Dry Dock	400	2,060
Harbor Expansion		
Slips	800	
Dry Dock		3,060
Residential Marina		
Existing	400	
Under Construction	400	3,860
Prop. Tract		
Phase I - VIII	400	4,260
Full Development	400	4,660



CHANNEL ISLANDS MARINA

PROPOSED TRACT NO. 2026-4
PHASED DEVELOPMENT

FIGURE 29

Observed Summer Sunday use habits are less intense than had been anticipated, especially in the count of tacking sailboats. An increasing number of sailboat owners are apparently opting for auxiliary power as a convenience in traversing the heavily used harbor area. This practice has a positive effect upon congestion and tends to offset the effects of the increased number of boats. But future traffic is still predicted to be very heavy. Unmitigated boat traffic problems could be a serious negative environmental impact. This is borne out by the computation of congestion indices after inclusion of the proposed development as summarized in Table 31.

TABLE 31

CONGESTION INDICES*

WIND ANGLE**	EXISTING CONDITIONS	APPROVED EXPANSION	AFTER TRACT PHASE IV
0°	7.0	23.4	33.1
30°	4.6	15.3	21.6
40°	3.0	10.0	14.2
45°	0.	0.	0.

Notes: * In units of interferences per acre per hour, as calculated at the entrance channel. A value of 10 indicates the beginning of concern; a value of 15 represents a serious condition.

** The average angle between wind and channel is estimated at 30° to 40°.

Expansion of the demand for cooling water will result in increases in current velocities. Expansion of the waterways through addition of Tract 2026-4 would result in additional incremental velocities. Calculations of current velocities under the Channel Islands Boulevard bridge are summarized in Table 32.

TABLE 32

CURRENT VELOCITIES FT/SEC.

CONDITION	MAXIMUM FLOOD VELOCITY	MAXIMUM EBB VELOCITY
Existing Marina, 500 cfs pumped*	0.5	-0.2**
Existing Marina, 3,000 cfs pumped*	1.0	0.3
With Tr. 2026-4, 500 cfs pumped*	0.7	-0.4**
With Tr. 2026-4, 3000 cfs pumped*	1.2	0.1

Notes: * Cubic feet per second (cfs).

** A negative value indicates flow out of the marina

As indicated in the Table, the maximum current after development of Tract No. 2026-4 is 1.2 fps during flood tide and with an Edison canal flow of 3000 cfs. This impact is expected to be small. The ultimate velocity of 1.2 fps under the Channel Islands Boulevard bridge is well within the bounds of reasonable design. Currents are not expected to create hazard or hardship for boats navigating near or under the bridge. Velocity would increase near Wooley Road because of reduced width of the canal to the north of the project. It is assumed that barriers would be introduced to restrict boat movement north of this point, with or without a bridge dedication at Wooley Road.

Mitigating Measures

- Congestion in the harbor entrance appears to be heading toward severe levels if left unchecked. It is the tacking of sailboats that creates entrance channel interference problems. The most effective form of mitigation is the use of auxiliary power by all sailboats operating within the harbor. Widespread adoption of this practice would eliminate the cause of congestion. With parellel traffic only, congestion does not occur until the volume is so heavy that a "bumper to bumper" situation exists. It is clear that without tacking carrying capacity would be increased.

- Other management techniques could include limited tacking hours. As an example, tacking sailboats could be prohibited from leaving the harbor between noon and 4:00 p.m., weekends, and holidays, June 15 to September 15. During these times they would have to paddle out or be towed out. It is assumed that returning sailboats will not need to tack due to the aft-wind.

- Marine traffic congestion will become a serious problem if unmitigated. This is true for the existing and approved facilities, whether or not Tract 2026-4 is constructed. It is recommended that all sailing vessels capable of accommodating auxiliary power be so equipped. Engines should be used for all in-harbor activity which would otherwise require tacking across parallel lane traffic. Tacking regulations are especially necessary during peak activity periods, that is, Summer, Sundays and holidays. These safety measures would leave the harbor a safe and enjoyable place for recreational activities and would greatly increase the capacity of boat traffic corridors. Boat use characteristics should be re-examined and congestion re-evaluated at each increment of marina expansion.

- Although channel currents are not expected to present any problems, shoaling through accumulation of silt could increase velocities to a critical level. The Ventura County Harbor Authority reports that only minor siltation problems have been experienced. In any event, dredging would provide effective mitigation of the problem. Difficulties to sailboats associated with loss of wind while against a rapid current would also be lessened as a secondary effect of the use of auxiliary power. Although channel currents are not expected to present any problems it is, nevertheless, recommended that all waterways, and in particular the canal under the Channel Islands Boulevard bridge, be monitored for siltation.

Bulkhead Erosion

At the present time, portions of the concrete bulkhead works in the Mandalay Bay residential marinas are experiencing problems with erosion and undermining. Pending legal action is aimed at fixing the exact cause of the problem. It is generally felt, however, that a properly designated and maintained bulkhead should remain intact for a much longer period of time than the relatively short lifespan of the installations in question.

Two basic types of construction have been employed in the building of bulkheads. One type of wall has been generally free of erosion and undermining, while the other has suffered considerable deterioration. There are several major differences between the two installations.

One wall design (for purposes of this report - "type I") is a pile supported L-type wall. Type I construction utilizes a filter-covered toe slope overlain by rock of 4 to 12 inches in diameter. The slope is at 3:1 and the toe of the slope lies approximately at lower-low water level.

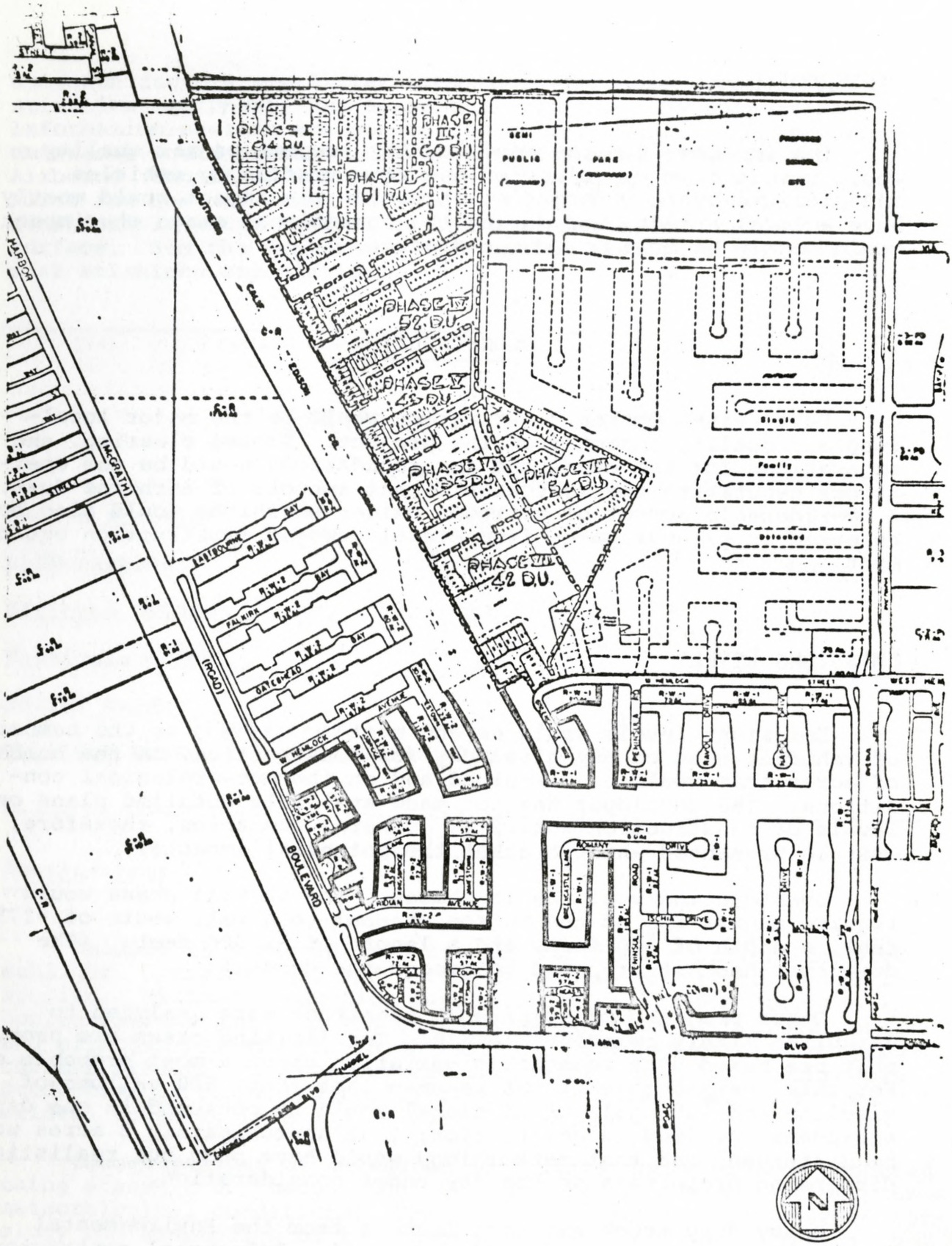
The other type (type II) wall has a steeper slope away from the toe at approximately 2:1. The slope is protected by concrete aggregate type rocks of 2 inches in diameter and there is no underlying filter material. The toe of the bulkhead lies well above low water levels, causing it to be exposed frequently during the tidal cycle.

Figure 30 indicates bulkhead segments at which toe erosion has taken place. Field inspections conducted in February of 1977 turned up numerous eroded areas under the type II wall. Dimensions of the undermining were typically 4 to 8 inches in elevation, around 50 feet in length, and penetrating several feet in (horizontal) depth. The damage was extensive enough in these areas to expose the timber bearing piles to view.

The developer has not specified the type of bulkheads he would use in Tract 2026-4. Experience in the existing marina is instructing, since eroding forces are similar to those that would occur in the channels and the main canal associated with the development.

Mitigating Measures

- In view of the erosion and undermining which has already occurred around the existing bulkheads, a cautious approach should be taken in future design. Filter protection of slopes and the use of coarse material for cover should be mandatory. Slopes should be flat enough to maintain their stability over many years. It is also recommended that any wooden piles used in future work should be treated against attack by marine organisms.



Bulkhead Erosion

CHANNEL ISLANDS MARINA

LOCATION OF BULKHEADS EXPERIENCING EROSION

FIGURE 30

AIR QUALITY

The impacts from the Mandalay Bay project on air quality would result from construction and from traffic by vehicles and pleasure craft. During construction the impact would mostly have a local effect, and during the operational stage the impact would mostly be of a regional character.

CONSTRUCTION

Dust raised during construction would be the major localized air quality impact from the project. Ground clearing, and excavations for the canal and for foundations would be the operations generating the most significant amounts of airborne dust. A considerable amount of nitrogen oxides emissions would also be released in exhaust gases from diesel powered construction equipment.

EMISSIONS LEVELS

Emissions levels would depend most sensitively on the numbers of vehicles used on any given day for construction, on the number of acres that would be disturbed and on the meteorological conditions. The developer has not made available detailed plans on levels of construction activity. General scenarios, therefore, must be presented which bracket the potential impacts.

Construction would be in phases. The initial phase would require excavation of the Edison channel to a full width of $\pm$275 feet, a depth of $\pm$30 feet, and a length of $\pm$2,500 feet. (The developer has not proposed to dredge the canal.)

Other projects of comparable magnitude were analyzed to establish likely emissions levels. Two limiting cases are proposed that are based upon reasonable variation about a most probable case. For this average case it was assumed that about 500 gallons of gasoline and $\pm$500 gallons of diesel would be consumed in one day by equipment involved in costruction, that approximately 8 acres would be disturbed, and that meteorology would have poor but realistic dispersing properties on the day under consideration.

Heavy duty truck emission factors from the Environmental Protection Agency manual AP-42 were used. Industrial contractors use types and mixes of equipment differently; and heavy duty vehicle

emission factors may differ from those for some types of construction equipment; but emission factors in the Supporting Information section are considered representative. Exhaust emissions would probably be within the ranges given in Table 33 Airborne (fugitive) dust would be significant only when the first few feet of earth materials are disturbed; there is considerable water content in the earth materials below the surface. See the Supporting Information section for fugitive dust emissions calculations.

TABLE 33

COMPUTED EMISSIONS - LBS./DAY

	Low Estimate	High Estimate
Carbon Monoxide	530	1,200
Hydrocarbons	63	140
Nitrogen Oxides	390	870
Particulate Matter	19	42
Sulfur Oxides	29	65
Fugitive Dust	230	510

AMBIENT LEVELS

Oxidant is produced from complex chemical reactions involving sunlight, hydrocarbons, and nitrogen oxides, and other chemical species. Oxidant production depends critically upon both the concentrations and upon the relative proportion of hydrocarbons and nitrogen oxides. The high ratio of nitrogen oxides to hydrocarbons produced by construction equipment forstalls measureable production of oxidant directly from these emissions. Nitrogen oxides, however, have a deleterious effect upon health.

Concentrations of unreacted pollutants downwind were computed using standard diffusion modeling. Results depend sensitively upon meteorological conditions. The use of realistic worst case meteorology and assumption of two cases for emissions levels, result in reasonable bracketing of ambient levels likely to be experienced downwind from the site.

The modeling predicts nitrogen oxides levels of 670-1,500 ug/m^3 [56] at 1,500 feet downwind from construction. Levels would decrease approximately 50 percent at twice the distance. There is no nitric oxide (NO) standard. This emission product would be thoroughly diluted before it is oxidized to nitrogen dioxide (NO_2) for which there are air quality standards.

Hydrocarbon levels were found to range from 33 to 74 ug/m^3 at 1,500 feet downwind from construction. These values are less than half the Federal hydrocarbon standard (160 ul/m^3).

Modeling predicts 24-hour average sulfur dioxide levels of 7 to 15 ug/m^3 at 1,500 feet from construction. These levels are considerably less than the California 24-hour standard (105 ug/m^3). Levels for other averaging periods are a lesser fraction of other sulfur dioxide standards.

Particulate matter would result from exhaust and airborne dust. Modeling predicts 24-hour average levels of 57 to 130 ug/m^3 at a distance of 1,500 feet from construction. The higher estimate exceeds the California 24-hour standard. This concentration would occur only when surface material would be disturbed under the assumption of limited dust control watering. There is a current dust problem in the area during tilling operations; it is aggravated when chicken manure is dispersed as fertilizer on the fields that include the proposed development site. [57]

Carbon monoxide (CO) emissions would result in ambient levels considerably smaller than the levels in the CO standards.

TRAFFIC

The principal impact on regional air quality would arise from project generated and project associated vehicular and boat traffic. Most emissions would result from vehicles and boats owned by residents of the Mandalay Bay project. Indirect emissions would arise from visitors to the site. These impacts would occur throughout the life of the project. There would be a slow decline in emissions, but not necessarily in the relative significance of the project upon regional air quality (see Table 35) as more stringent vehicular controls bear results. Impact on a local level would vary with

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(56) Refer to note (39) on page IV-67.
(57) Personal communication, Jim McGrath, 1977.

meteorological conditions. The regional effect in Ventura County can be described sufficiently in terms of the increment from the project to cumulative levels of emissions.

Vehicular Emissions

The estimation of emissions levels is necessarily approximate. Assumptions must be made as to the vehicular mix, the degree of vehicular deterioration, and effective average driving cycle and distance traveled.

Two sets of computations were performed. The first represent a worst case analysis of driving cycle, based on emission parameters in the Environmental Protection Agency (EPA) manual AP-42. This computation only applies to the first year of project usage and does not account for heavy duty trucks. As a result, estimates of hydrocarbon (C) and carbon monoxide (CO) levels are high. The second set of computations is based on emission factors that were modified by the California Air Resources Board and made available by the Ventura County Air Pollution Control District. This set assumes a five percent heavy duty vehicular mix and higher average speed. As a consequence, HC and CO levels are somewhat lower; and levels of nitrogen oxides (NOx), sulfur dioxide (SO_2), and particulate matter (PM) are on the high side for this project.

1. Gasoline Engine Emissions

Assumptions

- Peak afternoon trips - - 462
- Average daily trips - - 4,620
- Average trip length - - 6 miles
- Miles per day from project - - 27,720 miles
- Project completion date - - 1980 (estimated)
- Emission factors (Ref: EPA, Compilation of Air Pollution Emission Factors, 1976, AP-42.) (58)

Carbon monoxide	35.5 gm/mile
Total hydrocarbons	3.31 gm/mile
Nitrogen Oxides	2.21 gm/mile
Particulates	0.32 gm/mile
Sulfur dioxide	0.13 gm/mile

(58) Calculations which follow utilize these conversion factors: 0.0022046 pound in each gram; 2,000 pounds in each ton.

The emission factors for 1980 gasoline vehicular mix are based on the following assumption: Only California vehicles; average air temperature, 67°F; 40 percent of vehicular miles traveled under cold start transient conditions, 30 percent under hot start transient conditions, and 40 percent under warm engine conditions. Emission levels during the year would vary with changes in ambient temperature.

Table 34 presents the calculated average daily emissions from the proposed development for the daily total and the afternoon peak hour as based on the assumptions outlines above.

TABLE 34

GASOLINE ENGINE EMISSIONS

AIR POLLUTANT	EMISSION RATES LBS./DAY	LBS./HOUR
Carbon monoxide	2,169	217
Total hydrocarbons (*)	202	20.2
Nitrogen oxides	135	13.5
Particulates	19.6	2.0
Sulfur dioxide	7.9	0.8

* Note: The Ventura County APCD assumes 85 percent of total hydrocarbons enter into reaction to form photochemical oxidants.

2. Gasoline/diesel Engine Emissions

Assumptions

- Five percent of vehicles are heavy duty. Average speed - - 45 miles per hour.
- Average daily miles travelled [59] - - 22,199 to 27,720
- Emission factors from Ventura County APCD - as given in the following Table.

(59) The lower figure results from another computation. Assuming the 401 dwellings have an average family size of 3.2, driving an average of 17.3 miles per capita per day (Bill Thuman, Ventura County APCD), this results in 22,199 miles per day.

TABLE 35

EMISSION FACTORS, 1980-2000

YEAR	EMISSION FACTORS - GRAMS/MILE CO	HC	NO_x	PM	SO_2
1980	10.6	3.0	3.5	0.38	0.18
1985	5.4	1.5	2.6	0.25	0.18
1990	4.4	1.1	2.4	0.25	0.18
2000	4.2	1.1	2.4	0.25	0.18

Table 36 presents the calculated average daily total emissions using these emission factors.

TABLE 36

GASOLINE/DIESEL ENGINE EMISSIONS

YEAR	EMISSION RATES - - LBS./DAY CO	HC	NO_x	PM	SO_2	TOTAL
1980	519-648	147-183	171-214	19-23	9-11	864-1,079
1985	264-330	73- 92	127-159	12-15	9-11	386- 607
1990	215-269	54-67	117-147	12-15	9-11	408- 509
2000	206-257	54-67	117-147	12-15	9-11	398- 497

The higher figures for 1979 in this Table are comparable to those in Table 34 above. As stated earlier, the latter Table results in lower CO and HC estimates, but higher NO_x, PM, and SO_2 estimates.

PLEASURE CRAFT

EMISSION FACTORS

Available data useful for estimating emissions from pleasure craft are limited. The Environmental Protection Agency (EPA) has relied on sales information and emission data for other craft and

vehicles to tabulate emission factors for inboard pleasure craft.

The emission factors for inboards have an accuracy rating of D (below average). [Ref:36] When coupled with a projection of potential pleasure craft usage, the estimate of anticipated emissions from the project must necessarily be very approximate.

Boats regularly docked at the development would consist mostly of inboard craft and sailboats. A precise breakdown of inboard craft into percentages powered by diesel and by gasoline engines is not possible. Out of 700,000 inboard pleasure craft registered in the United States in 1972, almost 300,000 were equipped with an outboard-like power unit. According to sales data, 60 to 70 percent of these inboard/outdrive craft used gasoline-powered automotive engines rated at more than 130 horsepower. [Ref:36] The other 400,000 used conventional inboard drives powered by a variety of diesel and gasoline powerplants. In the following calculations it is assumed that 65 percent are gasoline powered and 35 percent are diesel powered. EPA emission factors are based on Coast Guard and automotive data [Ref: 36] and take the effect of water scrubbing of underwater gasoline engine exhaust into account. [Ref:36] All powered sailboats are assumed to be gasoline driven.

Most outboard motors are 2-stroke with average available horsepower of about 25(9.1 produced horsepower; Ref:36). The majority of outboard engines have underwater exhaust, making emission measurements difficult. EPA emission factors are based on very limited measurements. The emission factor rating is B (above average). Emission factors are summarized in the following Table. Units are based on full consumption, rather than miles travelled. Emission rates for particulate matter are not available; they are expected to be low owing to water scrubbing of exhaust gases.

TABLE 37

AVERAGE EMISSION FACTORS

PLEASURE CRAFT - LB./GAL

	CO	HC	NO_x	SO_2
Gasoline inboard	1.24	0.086	0.131	0.0064
Diesel inboard	0.14	0.180	0.340	0.027
Outboard	3.30	1.10	0.0066	0.0064

Source: Compilation of Air Pollutant Emission Factors, AP-42, Supplement No. 4., 1976.

Assumptions on Traffic and Use

Considerable variation was found between the statistics in the harbor projection study by Moffatt and Nichol [Ref:58] and the traffic counts made on July 3 and July 10, 1977.(60) Considerable variation in harbor usage from day to day can be assumed. This is not surprising upon observing that many factors influence recreational levels of activity. Weather is a strong factor and it appears that boaters adapt to their surroundings; that powered sailboats will use their motors, for example, when traffic increases. Since only limited data are available for the Channel Islands Harbor/Marina, two scenarios are postulated which probably serve as upper and lower limits on emissions likely to result, or average, during weekends. The lower limit is represented by the usage factors in Moffatt and Nichol; it is further assumed that 60 percent of powered sailboats have inboard engines, and 40 percent outboard engines. The upper limit is based upon the observations of usage made on July 10, 1977, together with the assumption that all sailboats docked at dwellings that are capable of adaptation to power would be required to have an auxiliary power unit and use it while navigating in the harbor/marina complex; it is assumed that, as a result, 1/3 have inboard engines, 1/3 outboard engines, and 1/3 are without power. It has also been observed that at some marina slips two boats were tied up; the second was an outboard equipped craft. It therefore is assumed that all trips by outboards result from dual tieups and useage, or are launched from some convenient location within the harbor/marina complex. Outboard traffic, then, is computed as additional to the traffic resulting from inboards and sailboats associated with dwellings, and together comprising 401 craft. In order to make the scenario based on observations on July 10 an upper estimate, statistics from Moffatt and Nichol on outboard usage are used in both scenarios.

Data for the two cases are summarized in the following Table. These data together with the average emission factors in the previous Table are sufficient for the computation of emissions for the two cases.

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(60) See data in Supporting Information Chapter.

TABLE 38

USAGE DATA

SUMMER SUNDAY AVERAGE

CRAFT	FUEL CONSUMPTION GALS./HR[1]	POPULATION PHASE 4	LOWER ESTIMATE AVE. SUMMER/SUN. TRIPS	LOWER ESTIMATE DURATION HRS.[2]	HIGHER ESTIMATE AVE. SUMMER/SUN TRIPS	HIGHER ESTIMATE DURATION HRS.[2]
Inboard						
gasoline	3.0	119	15	3	30	3
diesel	3.0	64	8	3	16	3
Sailboat		218				
non-powered	0	-	52	0	18	-
inboard	1.5	-	8	1	18	1
outboard	1.5	-	5	1	18	1
Outboard	1.5	-	27	3	27	3

Notes: (1) Fuel consumption rates from Ref. 36

(2) Estimated average for duration under power.

Daily Emission Rates

Total emissions, in pounds per day, are calculated from the product of emission factor, fuel consumption rate, average powered trip durations, and number of trips. Table 39 summarizes the results. Emissions for the two cases are separated by a slash.

Table 39

MAXIMUM SUMMER SUNDAY EMISSIONS

CRAFT	EMISSION RATES - - LBS./DAY CO	HC	NO_x	SO_x	TOTAL
Inboard -					
gasoline	167/335	12/23	18/35	0.86/1.7	198/395
diesel	10/20	13/26	25/49	1.9/3.9	50/99
Powered Sailboat					
inboard	15/34	1.0/2.3	1.6/3.5	0.08/0.17	18/40
outboard	25/89	8.3/30	0.05/0.18	0.05/0.17	33/119
Outboard	401/401	134/134	0.80/0.80	0.78/0.78	536/536
Total	618/879	168/215	45/89	3.7/6.7	834/1188

Peak half-hour water traffic use on July 10 was found to represent approximately eight percent of total daily traffic.(61) This level of activity was similar on July 3 but was sustained for a longer period. Eight percent of estimated Summer Sunday emissions are presented in the following Table. Approximately five percent of average daily trips occur in the peak half-hour, and were similarly estimated and presented in the Table. Peak emissions levels from the two sources on a weekend would be comparable.

(61) Refer to data in Supporting Information Chapter.

TABLE 40

PEAK HALF HOUR EMISSION RATES - LBS./HR.

SOURCE	CO	HC	NO_x	SO_x	TOTAL
Vehicles	108	10	10	0.5	129
Water Craft	60	15	5	0.4	80

The maximum likely emissions levels for 1980 and 1985 consist of using highest emission rates for vehicles and pleasure craft from the preceding tables.(62) These rates when combined with maximum emission rates from Table 39 for pleasure craft, result in maximum estimates. A comparison with emission levels in Oxnard (Regional Statistical Area III) and Ventury County is given in Table 41. The comparison shows that the project would represent a measurable level of emissions in the region.

MITIGATING MEASURES

Since pollution control of vehicles falls under state jurisdiction and since individuals are relatively free to use boats and vehicles as they see fit. effective mitigating measures are limited to direct disincentives on vehicular usage.

The City may limit total vehicle miles traveled by limiting the rate of development in general. Restrictions, however, may be offset to some degree by development elsewhere in Ventura County. Therefore, air quality measures should be applied uniformly in the region as part of general planning.

The City can limit emissions during construction by setting down and enforcing guidelines, such as the following:

- Use watering dust control on equipment and work areas, especially during morning hours (stable atmospheric conditions) and during high winds.

(62) Maximum carbon monoxide and hydrocarbon emission rates for 1985 can be estimated from the progression in comparable emission factors in Table 41.

It is assumed that emission rates from water craft would increase by 15 percent by 1985 as a consequence of increases in sizes of craft associated with the development.

- Restrict vehicles and equipment to traveling along well-watered ingress/egress routes.
- Require all dirt loads exiting the site be well watered after loading.
- Restrict all trucks and vehicles within the site to a maximum of 15 miles per hour.

TABLE 41

COMPARISON OF MAXIMUM ESTIMATED EMISSIONS - TONS/DAY

YEAR	BASIS	CO[1]	BC[1]	NO_x[1]	PM[2]	SO_x[2]
1980	Ventura County[3]	240	40	33	61	73.8
	RSA III[1]	85	12	11	17	72.4
	Project	1.52	0.21	0.15	0.012	0.009
	Project as Percentage of County	0.64	0.61	0.46	0.02	0.01
	Project as Percentage of City	1.80	1.80	1.40	0.07	0.01
1985[2]	Ventura County[3]	314	47	28	71	70
	RSA III[1]	110	16	9.2	20	69
	Project	1.06	0.17	0.008		0.009
	Project as Percentage of County	0.37	0.37	0.47	0.01	0.01
	Project as Percentage of City	0.96	1.08	1.42	0.04	0.01

Notes: (1) Inventory of mobile emissions sources.
(2) Inventory of all emissions sources (mostly stationary).
(3) Includes the project.

Source of inventory data: Ventura County Air Pollution Control Control District, Prelimiary Source of Emissions Inventory (unpublished). Data were projected to 1980 and 1985 from 1975 Ventura County APCD data using the projection estimate in Air Quality Maintenance Planning Policy Task Force, Preliminary Emissions Inventory and Air Quality Forecast, 1974-1995, Final Report, Appendix, 1976.

Noise Level Criteria

The Noise Element to the General Plan for the City of Oxnard area has not been completed. The City of Oxnard Planning Department was contacted to determine the appropriate criteria to use for assessing impact. A representative from the Planning Department indicated that the basic criteria to be used to assess impact are as follows:(63)

- No residential development will be permitted where the average CNEL exposure in exterior areas is 65 dB or greater
- All residential structures shall be insulated as necessary to insure that interior CNEL values due to exterior noise sources are less than 45 dB with windows closed.

Noise Impact

Impact from noise is assessed both by comparing noise levels intruding on a proposed site with local noise criteria for land uses designated for that site, and also by determining increases in noise level projected for sources associated with development of the site, such as construction activity and local traffic.

Project Noise Impact

Construction Phase

Heavy machines including dozers, scrapers, trucks and other earth moving equipment would be used during the construction phase of the

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(63) Mr. Donn J. Hineser, Planning Associate, City of Oxnard Planning Department.

project (estimated at three to six years). Typical noise levels from this type of equipment range from 85 to 95 dBA at fifty feet. Noise from construction equipment is generally localized and limited to the daytime construction hours. However, it is likely that occupants of the residences NWW of the bridge at Wooley Road and the new residences west of the channel just north of Hemlock would experience some annoyance during the construction period. The extent of the annoyance is unknown at this time because of the lack of information on construction equipment types and numbers.

Operation Phase

Local increases in noise level may be expected from automobile and boat traffic associated with the project. Noise level increases from traffic generated by the project are summarized in Table 42.

Table 42

PROJECTED CNEL NOISE LEVELS IN dB

ADJACENT TO LOCAL ROADWAYS*

STREET	CURRENT LEVEL	PROJECT LEVEL	CHANGE
Harbor Blvd.	69.6	69.7	0.1
Wooley			
West of Victoria			
East of Site	NA	56.3	NA
West of Site	NA	45.3	NA
East of Victoria	54.0	56.2	2.2
Hemlock			
West of Victoria	NA	42.2	NA
Channel Islands Blvd.	68	68	0.1
Victoria			
North of Wooley	58.3	58.9	0.6
South of Wooley	58.3	59.0	0.7

Notes: *Levels at 100 feet from centerline of roadways and computed from traffic data.
Data is calculated based upon traffic data.

In most cases where traffic is currently flowing, changes in noise level resulting from the project would be less than 1 dB. Changes in A-weighted levels of less than 1 dB are generally considered to be inaudible. Changes of 3 dB are considered noticeable. Noise impacts from traffic would be insignificant. The greatest impact would be along Wooley. Although sound levels would increase by some 2 dB, the absolute noise levels would remain at least 10 dB below City guidelines at the nearest property line.

Each of the proposed units would have a boat slip. Thus as many as 400 power boats may be associated with the project. The noise produced by power boats varies greatly depending on the types of boat and the manner in which it is operated. A summary of noise levels generated by power boats at 50 feet is shown in Figure 31 Of particular concern are the unmuffled "dry stack" boats used for water skiing and racing. These boats can generate considerable noise even at low speeds. Typical levels, shown in Figure 31 for this type of boat range from 100 to 115 dB at 50 feet. Noise from the dry stack type ski boats constitutes a potentially significant adverse impact on residents adjacent to the waterways, since noise produced by these boats is substantially greater than that produced by other types. It should also be noted that noise from dry stack-type ski boats exceeds levels set by the Harbors and Navigation Code, Sections 65, 654.06, and 668.

The noise criterion of interior CNEL values less than 45 dB with windows closed in an area should be investigated at the plan check stage (or during the architectural design of the residences) since it is normally primarily dependent on the details of the particular building design.(64) In general, however, all areas of the site were found to be well below CNEL 60; and conventional construction of the type normally utilized in Southern California attenuates exterior noise by approximately 20 dB; therefore, all completed houses on the proposed site should enjoy interior CNEL values less than 45 dB with windows closed even with no special acoustical treatment.

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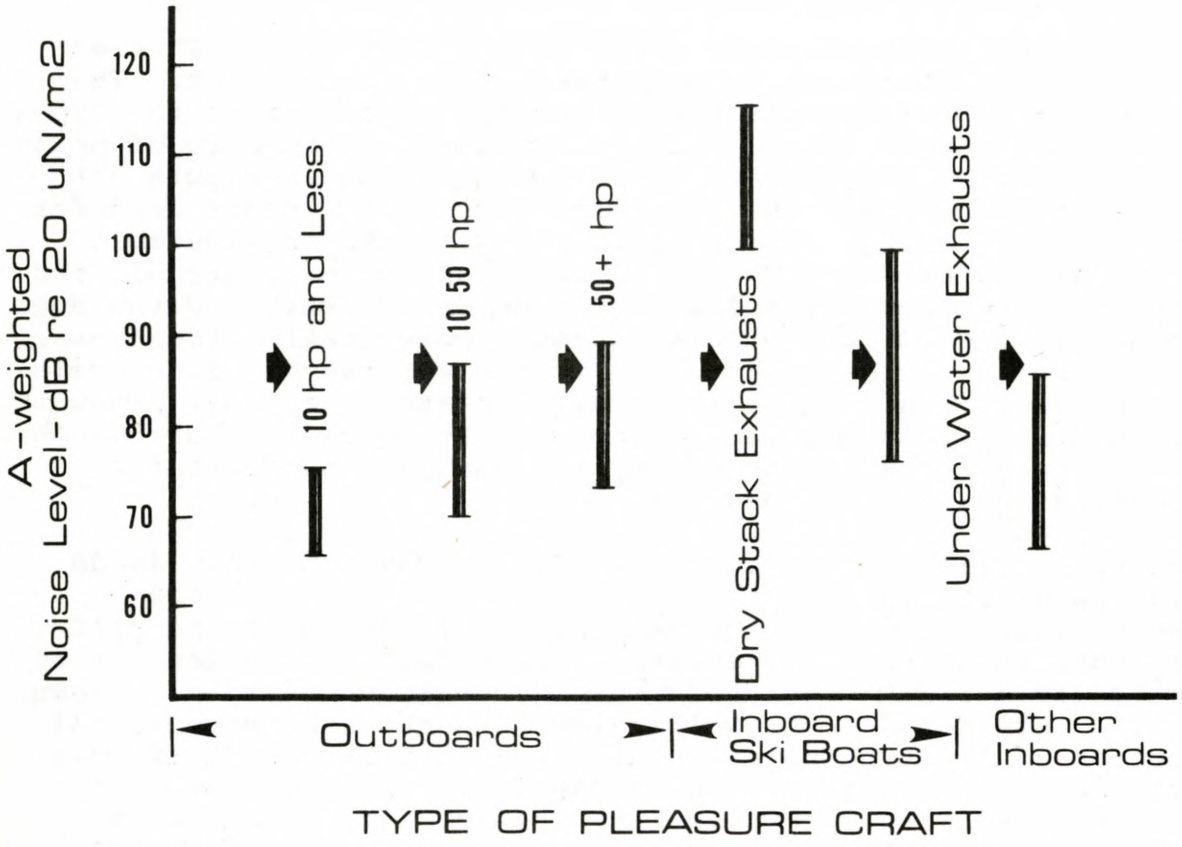
(64) The development west of the site and of the Southern California Edison canal incorporated sound proofing considerations, including field test in accordance with Chapter 35, Appendix (Universal Building Code 1973) prior to occupancy.



◗ Maximum level of 86 dBA at 50 feet. allowed by Code*

Source: Ref.:

figure **31**

Typical Noise Levels at a Distance of 50 Feet from Power Boats

Mitigating Measures

- Noise generated during the construction phase can be mitigated by insuring that all construction activities do not create unnecessary noise. Without an enforceable property line noise ordinance that includes noise from construction equipment, the only alternative is to insure that no equipment is used without all manufacturer supplied noise control devices such as exhaust mufflers and engine compartment covers. The mufflers should also be checked to insure they are in good repair.

- Boats in slips at the proposed development should be limited to those which either have underwater exhaust mechanisms or which can show compliance with California Motor Boat Noise Regulations (Harbors and Navigation Code; Sections 654, 654.06 and 668; Effective July 1, 1973). The code section limits noise levels from power boats to 86 dBA at 50 feet at full throttle. Much of the potential noise impact from power boats can be eliminated by enforcing this regulation.

- Speed limits of 5 knots should be set and posted for all waterways. Strict enforceability of such a speed limit may be difficult to implement. However, flagrant violations should be cited, thus discouraging speeds much above 5 knots.

SOCIOECONOMICS

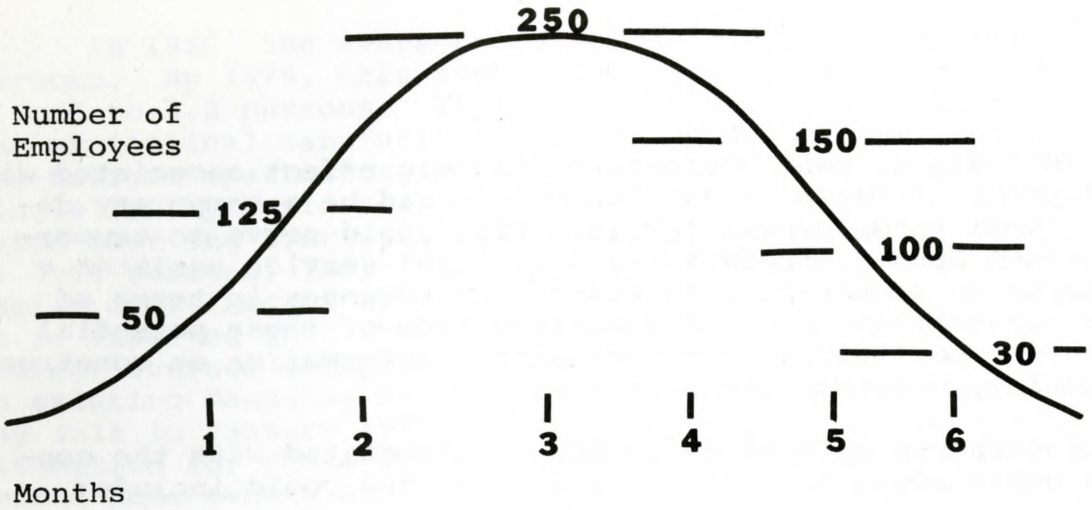
The socioeconomic influences of the proposed Mandalay Bay Phase IV development can be assessed in several ways. To begin with there are impacts which are associated only with the construction period and are short-term in nature. In contrast there are impacts which are attributable only to the operation of the completed development and are long-term in nature. On another level , impacts may be assessed on the basis of direct project generated effects and on the basis of indirect or induced impacts created by the development. The third level of impact assessment would be project related impact versus the cumulative impacts that the development would produce. All of these various levels of impacts will be identified in the discussions which follow.

Construction Impact

The development of the proposed project would be completed in eight phases as outlined in the Project Description section of this EIR. Many variables exist which could serve to foreshorten or lengthen the anticipated construction schedule, therefore no precise estimate can be made of the lapsed time which would be involved in this segment of the development plan. It is expected that the range of activities to be accomplished during the construction phase, including excavation, dredging, fill and compaction, lot subdivision, foundation laying, structural building, etc. could not be completed in less than 36-months. It is further anticipated that the construction period would not extend past six years, unless serious delays were encountered which could not be predicted at this time.

The prospective developer has not supplied definitive information concerning the construction schedules which would allow extrapolation to determine the exact number of individuals who would be involved in working on the construction of the project. On the basis of knowledge of projects of a similar scope and nature and informal inquiries made to construction firms, it can be estimated that approximately 500 individuals would be employed onsite during the construction phase. The most significant work crew would be associated with the development of the canal and internal project waterways. It is assumed that the main canal would be excavated first, and the internal waterways would be completed according to the phased development plan as outlined on the Site Plan, Figure 7 .

Due to the phased nature of the development plan, it is expected that the construction work force would fluctuate greatly during the course of the work. For example, if each phase were projected to cover a six month period, the number of employees expected onsite at any one time could be roughly represented by a bell curves as follows:



It must be emphasized that the numbers presented in the bell curve are estimates only; however, the level of fluctuation between the various months is believed to be accurate. That is, the crew would start off at a minimal number, enlarge to a crew approximately five times greater at the apex of the curve when all activities were underway, and taper off to a mimimal crew size again as finishing operations begin.

DEMOGRAPHICS

Construction trades are very well developed in Southern California. Ventura County, in particular, has a well established resident labor force trained in the construction skills which would be required for this project. It is, therefore, anticipated that the majority of individuals employed on the Mandalay Bay project would be drawn from local labor sources. The specialized construction activities associated with the canal excavation and waterways development may require more highly skilled individuals who would be drawn from more distant locations, but this number would be minimal in terms of total crew size.

In addition to the fact that the majority of requisite construction employees could be drawn from local sources, the phased nature of the development would mean that individuals with a particular skill would not be required over the entire time of the construction schedule, but would, perhaps, be required for short time periods during each of the eight phases. This pattern would apply specifically to carpenters, electricians, and related trades people.

Both of these factors (i.e. good supply of local labor, and phased construction schedules) suggest that the project would not affect local population levels during the construction period. The majority of individuals would be local residents and would commute to the site daily. If specialized skills are required that cannot be supplied by local sources, the short duration of their need would suggest that these individuals would choose to take temporary housing (hotel or motel) rather than relocating to Oxnard.

ECONOMICS

The most significant short-term economic effect associated with the development of Mandalay Bay Phase IV would be a temporary decrease in local unemployment levels. This could serve to temporarily decrease County expenditures for social service assistance and may serve to temporarily increase City revenues in terms of sales tax subventions, etc. A quantification of these potential impacts is not possible without definitive information on construction schedules, construction payrolls, etc.

Other economic effects which may be associated with the construction phase would be induced (indirect) and could include:

- Increased level of business for local supply firms
- Increased buiness for local sub-contract firms
- Increased business for local service establishments (motels, restaurants, etc.)

OPERATIONAL IMPACT

Socioeconomic impacts associated with the completed Mandalay Bay development will be substantial both in terms of demographic influences and economic factors.

DEMOGRAPHICS

A development of the scope of the proposed project would inevitably effect local population levels. It is proposed that a total of 401 single family residential units would be constructed on the site. The majority of these units would be two-bedroom dwellings.

Several factors must be considered in estimating the number of people who would, ultimately, be residents of the proposed development.

1. The configuration of the proposed homes (i.e. majority of two-bedroom units) would limit occupancy by large families.
2. There is a general trend toward declining size of individual families.
3. The nature of the proposed development (i.e: water oriented and sales prices of $100,000 and up) would attract higher income individuals who tend to have smaller families.

In 1960, the average household in Oxnard consisted of 3.5 persons. By 1975, this average family household size had declined to 3.2 persons. This overall average is derived from the statistical tabulations from all housing types - singles, one-bedroom apartments, other apartment types, condominiums, single family residences, etc. From these figures, it is estimated that the average family size in single family dwellings is 3.76 persons. [Ref: 67] Because this number includes single family dwellings of all sizes (i.e. one to five or more bedrooms) it is expected that the figure should be refined downward to reflect average occupancy in two-bedroom units. Average occupancy in existing Mandalay Bay was recorded at 2.6 individuals per housing unit in January 1975. This lower figure may be the appropriate assumption for Phase IV since many of the homes may be purchased by second home owners and not used year-round. However, for the purposes of this analysis, we have assumed an average dwelling occupancy in the Mandalay Bay project of 3.5 persons per unit as a worst case analysis.

Therefore, total project population would be:

401 units x 3.5 persons per unit = 1,403.5

For the purposes of simplifying further projections, this number will be rounded to 1,404.

The most significant impact of this net population increase would be the cumulative impacts experienced by existing public service systems. These impacts will be discussed in detail in the following section of this report.

In terms of the demographic profile of the Oxnard area, the development could produce a beneficial effect. The homes to be constructed will appeal to upper-income individuals. Some persons currently living in other portions of the City may relocate to this development, but it is believed that a major share of new residents will be drawn from areas outside of Oxnard. The character of the development may attract some semi-retired couples or individuals because of the water-oriented setting, but the greatest proportion of residents are expected to be upper-income family groups. The availability of this type of housing would be beneficial to the City. One of the basic planning goals for the City is to increase economic potential. As outlined in the Basic for Planning: Economic Potential, one of the most effective means towards this end is to increase the City's population of "white collar" residents. The nature of this development would certainly serve to attract many professional workers who would indirectly stimulate the City's economic base in many ways.

ECONOMICS

The proposed project would affect the economic base of the City of Oxnard in several ways, the most important being:

- Sales Tax Subventions
- Property Taxes
- Public Service Expenditures

SALES TAX SUBVENTIONS: As was noted in the Environmental Setting Chapter under the discussion of economics, sales tax subventions are the second largest source of City income. Any large-scale development of this nature which would produce a net increase in local population has the potential for generating added City revenues through this source.

An estimation of the magnitude of this long-term beneficial impact can be made based upon the following factors:

1. Sales price of homes
2. Anticipated income level of residents
3. Projected expenditure patterns

The homes are to be sold for $100,000 to $250,000, dependent upon the placement of the home on the site and the configuration of the individual unit. For the purposes of this analysis, an average selling price of $150,000 was used. According to representatives of Saving and Loan Associations, the normal practice for homes in this price range is for the buyer to advance 20 to 30 percent of the sales price as a down payment, and establish a mortgage agreement for repayment of the principal and interest (compounded at nine and one half percent) over a 20-year period. (65) The monthly payment on a mortgage of this size would be ± $725.00.

From this $725.00 monthly figure, average family income in the proposed development can be estimated on the basis of economic research studies. Several studies have been undertaken by governmental agencies and private research firms to determine the percentage of income which is allocated to various expenditure categories including housing. A figure most often quoted for housing expense is 25 percent of total income. The City of Oxnard [Ref:67] has estimated that an average of 19 percent of disposable income is allocated to housing and household expenses which would be a comparable figure to the 25

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(65) Personal communications: Southern California Savings and Loan, Home Savings and Loan. (July, 1977)
It is recognized that the cited figures represent favorable terms to the purchaser.

percent of total income. For facility of projections, the estimates here are based upon disposable income (taxes excluded) and the 19 percent figure for housing and household operating expense is used.(66)

If it is assumed that household operating expense (maintenance, etc.) would total approximately $200.00 per month, then the total house payment ($725.00) and household operating expense ($200.00) would be $725.00 monthly for prospective residents of Mandalay Bay Phase IV. Nineteen percent of an annual disposable income of $58,500 is equal to $926.25 per month. Therefore, projections for sales tax subventions are based upon an average family income of $58,500 per annum ($4,875 monthly).

The guidelines outlined in the following Table were used to apportion other expenditures for this example.

TABLE 43

HYPOTHETICAL EXPENDITURE ALLOCATIONS

CATEGORY OF EXPENDITURE	$/PER ANNUM	$/PER MONTH	% OF TOTAL
Total Disposable Income	$ 58,500.00	$ 4,875.00	100
Housing	11,115.00	926.25	19
Utilities	2,925.00	243.75	5
Insurance/Medical	4,095.00	341.25	7
Savings	5,265.00	438.75	9
Retail	31,590.00	2,632.50	54
Other	3,510.00	292.50	6

Note: It is emphasized that these calculations are based upon disposable income and therefore do not include property taxes or personal income tax expenditures.

Source: Independent research study, Stone and Webster, 1976.

Some sources report that Oxnard has an 80 percent retail sales capture (defined in this context as the percent of retail allocation spent by Oxnard residents within the City of Oxnard). [Ref:67]

(66) Although the 19 percent figure is applicable to average income families and may be too low for Mandalay Bay residents, it does support the worst case analysis.

It may be slightly unrealistic to assume that Mandalay Bay residents would exhibit a similar pattern unless their place of work were known. However, it is established that the shopping facilities within the City of Oxnard are excellent, and an estimation that 80 percent of retail expenditures would be made within the City limits is thought to be valid. Retail sales per unit would be:

	Total Retail Expenditures:	$31,590.00/per annum
(80%)	Oxnard Retail Expenditures:	$25,272.00/per annum
(15%)	Of Retail Expenditures allotted to non taxable items:	$ 4,738.50/per annum
	Amount of Expenditures taxed:	$20,533.50/per annum
(6%)	Total Sales Taxes	$ 1,232.01/per annum
(1/6th of 6%)	Oxnard Tax Subventions:	$ 205.33/per annum

The $205.33 figure is certainly not significant of and by itself, but when this figure is multiplied by the 401 families who are projected to be residents of the Mandalay Bay development the City could expect to receive ± $82,006 in annual sales tax subventions as a direct result of the development. Indirect sources of sales tax subventions may also accrue to the City by virtue of the development. This would result if new residents to the City living at Mandalay Bay established commercial outlets in the City which would draw additional shoppers to the City.

PROPERTY TAXES

Property taxes constitute the largest single revenue source for the City of Oxnard. The current tax rate is $10.95 per $100. of assessed valuation. Assessed valuation is figured at varying rates but cannot be in excess of 25% of total valuation (market value). It is not possible to project the exact dollar value that the City would receive in property tax revenues from the completed development until the specifications of each individual homesite are known and the time of completion is stipulated. By way of example, gross figures are used here to evidence the incremental rise in revenue the City would accrue if the proposed development were completed.

Agricultural land in Ventura County has an average market value of $10,000/acre. At an assessed value of 25%, with the most current tax rate applied, this would convert to an average tax collection of $273.75 in property taxes per acre, per annum. The market value of residential land is highly variable and is controlled to an extent by a multiplier effect. That is, the value of the land zoned for residential development and the value of the structure(s) erected on the land. For coastal zone areas in Ventura County, an average value which is considered reasonable is 20 - 25,000 per acre. On this basis, the property tax assessment for the completed Mandalay Bay development

would average $2,327.00 per lot, per annum. Therefore, the City could expect increased revenues equal to approximately $933,077.00 annually (67).

A further discussion of property tax rates applicable to agricultural acreage may be found in the Land Use Impact discussion. The discussion also includes a comparison of revenues which would be anticipated from the Mandalay Bay development in contrast to a residential development geared to median income individuals.

PUBLIC SERVICES

Public services are well represented throughout Oxnard. No new systems would be required to serve the development, however, utility lines would have to be extended to the homesites and certain services would require incremental capacity increases due to the scope of the proposed development.

WATER

A 12 inch water main exists in Harbor Boulevard and a new 12 inch main is to extend along Wooley to Harbor Boulevard. Water service is currently provided to the site and the adjacent Mandalay Bay development. Extension and realignment of connections to serve the proposed development would not involve major construction. The proposed water system, both domestic demand and fire flow, would be constructed by the applicant with service provided by the City of Oxnard.

Domestic water in the City of Oxnard is based primarily on a ground water system. There are several underground aquifers underlying the Oxnard Plain, these aquifers have a generally high dissolved salt content. Essentially horizontal semi-impermeable "clay caps" retard intermixing of water-bearing strata. In general, lower aquifers have less dissolved solids than higher ones. Concentrations of total dissolved solid (TDS) are on the order of 1,000 milligrams per liter (mg/l). The City has blended low cost, poor quality, local water supplies with water imported from the Metropolitan Water District to reduce TDS. In the past, blended water conformed to the State Standard of 500 mg/l TDS. During the drought, the City has approved a reduced standard of 900 mg/l TDS. Measures have been taken to retard sea water intrusion into aquifer waters resulting from past and present withdrawals of water from aquifers.

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(67) Data on market values and assessment rates obtained from Mr. Crow, Ventura County Tax Assessor's Office.

The total tract consists of ±82.7 acres. Agricultural usage currently occupies approximately 3.5 million square feet of this total acreage. A standard figure used for water consumption on irrigated lands is .132 gallons per day (gpd) per square feet of irrigated land.(68) Based upon this figure, current water consumption at the site is 462,000 gpd.

The proposed development would introduce 401 single family dwellings to the site. It has been projected that a maximum of 1404 persons would be residents of the completed development. An average water consumption figure for single family dwellings is 150 gpd per capita.(69) Estimates based upon these projections would mean that a total water consumption of 210,600 gpd could be expected for the fully completed project. Compared to current consumption, the development would result in a net decrease in demand equal to 251,400 gpd. This reduction would be a beneficial impact to the City System.

Water saving devices (flow restrictors, etc.) should be installed to aid in the City's conservation efforts. In addition it is recommended that the water system be looped to provide adequate fire flow requirements and help the system to be "self-cleaning".(70)

Storm Drains

Development of the site for residential use would increase the amount of runoff by a factor equivalent to the percentage increase in impermeable surfaces which would occur onsite. Runoff is not anticipated to be a serious problem, as was discussed in the Geology/Hydrology section.

Storm drain improvements, both surface and underground systems, would be provided by the developer and designed to current City of Oxnard accepted criteria. Upon completion, the storm drains would be dedicated to the City of Oxnard.

The City's Public Works Department states that desilting methods and debris collectors should be provided for all storm drain facilities before they discharge into the waterways.(71)

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(68) City of Los Angeles EIR Manual for Private Projects.
(69) Ibid.
(70) Planning Department response to Preliminary Draft, Public Works Department (October 11, 1977)
(71) Ibid.

SEWERS

The project would be connected to the City Sewer System and effluent would be ultimately conveyed to the Oxnard wastewater Treatment Plant. This facility provides primary treatment which is a mechanical filtration of floatable and settleable solids. The plant has 30 inch and 48 inch outfalls approximately 6,000 feet offshore of the Oxnard Beach area. Total processing time is approximately four hours.

The treatment plant is having some difficulty meeting the discharge requirements of its National Pollution Discharge Elimination System (NPDES) permit (pursuant to the Water Pollution Control Act of 1972) resulting from plant operation and design difficulties. In order to meet current Federal and State standards, the treatment plant will have to upgrade its facilities to secondary sewage treatment. A contract to complete these facilities was awarded in May, 1977, and the upgraded treatment plant will be operational by 1983.

The site is in what is called the "Yellow Moratorium Area," which prohibits sewer hookups at this time.(72) It is expected that the moratorium will be removed about September, 1978, after there is further progress in completing Phase 1 of the Western Trunk Project which involves construction of new sewer lines which would redefine service areas to avoid line capacity problems. This work will be accomplished through reactivation of an abandoned 24 inch relief line on Ventura Road.(73)

The primary design treatment capacity of the Oxnard Wastewater Treatment Plant is 25 million gallons per day (MGD). When secondary treatment is completed, design capacity will be diminished to 22.6 MGD. Current average flow rates at the plant are estimated to be 13.0 MGD. Within the year, the City of Port Hueneme, Point Mugu's Pacific Missile Test Center and Port Hueneme's Naval Construction Battalion Center will all be connected to the Oxnard plant. These additions will produce an additional 5.7 MGD load on the system. In addition, projects now under construction or pending represent a further demand increase of 4.18 MGD.

Average Daily Flow rate	13.0 MGD
Additional Connections	5.7 MGD
Projects Approved and/or Under Construction	4.18 MGD
	22.88 MGD

(72) Personal communication, Joe Yurko, Department of Public Works, City of Oxnard, 1977.

(73) Further data may be obtained from the Alderman, Swift, Swift and Lewis study, "Western Trunk/Ventura Road Trunk Sewer Study," June 1977

The severity of impact from any additional project is readily apparent from this calculation. The secondary plant will have a capacity of 22.6 MGD, .28 MGD below present loads and future commitments. Additionally, a recent City memorandum (11/30/77) prepared by the Planning and Public Works Departments recommends that "future growth of the City should be at a rate that can be accommodated by the wastewater treatment plant until the plant can be expanded."

On a site of this magnitude sewage is usually removed by gravity in sections; in this case sewage from the northern half would exit on Wooley Road, and from the southern half on Hemlock Avenue. The developer's plans do not allow this; the proposed southern canal would bisect the property and would serve as water access to the eastern ±130 acres that may eventually be developed. Engineering factors would probably call for a lift station on the property to expedite removal of all sewage at Wooley Road. The design of the station would have to be in accord with Lift Station Specifications of the Department of Public Works of the City of Oxnard, and would require the department's approval.

From Wooley Road the sewage could exit either to the east or west. There is a 12 inch gravity main located in Harbor Boulevard. Exit to the east is more likely. In this case, sewage would be pumped to Victoria Avenue, flow by gravity south to Hemlock, and from there be pumped by Lift Station #7 eastward -- presently to Ventura Road, and ultimately (1979 or 1980) to a new station at Patterson and Hemlock.

The proposed project would generate 140,350 gallons of sewage per day at completion based upon 100 gallons per day per capita. This calculation follows the formula established by the City of Los Angeles in their EIR Manual for Private Projects.

	Residential Sewage	=	(Sewage in gpd/per capita)		(Average Number of Persons per Unit)		(Number of Units)
Average:	140,350	=	100	x	3.5	x	401
Peak	210,525	=	(x1.5)100	x	3.5	x	401

The project would therefore add an additional burden of .14 to .21 MGD of sewage to the already overloaded system.

MITIGATING MEASURES

Any incremental increase to an already overburdened system such as the Oxnard system would impose adverse impacts. The most effective mitigation measures are those which could be installed and/or practiced at the individual homesites. One of the simplest and most effective

measures would be the installation of flow restrictors on toilets. It has been estimated that these devices can produce up to a ten percent savings in wastewater.

Other effective measures would require the cooperation of the development's residents and would include reducing the quantity of water used for bathing (water limiting devices can be installed on showers), eliminating unnecessary washing machine or dishwasher cycles and similar water conservation practices.

Solid Waste

Refuse collection service is provided by the City's Public Works Department, Refuse Collection Division. The City currently operates 33 refuse trucks which collect approximately 70,000 tons of solid waste annually for disposal. The disposal of solid waste is under the regional jurisdiction of the Ventura Regional County Sanitation District.

Solid waste generated by the City of Oxnard is being disposed of at the Santa Clara landfill, a 47-acre site located south of the Ventura Freeway, between the Santa Clara River and Ventura Road. This site has a design capacity of 1,000,000 cubic yards of fill and is operating near capacity at this time. The City is working closely with the County Sanitation District to investigate alternative sites and examine short- and long-range plans to meet projected demands.

The development, as proposed, would have the potential for generating ±3,128 pounds of solid waste per day. This estimate is based upon the assumption that single family residences average a solid waste generation of 7.8/lbs. per unit, per day.(74)

At this point, it is difficult to determine what impact the project would have on the City's solid waste system. Any added disposal at the Santa Clara landfill would decrease its life span as a disposal site. If the new site chosen is at a more distant location, many secondary impacts could result, such as increased air pollution and noise sources from the disposal vehicles.

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(74) City of Los Angeles, EIR Manual for Private Projects.

Mitigating Measures

One effective mitigating measure would involve facility of access for the disposal vehicles themselves. If internal streets are designed with adequate backup and turnaround space for refuse vehicles, collection can be accomplished much more easily.(75) Other measures would depend upon individual cooperation and could include a conscious effort to utilize recyclable materials and limit the overall solid waste generation.

Fire Protection

The project site is served by the City of Oxnard Fire Department. The station responsible for protection of the subject property would be Station #3, located at 150 West Hill Street, approximately 1-3/4 miles east of the site. This station is equipped with one 1,250 gallon per minute fire pumper and four firemen. Response time to a call from the site would be ± five minutes.(76)

The City plans to have a new fire station at Peninsula Road and Channel Islands Boulevard completed by July, 1978. This new station would assume prime responsibility for protection of the site. It is planned that the new station would house a pumper engine and a three-man crew. Completion of the Mandalay Bay development, as proposed, would not overburden this new station and no new equipment or additional personnel would be required. The new station would also shorten response time to under five minutes. Fire boats are operated by the Coast Guard and the Harbor Patrol at Channel Islands Harbor.

Mitigating Measures

The water system for the development will be constructed according to Fire Department guidelines to assure adequate hydrant spacing, water mains and pressures. Careful design of internal access corridors to provide adequate fire lanes would also mitigate potentially adverse impacts. All structures will be constructed to code specifications to eliminate highly flammable substances. The developer plans to make available detection devices approved by the State Fire Marshall.

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(75) See Vehicular Traffic for a further discussion of road design.

(76) See Fire Department letter dated November 3, 1977, in Supporting Information Section.

Public Protection

The Oxnard Police Department would provide law enforcement service to the site. The City's station is located downtown at 206 West Second Street.

The site is within current patrol routes and falls within a low-crime area according to police spokesmen. It is not anticipated that the development would produce any special problems which would require the addition of personnel or equipment to the City forces.

However, the City's Police Department is currently operating over its capacity in terms of manpower to population ratio. Also certain areas of the City have experienced rising crime indices and therefore an additional burden is being placed on the undermanned department. Although the Mandalay Bay development is not expected to create problems by adding special police protection problems, it will introduce ± 1,400 persons to the local population who will require services of the police force from time to time. Any additional population will produce a cumulative impact on the police department and reduce its overall efficiency. Therefore, the development may create the incremental population increase which would require an addition of personnel to the force.

Mitigating Measures

Several measures could be incorporated into the development to reduce potential burglary problems. Such actions as compliance to the City's burglary security ordinance, construction of closed garages with overhead doors and fencing and security service during construction are all recommended by the City Crime Prevention Unit. Of course, none of these measures would address the principal problem of the manpower shortage. The police budget would require expansion to add personnel and improve the department's staffing.

Telephone

The General Telephone Company of California serves the City of Oxnard.

Costs for extending service to the development would not be significant and installation fees would be the responsibility of the

individual subscribers. No adverse impact is expected.

Gas

Natural gas service would be provided to the development by the Southern California Gas Company. Existing gas mains in the vicinity would be extended to service the development with no extensive construction or environmental impact required.

According to Southern California Gas Company estimates, single family residences generally consume 91.25 therms of natural gas, per month, per dwelling unit. The Gas Company cautions that this average has not been updated to reflect energy conservation efforts, but it is believed reliable for a projection of demand magnitude.

On this basis, the Mandalay Bay development would represent a total demand for approximately 36,591 therms per month, or 439,095 therms per year of natural gas.

This incremental demand is within the present service parameters of the Gas Company, however it should be emphasized that future supplies of natural gas are tenuous and all possible efforts should be employed to conserve this resource. Specific mitigation measures are listed following the Electricity Section.

Electricity

Electrical service is provided to the City of Oxnard by the Southern California Edison Company. Two steam generating plants are operated within the City which provide electrical power through various substations. These plants burn low-sulfur fuel predominantly but natural gas is utilized when supplies are available. An additional generating plant is being proposed on one of four locations in Southern California of which Ormond Beach in Oxnard is a potential site.

Electrical transmission lines are now existent onto the property and extension of these service lines to the individual homesites could be accomplished without extensive construction or investment.

According to a 12-month analysis of electrical consumption in the Ventura area (April 1974 - March 1975) average monthly consumption of electricity in single family residences is 584 kwh per month. Therefore, the total electrical consumption at the Mandalay Bay development

would be expected to be 234,184 kwh per month or 2,810,208 kwh per year. This level of consumption is within the projected growth load of the utility, but again, the application of energy conservation measures is important.

Mitigating Measures

Insulation is one of the most effective means to conserve energy in single-family dwellings. The developer has proposed a thorough insulation plan to include:

- Exterior walls
- Ceilings with cold spaces above and corner ceilings
- Knee walls when adjacent to heated spaces
- Between collar beams
- Floors above vented crawl space
- Floors over an unheated or open space
- Weather stripping of all window openings and surrounding doors including doors opening into garage. Insulated glass on all exterior windows of 25 sq. ft. or larger.
- Duct insulation

The City would inspect the insulation systems to assure adherence to codes and guidelines.

Other recommended energy conservation measures which may be incorporated into the development could include:

- Use of fluorescent lighting rather than less efficient lighting
- Use of natural gas for heating and cooking
- Use of tinted or solar reflective glass on appropriate exposures
- Orientation to sunlight and use of overhangs
- Planting of deciduous trees to provide shade to the units in the summer months and to allow sunlight through in the winter months

- Use of windowless walls for western exposure
- Time control of exterior lighting
- Dimmer switches for interior lighting
- Utilize range exhaust hoods with positive automatic dampers
- Utilize tight fitting dampers in fireplaces

Health Care

St. John's Hospital, located within the City of Oxnard, is the largest acute care hospital in the Oxnard Plain. The hospital maintains 316 patient beds and provides 24-hour emergency service. Other hospitals in the region include:

- Oxnard Community Hospital, Oxnard — 48 beds
- Pleasant Valley Hospital, Camarillo — 60 beds
- Port Hueneme Adventist Hospital, Port Hueneme — 49 beds
- U.S. Navy Construction Battalion Center — 65 beds

Although the Naval hospital is operated for military personnel, emergency treatment is made available to the general public at this facility. The Naval hospital cannot, however, be included in the regional inventory of available acute care patient beds. Therefore, there are 473 patient beds presently available in area hospitals; 364 beds available in City hospitals.

Projections by the American Hospital Association state that 150.33 average yearly admissions occur per every 1000 increment of population. If the average hospital stay is assumed to be five days in duration,(77) 751.65 patient days could be expected per each 1000 increment of population. These statistics are summarized as follows:

364 patient beds = 132,860 patient day capacity

85,400 population = 12,838 admissions = 64,190 patient days

Mandalay Bay would add an estimated 210 patient admissions per year, or 1052 patient days. This increase could be accommodated by

(77) Statistic from Los Angeles County Comprehensive Health Planning Agency.

the existing facilities, but it would bring the hospitals to near capacity. With the exception of continued growth in Oxnard, expanded health care facilities will be required in the near future.

Schools

Oxnard City schools are currently operating under a federal court injunction which involves a mandatory busing program and a paired schools concept. Several elementary school districts operate in the City. The Mandalay Bay site is within the purview of the Oxnard Elementary School District. Two elementary schools and one junior high school would receive the student enrollment generated by the project.

The school district has a year-round education program which, in effect, staggers the school year and results in increased school capacity. The staggered schedules are not mandatory and are up to the discretion of the parents.

The Oxnard Union High School District oeprates two facilities for students in grades 9-12. High school students for the Mandalay Bay development would attend Oxnard High School. The school is presently operating at capacity.

Due to the extensive population growth which has occurred in Oxnard in recent years, nearly all area schools are operating at or near design capacity. In order to alleviate this overcrowding condition, more funds are required by the Districts. In May of 1977, the Oxnard City Council passed a resolution which would require the Mandalay Bay developer to pay to the City a fee of $500.00 multiplied by the anticipated student load per dwelling unit. The City's figure for single-family dwellings student generation is 1.17 students per dwelling unit.(79) On this basis the City would receive $234,585.00 in school fees. The developer may pay upon issuance of a building permit or may delay payment (via a surety bond or letter of credit) until such time as the dwelling is occupied. However, the current resolution is effective for only one calendar year and there is a provision for escalating the $500.00 multiplier each July 1 by the percentage of increase in the Los Angeles - Long Beach Consumer Price Index. These factors could, therefore, result in a decrease or increase in the required school fee by the time the Mandalay Bay homes are constructed.

Using the figure of 1.17 students per dwelling, approximately 469 school age children would be expected at the Mandalay Bay development. Statistics derived from the 1975 State Special Census show that

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(78) Specific information regarding the schools which would serve the Mandalay Bay development may be found in the Supporting Information Section, letter from the Oxnard Elementary School District.

(79) Average student generation factor used in City Resolution and student generation factor for single-family dwellings used by Basis for Planning [Ref: 67].

these children would fall into the basic grade levels as follows:

	Average Student Generation Mandalay Bay	
Elementary	.56/dwelling unit	225
Junior High	.21/dwelling unit	84
High School	.40/dwelling unit	160
Total	1.17/dwelling unit	469

A student increase of this magnitude to an already overcrowded school system would produce a severe adverse impact. Several factors suggest that the impact may not be as severe as the numbers indicate however.

- There is a City-wide trend for a decrease in student per occupied dwelling which may reduce overall enrollment [Ref.: 67]

  1970 .66 student per occupied dwelling
  1975 .44 student per occupied dwelling

- There is a State wide trend for smaller family size which will be reflected in continuing decreased enrollments, particularly in the elementary schools

- The Oxnard busing program has encouraged many parents to enroll their children in private schools. Projected income levels for Mandalay Bay residents suggests that many families would choose this option.

This is not to suggest that the Mandalay Bay development would not impose severe adverse impacts to the school system. From a cost/revenue standpoint the development would produce a net cost to the school system and would therefore require subsidies from tax dollars from other sectors of the economy.

The cumulative impact of Mandalay Bay's 469 students is particular significant. At the present time approximately 825 new residential units have been approved and are under construction in the City. Therefore, by the time Mandalay Bay would be developed, the existing overcrowded schools could be faced with the problems of trying to provide schooling to an additional $\pm$ 1000 pupils. This figure points to the severity of the existing problem and the substantial impact which one more development could create.

Mitigating Measures

- The most effective mitigating measure would be a substantial new funding source for the city schools so that new facilities could be constructed and operated. The feasibility of this ideal measure is in serious question, however, since the local constituency has voted down school bond issues on recent occasions and state aid is not expected to increase.

- Requiring the developer to dedicate a portion of his land for development of a school could offset city costs for site acquisition but would not be reflective of shared responsibility for public services.

- Increasing present school capacity through additional sessions (i.e. staggered class schedules) could partially alleviate the overcrowding but could result in a diminished quality of education.

Other Services

It is not expected that the Mandalay Bay development would impose any adverse impacts on other public services in the region. Such facilities as community and regional parks, libraries, etc., could accommodate the incremental demand increase generated by the project

ARCHAEOLOGY/PALEONTOLOGY

All surface indications show that there are no archaeological resources on the subject property, therefore it is assumed that the project will generate no direct or indirect impacts to the cultural environment. The immediate vicinity is expected to have a low potentiality to contain cultural resources; therefore, land planning or local coastal planning in the area would not adversely impact cultural resources.

Mitigating Measures

Due to the reported discovery of one small portable mortar it is recommended that an archaeologist inspect the site during any necessary

grading to insure that no subsurface remains exist. Inspection should be brief and limited to shortly after project inception, then again before final grading is completed. In the event an archeological site is indeed discovered, all construction and land alteration in the site vicinity should halt, and the site should be inspected and evaluated by a qualified archaeologist. Any mitigation measures would have to be proposed at that time.

SHORT AND LONG-TERM IMPACTS OF THE PROPOSED PROJECT

In the short-term, most changes that would occur on the site would be directly related to the activities associated with site preparation and building phases. Disruption of the site and of the area used for disposal of earth materials would be severe since ±1,500,000 cubic yards (or more) of earth materials would be excavated. There would be eight building phases once the Southern California Edison Canal was widened. The number of persons, the amount of construction equipment, and the level of disturbance would depend on yet to be specified construction procedures and scheduling. Because agricultural lands serve as a partial buffer on the north and east, disturbance, and other adverse prospects such as unsightliness, would be acutely felt only by the small cluster of current residents to the northwest and southwest. Fauna would be severely disturbed during site clearance and earth moving. The method that would be used to dewater the canal for excavations has not been specified; but there could be significant impacts upon the Southern California Edison power plant and upon water quality if interruption would occur in the average flow of 500 cubic feet per second of cooling water to the plant. There would be about 0.2 feet subsidence in soil layers below the areas of excavation and compaction. It is possible that local dewatering of the "semiperched" aquifer could result in minor differential settlement of the ground surface (this could be corrected).

Short-term environmental disruptions would include increased air pollutants downwind (especially airborne dust and nitrogenoxides) and locally elevated noise levels. There would also be increased turbidity during construction, followed by the potential for odors near the new waterways (from decay of green algae during a temporary bloom until a stable ecosystem is established); this phase would last for a few months after completion of construction. These impacts are discussed in their respective sections in Chapter V. Beneficial impacts may also occur in the short-term from increased demand for local construction and the partial expenditure of construction work payrolls in the City.

Irreversible changes would occur from the inception of site

preparation. Others would start after occupancy of the site. Landforms and waterways would be permanently altered, and agricultural land foregone.

Water quality in the marine/harbor complex would not be discernably changed as long as the pumped flow to the Edison plant was maintained at the current rate, or increased; otherwise a serious degradation of water quality, especially in the dead-end waterways, would occur together with a near permanent concomitant disruption of the marine ecosystem.

Subsequent to occupancy of the site, the following long-term impacts would occur throughout the life of the project:

- Increased water and land traffic with associated air pollution and noise
- Increased economic activity for the City
  - increased City revenues
  - induced development and modification of the City texture
- Increased population levels
- Increased demand for public services

IRREVERSIBLE ENVIRONMENTAL CHANGES

The Mandalay Bay Phase IV project, as proposed, would provide a system of waterways encompassing approximately 32.6 acres of water surface. In order to develop the waterways system, it is proposed that a grading/excavation program involving the removal of approximately 1,500,000 cubic yards of native materials be conducted. This action would produce a environmental change to the area which would generally commit future utilization of the site to water-oriented uses. Although it may be considered hypothetically feasible that the waterways could, at some future date, be drained and refilled, such an option would not be considered practical. Therefore, the introduction of the waterways to the site is assessed as an irreversible environmental change.

An analogous environmental change would result from development and improvement of roadways associated with the development, as described in Chapter III. Again, this action is assessed as an irreversible environmental change since alteration of the land in this manner (grading, leveling, installation of pavement, etc.) commits future generations to related land uses.

GROWTH INDUCING IMPACT

Any additional residential complex has growth inducing aspects: additional service needs attract additional population and resources to meet these needs. It is not possible to quantify this growth inducement. Moreover, the benefits may be at least as great as the adverse impacts; the City of Oxnard is currently planning on continued growth. As part of this planning, there is need in Oxnard for additional higher income housing (as well as for housing bringing lesser economic benefits to the City).

Development of the site as proposed would serve to commit the agricultural acreage east of the site to water oriented use, either in the form of a similar development or related recreational/commercial usage. This is particularly so in view of the proposed channel design and phasing program for the Mandalay Bay development. There would be a less forceful, but similar pressure on the agricultural acreage north of Wooley Road.

Development of the site in a residential mode would necessitate additional development of commercial and public services in adjacent areas. Development as upper income residential housing could draw to the area additional businesses employing persons earning upper middle and higher incomes. These additional businesses could have many (mostly economically beneficial) impacts on the City of Oxnard but it would not be expected that they would totally offset the cumulative impacts produced by the project

Growth inducement would result in a commensurate rise in environmental impacts (air pollution, noise, water, etc.) which would have the potential for downgrading the overall environmental quality of the region.

ALTERNATIVES TO THE PROPOSED PROJECT

According to the guidelines established for the implementation of the California Environmental Quality Act (CEQA), any alternative which could reasonably achieve the same objectives as the proposed project must be given consideration in the Environmental Impact Report. The option of no development must also be examined. Additionally, any alternative capable of substantially reducing or eliminating any significant environmental effects is also required to be considered, even if such alternative would impede the project objectives or be more costly.

There is no other practicable location in Oxnard for further marina development to meet demand for recreational boating. The basic alternative to this development would be marina development according to another plan or configuration.

The site is elongated along a north-south axis. Little variation upon the design of dead-end waterways off the Edison canal is possible. If the order of development were changed to total planned development of the ± 210 acres of agricultural land (between Wooley Road on the north, Hemlock Avenue on the south, Victoria Avenue on the east, and the Edison canal on the west), then other configurations of waterways would be possible. As long as pumping through the Edison Canal continues, water quality and other physical factors would not determine relative merits of alternative layouts.

The current plan is predicated upon development of all 210 acres so as to ultimately meet socioeconomic and environmental objectives of the City, which include a school site and park area. This piecemeal approach involving site acquisition of ± 83 acres for development in eight phases with no amenities, followed by ultimate acquisition of the remaining ± 130 acres for further water development with amenities is logical only to the degree that marine development of the remaining acreage is essentially dictated by the initial development. It is contrary to CEQA to approve plans on a piecemeal basis. The current plan should contain sufficient amenities to meet socioeconomic and environmental objectives of the city. If reconfiguration of the narrow ± 83 acre site to include amenities jeopardizes economic objectives of the developer, he should entertain additional land acquisition and design of the enlarged site.

The plan for the site contains ± 60 parking areas open to the public that are situated between rows of attached housing. These areas are small, on the order of 2,500 square feet each with many having dimensions of approximately 24 by 100 feet (Figure 4). Each such site allows off-street slant parking for several cars. There is little view or perspective, but these sites improve air movement and reduce fire hazard by physically separating rows of houses. These sites serve a minimal public access function. There are no retail or rest areas on the planned site. An alternative plan on either ± 83 or ± 210 acres would be to incorporate a park, shops, and restaurants in an area with extensive access to water. The loss in revenues from reduced housing would be offset by revenues from the commercial component, while public access factors would be enhanced.

Pricing of marina housing must necessarily fall within rather narrow limits. The plan represents a maximum practicable housing density. More smaller units would detract from the quality of the site and place severe burdens on public services. Lower density housing

would reduce the number of people allowed to participate in boating activity, but would also reduce environmental stress upon the waterways. Removal of the boating option with retention of a water vista would increase available land for housing, but would also lower revenues to the City. A water vista, combined with a commercial water-oriented area, and housing with reduced boating option would result in similar economic revenues to the City, greater public access to water, but lower boating access. Greater use of dry storage of boats would occur, with a reduced population of large boats and large number of small pleasure craft.

There are two options which do not utilize proximity to the current marina/harbor complex. One is extension of commercial/industrial zone south of Oxnard Airport. This option would enhance commercial and industrial development of the City with other concomitant socioeconomic effects. The stress on potential development of upper income housing in Oxnard would be greater under this option. Uses allowed in the area should be such that the marina/harbor complex is protected from intruding noise and air pollution associated with airport oriented business activity.

The other use is lower cost housing with minimal water access. This would increase access of lower income persons to the ocean and beaches in conformity with objectives of the Coastal Commission. Lower revenues would accrue to the City.

There is another proposed project that would greatly decrease options on the site. The U.S. Navy Elk Hills refinery and petroleum transporting project that is mandated by the U.S. Congress includes various options for transporting navy crude oil to U.S. markets. One option is a pipeline from Elk Hills near Bakersfield to Port Hueneme. The proposed route of the pipeline is through the eastern portion of the $\pm$ 83 acres site. (The pipeline would continue eastward on Hemlock Avenue and then south to Port Hueneme.) Routing of the pipeline could be changed by mutual agreement between the City and U.S. Navy if this is in the best interests of the City.

In summary, choice of alternative development options (or no development) are to be judged by socioeconomic factors; physical environmental factors have a lesser bearing. The City should examine the site in terms of its general planning objectives. The site should be specifically addressed in the Local Coastal Plan currently being drafted by the City.

PERSONS AND REFERENCES CONSULTED

Atlantis Scientific

PERSONS AND ORGANIZATIONS CONSULTED

City of Oxnard

Planning Department
- Donn J. Hineser
- Richard Floch
- Larry Walrod
- Merle Betz

Department of Public Works
- Bill McMahon
- Joe Yurko
- George Blumfield
- Larry Gonyea

Finance Department
- Mr. Terry
- Mr. Roberts
- Nelson Burras
- Robert De La Cruz

Oxnard School District
- Louis D. Matthews

Police Department

Fire Department
- Mr. Conley

Parks and Recreation Department

California Department of Navigation National Weather Service and Ocean Development
- Marty Mercado
- Joseph Keating

Water Quality Control Board
- Louis Schianazi

California Coastal Conservation Commission

South Central Regional Commission
- Steven F. Scholl

Ventura County

Agricultural Zoning & Preserves
- Todd Collart

Environmental Health
- Jim Pierce
- Ron Heinstran

Harbor Department
- Frank Anderson

Flood Control
- Phil Sherman

Airport
- Don Simpson

Tax Assessor
- Mr. Crow
- Bob Perry
- Pete Finney

Ventura County APCD
- Bill Thuman

U. S. Navy - Point Mugu

Southern Califonria Edison Company
- O. N. Racicot
- George Trevarther

Southern California Gas Company

Southern California Savings and Loan

Home Savings and Loan

Gorian and Associates

- Lynn Mc Knerney
- Bob Simons

Mc Grath Family

- Jim Mc Grath
- Tom Mc Grath

Moffatt and Nichol, Engineers

- Jim Crumpley

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SUPPORTING INFORMATION

Atlantis Scientific

VEGETATION

STATUS:

I - Introduced
N - Native
U - Unknown
A - Agricultural

SHRUBS AND HERBACEOUS PLANTS

COMMON NAME	SCIENTIFIC NAME	STATUS
Coast sagebrush	Artemisia californica	N
Coyote brush	Baccharis piluaris	N
Mule fat	Baccharis glutinosa	N
Mustard	Brassica spp.	I
Field mustard	Brassica campestris	I
Amblyopappus	Amblyopappus pusillus	N
California buckwheat	Erigonum fasciculatum	N
Coastal buckwheat	Erigonum cinereum	I
Yellow sweet clover	Melilotus indicus	I
White sweet clover	Meliotus albus	I
Nightshade	Solanum sarrachoides	U
Tomato	Lycopersicon esculentum	I
Sage	Salvia spp.	N
Wallflower	Erysimum suffrutescens	
Lupine	Lupinus spp.	N
Morning-glory	Convoluulus spp.	N
Fiddleneck	Amsinckia spectabilis	N
Heliotrope	Heliotropum curassavicum var. Oculatum	I
Milkweed	Asclepias spp.	N
Curly Dock	Rumex crispus	I
Peach	Pruns spp.	I
Bouganvillea	Bouganvillea spp.	I
Jacorander	Jacorander spp.	I

GRASSES

Blue grass	Poa spp.	I
Fescue	Festuca spp	I
Brome	Bromus spp.	I
Barley	Hordeum spp.	I
Crabgrass	Digitaria spp.	I
Bermuda grass	Cynodon dactylon	I
Oats	Avena spp.	I

TABLE A (Continued)

Agricultural Plants

COMMON NAME	SCIENTIFIC NAME	STATUS
Green beans (currently)	Phaseolus vulgaris	A
Tomatoes (currently)	Lycopersicon esculentum	A
Broccoli	Brassica oleracea	A
Cauliflower	B. oleracea	A
Spinach	Spinacia oleracea	A
Celery	Apium graveolens	A
Stock (cut folowers)	Matthiola spp.	

Trees

(Found only around McGrath house - NE corner)

Eucalyptus	Eucalyptus spp.	I
Oak	Quercus spp.	N
Weeping willow	Salix spp.	I
Cottonwood	Populus fremontii	N

FAUNA

AMPHIBIAN SPECIES

COMMON NAME	SCIENTIFIC NAME
Garden slender salamander	*Batrachoseps major*
Western toad	*Bufo boreas*
Pacific treefrog	*Hyla regilla*
Bullfrog	*Rana catesbeiana*

REPTILE SPECIES

Western fence lizard	*Sceloporus occidentalis*
Side-blotched lizard	*Uta stansburiana*
Southern alligator lizard	*Gerrhonotus multicarinatus*
California legless lizard	*Anniella pulchra*
Gopher snake	*Pituophis melznoleucus*
Common kingsnake	*Lampropeltis getulus*
Western rattlesnake	*Crotalus viridis*

MAMMAL SPECIES

Opossum	*Didelphis marsupialis*
Raccoon	*Procyon lotos*
Striped skunk	*Mephitis mephitis*
Spotted skunk	*Spilogale gracilis*
California ground squirrel	*Citellus beecheyii*
Botta packet gopher	*Thomomys bottae*
California meadow mouse	*Microtus californicus*
Muskrat	*Ondatra zibethicus*

TABLE B (Continued)

MAMMAL SPECIES (Cont.)

COMMON NAME	SCIENTIFIC NAME
Western harvest mouse	*Reithrodontomys megalotis*
House mouse	*Mus musculus*
Audubon cottontail	*Sylvilagus auduboni*
Black-tailed jackrabbit	*Lepus californicus*
Sea lion (occassionally in Canal)	*Zalophus californianus*
Domestic dog	*Canis familiaris*
Domestic cag	*Felis catus*

TABLE B (Continued)

BIRD SPECIES

STATUS:

C - Common
U - Uncommon
V - Visitor
SV - Summer visitor
WV - Winter visitor
R - Rare
E - Endangered

COMMON NAME	SCIENTIFIC NAME	STATUS
• Loons: Gaviidae		
Common Loon	Gavia immer	WV
Pacific Loon (formerly Arctic Loon)	Gavia pacifica	WV
• Grebes: Podicepididae		
Horned Grebe	Podiceps auritus	WV
Eared Grebe	Podiceps nigricollis	WV
Western Grebe	Aechmophorus occidentalis	WV
Pied-billed Grebe	Podilymbus podiceps	C
• Pelicans: Pelicanidae		
White Pelican	Pelecanus erythrorhynchos	SV
Brown Pelican	Pelecanus occidentalis	U,R,E
• Cormorant: Phalacrocoracidae		
Double-crested Cormorant	Palacrocorax auritus	C
• Herons and Bitterns: Ardeidae		
Great Blue Heron	Ardea herodias	C
Green Heron	Butorides virescens	C
Cattle Egret	Bubulcus ibis	SV
Great Egret (formerly Common Egret)	Casmerodius albus	C/Sep.-Apr.
Snowy Egret	Egretta thula	C/Sep.-Apr.
Black-crowned Night Heron	Nycticorax nyctricorax	C
• Ibises and Spoonbills: Threskiornithidae		
White-faced Ibis	Plegadis chichi	SV

TABLE B (Continued)

COMMON NAME	SCIENTIFIC NAME	STATUS
• Swans, Geese and Ducks: Anatidae		
Whistling Swan	Olor columbianus	SV
Canada Goose	Branta canadensis	SV
Brant (formerly Black Brant)	Branta bernicla	C/Nov. - Apr.
White-fronted Goose	Anser albifrons	VR
Snow Goose	Chen caerulescens	VR
Mallard	Anas platyrhynchos	C/Oct.-Feb.
Gadwall	Anas strepera	V, U
Pintail	Anas acuta	C/Aug. - Apr.
Green-winged Teal	Anas crecca	WV
Blue-winged Teal	Anas discors	SV
Cinnamon Teal	Anas cyanoptera	V, C/Feb.-Mar.
European Widgeon	Anas penelope	WV
American Widgeon	Anas americana	WV
Northern Shoveler	Anas clypeata	WV
Wood Duck	Aix sponsa	R
Redhead	Athya americana	SV
Ring-necked Duck	Aythya collaris	WV
Canvasback	Aythya valisneria	WV
Great Scaup	Aythya marila	SV
Lesser Scaup	Aythya affinis	WV
Common Goldeneye	Bucephala clangula	V
Bufflehead	Bucephala albeola	WV
Oldsquaw	Clangula hyemalis	V
Harlequin Duck	Histrionicus histrionicus	V
Ruddy Duck	Oxyura jamaicensis	C
Common Merganser	Mergus merganser	V, U
Red-breasted Merganser	Mergus serrator	WV
• Hawks, Kites, and Harriers: Accipitidae		
White-tailed Kite	Elanus leucurus	C/Oct.- Apr.
Bald Eagle	Haliaeetus leucocephalus	V, R, E
Marsh Hawk	Circus cyaneus	U
Osprey	Pandion haliaetus	V, R
• Falcons: Falconidae		
Peregrine Falcon	Falco peregrinus	U,R,E
Pigeon Hawk (Merlin)	Falco columbarius	V,R
• Quails and Pheasants: Phasianidae		
California Quail	Lophortyx californicus	U
• Rails, Gallinules and Coots: Rallidae		
Clapper Rail	Rallus longirostris	U,R,E
Virginia Rail	Rallus limicola	U

TABLE B (Continued)

COMMON NAME	SCIENTIFIC NAME	STATUS
Rails, Gallinules and Coots: Rallidae (cont.)		
Sora Rail	Porzana carolina	C
American Coot	Fulica americana	C
• **Plovers: Charadriidae**		
Semipalmated Plover	Charadrius semipalmatus	SV
Killdeer	Charadrius vociferous	C
American Golden Plover	Pluvialis dominica	V,R
Black-bellied Plover	Pluvialis squatarola	WV
• **Sandpipers: Scolopacidae**		
Black Turnstone	Arenaria melanocephala	SV
Long-billed Curlew	Numenius americanus	U
Whimbrel	Numenius phaeopus	WV
Willet	Catrophorus semiplamatus	WV
Greater Yellowlegs	Tringa melanleucos	WV
Lesser Yellowlegs	Tringa flavipes	WV
Knot	Calidrus canutus	V, U
Pectoral Sandpiper	Calidris melanotos	SV
Baird's Sandpiper	Calidris bairdii	WV
Least Sandpiper	Calidris minutilla	WV
Dunlin	Calidus alpina	WV
Western Sandpiper	Calidris mauri	WV
Short-billed Dowitcher	Limnodromus griseus	V, C/Apr. - May
Long-billed Dowitcher	Limnodromus scolopaceus	V, C/Aug. - May
Stilt Sandpiper	Micropalma himantopus	V
Marbled Godwit	Limosa fedoa	V, C/July - May
• **Avocets and Stilts: Recurvirostridae**		
American Avocet	Recurvirostra americana	SV
Black-necked Stilt	Himantopus mexicanus	SV
• **Phalaropes: Phalaropodidae**		
Wilson's Phalarope	Steganopus tricolor	V, C/Apr. - May
Northern Phalarope	Lobipes lobatus	SV
• **Gulls and Terns: Laridae**		
Glaucous Gull	Larus hyperboreus	VAGRANT
Glaucous-winged Gull	Larus glaucescens	WV
Western Gull	Larus occidentalis	C
Herring Gull	Larus argentatus	SV
California Gull	Larus californicus	C/Aug. - May
Ring-billed Gull	Larus delawarensis	C/July - Mar.
Mew Gull	Larus Canus	WV
Bonaparte's Gull	Larus philadelphia	C/Sep. - May

TABLE B (Continued)

COMMON NAME	SCIENTIFIC NAME	STATUS
Gulls and Terns: Laridae (cont.)		
Heerman's Gull	Larus heermanni	C/Jun. - Sep.
Forster's Tern	Sterna forsteri	C/Aug.Sep.Apr.May
Least Tern	Sterna albifrons	V, R, E
Royal Tern	Thalasseus maximus	V, U
Elegant Tern	Thalasseus elegans	V/Sep. - Oct.
Caspian Tern	Hydroprogne caspia	C/Aug. - Oct.
• Auks, Mures and Puffins: Alcidae		
Tufted Puffin	Lunda Cirrhata	V, U
• Pigeons and Doves: Columbidae		
Rock Dove	Columba livia	U
Mourning Dove	Zenaidura macroura	C
• Barn Owl: Strigidae		
Barn Owl	Tyto alba	V
• Owls: Tytonidae		
Screech Owl	Otus asio	V
Great Horned Owl	Bubo virginianus	V
Short-eared Owl	Asio flammeus	V
• Swifts: Apodidae		
Black Swift	Cypseloides niger	V
Vaux's Swift	Shaetura vauxi	V
• Hummingbirds: Trochilidae		
Anna's Hummingbird	Calypte anna	V, C
• Kingfishers: Alcedinidae		
Balted Kingfisher	Megaceryle alcyon	C/Aug.May
• Tyrant Flycatchers: Tyrannidae		
Tropical Kingbird	Tyrannus melancholicus	V, R
Western Kingbird	Tyrannus verticalis	V, C
Black Phoebe	Sayornis nigricans	C
• Swallows: Hirundinidae		
Violet-green Swallow	Tachycinetta thalassina	V, C/Mar. - Sep.
Bank Swallow	Riparia riparia	V, U
Barn Swallow	Hirundo rustica	V

TABLE B (Continued)

COMMON NAME	SCIENTIFIC NAME	STATUS
Swallows: Hirundinidae (cont.)		
Cliff Swallow	Petrochelidon pyrrhonota	V
• Jays, Magpies and Crows: Corvidae		
Common Crow	Corvus brachyrhynchos	C
• Nuthatches: Sittidae		
Red-breasted Nuthatch	Sitta canadensis	U
• Wrens: Troglodytidae		
Long-billed Marsh Wren	Telmatodytes palustris	C
• Mockingbirds and Thrashers: Mimidae		
Mockingbird	Mimus polyglottos	C
• Thrushes and Solitaires: Turdidae		
American Robin	Turdus migratorius	V/Sep. - Apr.
Western Bluebird	Sialia mexicanus	V
• Starlings: Sturnidae		
Starling	Sturnus vulgaris	C
• Warblers: Parulidae		
Tennessee Warbler	Vermivora peregrina	V, U
Black-throated Blue Warbler	Dendroica caerulescens	V, U
Yellowthroat	Geothlypis trichas	V, U
• Blackbirds and Orioles: Icteridae		
Bobolink	Dolichonyx oryzivorus	V, U
Red-winged Blackbird	Agelaius phoeniceus	C
Tricolored Blackbird	Agelaius tricolor	C
Brown-headed Cowbird	Molothrus ater	V, C
• Tanagers: Thraupidae		
Western Tanager	Piranga ludoviciana	V
• Finches and Sparrows: Fringillidae		
House Finch	Carpodacus mexicanus	C
Red Crossbill	Loxia curvirostra	V, U
Green-tailed Towhee	Chlorura Chlorura	V, U
Brown Towhee	Pipilo fuscus	C
Savannah Sparrow	Passerculus sandwichensis	C

TABLE B (Continued)

COMMON NAME	SCIENTIFIC NAME	STATUS
Finches and Sparrows: Fringillidae (cont.)		
Harris' Sparrow	Zonotrichia querula	V, U
White-crowned Sparrow	Zonotrichia leucophrys	V, C/Sep. - May
Golden-crowned Sparrow	Zonotrichia atricapilla	V, C/Oct. - May
White-throated Sparrow	Zonotrichia albicollis	V, U
Song Sparrow	Melospiza melodia	C

TABLE C

IN-HARBOR WATER QUALITY

Parameter/date	A entrance	B east branch	C west branch
Coliform (MPN/100 ml)			
Jun '76	2.2	2.2	2.2
Oct '76	2.2	16	2.2
Feb '76	2.2	2.2	2.2
Jun '77	2.2	2.2	2.2
Jul '77	2.2	2.2	2.2
Dissolved Oxygen (mg/l)			
Jun '76	7.2	6.5	7.3
Jul '77	8.0	7.3	6.9
Aug '76	7.5	7.3	7.3
Sep '76	7.7	7.9	7.9
Oct '76	7.6	7.2	6.9
Nov '76	7.7	7.0	6.6
Dec '76	6.9	6.9	7.2
Jan '77	7.5	7.2	6.9
Feb '77	7.7	7.3	7.2
Mar '77	7.8	7.7	7.8
Apr '77	8.2	8.0	8.1
May '77	7.7	7.5	7.4
Jun '77	7.0	7.0	7.4
Jul '77	8.1	9.1	9.4
Chloride, mg/l			
Jun '76	18400	18500	18600
Jul '76	18800	19000	18700
Aug '76	18990	18890	18990
Sep '76	18330	18330	18339
Oct '76	18200	18000	18100
Nov '76	19800	19300	19100
Dec '76	19600	19200	18500
Jan '77	19600	19200	18900
Feb '77	19600	19200	19200
Mar '77	19000	18900	19000
Apr '77	19600	18500	19200
May '77	19000	19400	19500
Jun '77	19200	19200	18800
Jul '77	19400	19300	19200

TABLE C (Continued) In-Harbor Water Quality

Parameter/date	A entrance	B east branch	C west branch
pH			
Jun '76	8.2	8.2	8.2
Jul '76	8.2	8.2	8.2
Aug '76	8.2	8.2	8.3
Sep '76	8.1	8.1	8.1
Oct '76	7.8	7.8	7.8
Nov '76	7.8	7.8	7.8
Dec '76	8.0	8.0	8.0
Jan '77	8.1	8.1	8.1
Feb '77	7.9	8.0	8.0
Mar '77	8.1	8.1	8.2
Apr '77	8.1	8.1	8.1
May '77	8.0	8.1	8.1
Jun '77	7.9	7.9	8.0
Jul '77	8.0	8.2	8.2
Phosphate (mg/l)			
Jun '76	0.1	0.1	0.1
Oct '76	0.1	0.1	0.1
Feb '77	0.1	0.1	0.1
Jun '77	0.1	0.1	0.1
Nitrate (mg/l)			
Jun '76	0.1	0.1	0.1
Oct '76	0.5	0.5	0.5
Feb '77	0.1	0.1	0.1
Jun '77	0.7	0.7	0.7
Ammonia (mg/l)			
Jun '76	1	1	1
Oct '76	1	1	1
Feb '77	1	1	1
Jun '77	1	1	1
Kjeldahl Nitrogen (mg/l)			
Jun '76	1	1	1.6
Oct '76	1	1	1
Feb. '77	2	2	2
Jun '77	1	1	1

TABLE C (Continued) In-Harbor Water Quality

Parameter/date	A entrance	B east branch	C west branch
In addition, in June '76 only, the following were sampled:			
Cadmium (mg/l)	0.01	0.01	0.01
Chromium (mg/l)	0.05	0.05	0.05
Copper (mg/l)	0.1	0.1	0.1
Iron (mg/l)	0.1	0.1	0.1
Lead (mg/l)	0.05	0.05	0.05
Manganese (mg/l)	0.1	0.1	0.1
Mercury (ug/l)	2	2	2
Nickel (mg/l)	0.1	0.1	0.1
Silver (mg/l)	0.1	0.1	0.1
Zinc (mg/l)	0.1	0.1	0.1

SAMPLING PROGRAM

Two sets of water samples and one set of bottom sediments were taken in conjunction with this report. Both surface and deep water samples were collected on June 30 and July 15, 1977. For each of the seven sampling points (refer to Figure A), the following parameters were measured:

- Depth
- Temperature
- Secchi disk transparency
- Dissolved oxygen
- Fecal coliform organisms
- Suspended solids
- Floating debris.

The findings are reproduced in Table D. The bottom material samples were analyzed for heavy metals and chlorinate hydrocarbons. Results are shown in Table E.

TABLE D

SUMMER 1977 HARBOR-MARINA WATER QUALITY

Parameter, date	Station 1 S	Station 1 B	Station 2 S	Station 2 B	Station 3 S	Station 3 B	Station 4 S	Station 4 B	Station 5 S	Station 5 B	Station 6 S	Station 6 B	Station 7 S	Station 7 B
Depth	0.1'	30'	0.1'	15'	0.1'	14'	0.1'	6'	0.1'	8'	0.1'	10'	0.1'	10'
		33'		13'		13'		4'		8'		10'		13'
Temperature (°C)														
Jun 30, '77	15°	13°	16°	15°	17°	14°	19°	19°	20°	18°	19°	17°	19°	17°
Jul 15, '77	13°	12°	17°	16°	17°	16°	19°	18°	19°	17°	18°	17°	18°	17°
Secchi Disk														
Jun 30, '77	16'		8'		7'		3.5'		4'		5'		7'	
Jul 15, '77	14'		7'		7'		1.5'		3.5'		4'		6'	
Dissolved Oxygen														
Jun 30, '77	7.4	10.9	7.2	8.7	7.2	8.6	6.4	6.7	6.6	7.1	6.9	8.4	7.2	9.1
Jul 15, '77	6.9	11.0	7.8	8.0	8.2	8.4	5.9	6.7	6.4	7.2	6.4	7.8	7.3	8.2
Fecal Coliform (mpn/100 ml)														
Jun 30	7	3	4	21	9	7	240	4	240	43	4	3	3	3
Jul 15	3	9	3	11	4	4	93	2	15	15	3	3	3	4
Suspended Solids (mg/l)														
Jun 30	20	19	10	25	9	18	22	133	15	22	14	19	20	19
Jul 15	8	16	8	10	8	11	17	11	9	24	8	11	5	10
Debris														
Jun 30	0		0		0		see photo		0		see photo		0	
Jul 15	0		0		0		Figure		0		Figure			

TABLE E

BOTTOM SEDIMENTS - JULY, 1977

(all values in mg/dry Kg)

Parameter	Station 2	Station 3	Station 5	Station 6	Station 7
Copper	40	15	46	29	39
Zinc	76	41	108	101	99
Lead	24	17	105	25	27
Cadmium	1	1	1	1	1
Chromium	25	17	28	29	28
Nickel	24	13	22	21	25
Mercury	0.111	0.039	0.083	0.137	0.397
Arsenic	5.05	0.90	3.79	1.80	2.00
Chlorinated-Hydrocarbons	-	-	-	0.0001	0.0001

TIDAL FLUSHING ANALYSIS

The mean turnover time of waters in the existing and expanded harbors has been estimated through a numerical process based on the depth and area configuration of the waterways system and flows due to tides and cooling water delivered to the Edison power plant. Tidal information is based upon tables from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Harbor configuration and channel sections were compiled from City of Oxnard zoning maps, from U. S. Department of Commerce National Ocean Survey sounding charts, and from personal depth recording in the harbor and marina. Tentative tract plans were used to estimate proposed marina sections.

In any harbor water quality depends to a large extent upon the rate at which embayed water is replaced by ocean water. This process can be numerically estimated as "mean replacement time", which for this study has been defined as the expected time for a particule of water found initially at a given point to be replaced by a particle of ocean water. Of course water quality depends upon a great many other factors, such as pollutant inputs, but it can be seen that if the mean replacement time for a particular area is very short then the make-up of water in that area should not differ appreciably from that of the surrounding ocean water.

In a tidal bay water flows in between low and high tides, and water flows out between high and low tides. The inflow is termed flood flow and the outflow is termed ebb flow. The volume of water passed in either the flood or ebb tide is termed the bay's tidal prism. A complete flood-ebb cycle averages a little more than 1/2 hours. Thus the average rate of tidal flow can be found by dividing the tidal prism volume by 6 hours. The Channel Islands situation is somewhat unique in that the Edison canal creates a continuous pumped flow into the harbor. This flow augments the normal replacement phenomenon associated with tidal action only.

COMPUTATION

To facilitate computer application of the flushing analysis the existing and proposed harbor system was modeled into a series of interconnected channels, or "basins". Figure 23 is a representation of the mathematical model used in this analysis. Each rectangle represents a section of harbor/marina channel. These rectangular basins are interconnected by circular nodes. Program input includes:

1. Number of basins, and for each basin:

    a. volume

    b. cross-sectional area

    c. length

    d. percentage of pumped flow

    e. preceding node number

    f. following node number

    g. diffusion coefficient

2. Number of nodes, and respective columes (most nodes have vanishing small columes and are used only as a convenience to calculations)

3. The number of different pumped flow conditions and the respective rates of flow

Program output includes:

1. rate of pumped flow

2. node numbers

3. mean replacement time for each node

Each basis contains a certain volume of water at mean sea level and during the tidal cycle certain volumes of water are exchanged back and forth between adjacent basins. The calculation of mean replacement time is the key to projecting water quality for the various basins. A detailed description of the mathematic process used for these calculations is available from Atlantis Scientific upon request.

In Table 17 mean replacement times are listed for certain points of interest. Values have been calculated for the existing facilities under a pumped flow of 500 cfs (existing Edison demand) and under a flow of 3,000 cfs (ultimate). Then, for the proposed marina including Tract No. 2026-4, replacement times have been calculated with a pumped flow of 3,000 cfs. All diffusion constants are based upon a nominal six-foot tidal range.

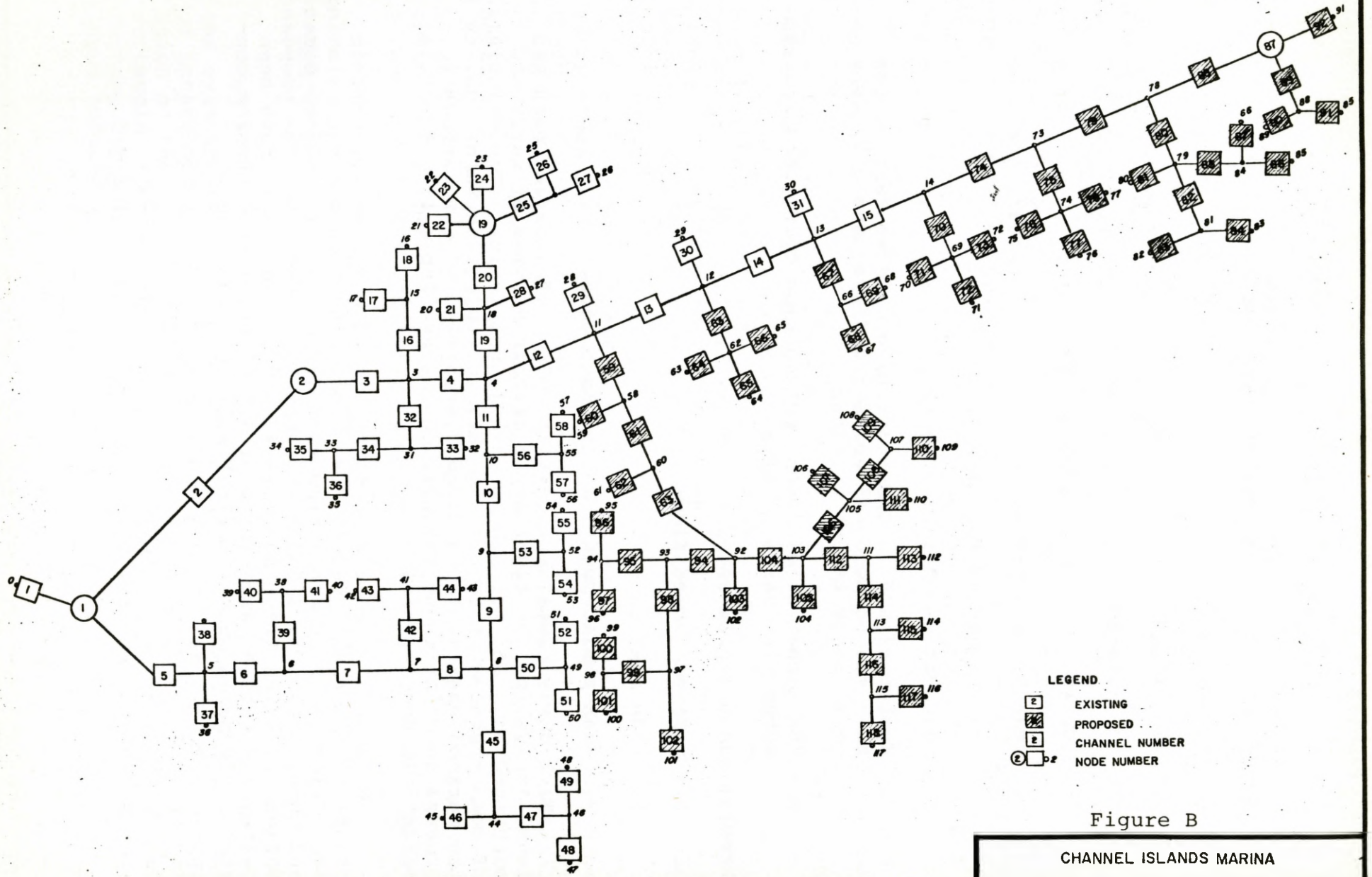


Figure B

CHANNEL ISLANDS MARINA

MATHEMATICAL MODEL OF HARBOR/MARINA SYSTEM

CHANNEL ISLANDS MARINA
BOAT COUNT SUMMARY
JULY 3, 1977

TIME	OUTGOING				INCOMING			
	POWER		SAIL		POWER		SAIL	
	Inboard	Outboard	Tacking	Aux. power	Inboard	Outboard	Tacking	Aux. power
8:00 - 8:30								
8:30 - 9:00								
9:00 - 9:30								
9:30 - 10:00								
10:00 - 10:30								
10:30 - 11:00								
11:00 - 11:30								
11:30 - 12:00								
Noon - 12:30	-	-	-	-	-	-	-	-
12:30 - 1:00	-	-	-	-	-	-	-	-
1:00 - 1:30	2	10	21	1	5	10	15	0
1:30 - 2:00	4	5	23	2	7	8	20	2
2:00 - 2:30	7	7	26	3	14	10	19	0
2:30 - 3:00	5	5	19	1	7	6	14	1
3:00 - 3:30	11	5	9	10	27	6	14	9
3:30 - 4:00	6	2	12	6	27	3	19	12
4:00 - 4:30	10	2	9	2	17	4	21	16
4:30 - 5:00	9	2	16	3	23	4	30	8
5:00 - 5:30	5	0	8	1	19	3	37	4
5:30 - 6:00	2	1	4	1	5	3	10	2
6:00 - 6:30	-	-	-	-	-	-	-	-
6:30 - 7:00	-	-	-	-	-	-	-	-

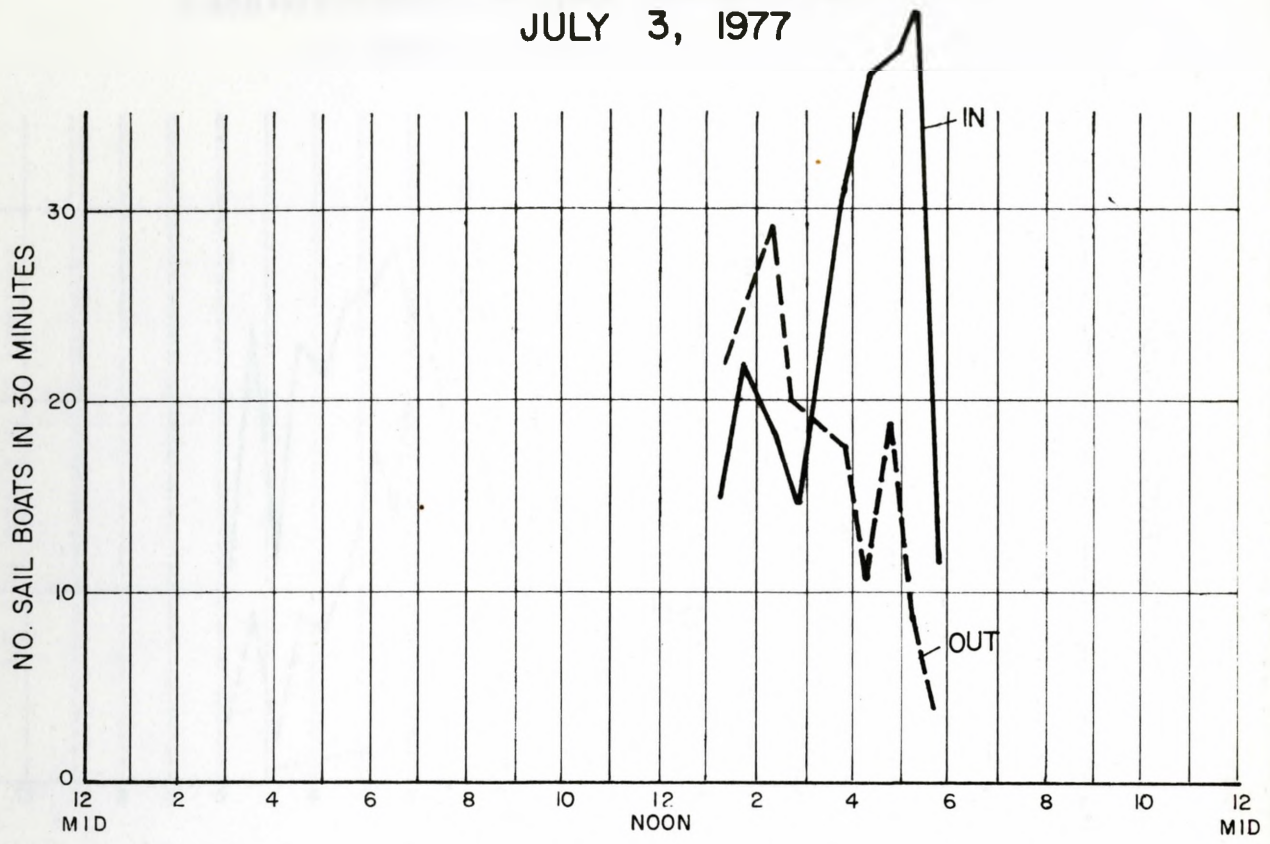
TABLE F (CONTINUED)

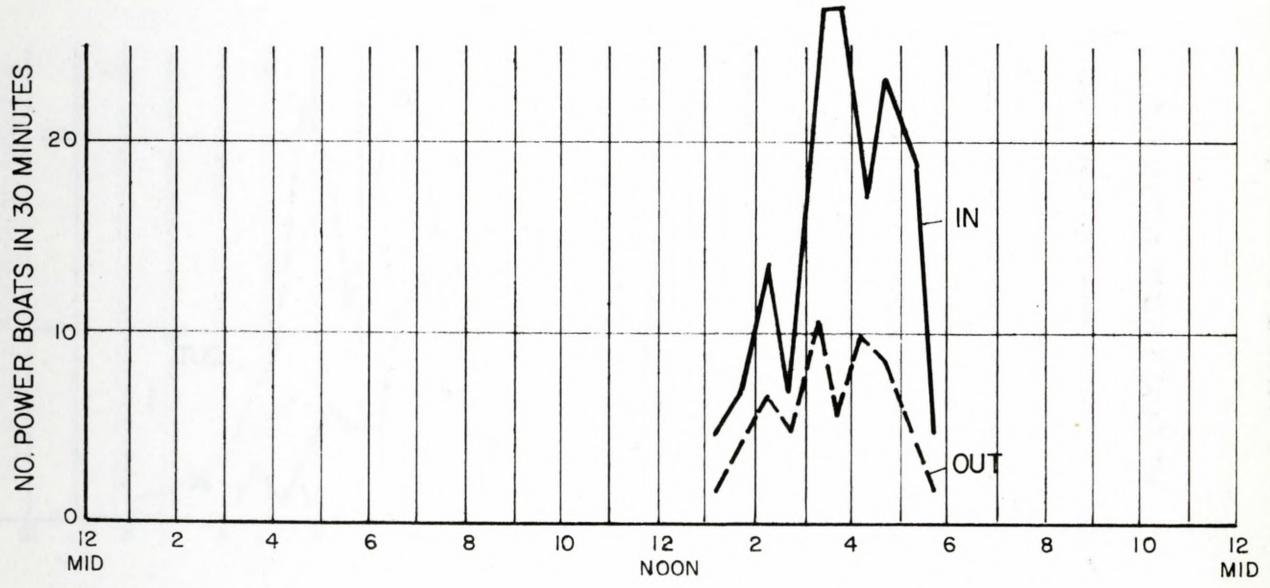
CHANNEL ISLANDS MARINA
BOAT COUNT SUMMARY
JULY 10, 1977

TIME	OUTGOING				INCOMING			
	POWER		SAIL		POWER		SAIL	
	Inboard	Outboard	Tacking	Aux power	Inboard	Outboard	Tacking	Aux. power
8:00 - 8:30	-	-	-	-	-	-	-	-
8:30 - 9:00	17	3	1	4	7	1	1	0
9:00 - 9:30	6	3	0	4	3	1	1	1
9:30 - 10:00	13	8	1	6	10	5	0	0
10:00 - 10:30	15	5	4	5	9	2	1	0
10:30 - 11:00	10	1	9	4	9	2	5	0
11:00 - 11:30	10	3	8	8	10	5	5	1
11:30 - 12:00	10	2	14	11	16	3	10	2
12:00 - 12:30	3	0	14	4	13	0	13	1
12:30 - 1:00	12	3	18	16	16	2	14	8
1:00 - 1:30	6	3	16	3	10	3	18	6
1:30 - 2:00	13	2	12	17	21	5	14	7
2:00 - 2:30	11	2	10	4	23	2	25	3
2:30 - 3:00	5	3	15	2	18	3	26	0
3:00 - 3:30	5	2	9	2	11	2	19	6
3:30 - 4:00	6	2	8	0	19	3	18	3
4:00 - 4:30	3	2	9	0	22	8	20	3
4:30 - 5:00	1	0	1	1	9	0	12	0
5:00 - 5:30	3	0	9	0	7	0	21	3
5:30 - 6:00	1	0	3	0	4	0	9	2
6:00 - 6:30	-	-	-	-	-	-	-	-
6:30 - 7:00	-	-	-	-	-	-	-	-

TABLE F (CONTINUED)

BOAT COUNT
CHANNEL ISLAND HARBOR ENTRANCE
JULY 3, 1977





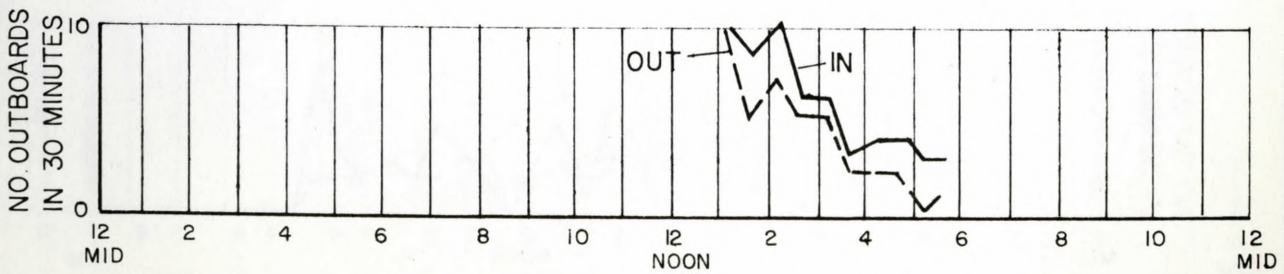
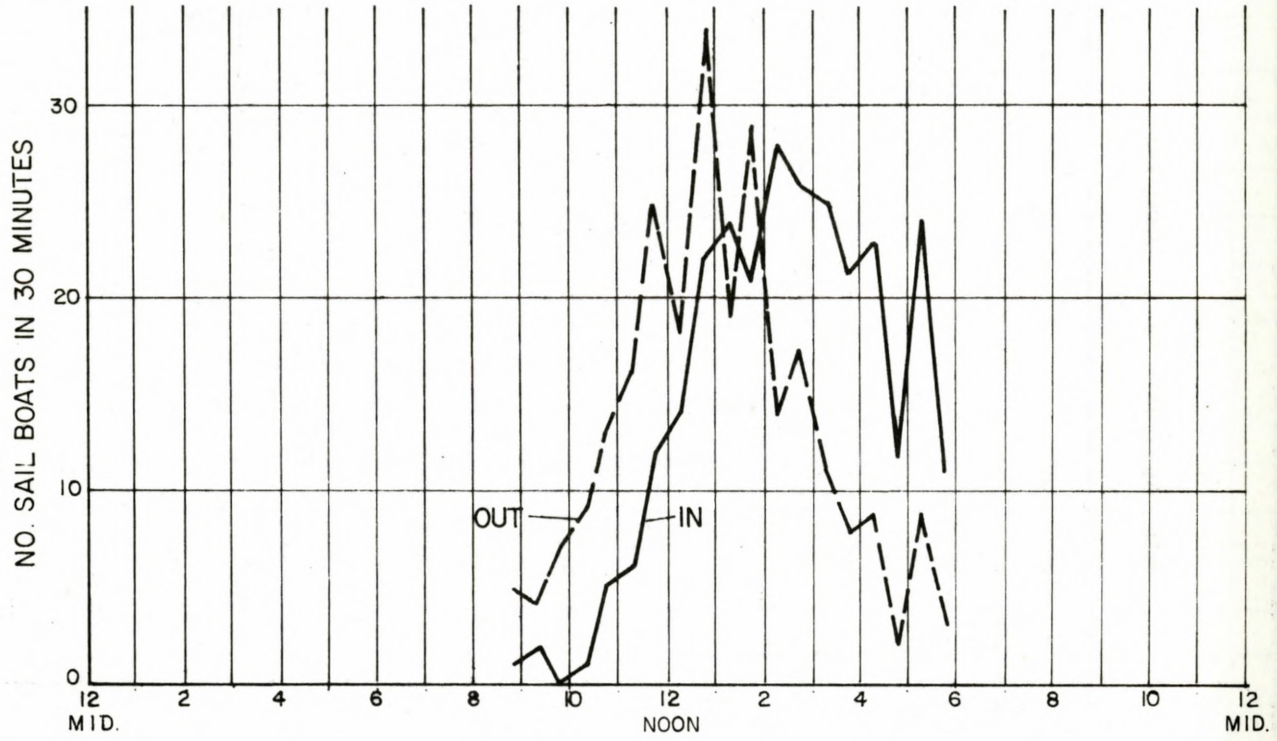
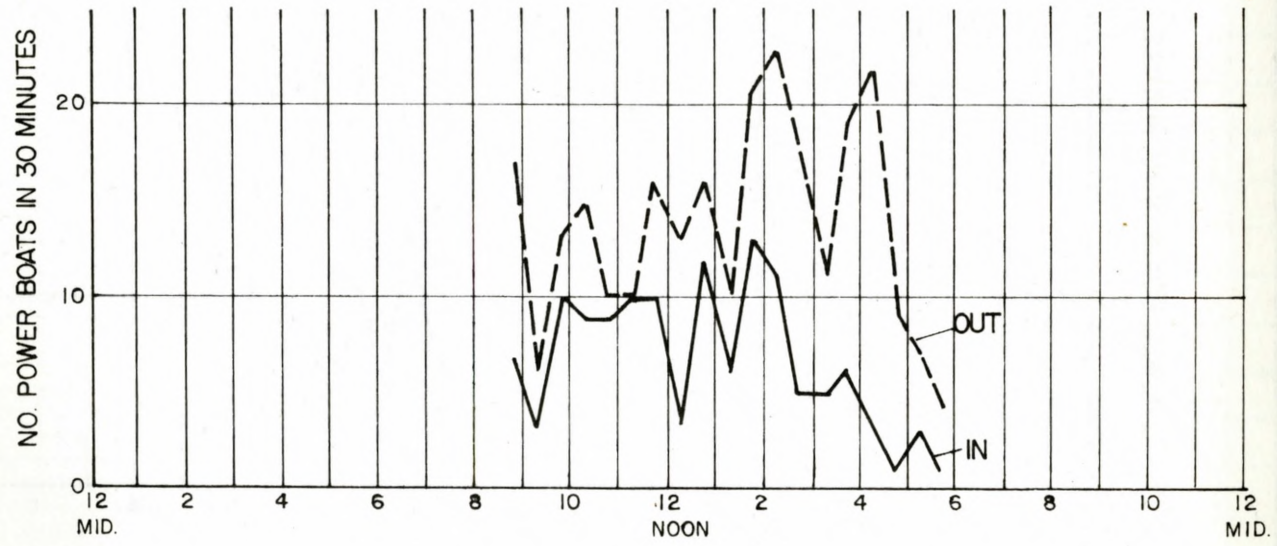


TABLE F (CONTINUED)

BOAT COUNT
CHANNEL ISLAND HARBOR ENTRANCE
JULY 10, 1977





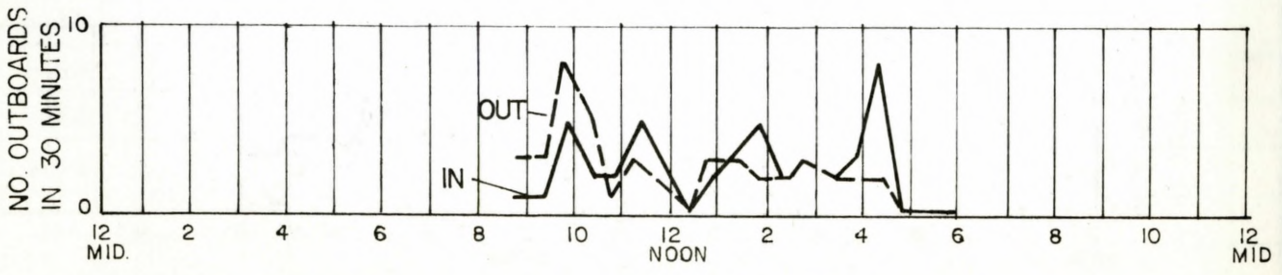
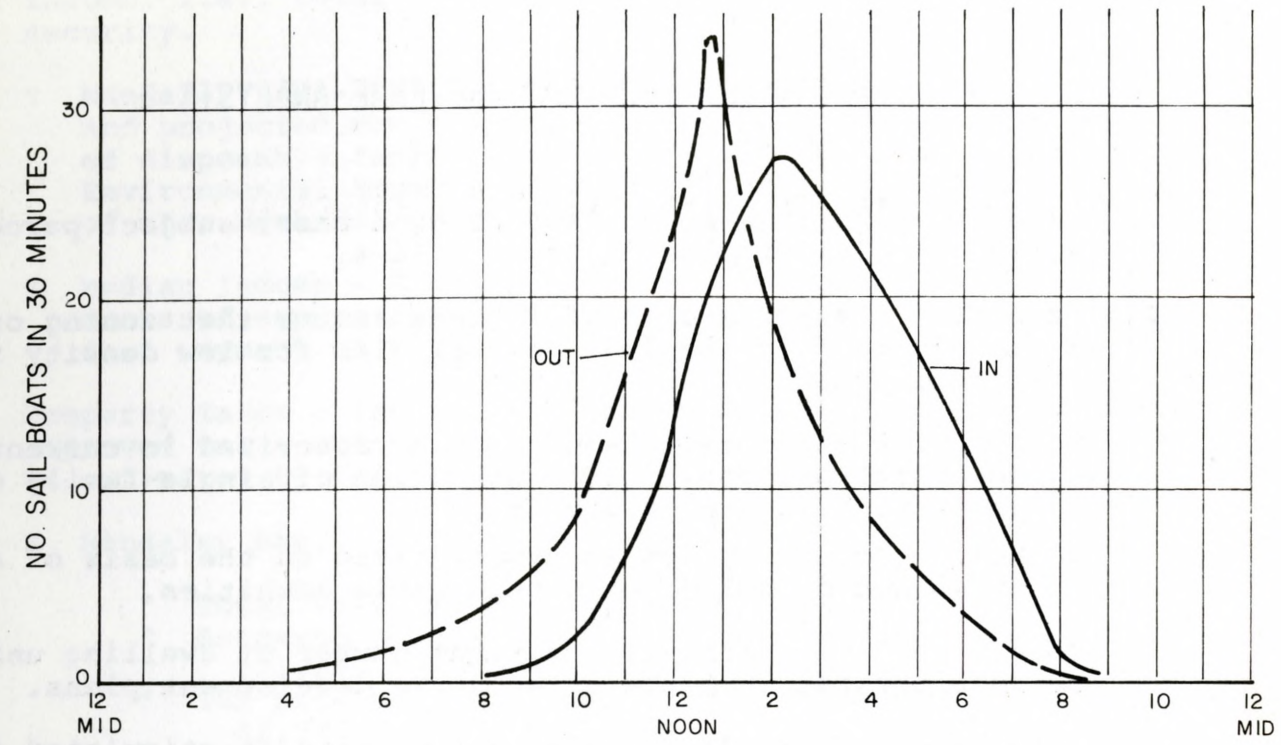
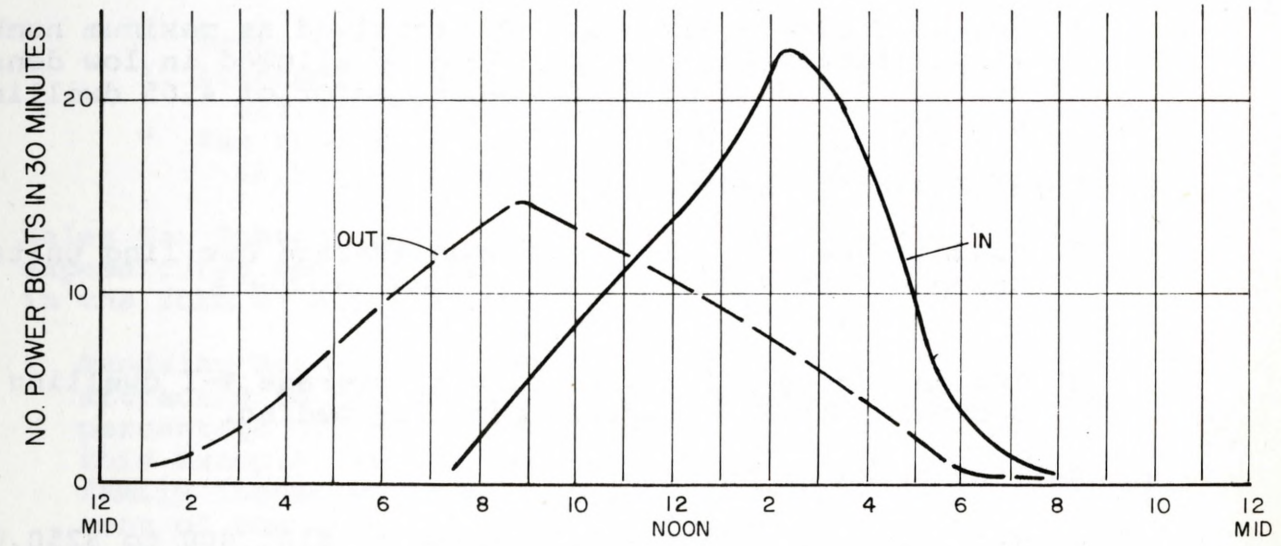
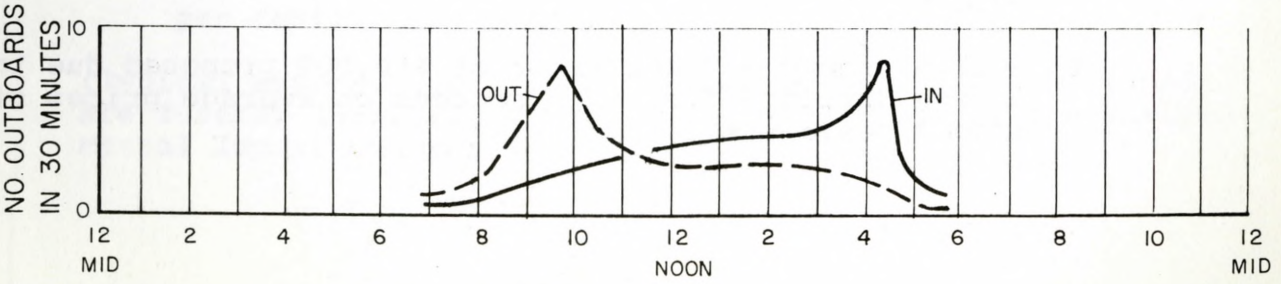


TABLE F (CONTINUED)

BOAT COUNT
CHANNEL ISLAND HARBOR ENTRANCE
ESTIMATED NORMAL SUMMER SUNDAY







METHODOLOGY FOR COST/REVENUE ANALYSIS

1. Acreage - ±32.7 acres applied to each case; subject parcel identified as City of Oxnard, Tract 2026-4.

2. Land Use - Land use classifications assume that zoning of parcel is as provided in the 1990 General Plan for low density residential development.

   - ¶ Mandalay Bay option is project as described in current development proposal for construction of single-family dwelling units with waterways amenity.
   - ¶ Median Income option is hypothesized on the basis of a plan which would include only negligible amenities.

3. Total Dwelling Units - The maximum number of dwelling units to be incorporated into the alternative development plans.

   - ¶ Mandalay Bay - 401 single-family units as stipulated in current development plan.
   - ¶ Median Income - 385 units hypothesized as maximum number of single-family units which would be allowed in low density residential zone at a build-out factor of 4.65 dwelling units per acre.

4. Total Project Residency -

   - ¶ Mandalay Bay - 1,404 based upon average dwelling units occupancy of 3.5 for a worst case analysis.
   - ¶ Median Income - 1,734 based upon average %-1 dwelling unit occupancy of 3.76 persons per City median.

5. Selling Price of Units -

   - ¶ Mandalay Bay - Sales price range of $100,000 to $250,000 has been proposed by developer - average price of $150,000 selected.
   - ¶ Median Income - Sales price of $50,000 proposed due to information obtained from City sources on average prices of media income residences.

6. Average Family Income - Stated in terms of disposable family income, i.e., total income less payments for taxes and social security.

   ¶ Mandalay Bay - $52,500 based upon selling price per unit, and projected monthly payments on house equal to 9 percent of disposable family income. (See Economics discussion in Environmental Impacts Chapter for a further clarification of this methodology.)

   ¶ Median Income - $24,000 based upon required mortgage payments of approximately $400 on the $50,000 home [assumed down payment of $10,000].

7. Property Taxes - Property tax assessments based upon average improved value of the two alternative homesite configurations as estimated by the Ventura County Tax Assessor's Office.

   ¶ Mandalay Bay:

      ° Total value at $85,000 per lot (401 lots)
      ° Assessed valuation at 25 percent of total value = $21,250 per acre
      ° Tax rate at $10.95 per $100 of assessed valuation = $2,327.00 per acre = $933,077.00

   ¶ Median Income:

      ° Total value at $55,000 per lot (385 lots)
      ° Assessed valuation at 25 percent of total value = $13,750 per acre
      ° Tax rate at $10.95 per $100 of assessed valuation = $1,505.00 per acre = $579,665.00

8. Sales Tax Subventions - Dollar estimate of the 1% of retail expenditures made in the City which is returned to the City in the form of a tax subvention.

   ¶ Mandalay Bay - Upper income individuals who would be attracted to the Mandalay Bay development spend a lower percentage of their total incomes on retail sales. For this example, it was assumed that 54 percent of the total family income would be expended on retail goods - 80 percent of the expenditures are assumed to be spent in Oxnard.

      $58,500 x 54% x 80% x 1% (subvention = $205.33 per family, per year

   (Typical expenditures for the Mandalay Bay "average" family are further detailed in the Economics section of the Environmental Impact Chapter.)

¶ Median Income - Median income individuals typically spend a higher proportionate amount of their incomes on retail goods, since their incomes allow less margin for savings, investments and other expenditures attributed to higher income individuals. For this example, retain expenditures were estimated to be 65 percent of total family income, again 80 percent of the total retail allotment was assumed to be spent in Oxnard.

$24,000 x 65% x 80% x 1% (subvention) = $124.80, per family, per year

9. Other Taxes - Property taxes and sales tax subventions are the largest sources of per capita revenue which accrue to local government. However, there are many other forms of local revenue which may be considerable depending upon the nature of the development. Such items as special taxes (boats, airplanes), fines and penalties, license fees, etc. all contribute to principal revenue sources.

¶ Mandalay Bay - the most significant other revenue source which would be attributed to Mandalay Bay would be the taxes levied on the boats which residents would dock at the proposed marina. The tax rate for 401 boats, each valued at approximately $12,500 is estimated to be $260 per vessel, for a total tax contribution of $104,260.00.

Other taxes were calculated on the basis of a per capita contribution of $10.17 per year. This figure was extrapolated from the revenue summary provided in the 1990 General Plan.

¶ Median Income - Since no special amenities are to be incorporated into this hypothetical development plan, no boat taxes or similar large source revenue producer could be identified. The $10.17 per capita figure was applied to the estimated population level of 1,448.

10. Principal Revenue Sources - The total figure presented for both options considers only the principal revenue sources as outlined in items 7, 8 and 9 above. It must be emphasized that this is not an absolute total - it is a representation of principal revenue sources only. The Mandalay Bay development would, for example, include special district assessments related to waterways maintenance. Many other revenues would be produced - state subventions, indirect benefits from induced employment, etc. However, extrapolation of these secondary revenue sources would be too speculative for inclusion in this comparative analysis.

11. Protective/Maintenance Services - Protective and maintenance services include police, fire, health and public works. Public works, including roadway maintenance, sewer and refuse services, comprise the largest share of local government expenditures required in support of residential developments.

A per capita average figure was used for both development options. The per capita figure was based upon information obtained from the City budget for per capita expenditures for the tax years 1973-1974 and 1975-1976. The percentage differences between total City revenues and expenditures were calculated from these tabulations. From this point, projected City revenues for 1980 (from "1990 Proposed General Plan") were studied. The average difference between revenues and expenditures for the preceding years was applied to this total to estimate total City expenditure for 1980. On this basis, the percentage of expenditures directly related to protective/maintenance services was projected.

The per capita figure applied was $120.83.

12. Schools - The amount of money which is required in support of the education of one public school pupil in the city of Oxnard is estimated to average $1,332.00 per year. The student generation factor for single-family residences taken from the Basis for Planning - Economic Potential [Ref: 67] is 1.17 per single family dwelling. However, for this worst case analysis it is assumed that the school child occupancy is 1.76 pupil per unit.

¶ Mandalay Bay

3.76 persons per dwelling unit;
401 dwelling units x 1.76 pupil per unit x $1,332.00

¶ Median Income

385 dwelling units x 1.17 pupil per unit x $1,332.00

13. Other Services - Other services include parks and recreation, libraries, social services, etc., designated as the leisure and burden services category in the City Budget. A per capita figure was used which was established following the same measures as described in item 11, above.

The per capita figure applied was $37.00

14. Principal expenditure sources totalled are representative of average per capita expenditures which would be required in support of the two hypothetical development plans.

BENTHIC SURVEY

METHODS OF STUDY

SUBTIDAL BENTHOS

Benthic samples were taken at five stations (Table G) by SCUBA divers on July 7, 1977. Each sample measured 15.24 cm (0.1524 m) in diameter and covered 182.4 cm^2 (0.018 m^2). The samples were preserved with formalin and transported to the laboratory. The samples were washed through a screen with a 0.5 mm opening. All the animals retained on the screen were identified to species in so far as is possible.

INTERTIDAL BENTHOS

Intertidal beach collections were made at three stations (Table G), the only areas with beaches. Each sample measured 15.24 cm (0.1524 m) in diameter and covered 182.4 cm^2 (0.018 m^2) of surface area. The material was transferred to a gallon jar and preserved with formalin. The samples were transferred to the laboratory where the material was washed through a 0.5mm screen. All animals retained on the screen were identified to species in so far as possible.

PILING

The fouling organisms were scraped from a piling at three stations (Table G), the only areas with such structures. Each sample was collected from the subtidal depths with the aid of SCUBA divers. The sample area was selected from that section of the piling which had the greater accumulation of marine growth. Approximately 320 cm^2 (0.032 m^2) of surface area was sampled. The material was preserved in the field with formalin and transported to the laboratory. The material was washed through a 0.5 mm screen. All organisms were identified to species in so far as possible.

BOAT FLOATS

Samples of the fouling organisms attached to boat floats were made at three stations (Table G), the only areas with docks. Since

boat floats rise and fall with the tides, these organisms are always submerged in sea water. Approximately 320 cm^2 (0.032 m^2) of surface area was sampled. The material was preserved in formalin and transported to the laboratory. The material was washed through a 0.5 mm screen and the material retained on the screen was identified to species in so far as was possible.

BENTHIC SURVEY

RESULTS

Subtidal Benthos

The results of the diver benthis survey are summarized according to the quantitative occurrence of species in Table G. A total of 68 different species were encountered of which 31 species were polychaetes and the remaining 37 species belong to the other invertebrate groups, chiefly the molluscans and crustaceans. The number of species per station ranged from 21 to 34. Considerable amount of variability was noted from station to station but this variability was largely the result of occasional occurrence of many species which were present at only one or two stations. The species diversity index at these five stations ranged from 0.618 to 0.908 (nematodes, copepods and ectoprocts not included) which indicate by in large good water quality.

Those stations located in the main channels (numbers 2,3 and 7) were characterized by the polychaete species belonging to family Syllidae (Sphaerosyllis californiensis, Exogone lourei, Brania sp. and others) as well as other polychaetes (Capitita ambiesta and Cossura candida). The presence of these latter two species in large numbers are generally indicative of clean water conditions (Reish, 1973). However, station 7 was apparently affected by more estuarine conditions as indicated by 179 oligochaetes. The presence of Capitella capitata at this station in large numbers is probably more indicative of estuarine conditions than a polluted environment.

Station 5 which is located in a blind-ending cha-nel is apparently a relatively clean benthic environment since many species are present including Capitita ambiseta and Cossura candida. The presence of a few Capitella capitata may be indicative of either passed stressed conditions, pending stressed conditions, or neither of these.

Station 6 which was located in a blind-ending channel is the most stressed area investigated. The presence of a large population of Capitella capitata and a large number of the semi-polluted polychaete Pseudopolydora paucibranchiata are evidence for a stressed environment.

Intertidal Benthos

The quantitative occurrence of the intertidal invertebrates collected from three sandy beaches are given in Table H. A total of 45 species of intertidal invertebrates were collected from these three stations. The number of species at the three intertidal stations ranged from 11 to 29. The fewest number of species were taken at station 2 which was characterized by coarse sand. The species diversity for these three stations ranged from 0.113 to 0.591 (nematodes, copepods and ectoprocts not included) with the highest at station 7 and the lowest at station 2 Sandy beaches typically are a low productive environment in comparison to stations possessing finer sediments. A large number of Capitella capitata were collected at Station 7, but because of the large diversity of species, the presence of this species along the channel leading to the steam generator plant is probably more indicative of estuarine conditions than polluted environments as was noted for the subtidal sample taken here.

Pilings

The quantitative occurrence of the marine organisms present on the subtidal collection from polings is listed in Table I. A total of 72 species of invertebrates were collected from pilings at stations 3, 5 and 6. The number of species ranged from 25 to 46 species per collection with the piling at station 6 having the greatest number and station 5 having the fewest. There was a diversity of animal groups represented in the piling community which is generally indicative of good environment. Principle animal groups included polychaetes, crustaceans, molluscans, and tunicates with some hydroids and bryozoans species present.

Boat Floats

The quantitative occurrence of the marine organisms present on the boat floats were listed in Table J. A total of 54 species of marine organisms were collected of which 8 species were algae and 46 species were marine invertebrates. The collection from the boat floats at station 3 and 5 were rich and varied with a total of 36 and 31 species, respectively taken. Only 16 species were collected at station 6 but this low number is because these floats were recently installed and there has been an insufficient length of time for the community to develop. Only small specimens of the bay mussel Mytilus edulis were present on the floats at station 6 in contrast to mature specimens at the other two stations. The organisms on the boat floats at stations 3 and 5 are typical to what has been observed in other marinas in southern California.

FISHES

While the fish fauna was not studied in Channel Islands Marina, a list of expected fish species is given in Table L. Since fish are capable of considerable movement, additional species will occur which are not on this list.

CONCLUSIONS

The intertidal and subtidal marine animal life in the existing Channel Island Marina is rich and varied but the intertidal algae is somewhat limited. A total of 143 species were identified of which 47 were intertidal, 70 were subtidal, 72 were pilings, and 46 were boat floats. The list of intertidal marine life would have been larger if the rock jetties at the entrance to the marina had been surveyed. The subtidal diversity index varied from 0.618 to 0.909 (nematodes, copepods and ectoprocts not included) with the highest figures at the stations located nearest the marina entrance. There are a number of bind-ending tunnels located throughout the Channel Islands Marina which, under a different set of circumstances, would have reduced water quality, but because of the large quantity of marine water withdrawn for cooling waters by the steam generating plant, the water quality is good. If, for any reason, this steam generating plant would cease operation, then water circulation would be reduced and the water quality would deteriorate. With the expansion of Mandalay Bay Marina and future planned expansion, it is important that dissolved oxygen measurements be made periodically of subsurface waters and especially of water within one foot of the bottom. In addition, benthic samples should be taken twice a year, especially witbin selected blind-ending channels for the presence of sulfide producing sediments and deteriorating animal populations.

TABLE G

Station Locations and Types of Biological Sampling, Mandalay Bay, City of Oxnard, July 7, 1977

Station Number	Location	Type of Sample			
		Benthos	Intertidal	Piling	Float
2	Mid-channel off junction of La Brea St. and Harbor Blvd.	x	x		
3	Mid-channel opposite Curlew Way	x	x	x	x
5	End of Napoli Bay	x		x	x
6	End of Gateshead Bay	x		x	x
7	Mid-So. Calif. Edison Channel, opposite Gateshead Bay	x	x		

TABLE H

Number of Species and Specimens of Organisms

Collected from Subtidal Benthos, July 7, 1977

Species	Station Number				
	2	3	5	6	7
Coelenterata					
hydromedusae				+	
Nemertea					
nemertean, unidentified	2	4	1	11	2
Nematoda					
nematode, unidentified	+*	+	+		+
Annelida					
Oligochaeta					
oligochaete, unidentified					179
Polychaeta					
Ameana occidentalis		3			
Axiothella rubrocincta	1				1
Boccardia uncata			7		
Brania sp.	50	16	21	3	50
Capitella capitata			12	66	108
Capitita ambiseta	44	32	21	1	60
Cirratulid, unidentified	1				
Cossura candida		23	35		6
Ctenodrilus serratus			1		
Exogone gemmifera	1				
Exogone lourei	2	4	58	58	228
Goniada littorea		1			
Haploscoloplos elongatus	1	1	14	3	
Harmothoe sp.					1
Lumbrineris erecta				1	
L. tetraura			2	4	
Lumbrineris sp.		1			
Ophryotrocha puerilis		3			10
Pholoe glabra		1			
Platynereis bicanaliculata		1			1
Polycirrus sp.				1	
Polydora limicolor			6		
Prionospio cirrifera	8			11	1

*+=present

TABLE H (continued)

Species	Station Number				
	2	3	5	6	7
Annelida					
Polychaeta (continued					
Prionospio h. newportensis				8	
Pseudopolydora paucibranchiata				97	
Schistomeringus longicornis		1	5		9
Sphaerosyllis californiensis	23	1			
S. pirifera					12
Spio sp.			4		
Tharyx sp.		1			
Typosyllis fasciata					2
Mollusca					
Gastropoda					
Prosobranchiata					
Vitrinella sp.			1		
Opisthobranchiata					
Haminoea sp.				1	
Pelecypoda					
Macoma nasuta	6				
Mytilus sp.			2		
Parvilucina sp.			1		
Pelecypod, unidentified					1
Tellina modesta	1				1
Arthropoda					
Crustacea					
Ostracoda					
Cylindroberis mariae	1				
Euphilomedes carcharodonta		2		26	3
Copepoda					
cyclopoid, unidentified					+
harpacticoid, unidentified		+	+	+	+
Malacostraca					
Mysidacea					
Neomysis sp.				2	
Leptostraca					
Epinebalia sp.				1	

TABLE H (continued)

Species	Station Number				
	2	3	5	6	7
Arthropoda					
Crustacea					
Malacostraca (continued)					
Cumacea					
Cumella sp.	55	1		6	5
Oxyurostylis pacifica	1	4	5	4	5
Isopoda					
Ianiropsis analoga					26
Paracerceis sp.			1	2	26
Tanaidacea					
Anatanais normani			1		
Leptochelia dubia	3			4	212
Amphipoda					
Ampithoe plumulosa					1
Ampithoe sp.					1
Aorides columbiae	15	8			13
Caprella sp.			1		
Corophium acherusicum		4		19	22
Elasmopus rapax					1
Mayerella banksia	1	1		5	6
Podocerus brasiliensis		3			
Decapoda					
decapod larva			1		
Pycnogonida					
pycnogonids, unidentified					1
Ectoprocta					
Crisulipora occidentalis	+				
Cryptosula pallasiana	+				
Echinodermata					
Holothuroidea					
leptosynaptid, unidentified				3	
Molpadia sp.?		1			
Chordata					
Vertebrata					
Osteichthyes					
fish larva					1
Total number of species	21	25	23	24	34
Total number of specimens	216	116	200	337	995

TABLE I

Number of Species and Specimens of Organisms

Collected from Intertidal Beaches, July 7, 1977

Species	Station Number		
	2	3	7
Nematoda			
nematode, unidentified		+*	+
Annelida			
Polychaeta			
Armandia bioculata	1		
Boccardia proboscidea		1	37
B. uncata	2	12	19
Brania sp.	4	262	2
Capitella capitata	2	28	253
capitellid, juvenile	2		
Cirratulus cirratus			3
Ctenodrilus serratus		1	
Exogone gemmifera	1		
Exogone lourei		3	187
Goniada brunnea			1
Goniada littorea	1		
Naineris dendritica			1
nereid, juvenile		1	
Notomastus (C.) tenuis	5		
Ophryotrocha puerilis		8	
Paraonides platybranchia	274		
Platynereis bicanaliculata		2	
Polydora limicolor	1	1	5
Polydora socialis			33
Polyophthalmus pictus		2	
Pseudopolydora paucibranchiata			2
Sphaerosyllis californiensis		1	1
Spirobis sp.		3	
Tharyx sp.			14
Typosyllis fasciata			1
Sipunculoidea			
Dendrostomum pyroides			1

* + = present

TABLE I (continued)

Species	Station Number		
	2	3	7
Crustacea			
Ostracoda			
Euphilomedes carcharodonta			1
Copepoda			
cyclopoid, unidentified		+	
harpacticoid, unidentified		+	+
Malacostraca			
Leptostraca			
Epinebalia sp.		5	
Cumacea			
Cumella sp.		1	
Oxyurostylis pacifica		25	1
Tanaidacea			
Anatanais normani		154	7
Leptochelia dubia		9	7
Amphipoda			
Ampithoe plumulosa			1
Ampithoe sp.		3	1
Aorides columbiae		63	
Corophium acherusicum		303	44
gammaridean, unidentified		1	
Hyale frequens		1	
Podocerus brasiliensis		12	
Decapoda			
Hemigrapsis nudis			1
Ectoprocta			
Bugula neritina		+	
Chordata			
Vertebrata			
Osteichthyes			
Clevelandia ios	1		
fish larva		2	
Total number of species	11	29	25
Total number of specimens	294	904	623

TABLE J

Number of Species and Specimens of Organisms

Collected from Boat Floats, July 7, 1977

Species	Station Number		
	3	5	6
Coelenterata			
Anthozoa			
Anthopleura sp.		1	
Nemertea			
nemertean, unidentified	1	71	
Nematoda			
nematode, unidentified	+	+	+
Annelida			
Polychaeta			
Brania sp.	3	8	
Capitella capitata	1		
Cirratulus cirratus	1		
Ctenodrilus serratus		4	
Eulalia aviculaseta	1		
Eupomatus gracilis	4		
Exogone lourei	4	23	1
Megalomma circumspectum	1		
Naineris dendritica		1	
Nereis grubei	4		
Nereis latescens	4		
Ophryotrocha puerilis		7	
Polydora limicolor	5	1	
Sabella sp.	1		
Schistomeringas longicornis	1	4	
Spirorbis sp.	12	27	5
Typosyllis pulchra		5	
Mollusca			
Amphineura			
Mopalia mucosa	1	1	

TABLE J (continued)

Species	Station Number		
	3	5	6
Mollusca (continued)			
Gastropoda			
Prosobranchiata			
Collisella		3	
Opisthobranchiata			
Doto sp.		2	
Pelecypoda			
Chione sp.		1	
Mytilus edulis		23	1
Arthropoda			
Crustacea			
Copepoda			
harpacticoid, unidentified	+	+	+
Pseudomyicola sp.		15	
Malocostraca			
Isopoda			
Ianiropsis analoga	7	1	
Paracerceis sculpta	2	44	
Tanaidacea			
Anatanais normani	212	172	8
Amphipoda			
Ampithoe plumulosa			1
Caprella angusta	1		2
Caprella gracilor	3		
Caprella irregulans			4
Corophium acherusicum	9	58	
Elasmopus rapax	5		
gammaridae, unidentified		3	
Jassa falcata	3		
Podocerus brasiliensis	1		
Entoprocta			
Barentsia		+	
Ectoprocta			
Bugula californica		+	+
Bugula neritina		+	+
Cryptosula pallasiana	+		

TABLE J (continued)

Species	Station Number		
	3	5	6
Echinodermata			
echinoid, unidentified	1		
Chordata			
Urochordata			
Botryllus sp.	+	+	+
Ciona intestinalis	3		
Chlorophyta			
Bryopsis sp.	+	+	
Enteromorpha sp.			+
Ulva sp.	+	+	+
Phaeophyta			
Dictyota sp.	+		
Ectocarpus sp.			+
Rhodophyta			
Antithamnion sp.	+		+
Gelidium sp.	+	+	
Polysiphonia sp.	+		
Total number of species	36	31	16
Total number of specimens	291	475	22

TABLE K

Number of Species and Specimens of Organisms

Collected from Pilings, July 7,.1977

Species	Station Number		
	3	5	6
Porifera			
Leucosolenia sp.			+*
Coelenterata			
Hydrozoa			
Obelia sp.		+	+
Nemertea			
nemertean, unidentified		5	
Nematoda			
nematode, unidentified	+	+	+
Annelida			
Polychaeta			
Armandia bioculata	2		
Brania sp.	14	13	17
Capitita ambiseta	1		
Cirratulus cirratus	1		
Cirriformia luxuriosa		5	
Crucioera websteri			3
Ctenodrilus serratus	3	15	1
Dodecaceria concharum	9		
Eupomatus gracilis			20
Exogone lourei	9	48	3
Fabricia sp.		1	
Halosydna brevisetosa			1
Hydroides pacificus			2
Lumbrineris erecta		1	
Lumbrineris sp.	1		
Nainneris dendritica		4	
Paleanotus bellis	1		
Polydora limicolor		4	
Pseudopotamilla intermedia			5
Sabella sp.			1
Schistomeringas longicornis		1	
Serpula sp.		1	

* + = present

TABLE K (continued)

Species	Station Number		
	3	5	6
Annelida			
Polychaeta			
Spirorbis sp.		60	45
Thormora johnstoni	1	1	
Typosyllis sp.	1		
Mollusca			
Gastropoda			
Prosobranchiata			
Barleeia sp.	1		
Collisella strigatella			7
Notoacmaea persona			1
Opisthobranchiata			
Dendronotus sp.			1
Doto sp.			4
Pelecypoda			
Chama sp.	+		
Hiatella arctica	3		
Mytilus edulis		63	
Arthropoda			
Crustacea			
Copepoda			
harpacticoid, unidentified	+	+	+
Pseudomyicola sp.		38	
Cirripedia			
Balanus sp.			+
Malacostraca			
Mysidacea			
Neomysis sp.	6		
Isopoda			
Dynamenella sp.			4
Ianiropsis analoga		1	3
Munnidae, unidentified	1		
Paracerceis sculpta			33
Paracerceis sp.		1	
Tanaidacea			
Anatanais normani	1	126	47
Leptochelia dubia	1		

TABLE K (continued)

Species	Station Number		
	3	5	6
Arthropoda			
Crustacea			
Malacostraca (continued)			
Amphipoda			
Amphideutopus oculatus	2		
Amphilodrus neopolitanus	1		5
Ampithoe plumulosa			45
Ampithoe sp.	4		45
aoridae, unidentified			4
Caprella angusta			64
Caprella californica			75
Caprella gracilor	20		121
caprellid, unidentified			3
Corophium acherusicum	52	33	6
Elasmopus rapax			30
Ericthonius brasiliensis			6
Jassa falcata			1
Leucothoe alata	1		3
Maera vigota			1
Podocerus brasiliensis	1		28
Ectoprocta			
Bugula californica		+	+
Bugula neritina			+
Celleporaria brunnea			+
Cryptosula pallasiana		+	+
Chordata			
Urochordata			
Botryllus sp.	+		+
Ciona sp.			+
Styela montereyensis			+
Styela plicata		+	+
Total number of species	28	25	46
Total number of specimens	134	421	635

TABLE L

Systematic List of Marine Organisms Collected

From Mandalay Bay, City of Oxnard, July 7, 1977

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Porifera				
Leucosolenia sp.			x	
Coelenterata				
Hydrozoa				
hydromedusae	x			
Obelia sp.			x	
Anthozoa				
Anthopleura sp.				x
Nemertea				
nemertean, unidentified	x		x	x
Nematoda				
nematode, unidentified	x	x	x	
Annelida				
Oligochaeta				
oligochaete, unidentified	x			
Polychaeta				
Ameana occidentalis	x			
Armandia bioculata		x	x	
Axiothella rubrocincta	x			
Boccardia proboscidea		x		
Boccardia uncata	x	x		
Brania sp.	x	x	x	x
Capitella capitata	x	x		x
capitellid, juvenile		x		
Capitita ambiseta	x		x	
Cirratulid, unidentified	x			
Cirratulus cirratus	x	x	x	x
Cirriformia luxuriosa			x	
Cossura canida	x			
Crucioera websteri			x	

TABLE L (continued)

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Annelida				
Polychaeta				
Ctenodrilus serratus	x	x	x	x
Dodecaceria concharum			x	
Eulalia aviculaseta				x
Eupomatus gracilis			x	x
Exogone gemmifera	x	x		
Exogone lourei	x	x	x	x
Fabricia sp.			x	
Goniada brunnea		x		
Goniada littorea	x	x		
Halosydna brevisetosa			x	
Haploscoloplos elongatus	x			
Harmothoe sp.	x			
Hydroides pacificus			x	
Lumbrineris erecta	x		x	
Lumbrineris tetraura	x			
Lumbrineris sp.	x		x	
Megalomma circumspectum				x
Naineris dendritica		x	x	x
nereid, juvenile		x.		
Nereis grubei				x
Nereis latescens				x
Notomastus (C.) tenuis		x		
Ophryotrocha puerilis	x	x		x
Paleanotus bellis			x	
Paraonides platybranchia		x		
Pholoe glabra	x			
Platynereis bicanaliculata	x	x		
Polycirrus sp.	x			
Polydora limicolor	x	x	x	x
Polydora socialis		x		
Polyophthalmus pictus		x		
Prionospio cirrifera	x			
Prionospio h. newportensis	x			
Pseudopolydora paucibranchiata	x	x		
Pseudopotamilla intermedia			x	
Sabella sp.			x	x
Schistomeringas longicornis	x		x	x
Serpula sp.			x	
Sphaerosyllis californiensis	x	x		
S. pirifera	x			

TABLE I (continued)

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Annelida				
Polychaeta				
Spio sp.	x			
Spirorbis sp.		x	x	x
Tharyx sp.	x	x		
Thormora johnstoni			x	
Typosyllis fasciata	x	x		
Typosyllis pulchra				x
Typosyllis sp.			x	
Sipunculoidea				
Dendrostomum pyroides		x		
Mollusca				
Amphineura				
Mopalia mucosa				x
Gastropoda				
Prosobranchiata				
Barleeia sp.			x	
Collisella strigatella			x	
Collisella sp.				x
Notoacmaea persona			x	
Vitrinella sp.	x			
Opisthobranchiata				
Dendronotus sp.			x	
Doto sp.			x	x
Haminoea sp.	x			
Pelecypoda				
Chama sp.			x	
Chione sp.				x
Hiatella arctica			x	
Macoma nasuta	x			
Mytilus edulis			x	x
Mytilus sp.	x			
Parvilucina sp.	x			
pelecypod, juvenile	x			
Tellina modesta	x			

TABLE L (continued)

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Arthropoda				
Crustacea				
Ostracoda				
Cylindroleberis mariae	x			
Euphilomedes carcharodonta	x	x		
Copepoda				
cyclopoid, unidentified	x	x		
harpacticoid, unidentified	x	x	x	
Pseudomyicola sp.			x	x
Cirripedia				
Balanus sp.			x	
Malacostraca				
Mysidacea				
Neomysis sp.	x		x	
Leptostraca				
Epinebalia sp.	x	x		
Cumacea				
Cumella sp.	x	x		
Oxyurostylis pacifica	x	x		
Isopoda				
Dynamenella sp.			x	
Ianiropsis analoga	x		x	x
Munnidae, unidentified			x	
Paracerceis sculpta			x	x
Paracerceis sp.	x		x	
Tanaidacea				
Anatanais normani	x	x	x	x
Leptochelia dubia	x	x	x	
Amphipoda				
Amphilodrus neopolitanus			x	
Ampithoe plumulosa	x	x	x	x
Ampithoe sp.	x	x	x	
aoridae, unidentified			x	
Aorides columbiae	x	x		
Caprella angusta			x	x
Caprella californica			x	
Caprella gracilor			x	x

TABLE L (continued)

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Arthropoda				
Crustacea				
Malacostraca				
Amphipoda (continued)				
Caprella irregulans				x
Caprella sp.	x			
caprellid, unidentified			x	
Corophium acherusicum	x	x	x	x
Elasmopus rapax	x		x	x
Erichthonius brasiliensis			x	
gammaridean, unidentified		x		x
Hyale frequens		x		
Jassa falcata			x	x
Leucothoe alata			x	
Maera vigota			x	
Mayerella banksia	x			
Podocerus brasiliensis	x	x	x	x
Decopoda				
decopod larva	x			
Hemigrapsis nudis		x		
Pycnogonida				
pycnogonids, unidentified	x			
Entoprocta				
Barentsia sp.				x
Ectoprocta				
Bugula californica			x	x
Bugula neritina		x	x	x
Celleporaria brunnea			x	
Crisulipora occidentalis	x			
Cryptosula pallasiana	x		x	x
Echinodermata				
Holothuroidea				
leptosynaptid, unidentified	x			
Molpadia sp.?	x			

TABLE L (continued)

Species	Distribution			
	Benthos	Intertidal	Piling	Float
Chordata				
Urochordata				
Botryllus sp.			x	x
Ciona intestinalis				x
Ciona sp.			x	
Styela montereyensis			x	
Styela plicata			x	
Vertebrata				
Clevelandia ios		x		
fish larva	x	x		
Chlorophyta				
Bryopsis sp.				x
Enteromorpha sp.				x
Ulva sp.				x
Phaeophyta				
Dictyota sp.				x
Ectocarpus sp.				x
Rhodophyta				
Antithamnion sp.				x
Gelidium sp.				x
Polysiphonia sp.				x

TABLE M

List of Species of Fish Expected to Be

Present in Channel Island Marina,

City of Oxnard*

Chordata

Vertebrata

Chondrichthys

Rhinobatos productus
Urobatus halleri

Osteichthyes

Anchoa compressa
Anisotremus davidsoni
Atherinops affinis
Clevelandia ios
Cymatogaster aggregata
Embiotoca jacksoni
Gemyonemus lineatus
Gibbonsia elegans
Gillichthys mirabilis
Heterostichus rostratus
Leptocottus armatus
Mugil cephalus
Rhacochilus vacca
Syngnathus griseolineatus

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*This list is based on distribution information included in Marine Life of Southern California by Donald J. Reish, 1972.

TABLE N

TRIP GENERATION FACTORS

BUILDING TYPE	FACILITIES STUDIED	TRIP UNITS	A.D.T. / TRIP UNIT	RANGE of A.D.T.'s	A.M. PEAK			P.M. PEAK		
					A.M. TRIPS/UNIT	IN %	OUT %	P.M. TRIPS/UNIT	IN %	OUT %
SINGLE FAMILY RESIDENCES	152	D.U.	8.76	6.81-12.2	0.88	30	70	1.02	60	40
MULTIPLE FAMILY RESIDENCES	36	D.U.	6.64	3.0-8.88	0.59	40	60	0.73	50	50
MOBILE HOME PARKS	11	D.U.	6.77	3.8-10.4						
MOTELS	11	D.U.	9.56	4.7-13.4	0.85	60	40	0.76	50	50
RESTAURANTS - DRIVE IN	3	1000 □'	2210	1160-3260				135	50	50
RESTAURANTS - SIT DOWN	4	1000 □'			71.0	50	50	24.9	50	50
SERVICE STATIONS	29	EACH			22	50	50	23	50	50
CAR WASH	2	EACH						66	50	50
BOOK STORES	2	1000 □'	67.4	31.6-103.2						
LIBRARY	4	1000 □'	55.8	28.7-75.4				8.2		
BANKS	23	1000 □'	61.45	5.8-188.4						
BANK DRIVE IN	3	EACH						373.3	50	50
MEDICAL OFFICES	8	DOCTOR	63.2	31-128.36						
HOSPITALS	20	BED	8.78	3-19	0.80	60	30	0.92		
GENERAL OFFICES	36	1000 □'	9.33	1.6-43.6	1.62	70	30	5.30	30	70
GROCERY STORES	7	1000 □'	30.5	17.6-45.4	1.00	65	35	13.0	50	50
DRUG STORES	5	1000 □'	43.9	19.0-99.8						
CLOTHING STORES	13	1000 □'	31.3	10.4-55.0						
HARDWARE STORES	2	1000 □'	29.5	21.6-37.4						
DEPARTMENT STORES	18	1000 □'	25.5	6.2-56.2						
VARIETY STORES	5	1000 □'	14.4	7.8-18.4						
FURNITURE STORES	8	1000 □'	5.6	0.6-13.4						
NEIGHBORHOOD SHOP CTRS.	9	1000 □'	143.5	84-216	1.85	55	45	15.41	50	50
COMMUNITY SHOP CTRS.	17	1000 □'	64.78	40-93.42				6.61	50	50
REGIONAL SHOP CTRS.	19	1000 □'	40.88	17.28-81.82	0.63	70	30	3.28	40	60
INDUSTRIAL PARKS	6	1000 □'	10.78	3.7-25.24				1.15		
HIGH SCHOOLS	5	STUDENT	1.42	1.1-2.1	0.34	70	30			
COLLEGES	20	STUDENT	2.06	0.9-3.9	0.19	90	10	0.17	30	70

TRAFFIC DIRECTIONAL DISTRIBUTION

Northwest

Ventura, Santa Barbara	(0.5 x 12.6) = 6.3	
		6.3

Northeast

Ventura, Santa Barbara	(0.5 x 12.6) = 6.3	
Santa Paula etc.	= 0.8	
Oxnard	(0.33 x 61.9)= 20.6	
		27.7

East

Oxnard	(0.33 x 61.9)= 20.6	
Thousand Oaks, Camarillo, L.A. etc	= 11.2	
		31.8

South

Oxnard	(0.33 x 61.9)= 20.6	
Port Hueneme	= 1.36	
		34.2

TRAFFIC DISTRIBUTION

Primary Place of Employment of the Principal Wage Earner If He/She Works In Ventura County

		Northwest	Northeast	East	South
Ventura	1,979	990	990	-	-
Oxnard	11,558	-	3,853	3,853	3,852
Camarillo	965	-	-	965	-
Thousand Oaks	339	-	-	339	-
Simi/Moorpark	118	-	-	118	-
Port Hueneme	2,523	-	-	-	2,523
Ojai	52	26	26	-	-
Santa Paula	93	-	93	-	-
Fillmore/Piru	49	-	49	-	-
Subtotal	17,676	1,016	5,011	5,275	6,375

Primary Place of Employment of the Principal Wage Earner If He/She Works Outside Ventura County

Canoga Park/Woodland Hills	56	-	-	56	-
Chatsworth/San Fernando	83	-	-	83	-
Sherman Oaks/Van Nuys	78	-	-	78	-
Burbank/Tujunga	28	-	-	28	-
West Los Angeles	180	-	-	180	-
Glendale	49	-	-	49	-
Hollywood/Central L.A.	96	-	-	96	-
Long Beach	96	-	-	96	-
Santa Barbara	327	164	163	-	0
Subtotal	993	164	163	666	0
TOTAL	18,669	1,180	5,174	5,941	6,375
Percent		6.3	27.7	31.8	34.2

AIR POLLUTION EMISSION FACTORS

Emissions during construction arise from two sources: exhaust emissions and airborne dust. Exhaust emission factors are given in Table

TABLE Q

EMISSION FACTORS FOR CONSTRUCTION - LBS./1,000 GALS*

HEAVY DUTY VEHICLES

POLLUTANT	VEHICLE TYPE	
	GASOLINE	DIESEL
Hydrocarbons	76	37
Nitrogen Oxides	52	370
Particulate Matter	16	13
Sulfur Dioxide	5	27

Notes: * These emission factors were obtained by multiplying conventional emission factors in gm/mi. by estimates for miles per gallon and converting to pounds per 1,000 gallons

Source: U.S. EPA, Compilation of Air Pollution Emission Factors, Publication AP-42., 1976.

Airborne dust emissions were calculated using an emission factor of 1.2 tons per acre per month of activity with a 50 percent reduction that can be ascribed to either dust control watering or the presence of some moisture in these earth materials. No emissions were assumed to result from excavation by reason of the high moisture content.

OXNARD SCHOOL DISTRICT

831 SOUTH "B" STREET • OXNARD, CALIFORNIA 93030 • 805/487-3918

August 18, 1977

Ms. Linda De Long
Atlantis Scientific
9015 Wilshire Boulevard
Beverly Hills, CA 90211

Dear Ms. De Long:

In response to your inquiry concerning impact of proposed development Tract 2026, we are providing the following information.

1. The proposed tract is in the attendance area of the Juanita School for grades kindergarten through three and Curren School for grades kindergarten and four through six. The junior high school serving the area is Fremont School.

2. Transportation is provided.

3. Juanita - 663 current enrollment
660 maximum capacity

Curren - 667 current enrollment
750 maximum capacity

Fremont - 1088 current enrollment
1110 maximum capacity

4. Yes, children will need to be involved in our staggered schedule.

5. Fees generated by the City Resolution 7027 would partially offset the impact of the increased enrollment.

6. The main problem facing the school district would be providing adequate facilities to educate the students generated from this housing development. The question remains as to whether there would be adequate funds generated by the city ordinance to provide adequate temporary facilities. A second part of the problem is that any temporary facilities made available would have to be located on a site (Lemonwood) which is some distance away from your proposed development. However, this would be a matter of rescheduling students and we do not anticipate it would affect the school attendance for this development.

Sincerely yours

Louis D. Mathews, Ed. D.
Assistant Superintendent
Business and Fiscal Services

CITY OF OXNARD
CALIFORNIA

DEPARTMENT OF FIRE
251 SOUTH C STREET
PHONE 487-6314

3 November 1977

Atlantis Scientific
9015 Wilshire Boulevard
Beverly Hills, California 90211

Dear Ms. DeLong,

In response to your questions of 27 October 1977 regarding the proposed Phase IV development of the Mandalay Bay project, we offer the following:

1. The current staffing at Fire Station #3 (150 Hill Street) is four men on duty at all times and is adequate for the present and future development.
2. The apparatus housed at Fire Station #3 is a 1250 GPM fire pumper and is adequate for the present and future development.
3. Response time from Fire Station #3 to the proposed development would be approximately five to seven minutes.
4. The only problems anticipated at this time would be adequate water mains, fire hydrants, accessibility, and room to manuever fire apparatus in the new development.

Fire Station #6 (Peninsula Road) is scheduled to be operational in June 1978 and will be manned by a three-man crew.

Response time from Fire Station #6 to the proposed development is anticipated to be from two to three minutes.

Our initial response to residential structure fires in the City of Oxnard includes two fire pumpers, one squad, ten Fire Fighters, and one Chief Officer.

If we may be of any further assistance, please do not hesitate to contact us.

Very truly yours,

H. A. Gustafson, Fire Chief

by H. Conley
H. Conley, Assistant Chief

ldc