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ORMOND BEACH

WETLANDS PUBLIC ACCESS STUDY

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Prepared for the

CITY of OXNARD

Takata/Associates, Inc.
with
WESTEC Services, Inc.

April 1982

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WETLANDS PUBLIC ACCESS STUDY

Prepared for:

THE CITY OF OXNARD

Prepared by:

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Pasadena, California 91105

with

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April 1982

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EXECUTIVE SUMMARY

The Ormond Beach environment has been impacted by past development. Dumping and on-going trespass of off-road-vehicles (ORV's) continue to degrade the sensitive wetlands and dune areas. Recent closing of other areas in the County to ORV activities has increased ORV traffic in Ormond Beach thereby accelerating the damage to the wetlands and dunes.

This study identifies a two phase priority plan to implement strategies of policy and structural design solutions which would prohibit unauthorized access to the wetlands and dunes especially to off-road-vehicles. Controlled public access for passive recreation and educational and interpretive purposes would be encouraged.

Phase 1, short-term recommendations include:

- Immediately secure the LNG wetland dunes areas with barriers and maintain the Arnold Road access until Phase 2 decisions are made;
- Begin acquisition proceedings and funding for the LNG wetlands site;
- Increase police patrol in Ormond Beach and establish a "citizens' monitor" program (groups to report trespass violations).
- Develop a public relations program regarding the future of Ormond Beach; involve the public in the construction of the protection barriers.

City costs for Phase 1 is estimated to be about $3,100 and the potential grants, subventions and private funding range from $16,000 to $19,750.

Phase 2, long-term, recommendation include:

- Study the long-term feasibility of a phased ORV closure at Ormond Beach by:
  - authorizing a joint City and County study to identify an off-site area for ORV's and
  - developing the selected off-site ORV facility
- Accept title to the LNG wetland site
- Secure the Arnold Road access, close Ormond Beach to ORV uses; maintain public access for pedestrians and bicycles.
- Determine feasible options for wetland restoration and interpretive/educational programs and facilities.

Phase 2 funding costs are estimated to be about $62,000. The costs and responsibility for the development of an off-site ORV facility has not been determined. However, the State Parks and Recreation "Green Sticker" fund has monies set aside for the development of ORV facilities.

Total Phase 1 and 2 City costs estimates are $3,110; and potential grants/subventions and private fundings estimates range from $78,000 to $81,750.

The priority plan strategies and structural design solutions are envisioned to protect the sensitive environments and recreational opportunities of Ormond Beach, as well as, provide a long range resolution for the ORV recreation problem and wetlands restoration. The techniques, designs, process and policies found in this document are envisioned to serve as a model for applications in other coastal zone environments.

INTRODUCTION

OVERVIEW

This project, funded by a Coastal Commission Grant, is one aspect of a larger wetlands restoration concept. It is an attempt to implement the policies of the City of Oxnard's Local Coastal Plan with reference to the protection of the sensitive wetland and dune habitats of Ormond Beach. The Ormond Beach environment has been impacted by past development; on-going trespass of off-road vehicles (ORV) and dumping that continues to degrade the sensitive wetland and dune areas.

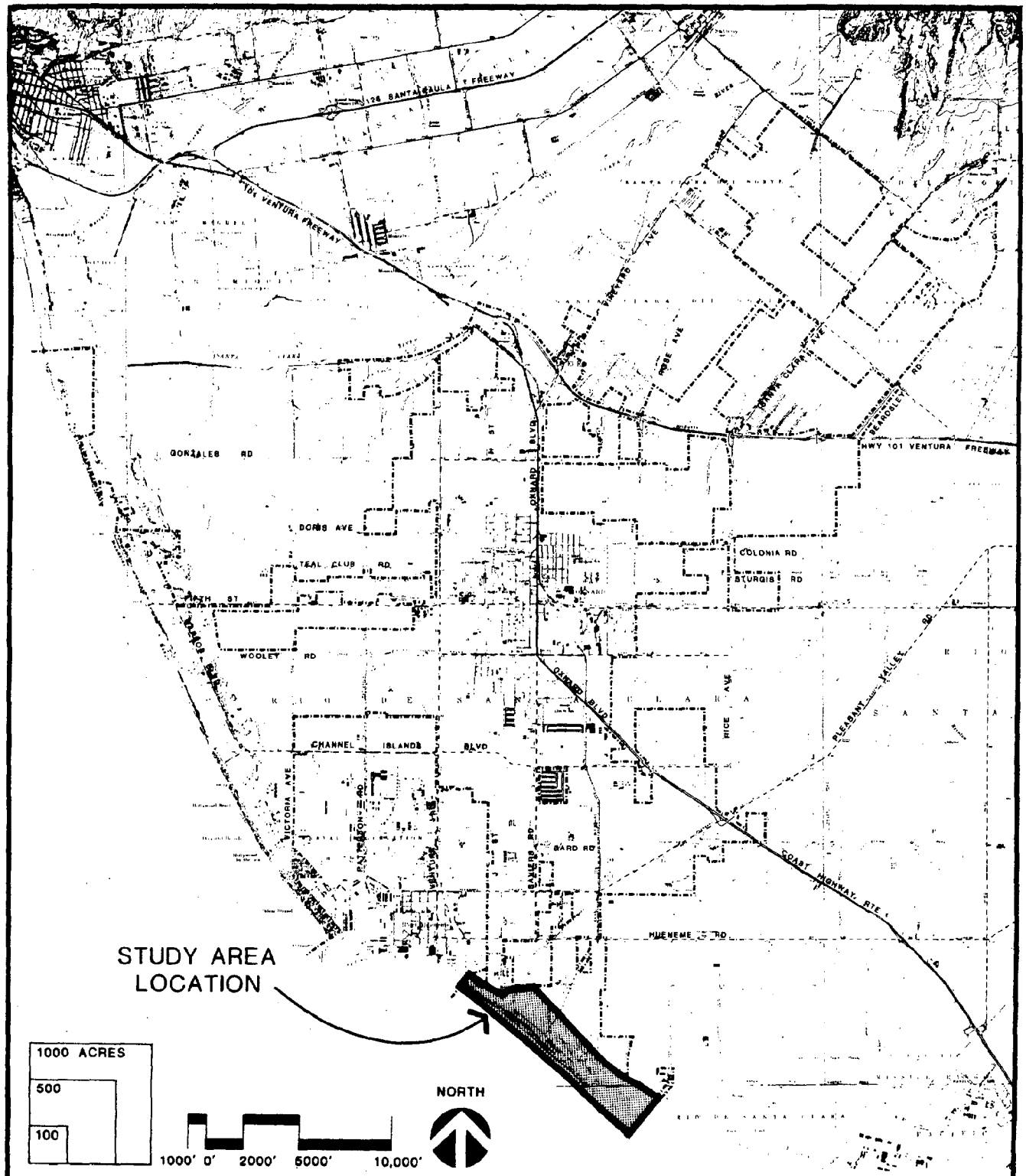
STUDY AREA LOCATION

The Ormand Beach study area (see map, next page) is approximately five hundred thirty acres located in the southeastern section of the City of Oxnard.

PURPOSE

The purpose of this study is to develop a process and strategies which would provide for the implementation of policies and development of structural solutions which would protect the wetlands and dunes by prohibiting unauthorized access to ORV's, while at the same time permitting controlled public access and encouraging an educational passive recreational enjoyment of this sensitive resource area.

Key to the development of study recommendations were a field trip and two public workshops involving ORV users, environmentalists, educa-



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WETLANDS PUBLIC ACCESS STUDY AREA

tors, students, landowners and interested citizens. The field trip and workshops provided a means to:

- Inform the public of the sensitive resources of Ormond Beach;
- Identify issues and concerns;
- Resolve differences and problems of the various interest groups and develop alternative plans and strategies; and
- Evaluate the alternatives and recommend a preferred plan and strategy for the future of Ormond Beach.

The purpose of this report is to summarize the findings of the site inventory and analysis; describe the design alternatives and evaluation; and recommend preferred plan strategies and design solutions. The report is organized in five sections and Appendix.

Section 1:	Existing Factors: environmental and man-made
Section 2:	User Patterns
Section 3:	Opportunities and Constraints
Section 4:	Resource Protection Alternatives
Section 5:	Priority Plan Recommendations and Strategies
Appendix:	Design and Structural Alternatives

SECTION 1

EXISTING FACTORS: ENVIRONMENTAL & MAN-MADE

ENVIRONMENTAL FACTORS

Introduction

This section provides a brief overview of the environmental characteristics of the Ormond Beach study area with emphasis upon biological resources. The purpose of this section is to provide a description of pertinent environmental factors based on brief field inspection and literature review.

Physical Environment

The Ormond Beach study area consists of freshwater and/or saltwater marshes, mudflats, stabilized sand dunes, sandy beaches and areas filled for existing or proposed industrial applications. Dames and Moore (1981) have stated that soils within the coastal marshlands generally consist of a dark brown or grayish brown clay loam or silty clay loam. The substrate is predominantly undrained hydric soil which is saturated or covered with water for at least a portion of the year. The remainder of natural soils in the study area consists of dune sand and sandy beach. Stabilized sand dunes have historically formed the upper portions of the sandy beach area. The stabilized dunes generally run no more than five feet high and are naturally well vegetated. Off-road vehicle activity combined with wind erosion has substantially degraded the quality and existence of dunes along much of the beach. Several upland portions of the

study area have been filled with various types of fill material.

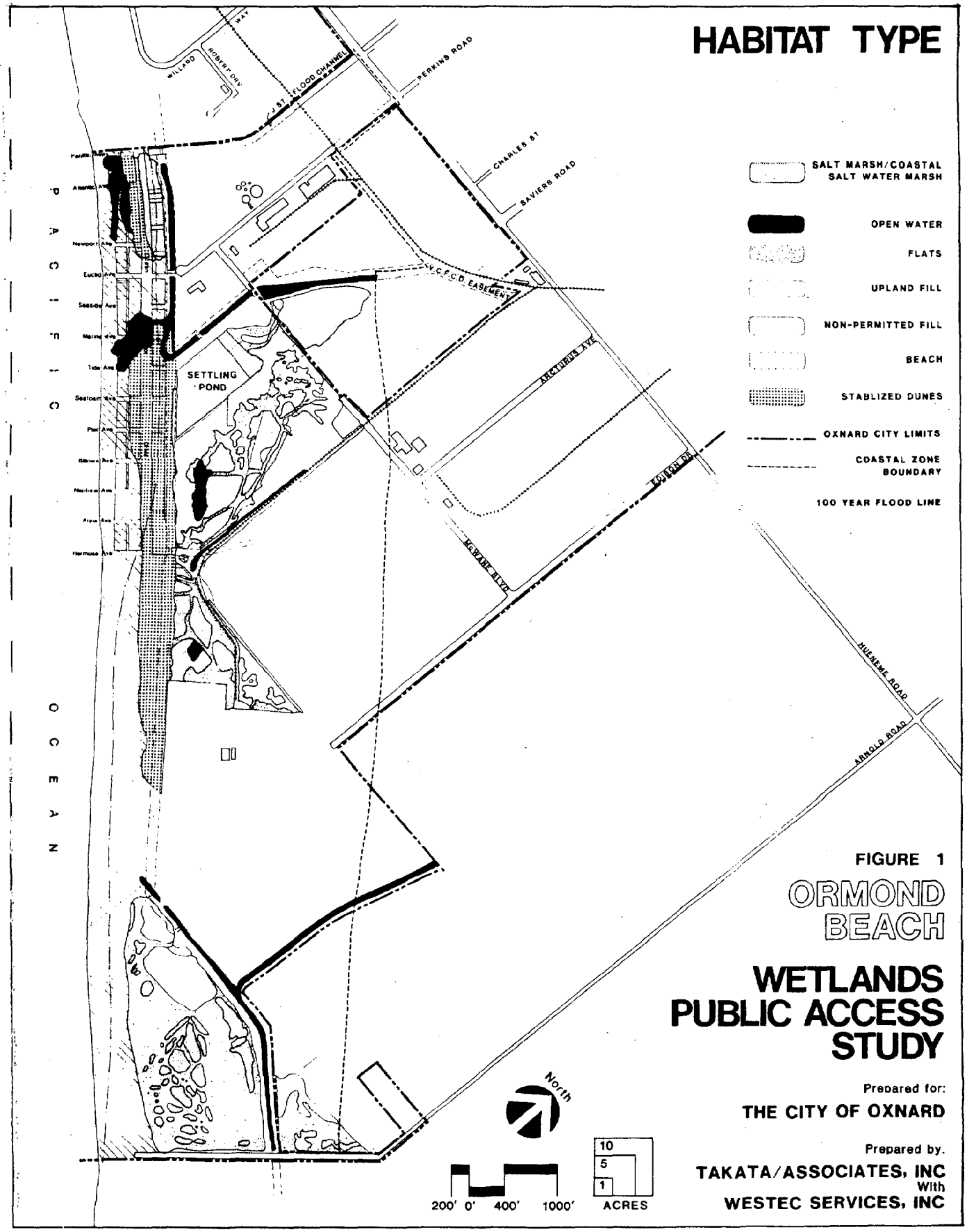
The study area is bounded on the north by the J Street Flood Control Channel. The Oxnard Channel crosses the beach area at the northern end of the former LNG site. In addition, several drainage ditches cross the study area as shown in Figures 1& 2. Marshes on-site are not open to direct tidal movement, apparently obtaining most water from storm runoff and perhaps irrigation tail water. Subsurface tidal inflow is also a possibility.

Biological Environment

Habitat Types

Vogl (1980) conducted a field survey of the Ormond Beach wetlands for the California Coastal Commission (South Central Region). Figure 1 provides a map of habitat types delineated by Vogl. Dune and sandy beach habitats were added by the use of aerial photographs. Habitat types within the study area consist of salt marsh and brackish water marsh, open water, mudflats, upland habitat (primarily fill areas), stabilized dunes and sandy beach.

Salt marsh vegetation is classified by Vogl (1980) as salt pan (water ponded over salt flats), mature pickleweed (Salicornia virginica) marsh, upper salt grass (Distichlis sp) salt marsh and upland habitat containing primarily weedy species. Ecotonal areas exist between these communities. In addition to those habitats identified by Vogl (1980), a 200-400 foot band of stabilized sand dunes (coastal strand vegetation) exists seaward from the wetlands where off-road vehicles traffic has not been intense (Figure 5). A sandy beach habitat


HABITAT TYPE
SALT MARSH/COASTAL SALT WATER MARSH
OPEN WATER
FLATS
UPLAND FILL
NON-PERMITTED FILL
BEACH
STABLIZED DUNES
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
WILLARD
ROBERT DRV
J ST. FLOOD CHANNEL
V.C.F.C.D. EASEMENT
SETTLING POND
ARCTURUS AVE
EDISON DR
McWANE BLVD
HUENEME ROAD
ARNOLD ROAD
PACIFIC OCEAN
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 1
ORMOND BEACH
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exists seaward from the dunes (Figure 1).

Wildlife Resources

The Ormond Beach study area provides excellent wildlife habitats for a variety of species utilizing salt marsh, mudflats open water and dune areas. Avian use of the study area is by far the most striking aspect of the study area. Habitat for shorebirds, waterfowl, upland species and raptors exists on the area. The extensive mudflat areas provide valuable habitat for many shorebirds whereas the open water areas provide significant habitat for over-wintering and migratory waterfowl. Stabilized sand dune habitat supports a nesting population of the California Least Tern, a State and Federal endangered species. The Salicornia virginica marsh supports nesting populations of the State listed endangered Beldings Savannah Sparrow (California Department of Fish and Game, 1980). The area also supports the more urbanly adapted species of reptiles, amphibians and mammals.

Sensitive Biological Resources

Generally, the undeveloped portion of the entire study area should be considered of high biological sensitivity due to several factors:

(1) The area supports many sensitive wildlife species including State and Federally listed endangered species.

(2) The area contains a diverse complement of habitat types which provide for a rather unique degree

of species diversity in a relatively small area.

(3) Coastal wetlands are diminishing within Southern California.

(4) Although wetlands and dunes have been disturbed by ORV activities, there is still an opportunity to provide nearly full restoration.

Current Impacts to Study Area

The area is heavily used by two-, three- and four-wheeled vehicles (see Section 2). The southern end of the study area (south of the Edison plant) has been especially heavily impacted, with many of the stabilized dunes all but obliterated. The wetlands areas have also been heavily disturbed by ORV activity.

MAN-MADE ENVIRONMENT

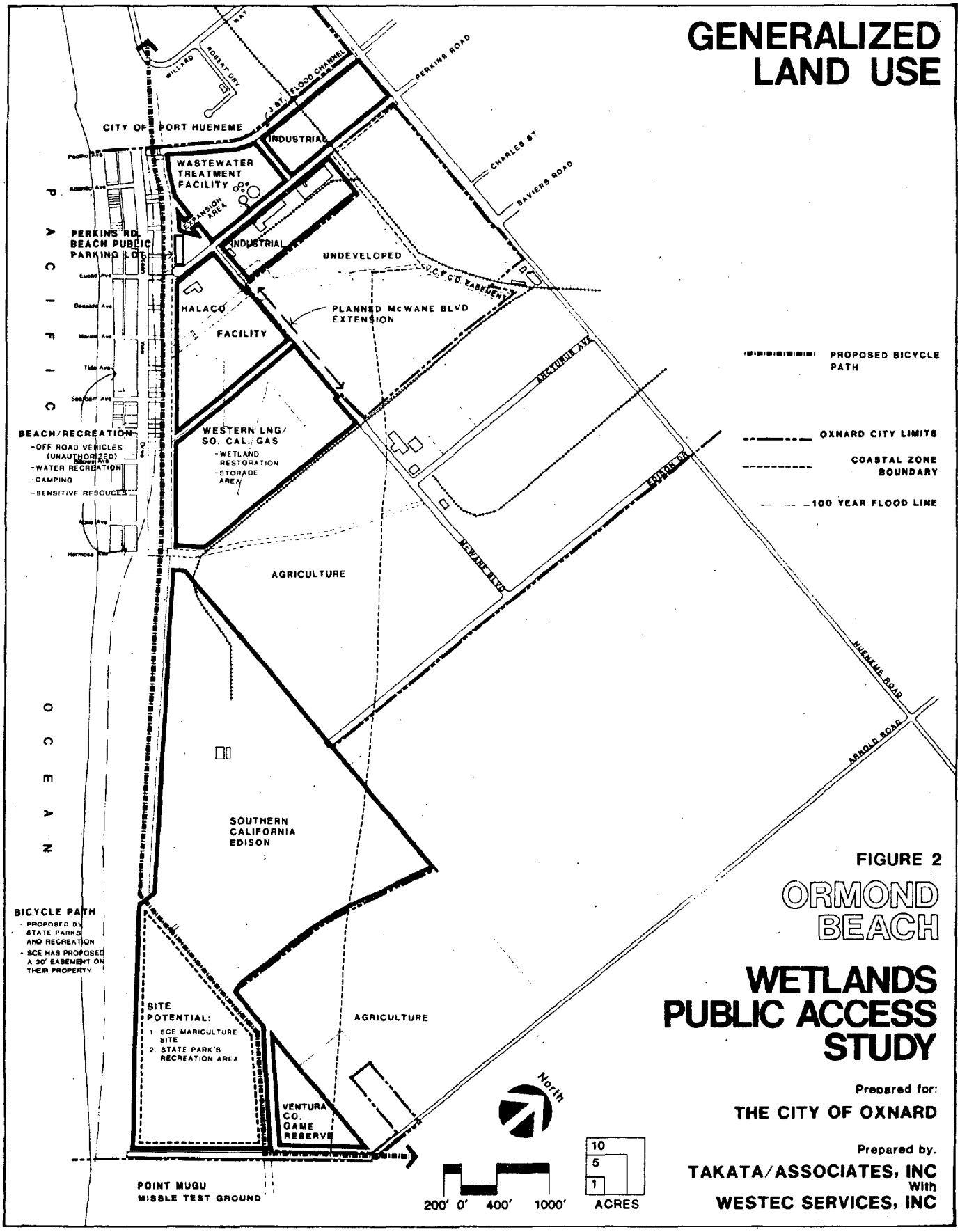
Introduction

This section discusses the man-made environment of the Ormond Beach Study area; they include the following key elements:

- Existing and proposed landuse;
- Circulation and parking; and
- Security/Safety.

Existing and Proposed Landuse

As figure 2 depicts, the existing landuses within and surrounding the


GENERALIZED LAND USE
CITY OF PORT HUENEME
INDUSTRIAL
WASTEWATER TREATMENT FACILITY
EXPANSION AREA
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
WILLARD
ROBERT DAY
J ST. FLOOD CHANNEL
PERKINS RD. BEACH PUBLIC PARKING LOT
INDUSTRIAL
UNDEVELOPED
V.C.F.C.D. EASEMENT
HALACO FACILITY
PLANNED McWANE BLVD EXTENSION
ARCTURUS AVE
PACIFIC OCEAN
BEACH/RECREATION
-OFF ROAD VEHICLES (UNAUTHORIZED)
-WATER RECREATION
-CAMPING
-SENSITIVE RESOUCES
WESTERN LNG/ SO. CAL. GAS
-WETLAND RESTORATION
-STORAGE AREA
PROPOSED BICYCLE PATH
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
AGRICULTURE
McWANE BLVD
HUENEME ROAD
ARNOLD ROAD
SOUTHERN CALIFORNIA EDISON
BICYCLE PATH
- PROPOSED BY STATE PARKS AND RECREATION
- SCE HAS PROPOSED A 30' EASEMENT ON THEIR PROPERTY
SITE POTENTIAL:
1. SCE MARICULTURE SITE
2. STATE PARK'S RECREATION AREA
AGRICULTURE
VENTURA CO. GAME RESERVE
POINT MUGU MISSLE TEST GROUND
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 2
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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Ormond Beach study area include industry, agriculture, Southern California Edison energy generation facility, sewer treatment plant, recreation and the Point Mugu Navy Missile Test Grounds.

These existing landuses basically approximate the patterns outlined by the City of Oxnard's 1990 landuse element of the General Plan and the City's recently completed Coastal landuse plan (Figure 3). The City's Coastal Landuse Plan further designated specific areas for resource protection and priority for industrial uses which are coastal dependent.

The key landowners in the study area include the City of Oxnard, wastewater treatment plant, managed by the Ventura Regional County Sanitation District, HALACO metal processing plant, Western LNG Terminal Associates, the Southern California Edison Generating plant and an undeveloped subdivision composed of various ownerships including state, city and private holdings.

Wastewater Treatment Plant

Future plans for the wastewater treatment plant include expansion of the facility south to the adjacent five acre parcel to accommodate four secondary clarifying tanks. Security fencing would surround this area and intersect westerly with the J Street Flood control channel fence, thus precluding any potential ORV access from the north.

Western LNG Site

Proposals for the former LNG site include the restoration of wetlands on the site. The owner has been coordinating with California Fish

COASTAL PLAN LAND USE MAP

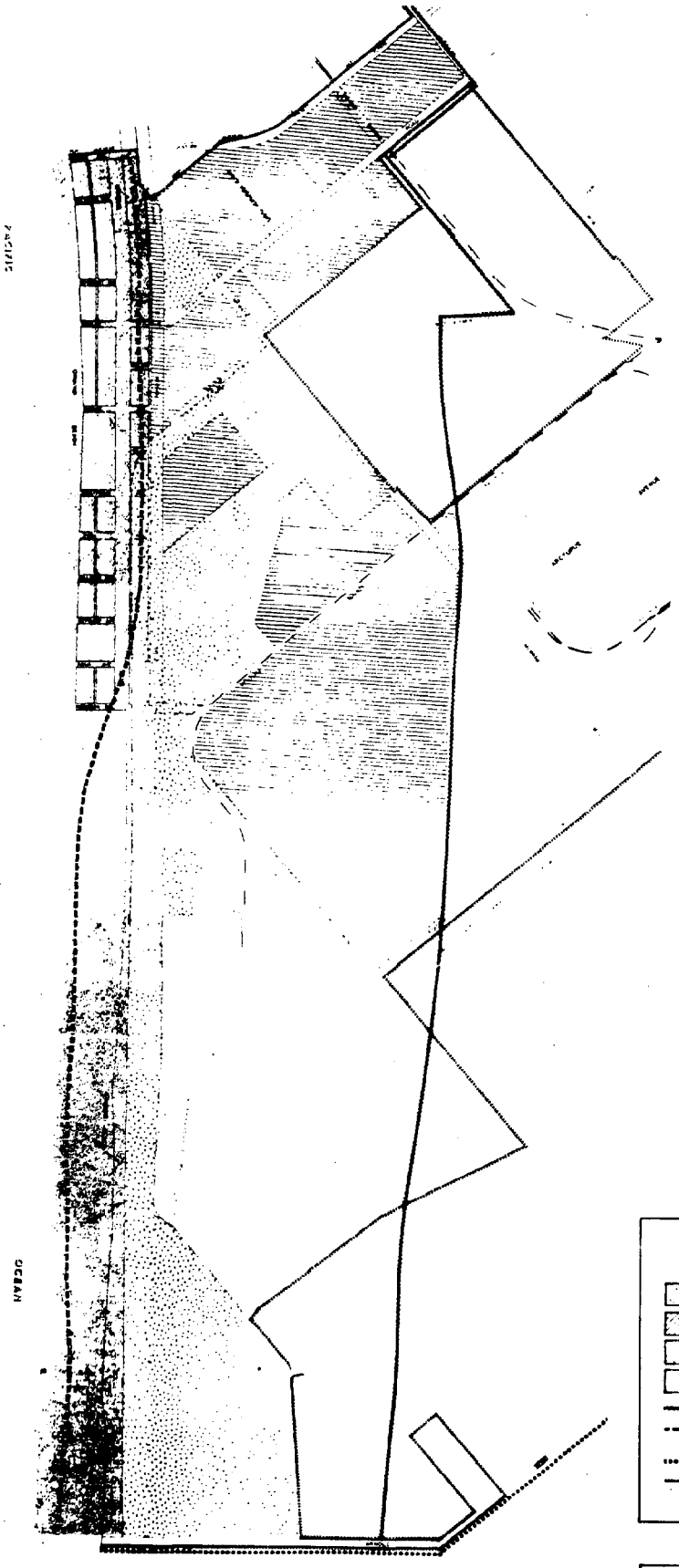


FIGURE 3

LEGEND

- RECREATION AREA
- INDUSTRY : PRIORITY TO COASTAL DEPENDENT
- RESOURCE PROTECTION AREA
- ENERGY FACILITIES
- COASTAL ZONE BOUNDARY
- 100 YEAR FLOOD LINE (NATIONAL FLOOD INSURANCE)
- URBAN RURAL BOUNDARY
- OXNARD CITY LIMITS

ORMOND BEACH

and Game and negotiating with the State Coastal Commission in regards to the protection of these wetlands. The northeastern portion of this site has been proposed for an equipment storage yard.

Southern California Edison Site (SCE)

The SCE site is primarily devoted to the generation of electricity and those activities are secured by fencing and security personnel. Undeveloped portions of the SCE property include the wetland area near Arnold Road and properties west and south of the generating plant. Various short and long-range uses have been indicated by SCE and the State Parks & Recreation Department; pertinent proposals include:

1. Mariculture facility: this proposes to utilize waste heat from the generating plant for a commercial lobster facility. The facility would be located on the existing 55 acre wetland area near Arnold Road.

2. Other short and long range SCE proposals include: combined cycle generating units; a waste water treatment facility; coal gasification plant and possibly coal-fired generating units.

3. The State Parks & Recreation Department's General Plan has identified as a long range proposal the purchase of about 164 acres of SCE property for the restoration/preservation of the wetlands, parking facilities and

day use facilities. The proposal is identified for non-intensive uses. The State Parks Dept. indicated that the proposal is long range and has not been funded.

4. The State Parks & Recreation Department has a proposed bicycle path on the north side of the beach area from Perkins Road to Arnold Road. The bicycle path follows the southern perimeter of the SCE property and follows the south side of canal to Arnold Road (see Figure 2). SCE has agreed to a 30 foot easement for this proposal. However, State Parks and Recreation Dept. has not acted on this proposal. State Parks and Recreation Department did indicate that the priority bicycle projects for implementation would be in the north part of the county.

Circulation and Parking

As Figure 2 depicts, the Ormond Beach Study area is served by Hueneme Road, a major thoroughfare, and the minor thoroughfares: Perkins Road, Arcturus Avenue, Edison Drive, Arnold Road and McWane Boulevard. The Ventura County Railroad provides rail access to the industrial uses and the SCE generating site.

The City's Circulation Element indicates the following future proposals:

- McWane Boulevard to be completed and upgraded

to a major thoroughfare as development dictates.

- Extension of Rose Avenue to McWane Boulevard as development dictates.

Public parking for the beach area is currently provided for at the terminus of Perkins Road. Preliminary site investigations indicate the parking lot has been used as a staging area for ORV's.

Security and Safety

Fire/Emergency Vehicles: Access for fire and emergency vehicles would be required to service the south side of the SCE generating facility via Arnold Road; and the beach area primarily for emergency vehicles and for occasional boat groundings and fires.

Police Vehicles: Interview with the Oxnard Police Department indicate patrol vehicles would require access to the beach area to police unauthorized camping and boisterous parties. Locked security gates with keys for the patrol vehicles would be acceptable to the Police Department.

SECTION 2

USER PATTERNS

INTRODUCTION

In order to develop a workable plan and designs to manage off-road vehicle use at Ormond Beach it is necessary to determine the type of ORV activity as well as ORV access points to the area. Direct analysis of this aspect of the study was somewhat constrained due to the short time span of the study. In addition, the study was conducted during wintertime when ORV use is low. An indirect method of analysis was developed to answer the required user pattern questions. Major components of this methodology included:

1. Detailed color aerial photographs (1" = 400') that were taken on July 8, 1981, were carefully examined to define ORV tracks, trails and areas of vegetation loss.

2. Conducted interviews with police officials, property owners and other persons with special knowledge of the area.

3. Conducted walkover survey of entire Ormond Beach area on Sunday, February 21.

4. Conducted partial surveys on four other weekdays.

Based on the above studies, actual and potential ORV access points were identified and the study area was divided into areas of intense, heavy

and moderate ORV use.

CURRENT RECREATION USE

Because the Ormond Beach area is currently open to ORV use the area appears to afford recreational opportunities not currently available at most area beaches. Beach goers can drive four-wheel drive vehicles onto most portions of the beach and use these vehicles as a central base for two- or three-wheeled ORV use, surfing fishing or sunbathing. Overnight camping is also conducted, with the largest concentration of campers apparently in the southern half of the study area near Arnold Road.

It should be noted that no sanitary facilities exist within the study area. In addition, little in the way of vehicle regulation and control exists, with the exception of occasional patrols by the Oxnard Police Department. Because of the frequency of ORV activity during peak use periods, other recreational uses would probably be curtailed because of hazards to pedestrian safety.

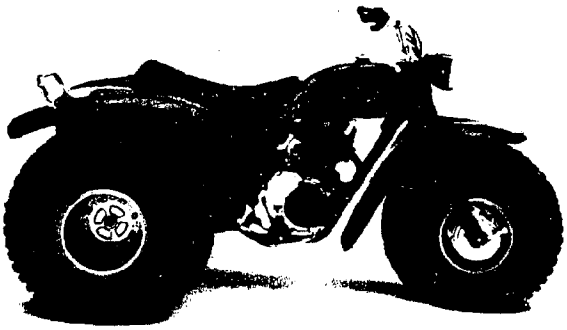
ORV USE PATTERNS

Vehicle Mix (see Plate 1)

Based on study area observation and vehicle track analysis, the Ormond Beach area is used by four-wheeled vehicles, three-wheeled vehicles and two-wheeled vehicles. Four-wheeled vehicles appear to be used primarily for beach access, with intensive recreational driving use not highly significant. Both four-wheeled drive vehicles and two-wheel drive vehi-

Plate 1

ORV Specifications



Three-Wheeled All Terrain Vehicle (ATC)

Length: 51" to 70"

Width: 31" to 42"

Height: 31" to 40"

Weight: 169 to 297 pounds

Two Wheeled Dirt Bike

Length: 80" to 83"

Width: 33"

Height: 39"

Weight: 190 to 220 pounds

cles with wider tires can easily reach most portions of the study area. A majority of the four-wheel traffic consists of motorhomes, campers and pickups used as a home base of ORV or beach related activities. Many of these vehicles are also used for transport of two and three-wheeled vehicles to the area. Recreational driving of four-wheeled vehicles is probably not intense because the study area is relatively small, contains only low dunes and contains little in the way of topographic interest for this type of ORV activity. The observation can be partially borne out by the lack of evidence of significant dune buggy use within the area.

Three-wheeled all terrain vehicles (ATC's) appeared to be the most commonly used vehicle within the study area. Over thirty of these vehicles were counted in use on one Sunday morning. These vehicles are transported to the area via truck or trailer and are used both within the beach areas, stabilized dunes and wetlands. The low dunes and other topographic features provide good recreational activity for these vehicles. These vehicles also appear to be doing a significant portion of the environmental damage in the area by:

1. General random recreational riding through dunes and wetlands. For the most part, ATV riders oriented away from established paths and rode more on the generally undisturbed dunes.

2 Establishing circular "mini enduro" courses within sand dune areas. Organized use of these tracks may be a possibility but was not observed during this study.

Motorcycles (both dirt bikes and street machines) are also a factor

within the study area. Although not as numerous as the ATC's, motorcycles were observed in significant numbers (more than ten at a time in the study area). Motorcycles tended to be used in more of a straight line fashion along the coastal strip but were also observed within the wetlands. ORV activity occurs throughout the year. However, based on conversations with various officials, ORV activity is much greater during summer months and has significantly increased in the past eight months due to closures of other ORV areas. The Santa Clara River bottom is the most recent of these.

PRIMARY ORV ACCESS POINTS

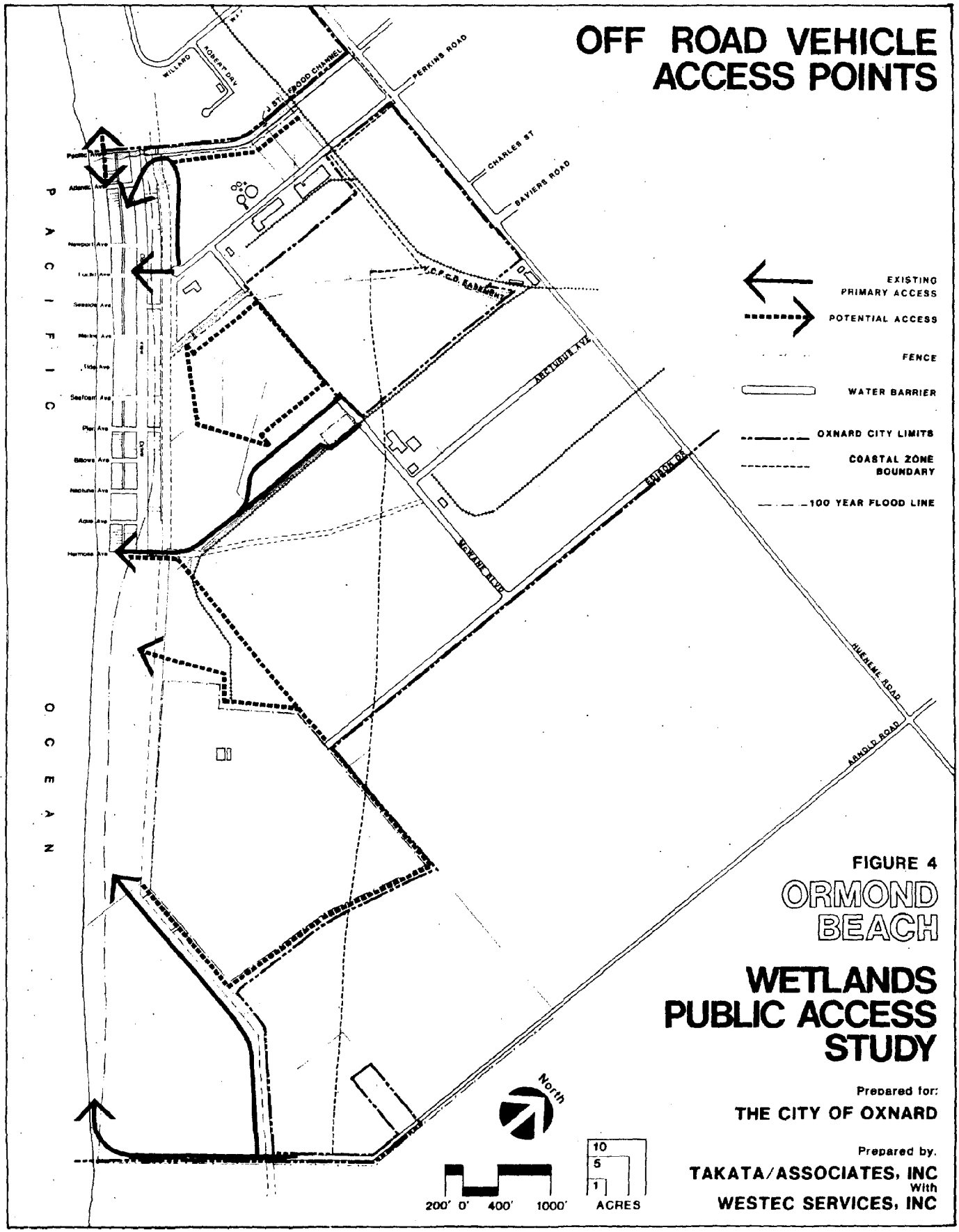
The following major access points for vehicles entering the Ormond Beach area were identified as follows in the following section.

Arnold Road

Arnold Road serves as the easiest access route for the study area. Located at the southern end of Ormond Beach adjacent to the Pacific Missile Testing Center, Point Mugu (Figure 4), Arnold Road is paved up to the edge of the sandy beach. The ease of access and the well-packed condition of the sand and adjacent saltflat (Figure 1) allows all types of vehicles to enter the area. Access is gained via a two-lane bridge that is unbarricaded. Once a vehicle crosses the bridge, it can either directly enter the beach area or travel in a north-westerly direction on a dirt roadway to the beach.

Western LNG Site Access

Vehicles can enter the beach area as well as an extensive wetlands at the LNG site through two dirt roadways; one in the center of the site and one at the railroad tracks at the southern end. The area has been partially fenced and/or bermed, but access is easy for all vehicles because a gate has been torn down by vandals.


OFF ROAD VEHICLE ACCESS POINTS
EXISTING PRIMARY ACCESS
POTENTIAL ACCESS
FENCE
WATER BARRIER
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
PACIFIC OCEAN
WILLARD
ROBERT DRV
J ST. FLOOD CHANNEL
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
V.C.F.C.D. EASEMENT
ARCTURUS AVE
EDISON DR
McWANE BLVD
HUENEME ROAD
ARNOLD ROAD
Pacific Ave
Atlantic Ave
Newport Ave
Seaside Ave
Marine Ave
Tide Ave
Seafoam Ave
Pier Ave
Billows Ave
Neptune Ave
Aqua Ave
Hermosa Ave
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 4
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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Perkins Road

Unobstructive access can be accomplished onto the study area via a well-packed roadway aligning along the east bank of a drainage channel adjacent to the J Street Drainage Channel. A pipe and cable barrier exists across a bridge directly west of the end of Perkins Road. A portion of this barricade had been pulled down to allow access by two- and three-wheeled vehicles.

SECONDARY ORV ACCESS

Several other potential access points which exist along the study area should also be considered in any vehicle management plan. These access points are not currently experiencing significant use, but they could be used if primary access points were sealed off.

Northern Portion of Study Area (Port Hueneme)

Secondary access to the study area can be gained via Pier Park across the J Street Drainage Channel, across a small foot bridge spanning the channel and potentially along a service roadway along the southern portion of the J Street Drainage Channel.

Western LNG Site

Secondary access could be gained by two- and three-wheeled vehicles and four-wheeled vehicles could potentially gain access to the study area via any point along the eastern border of the LNG facility. This access also includes the railroad tracks.

Southern California Edison Site

Two- and three-wheeled vehicles could potentially gain access along the perimeter of the Southern California Edison Plant.

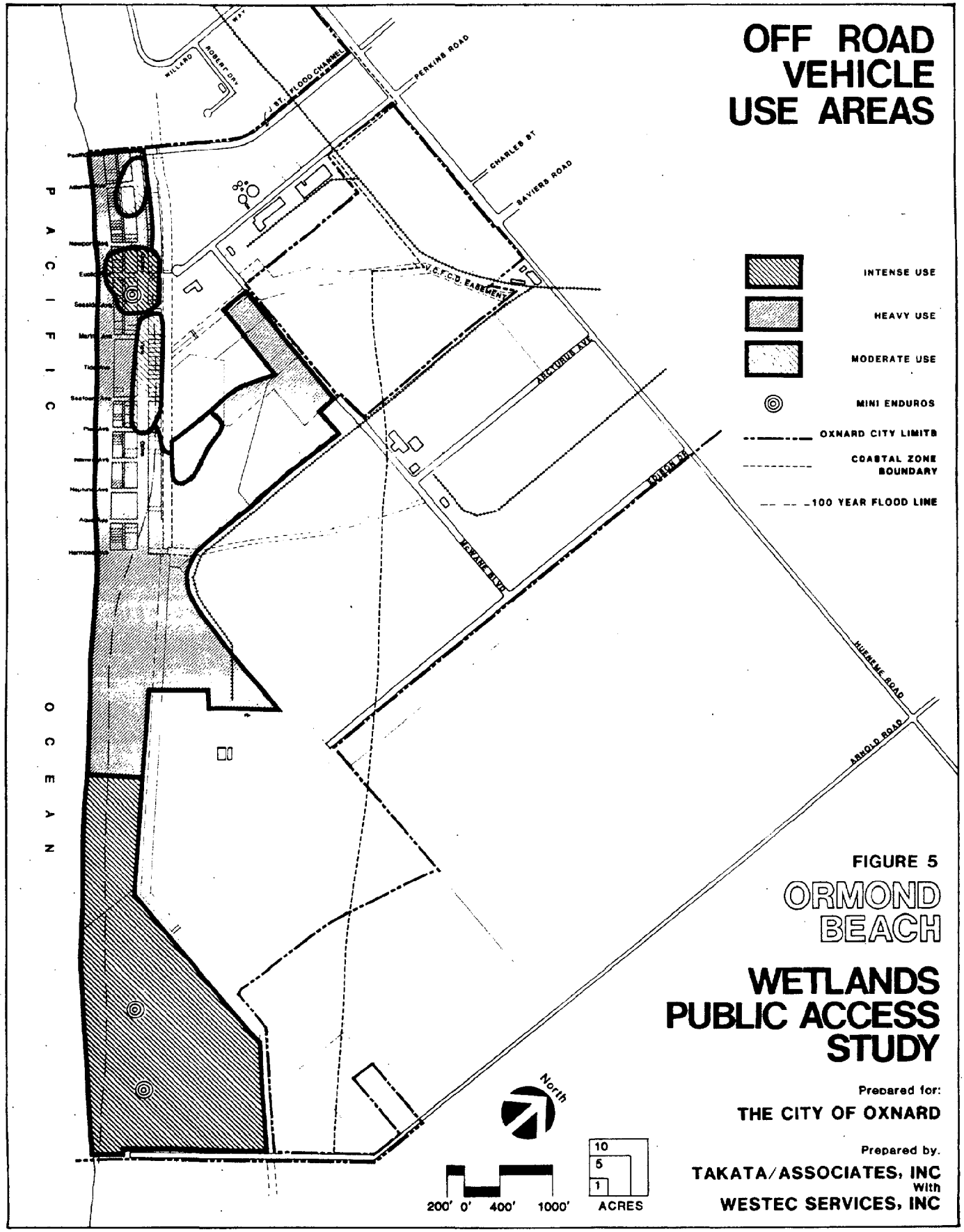
AREAS OF ORV USE

Figure 5 defines areas of intense, heavy and moderate ORV use within the study area. These areas of use were qualitatively determined as follows:

> Intense Areas: Areas that have been so heavily damaged so as to obliterate most vegetation and landforms such as sand dunes.
> Heavy Areas: Areas that have been disturbed by formation of numerous roads. One to two vehicle passover tracks are evident off formed roads.
> Moderate Area: Areas bisected by only few discrete roads. Vegetation relatively intact.

As shown in Figure 5 , the southern portion of the study area shows that the area experiences intense ORV use. This intense use is probably due to the ease of vehicular access from Arnold Road for four-wheeled vehicles and the use of these areas for camping and as a base for two- and three-wheeled ORV activity. Studies by WESTEC Services (1977) in the California Desert have shown that the greatest ORV damage occurs close to camping and vehicular parking areas. The other area of intense vehicular use is near Perkins Road where, again, four-wheeled vehicle access is quite easy.

Areas of heavy uses are generally located within the central portion of


OFF ROAD VEHICLE USE AREAS
INTENSE USE
HEAVY USE
MODERATE USE
MINI ENDUROS
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
PACIFIC OCEAN
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
V.C.F.C.D. EASEMENT
ARCTURUS AVE
SOUTH ST
HUENEME ROAD
ARNOLD ROAD
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 5
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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THE CITY OF OXNARD
Prepared by:
TAKATA/ASSOCIATES, INC
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the study area and wetland areas. It should be noted that this area may be experiencing greater recent activity due to the lessening appeal of riding ORV's in heavily disturbed areas. Portions of this area could be reclassified as heavy areas within a year or two. Moderate use areas include a small dune area near the HALACO facility and some rather isolated wetland areas.

DUMPING AREAS

Areas of concentrated illegal dumping exist in three major areas:

1. the upland areas at the LNG site;
2. areas near the end of Arnold Road;
3. LNG wetlands areas adjacent to HALACO.

Materials dumped appear to consist primarily of dirt, rock, concrete and vegetative matter. According to site observations, there could be possible leakage of industrial waste from HALACO's settling pond into the LNG wetland.

SECTION 3

OPPORTUNITIES & CONSTRAINTS

INTRODUCTION

The following analysis identified four major ORV opportunity-constraint areas; they include:

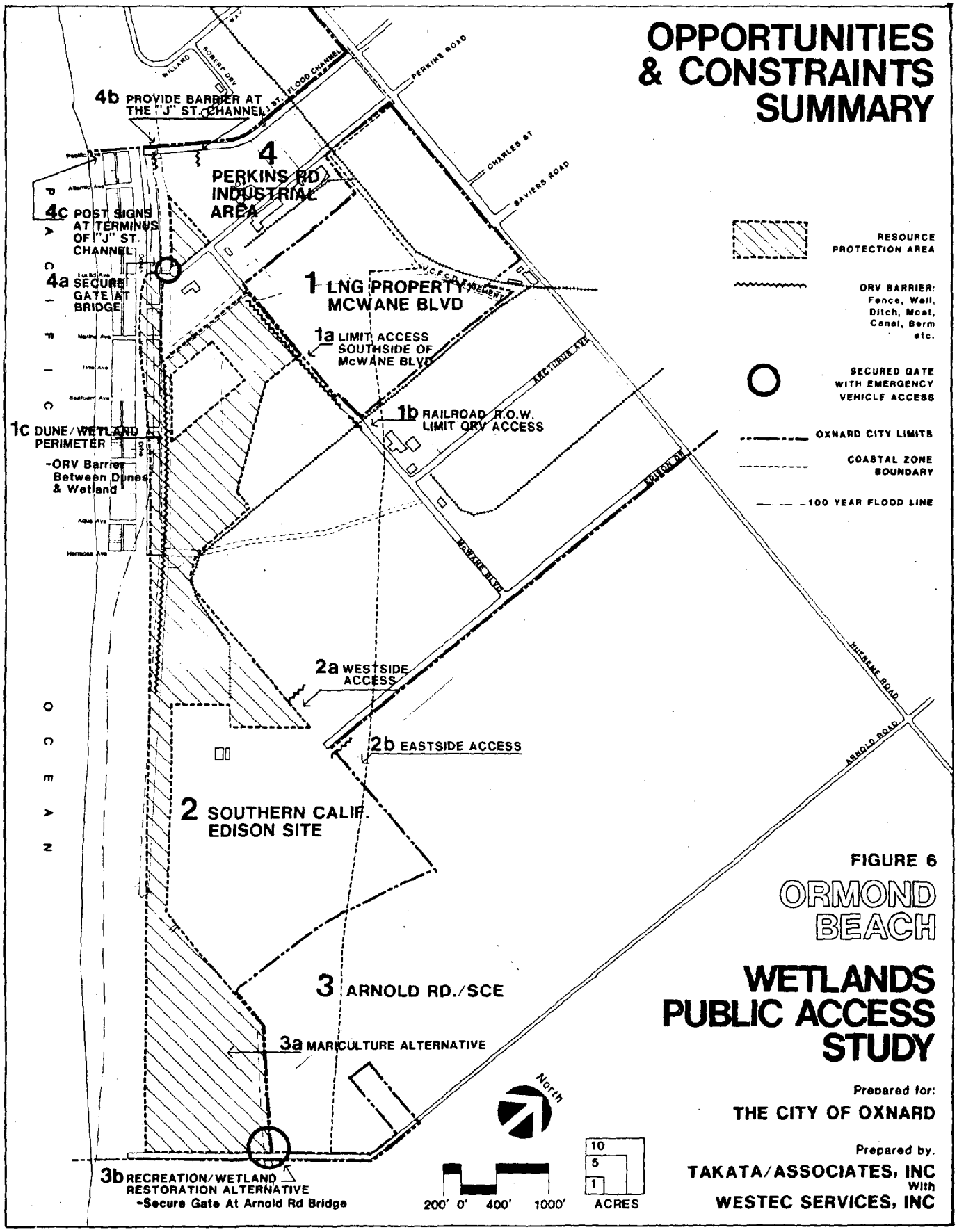
Area 1:	LNG Property/McWane Boulevard
Area 2:	Southern California Edison (SCE) Site
Area 3:	Arnold Road/SCE
Area 4:	Perkins Road/Industrial Area

Opportunity areas are defined as potential areas where ORV access and activity may be controlled. Constraint areas are existing and potential areas of conflict in controlling ORV activity. Figure 6 and the following paragraphs summarize the major findings of the opportunities and constraint analysis.

Area 1: LNG PROPERTY/MCWANE BOULEVARD

1a. McWane Boulevard Completion: The completion of McWane Boulevard between the LNG site and Perkins Road would provide additional ORV access opportunities. Barriers on the south side of McWane Boulevard could limit access to the sensitive areas.

1b. Railroad R.O.W.: Limited ORV access on the rail-


OPPORTUNITIES & CONSTRAINTS SUMMARY
4b PROVIDE BARRIER AT THE "J" ST. CHANNEL
4 PERKINS RD INDUSTRIAL AREA
4c POST SIGNS AT TERMINUS OF "J" ST. CHANNEL
4a SECURE GATE AT BRIDGE
1 LNG PROPERTY MCWANE BLVD
1a LIMIT ACCESS SOUTHSIDE OF McWANE BLVD
1b RAILROAD R.O.W. LIMIT ORV ACCESS
1c DUNE/WETLAND PERIMETER
-ORV Barrier Between Dunes & Wetland
2a WESTSIDE ACCESS
2b EASTSIDE ACCESS
2 SOUTHERN CALIF. EDISON SITE
3 ARNOLD RD./SCE
3a MARICULTURE ALTERNATIVE
3b RECREATION/WETLAND RESTORATION ALTERNATIVE
-Secure Gate At Arnold Rd Bridge
PACIFIC OCEAN
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
ARCTURUS AVE
EDISON DR
McWANE BLVD
HUENEME ROAD
ARNOLD ROAD
RESOURCE PROTECTION AREA
ORV BARRIER: Fence, Wall, Ditch, Moat, Canal, Berm etc.
SECURED GATE WITH EMERGENCY VEHICLE ACCESS
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 6
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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road right-of-way (ROW) to the dunes and the wetland area may be difficult to implement because the area must be kept clear for railroad operations.

1c. Dune/Wetland Perimeter: This area has a number of opportunity areas for ORV barriers, such as, ditches, canals, wall, fences, etc. However, some of these barriers could cause undesirable impacts to these habitats. Some possible problems include:

- hydrologic floods;
- tidal interference; and
- disturbance to dune movement.

AREA 2: SOUTHERN CALIFORNIA EDISON (SCE) SITE

2a. Westside access near the SCE facility may be a potential entry point if other areas are blocked off. Routes through this area seem less desirable because much of the area is covered with water and wet soils. Control may be designed by ditches, fences and topographic changes.

2b. Eastside access would be on the berm adjacent to the SCE perimeter fence. Control: see 2a.

AREA 3: ARNOLD ROAD/SCE

The following alternatives are based upon various options indicated by

the SCE, State Parks & Recreation Department and the City of Oxnard:

3a. Mariculture alternative: The development of this proposal would require construction on the existing wetland area. Because there would be less open land, the area would be less desirable for ORV activity. With development adjacent to the south perimeter of the canal and Arnold Road, the area could prevent ORV access by barriers such as walls and fencing.

3b. Recreation/Wetland Restoration Alternative: This alternative would exclude all ORV activity by securing the bridge at Arnold Road with access for emergency/security vehicles, pedestrians and bicyclists.

AREA 4: PERKINS ROAD/INDUSTRIAL AREA

4a. Improve security gate and lock system on bridge access

4b. Provide a barrier (fence, gate, channel extension,etc.) to block ORV access. Entry from the north near the J Street Channel would be stopped by the fencing from the Wastewater Treatment Plant expansion.

4c. North Perimeter/J Street Channel: Observations of ORV activities in this area indicate the ORV's are reluctant to cross this line probably because the area is posted with signs prohibiting ORV activity and is

patrolled by Port Hueneme. According to some of the ORV user groups there is an unwritten policy that the ORV's would not encroach into Port Hueneme. Barriers in this area may not be necessary.

SECTION 4

RESOURCE PROTECTION ALTERNATIVES

INTRODUCTION

The purpose of this section is to summarize the analysis and evaluation of the alternatives regarding the protection of the sensitive resources of Ormond Beach. The key element in the alternatives development process were two public workshops in which various groups including environmentalists, students and ORV users provided ideas and suggestions for the protection of Ormond Beach.

THE ALTERNATIVES

The alternatives are based upon the first public workshop held on March 19, 1982, and were presented in a second public workshop April 16, 1982.

The first public workshop identified a range of five alternatives which were developed for review and evaluation. The alternatives ranged from a status quo scheme to complete closure to ORV uses. They include:

- Alternative 1 Status Quo
- Alternative 2 Designated Off Road Vehicle Areas
- Alternative 3 Limited Off Road Vehicle Access
- Alternative 4 LNG Acquisition/Phased Closure
- Alternative 5 Complete Off Road Vehicle Closure

ALTERNATIVE 1
STATUS QUO

PROGRAM

1. No City or State actions
2. No private owner actions

STATUS QUO ADVANTAGES

1. Provides an unauthorized ORV recreation area

STATUS QUO DISADVANTAGES

1. Continued legal and liability problems
2. Unauthorized trespassing
3. Health/Safety problems
4. Wetlands and dune areas not protected, probably complete destruction of resources
5. High maintenance costs because of dumping and vandalism
6. Low probability of success
7. Incompatible with existing land uses
8. Low diversity of use
9. Educational opportunities lost with the destruction of the wetlands and dune environments
10. Difficult security and enforcement problems
11. Unacceptable to City's goals and objectives

ALTERNATIVE 2

DESIGNATED OFF ROAD VEHICLE AREAS (Figure 7)

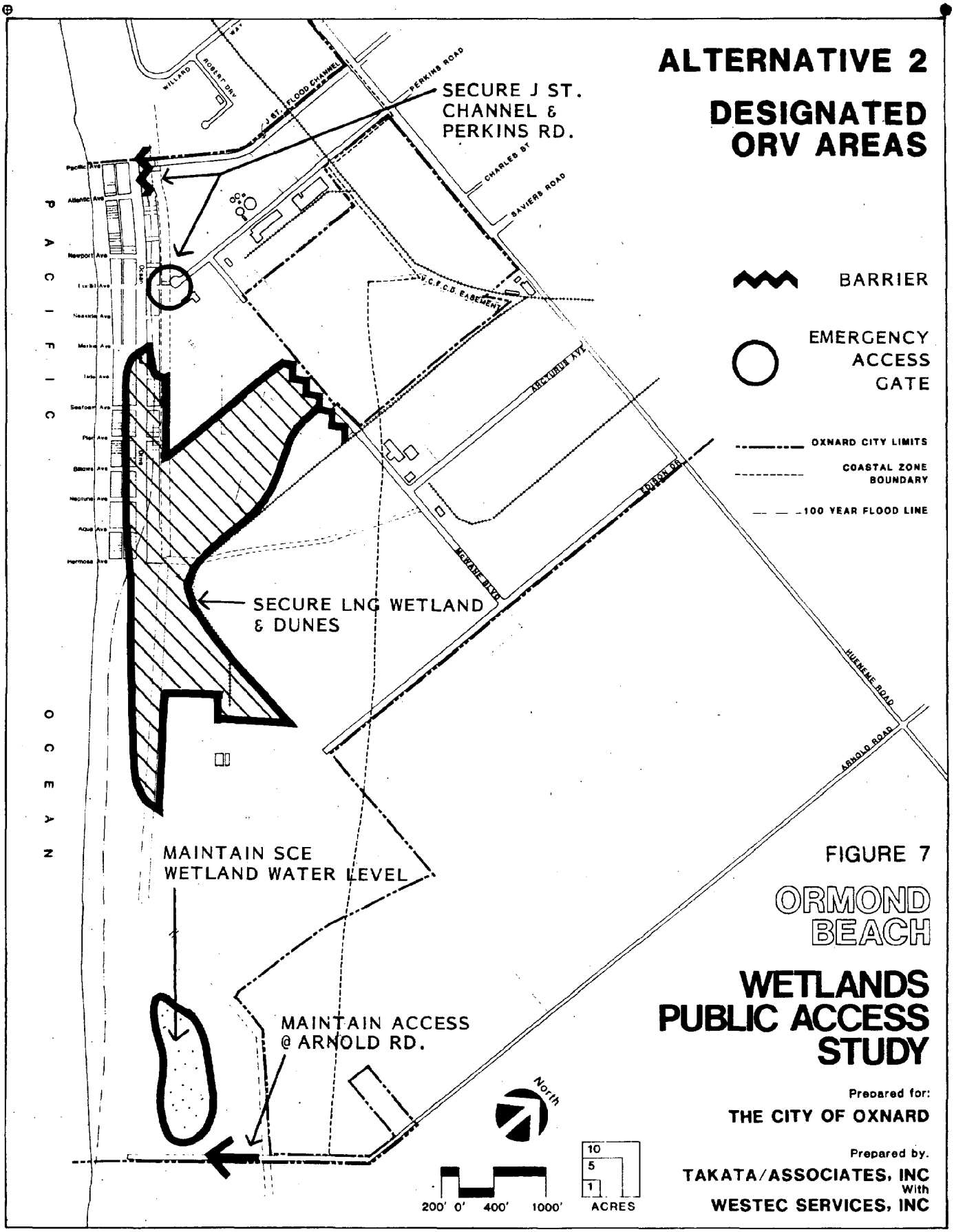
PROGRAM

1. Secure north boundary of LNG site
2. Secure Perkins Road access
    a. 2 gates (one emergency vehicle access)
    b. allow pedestrian access
3. Continue to allow access at Arnold Road
4. Provide protection for LNG site and dune area (primary protection area)
5. Maintain constant water level in SCE's wetland to protect resource area
6. Provide Public Relations program
7. Enforcement program
    a. police patrol
    b. violators cited
    c. post signs
    d. citizen's monitor group
        1) ORV groups
        2) environmental/educational groups

Note: Assumes current SCE policies toward ORV's.

DESIGNATED ORV AREAS ADVANTAGES

1. Provides limited ORV use on the strand and areas near Arnold Road.
2. Protects primary protection area (LNG site) and SCE wetland


ALTERNATIVE 2
DESIGNATED ORV AREAS
SECURE J ST. CHANNEL & PERKINS RD.
SECURE LNG WETLAND & DUNES
MAINTAIN SCE WETLAND WATER LEVEL
MAINTAIN ACCESS @ ARNOLD RD.
BARRIER
EMERGENCY ACCESS GATE
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
PACIFIC OCEAN
PERKINS ROAD
J ST. FLOOD CHANNEL
CHARLES ST
SAVIERS ROAD
V.C.F.C.D. EASEMENT
ARCTURUS AVE
FULTON ST
MCWANE BLVD
HUENEME ROAD
ARNOLD ROAD
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 7
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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DESIGNATED ORV AREAS DISADVANTAGES

1. ORV activities are on private property, (SCE and others)
2. Legal and liability problems
3. A "sanctioned" ORV area may attract too many users - beyond the site's capacity, could be a safety problem
4. Security and enforcement would be difficult
5. Difficult to monitor and patrol
6. This alternative may not be implemented if:
    a. SCE develops the mariculture facility (lobster farm); or
    b. State Parks Dept. acquires the property for wetland restoration and passive recreation

ALTERNATIVE 3

LIMITED OFF ROAD VEHICLE ACCESS (Figure 8)

PROGRAM

1. Secure north boundary of LNG site
2. Secure Perkins Road access
    a. 2 gates (one emergency vehicle access)
    b. allow pedestrian access
3. Continue to allow access at Arnold Road
    a. appropriate for 4 wheel drive vehicles
4. Fence off dune and strand area approximately 4200' west of Arnold Road
5. Maintain constant water level in the SCE wetland to protect resource area
6. Provide sanitary facilities

Note: This alternative assumes SCE's current ORV enforcement policy.

LIMITED ACCESS ADVANTAGES

1. Provides limited ORV use
2. Protects LNG wetland and dunes west of the proposed strand barrier
3. Maintains waterbird habitat
4. Possible acquisition of property for ORV use.

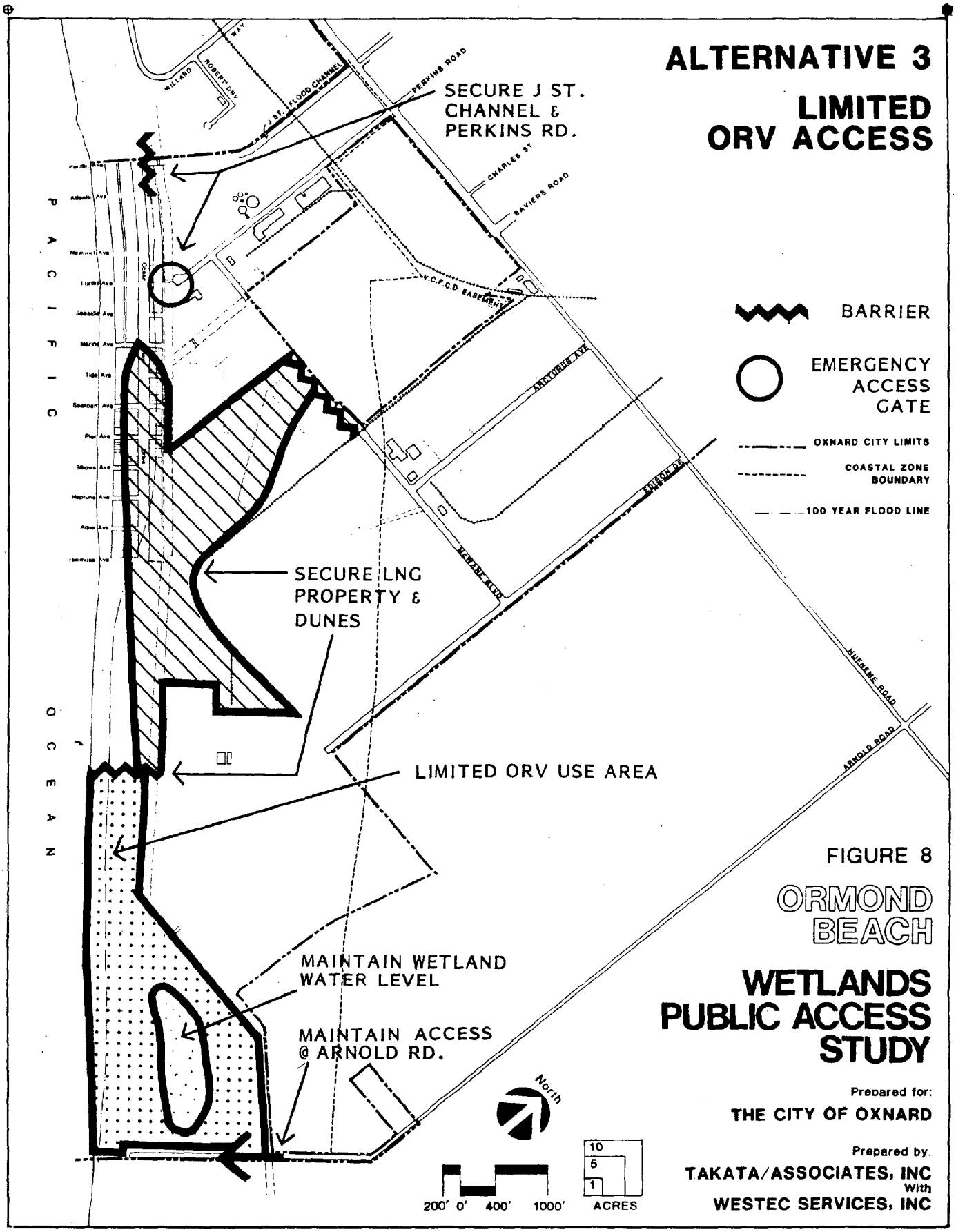

FIGURE 8

ORMOND BEACH

WETLANDS PUBLIC ACCESS STUDY

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LIMITED ACCESS DISADVANTAGES

1. ORV activities are on private property (SCE and others)
2. Legal and liability problems
3. A "sanctioned" ORV area may attract too many users - beyond the site's capacity, could be a safety problem
4. Security and maintenance costs would be high
5. This alternative may not be implemented if:
    a. SCE develops the mariculture facility (lobster farm); or
    b. State Parks Dept. acquires the property for wetland restoration and passive recreation

ALTERNATIVE 4

LNG WETLANDS ACQUISITION/PHASED ORV CLOSURE (Figure 9)

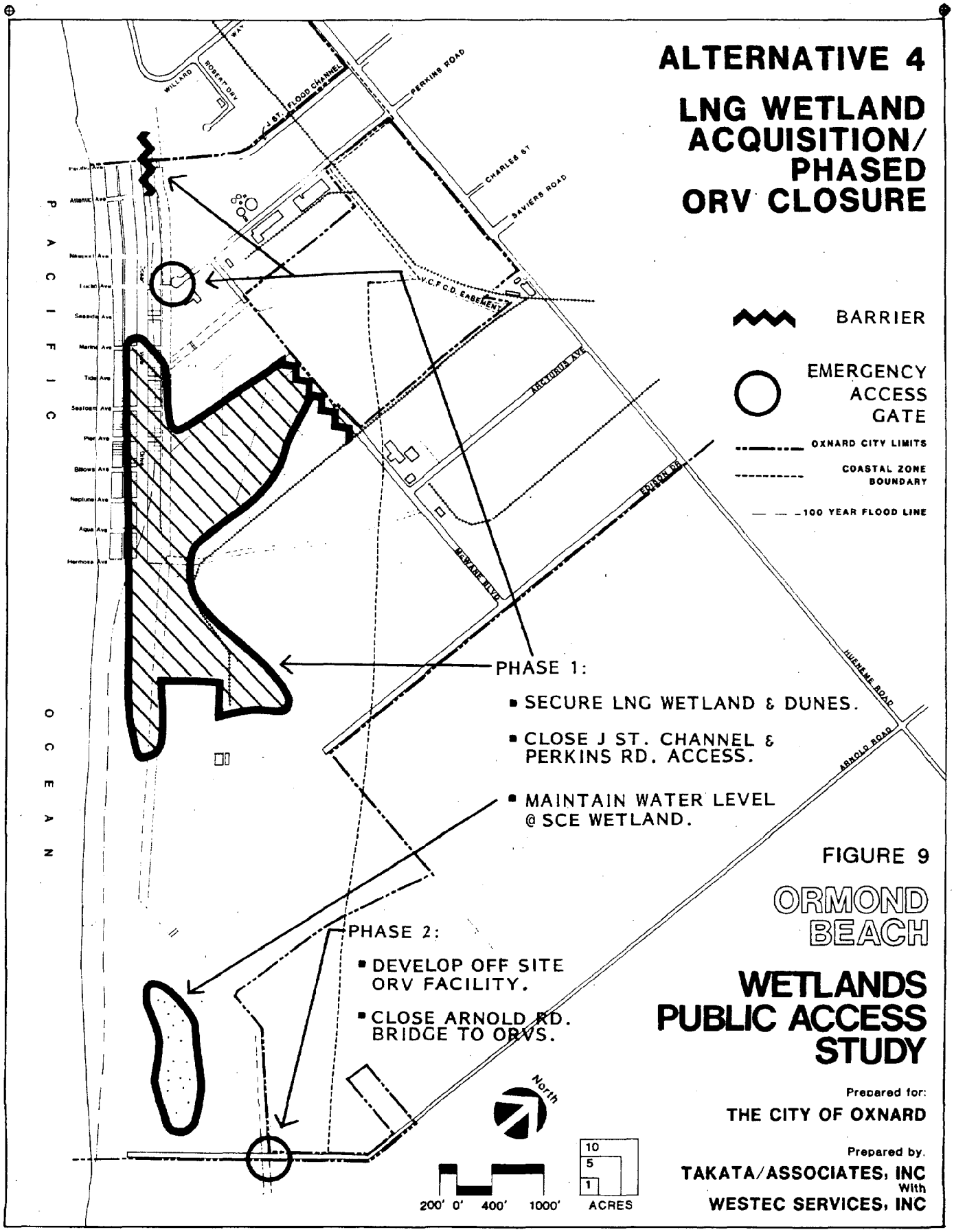
PROGRAM

Phase I

1. Secure north boundary of LNG site
2. Begin acquisition proceedings with LNG
3. Secure Perkins Road access
    a. two gates
    b. allow pedestrian access
4. Prohibit ORV use on wetlands and dunes
    a. sign and secure perimeter of the dunes and LNG wetland

Phase 2

5. Begin site search study
    a. identify alternative ORV use areas
6. Monitor environmental condition
    a. designate test areas
    b. provide photographic documentation of each test site
7. Enforcement
    a. police patrol and citing for trespassing
    b. citizens' monitor group
        1) ORV clubs
        2) Sierra Club/Audobon Society, etc.
    c. educational
    d. surveillance: call police when violators are sighted


ALTERNATIVE 4
LNG WETLAND ACQUISITION/ PHASED ORV CLOSURE
BARRIER
EMERGENCY ACCESS GATE
OXNARD CITY LIMITS
COASTAL ZONE BOUNDARY
100 YEAR FLOOD LINE
PHASE 1:
• SECURE LNG WETLAND & DUNES.
• CLOSE J ST. CHANNEL & PERKINS RD. ACCESS.
• MAINTAIN WATER LEVEL @ SCE WETLAND.
PHASE 2:
• DEVELOP OFF SITE ORV FACILITY.
• CLOSE ARNOLD RD. BRIDGE TO ORVS.
PACIFIC OCEAN
PERKINS ROAD
CHARLES ST
SAVIERS ROAD
J ST. FLOOD CHANNEL
W.C.F.C.D. EASEMENT
ARCTURUS AVE
EWING RD
DEVANE BLVD
HUENEME ROAD
ARNOLD ROAD
North
200' 0' 400' 1000'
10
5
1
ACRES
FIGURE 9
ORMOND BEACH
WETLANDS PUBLIC ACCESS STUDY
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8. After LNG Wetlands acquisition by the City
    a. begin interpretive programs
        1) school and college
        2) interested groups
    b. provide access and parking lot off of McWane Blvd.
9. Develop selected off-site ORV facility
10. Secure Arnold Road access
    a. security gate

LNG WETLAND ACQUISITION/PHASED ORV CLOSURE ADVANTAGES

1. Provides wetlands protection.
2. Provides for a diversity of uses including limited ORV use, educational/interpretive, beach recreation, fishing, surfing, etc.
3. Provides educational/interpretive opportunities.
4. Health and safety problems are mitigated.
5. Ease of City enforcement

LNG WETLAND ACQUISITION/PHASED ORV CLOSURE DISADVANTAGES

1. Legal and liability problems
2. Maintenance costs may be high

ALTERNATIVE 5

COMPLETE CLOSURE TO OFF ROAD VEHICLES (Figure 10)

PROGRAM

1. Secure North boundary of LNG site
2. Secure Perkins Road Access
    a. 2 gates (one should be available for emergency vehicles)
    b. allow pedestrian access
3. Secure Arnold Road access at bridge
    a. 1 gate - emergency vehicle access
4. Provide Public Relations Program
5. Enforcement
    a. police patrol
    b. violators cited
    c. post signs
6. Provide adequate maintenance program and funding
7. Begin interpretive program for wetlands and dune area
    a. schools and college
    b. interested groups

COMPLETE CLOSURE ADVANTAGES

1. Legal and Liability problems minimized
2. Health and Safety problems minimized
3. ORV damage to wetland and dunes mitigated
4. Provides Wetlands and Dunes protection

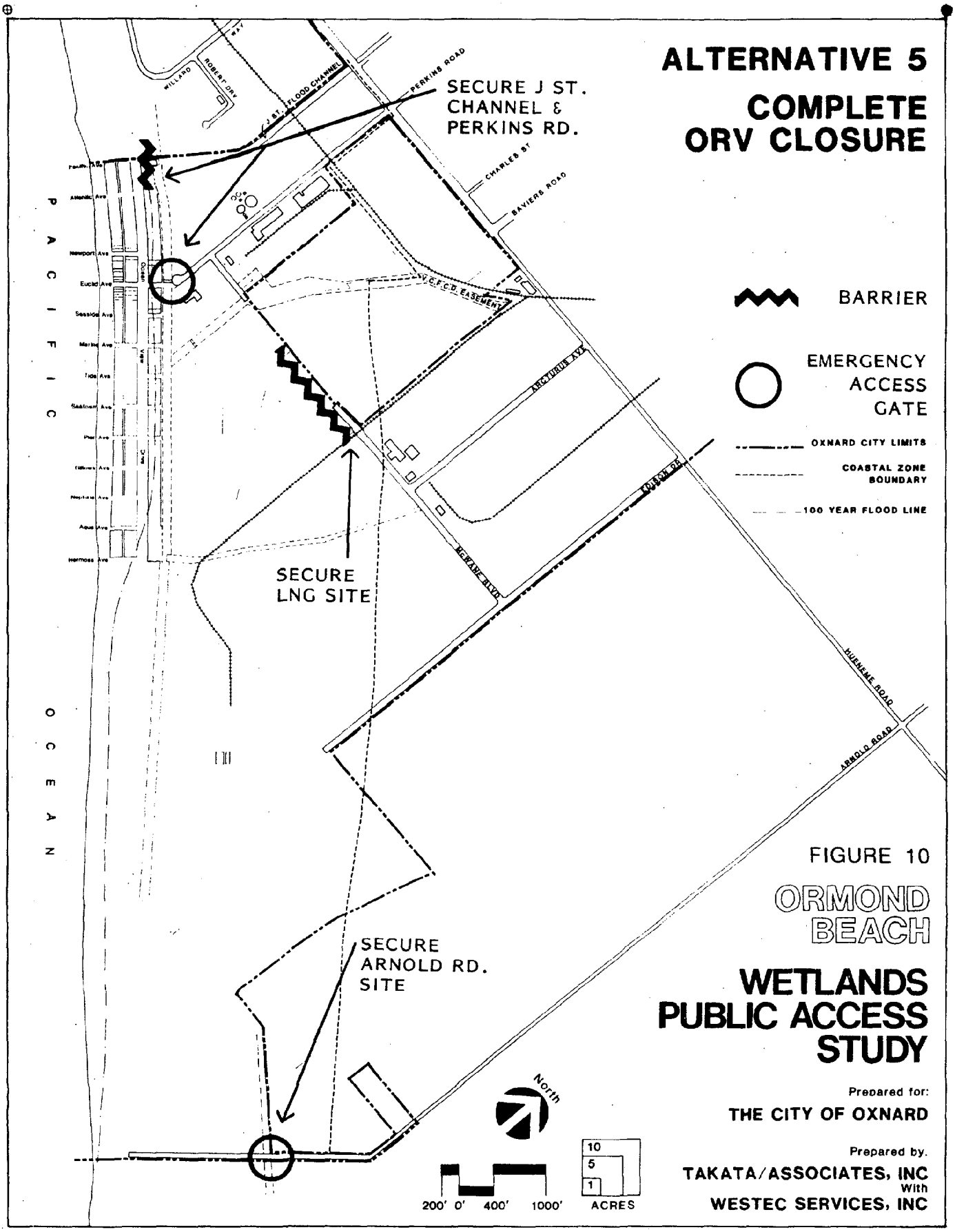

FIGURE 10

ORMOND BEACH

WETLANDS PUBLIC ACCESS STUDY

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5. High probability of success

6. Compatible with adjacent land uses; mitigates current access and dumping problems

7. Educational opportunities, i.e., interpretive stations and trails

8. Provides good enforcement capabilities

COMPLETE CLOSURE DISADVANTAGES

1. Capital costs for gates and barrier construction

2. Higher maintenance costs

3. No on-site or off-site provision for ORV users.

EVALUATION

As Table 1 depicts, five alternatives were evaluated and ranked using thirteen criterion:

1. Legal
2. Liability
3. Health and Safety
4. Wetland Protection
5. Dune Protection
6. Capital Costs
7. Maintenance Costs
8. Probability of Success
9. Land Use Compatibility
10. Diversity of Use
11. Educational Opportunity
12. Enforcement Capability; and
13. Responsibility

The evaluation was conducted by the consultants using their best professional judgements in assigning high to low compatibility ratings to the various alternatives. The purpose of the evaluation was to identify the relative differences of each alternative and identify the most compatible alternatives. The evaluation ranked the following alternatives from the most compatible to the least compatible.

Alternative	Ranking
5. Complete ORV closure	1
4. LNG Acquisition/Phased Closure	2
2. Designated ORV areas	3
3. Limited ORV access	4
1. Status Quo	5.

The five alternatives were presented at the second public workshop. The following is a summary of the results of the second workhop.

- Alternative 1, Status Quo, was not acceptable to the City of Oxnard because it would prevent the City from implementing its Local Coastal Plan and General Plan objectives.

- Alternative 5, Complete ORV closure, was not acceptable to ORV interest groups because it did not recognize the need for an alternative ORV recreation site.

- Alternatives 2 and 3, Designated ORV areas and Limited ORV access, were identified as schemes which would be

TABLE 1

RESOURCE PROTECTION ALTERNATIVES

ALTERNATIVES / EVALUATION FACTORS	LEGAL	LIABILITY	HEALTH/SAFETY	INTENSITY OF USE	WETLAND PROTECTION	DUNE PROTECTION	CAPITAL COSTS	MAINTENANCE COSTS	PROBABILITY OF SUCCESS	LAND USE COMPATIBILITY	DIVERSITY OF USE	EDUCATIONAL OPPORTUNITIES			ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
COMPLETE CLOSURE	●	●	●	●	●	●	◎	◒	●	●	◒	●	○	○	●	O/P		1
LIMITED ORV ACCESS	◎	◎	◒	◒	◒	◒	◎	◎	◒	◒	◒	◒	○	○	◒	O/P		4
LNG WETLANDS ACQUISITION/PHASED ORV CLOSURE	◎	◎	●	◒	●	◒	◎	◎	◒	●	●	●	○	○	◒	O, P, S		2
DESIGNATED ORV AREAS	◎	◎	◒	◎	●	●	◒	◒	◒	◒	●	◒	○	○	◒	O/P		3
STATUS QUO	◎	◎	◎	◎	◎	◎	●	◎	◎	◎	◎	◎	○	○	◎	P		5
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			

● HIGH COMPATIBILITY

◒ MODERATE COMPATIBILITY

◎ LOW COMPATIBILITY

RESPONSIBILITY

O CITY OF OXNARD

P PRIVATE LANDOWNER

S STATE

Source: Takata/Associates, Inc.
WESTEC Services, Inc. 1982

difficult to implement if SCE developed their property for a mariculture facility. The areas set aside for the ORV use seemed to be undersized for the current and future ORV traffic.

- Alternative 4, LNG Wetlands Acquisition/Phase Closure, with modifications, seemed the most feasible and was selected as the preferred alternative. The workshop participants suggested that this alternative should emphasize a short-term and long-term priority plan. The short-term phase should provide immediate protection for the wetlands and dunes; the long-term phase should identify an alternative off-site ORV facility, options for wetlands restoration, educational/interpretive programs and the phased closure of Ormond Beach to unauthorized ORV users. Other workshop suggestions and ideas, such as public relations, monitoring and funding have been incorporated in Section 5, the Priority PLand and Strategies.

SECTION 5

PRIORITY PLAN RECOMMENDATION AND STRATEGIES

INTRODUCTION

The purpose of this section is to describe the key elements of the priority plan recommendations and provide implementation strategies for the realization of the plan. The priority plan and strategies are based upon the preferred phased closure alternative, outlined in Section 4, with significant changes and refinements suggested at the second public workshop.

PRIORITY PLAN RECOMMENDATIONS

The priority plan recommendations outline a two phase implementation process which would provide for:

- protection of the Ormond Beach wetlands/dune environment;
- development of educational/interpretive programs and facilities; and
- an alternative off-site ORV facility search study and development of an ORV recreation area.

The elements of the plan are depicted in Figure 11 and listed by phase in Table 2. Each element is described by quantities, unit cost, city costs, funding and phasing.

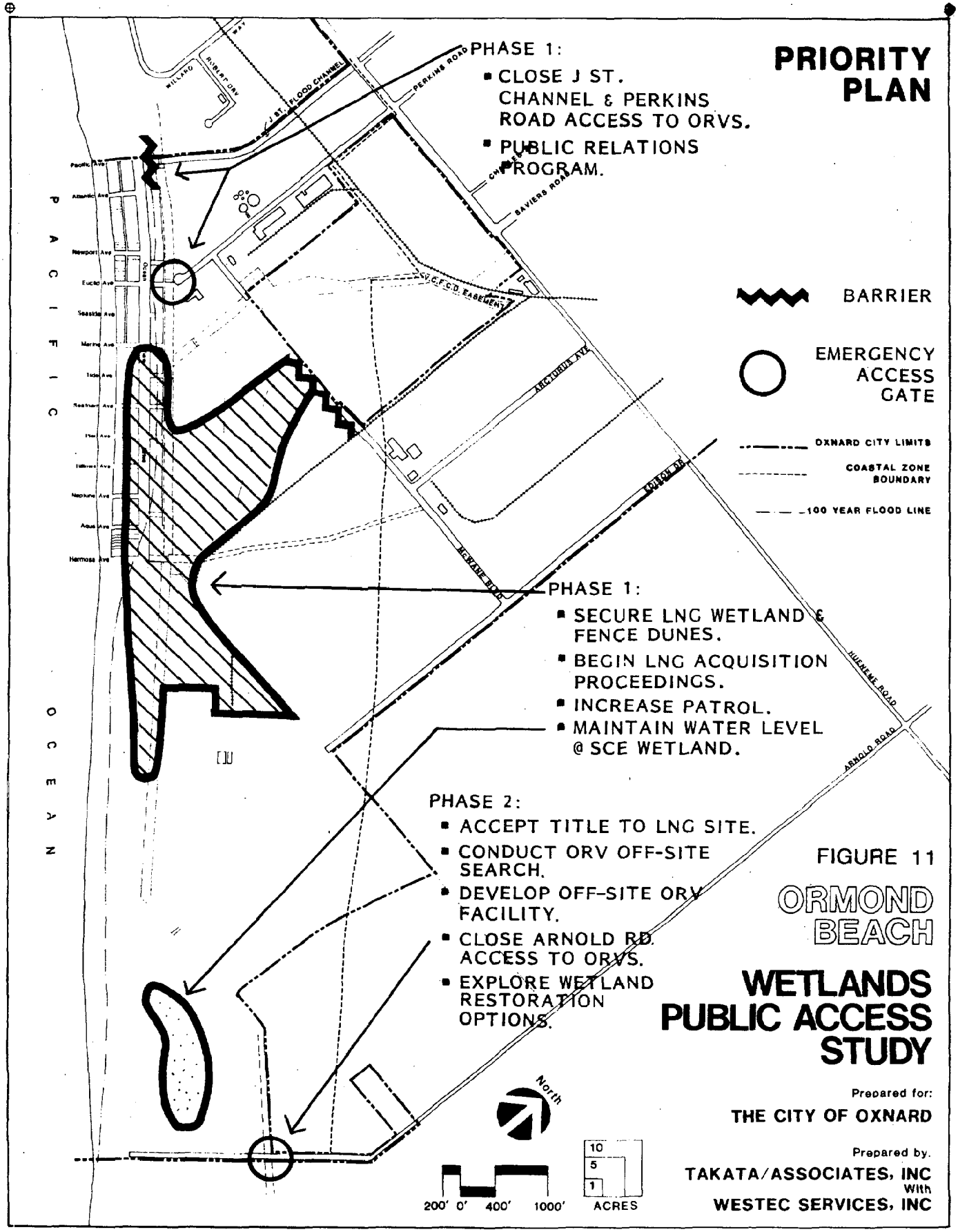

FIGURE 11

ORMOND BEACH

WETLANDS PUBLIC ACCESS STUDY

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TABLE 2

PRIORITY PLAN ELEMENTS

Plan Recommendations	Quantity	Unit Cost	City Costs	Potential Grants/Subventions Private Funding	Phase
1. Provide a ditch on the north side of the LNG site	1000 cu/yd	$3.75/cu.yd.	---	$3,750. Coastal Conservancy Grant	1
2. Provide security gate at access road (terminus of Perkins Road)	1 ea.	Allow	---	$3,000. Coastal Conservancy Grant	1
3. Provide wall barrier on the east side of the terminus of the "J" St. Channel	50 ft.	$35./ft.	---	$1,750. Coastal Conservancy Grant	1
4. Prohibit ORV use in the wetlands and dunes; provide signs and "snow fences" on the perimeter of the dune area.	5000 ft.	$2.25/ft.	---	$7,500.- $11,250. - Coastal Conservancy Grant - Volunteer labor could reduce cost by .75/ft.	1
5. Begin acquisition proceedings for LNG wetland site. Prepare necessary grant and funding paperwork as required by Coastal Commission and Coastal Conservancy	---	---	---	- Coastal Commission - Coastal Conservancy Grant	1
6. Maintain year round water level in SCE wetland	---	---	---	---	1
7. Continued police patrol of Ormond Beach 1st yr. increase patrol	30 days	Allow	$2,600.	Possible Law Enforcement Grant	1
8. Public relations program and citizen monitors	---	---	---	- News releases to media - Workshop for citizen monitors	1
9. Provide trash bins at Ormond Beach	2 ea.	$255.	$510.	- Place at Arnold Road and Perkins Road	1
PHASE I TOTALS	---	---	$3,110.	$16,000. - $19,750.	
10. Assign City staff to conduct off-site ORV facility search study	---	---	---	$4,000. State Parks ORV Green Sticker Funds	2
11. Accept title to the LNG wetlands property	---	---	---	$40,000. (available) - Joint City/County Effort	2
12. Develop selected off site ORV facilities	---	---	---	- Unknown State Parks ORV Green Sticker Funds	2
13. Provide security gate at Arnold Road Bridge; close Ormond Beach to ORV uses	1 ea.	---	---	$3,000. - Costs shared by SCE/ Coastal Commission Grant	2
14. Determine feasible options for wetland restoration and interpretive/ education programs and facilities	---	---	---	$15,000. - Coastal Conservancy Grant	2
PHASE II TOTALS	---	---	------	$62,000.	
TOTAL	---	---	$3,110.	$78,000. - $81,750.	

IMPLEMENTATION STRATEGIES

The following are the recommended strategies to be considered when implementing Phase 1 and Phase 2 of the Priority Plan.

Phase 1 recommendations are primarily short-term actions that would provide immediate protection for the wetlands and dune environments. The Phase 2 recommendations are long-term actions and many of them require additional study and analysis. The long- and short-term strategies are listed as follows:

1. Public Relations: provide a public relations program informing citizens of the Ormond Beach Priority Plan. News releases should explain the basis for the plan in regards to the protection of the wetlands and dune areas, phased closure for ORV uses and the legal consequences, i.e. fines, for encroaching on the protected areas. Information should be released to the major newspapers in Ventura County, as well as, the radio, television and various interest group newsletters.

2. Security and Surveillance: provide patrolling and monitoring program which utilizes police and volunteer monitors:

    a. during Phase 1 consider increased police patrol, especially on weekends and other peak use periods (assume an additional thirty person days per year).

b. patrol procedures should be coordinated between the City, SCE, private landowners and citizens' monitor groups.

c. encourage interested groups such as the Audubon Society, Sierra Club, off-road vehicle clubs and others to act as "monitors" during their Ormond Beach outings. The monitors would call police whenever unauthorized trespassing occurs in the wetland and dune area. Under no circumstances are the monitors to confront or harass the violators.

d. designate a citizens' band (CB) radio frequency to alert police of violators in Ormond Beach. If the CB transmitting range is short of the police facility, coordinate with SCE via a CB unit to relay violations.

e. consider an "on-site" host monitor, who would live in temporary quarters such as a mobile home to monitor the activities on Ormond Beach. The host monitor would receive a place to reside in exchange for monitoring duties. A similar program has been instituted at Point Mugu State Park.

3. Construction Assistance: during the workshops a number of strategies were suggested to help minimize construction costs. They include:

a. the provision of labor by interested ORV and environmental groups to erect signs and snow fences around the dunes and wetland and other barrier devices that would secure the sensitive resources of Ormond Beach. The signs would explain the sensitive nature of the wetlands and the dunes and credit the groups which provided labor for the construction of the barrier. This strategy has major benefits:

    1) labor costs mitigated;
    2) user group education;
    3) user group interaction and cooperation
    4) less vandalism because of user group participation.

b. private sector funding for improvements, for materials and/or labor. Shared responsibility for improvements between the city and private sector should also be considered.

4. Maintenance: key maintenance strategies include:

    a. in the first year set aside a budget for extraordinary maintenance and replacement expenses.

    b. response times for the repairs to fencing and barriers should be short.

5. Off-site Search for ORV Facility: The ORV site search study should be conducted by the City of

Oxnard, County of Ventura with assistance from ORV users and environmental groups. The city-county relationship would combine its resources to identify a suitable ORV facility within the county. The ORV and environmental groups could provide technical criteria for the facility's size and environmental sensitivity.

6. Education/Interpretive Facilities: The wetlands and dune environments are educational resources which can provide the local schoools, community college and interested citizens with a "living laboratory." Interpretive trails, programs and facilities could be undertaken by the following groups and agencies:

   a. local schools;
   b. Oxnard Community College;
   c. City Parks and Recreation;
   d. State Parks and Recreation; and
   e. Interest groups (e.g., Audubon Society, Sierra Club, etc.)

APPENDIX

DESIGN AND STRUCTURAL ALTERNATIVES

INTRODUCTION

The purpose of this section is to:

- Identify design objectives and criteria for the development and evaluation of specific design alternatives to discourage ORV activity and maintain access for pedestrians and bicycles.

- Identify design concept alternatives in sufficient detail to communicate their implications in regards to relative cost impacts, performance in discouraging ORV's, character, durability and responsibility.

- Evaluate the various design concepts and select and rank the most appropriate proposals for recommendation.

DESIGN OBJECTIVES AND CRITERIA

Specific design objectives and criteria were formulated to aid in the development and evaluation of the design concept alternatives. The goals of these objectives and criteria were to:

- discourage off-road-vehicle activity in the study area;

- maintain access for pedestrians and bicyclists;
- identify the potential adaptability of the design solutions to other coastal areas; and
- protect the senstive wetland and dune environment of Ormond Beach.

The objectives and criteria for the access barrier design alternatives included thirteen to fifteen factors. They are summarized in the following paragraphs.

Cost Criteria

1. Minimize capital investment by controlling construction costs.
2. Minimize maintenance costs by utilizing low maintenance materials and systems which don't require labor intensive up keep.
3. Minimize enforcement and security patrol costs.

Maintenance Criteria

1. Utilize materials which require low maintenance.
2. Design a system which may be quickly and easily repaired and maintained.
3. Avoid sophisticated systems which may require specialized training for on-going maintenance.

Durability Criteria

1. Design an access and barrier system that can withstand heavy abuse and vandalism.

2. Design a system with materials which can function over several seasons without replacement.

Reliability Criteria

1. Design an access and barrier system which would provide security from ORV use.

Available Materials Criteria

1. Design a system which uses available materials from local sources. Avoid utilizing exotic material and hard to get products.

Ease of Construction Criteria

1. Utilize simple construction techniques.

2. Design a system where the construction time frame is short.

Security Criteria

1. Design a system that can prevent ORV entry into the study area.

2. Utilize materials and/or techniques that discourages the use of winches, ramps and other means of illegal access.

Safety/Liability Criteria

1. Design a system that is not dangerous to public health safety.

2. Design a system that minimizes the public and private owners' liability.

Aesthetic Criteria

1. Where possible utilize colors and materials which complement the site environment.

2. Soften hard edges, such as walls, fences and severe earth grading with landscaping.

Environmental Compatility Criteria

1. Design a system that does not adversely impact the sensitive wetlands and dunes environment.

Adaptability Criteria

1. Design a system that could be adapted to other coastal areas which are experiencing similar ORV intrusion.

Pedestrian Access Criteria

1. Provide pedestrian access to the beach and ocean.
2. Prevent ORV access through the pedestrian entrance areas.

Bicycle Access Criteria

1. Provide bicycle access to the proposed bicycle path.
2. Prevent ORV access through the bicycle entrance areas.

Emergency Access Criteria

1. Limit emergency vehicle access to the Arnold Road Bridge, Perkins Road Bridge and the Southern California Edison generating complex.
2. Provide a locking system for the access gates which can be opened by the police department, fire department and other departments.
3. Provide a fourteen foot wide (minimum) emergency vehicle access lane.

Enforcement Capability Criteria

1. Design a system that could be easily patrolled by security vehicles.

2. Post signs prohibiting ORV activity in strategic places.

Responsibility Criteria

1. Identify responsibility for the construction, maintenance and patrolling of the proposed design alternative. Responsible parties include the City of Oxnard private landowners and the State of California.

DESIGN CONCEPTS ALTERNATIVES FORMULATION

Based upon the findings of the previous phases, design criteria and ORV specifications (see Plate 1), five access/barrier categories were identified:

1. Fence/Wall Barriers;
2. Landform Barriers;
3. Water Barriers;
4. Controlled Access; and,
5. Pedestrian/Bicycle Access.

Within these five categories a total of thirty-six design concepts were developed; they are described as follows:

Fence/Wall Barrier Alternatives

There were eight design concepts developed for this category. The alternatives ranged from a common chain-link fence to elaborate concrete barriers. The fence/wall design alternatives are described in the following pages.

1A Chain Link Fence

1B Poles/Pilings/Bollards

1C Steel/Metal Fence

1D Block Wall

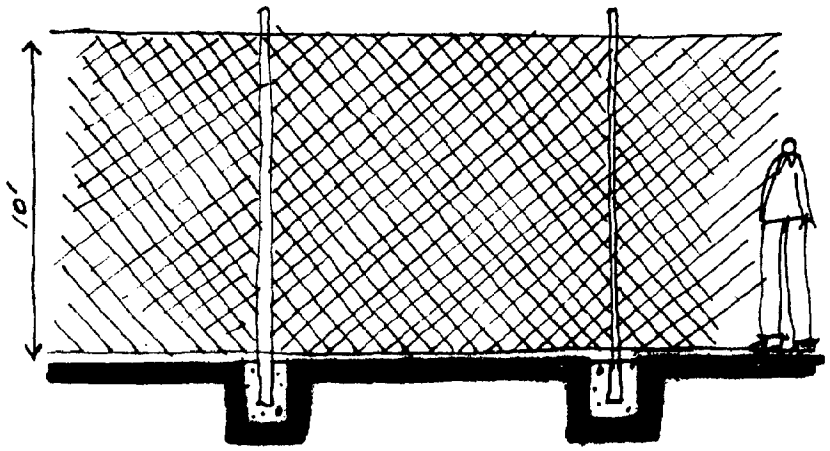
1E Concrete Wall

1F Fanwall Barrier

1G Caltrans Barrier

1H "Dragons" Teeth

1 FENCE / WALL BARRIERS

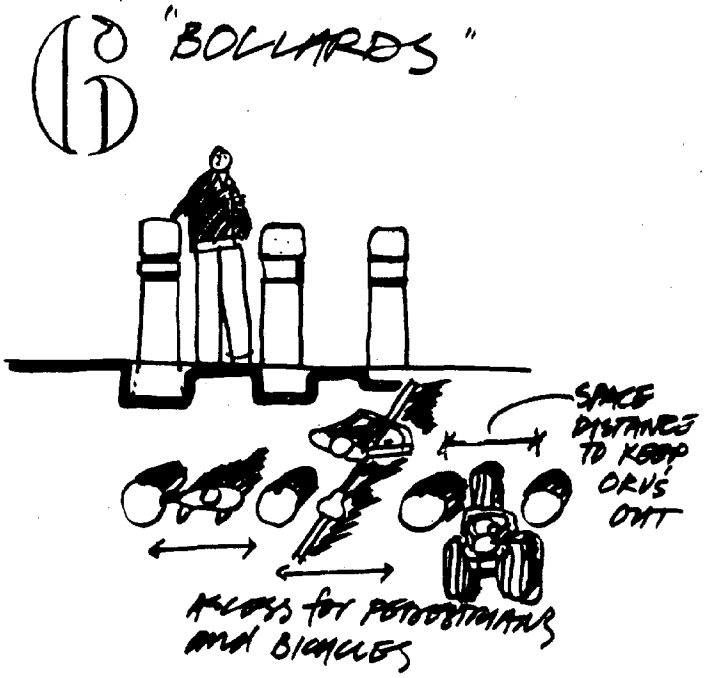


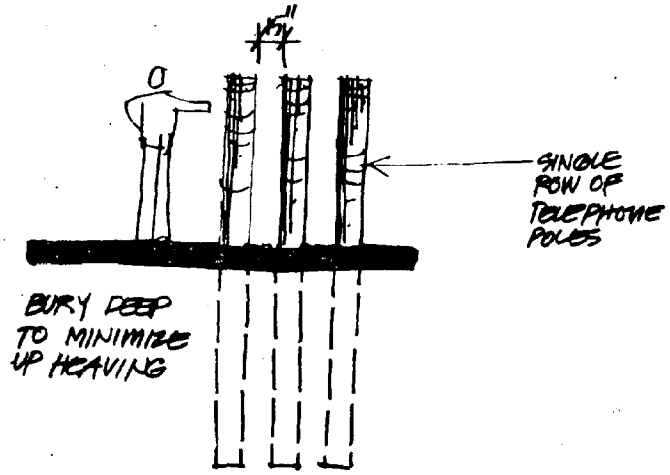
1A. CHAIN LINK FENCE

Advantages: low cost, easily maintained, made with easily obtainable material adaptable to other areas.

Disadvantages: low security and reliability, may be pulled out with ORV winch, low durability and may not be visually acceptable in some areas.

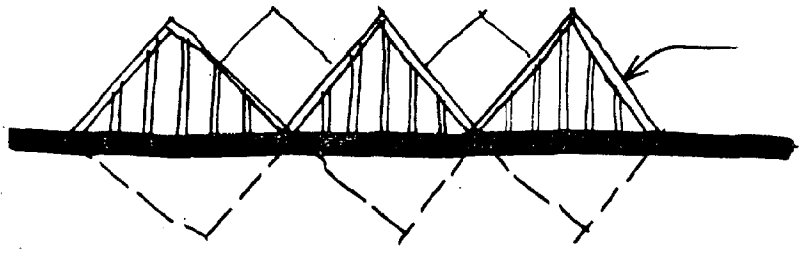
1B POLES / PILINGS / BOLLARDS





Advantages: costs, uses available materials, safe.

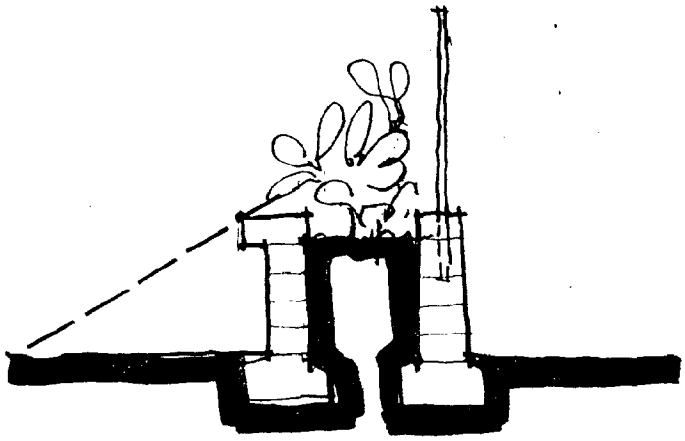
Disadvantages: some moderate maintenance, construction, security and environmental, compatibility problems.

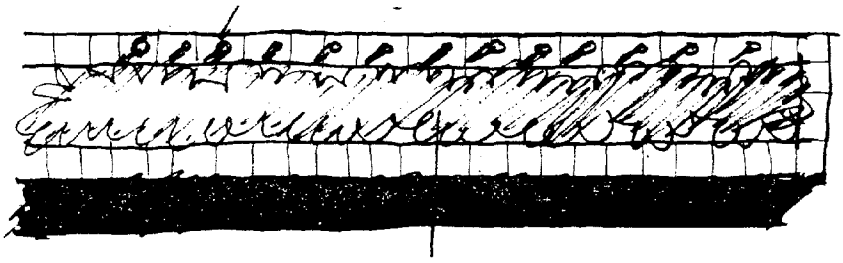


1C. STEEL / METAL FENCE

Advantages: durable, reliable secure.

Disadvantages: high costs, difficult to construct, high repair costs.

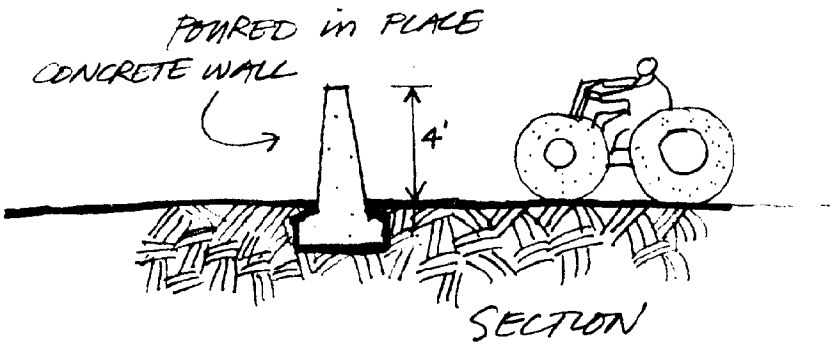




1D. BLOCK WALL

Advantages: low maintenance, durable, reliable, secure, adaptable to other areas.

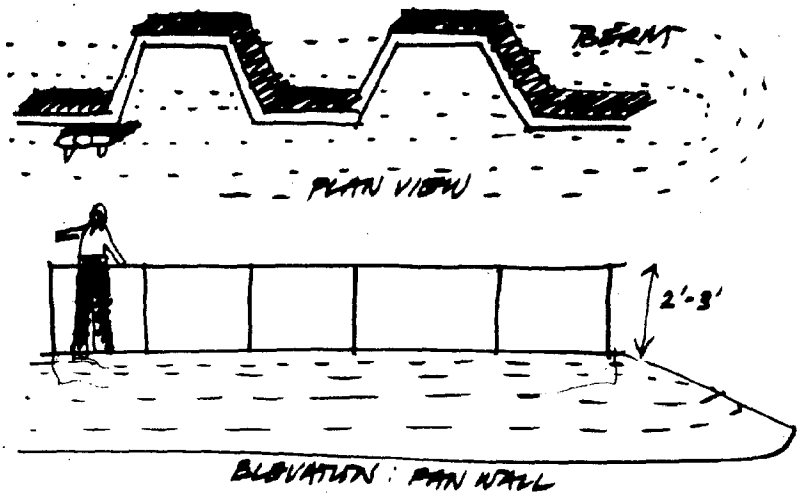
Disadvantages: costs, difficult to construct.



1E. CONCRETE WALL

Advantages: maintenance, durable, reliable, secure and adaptable

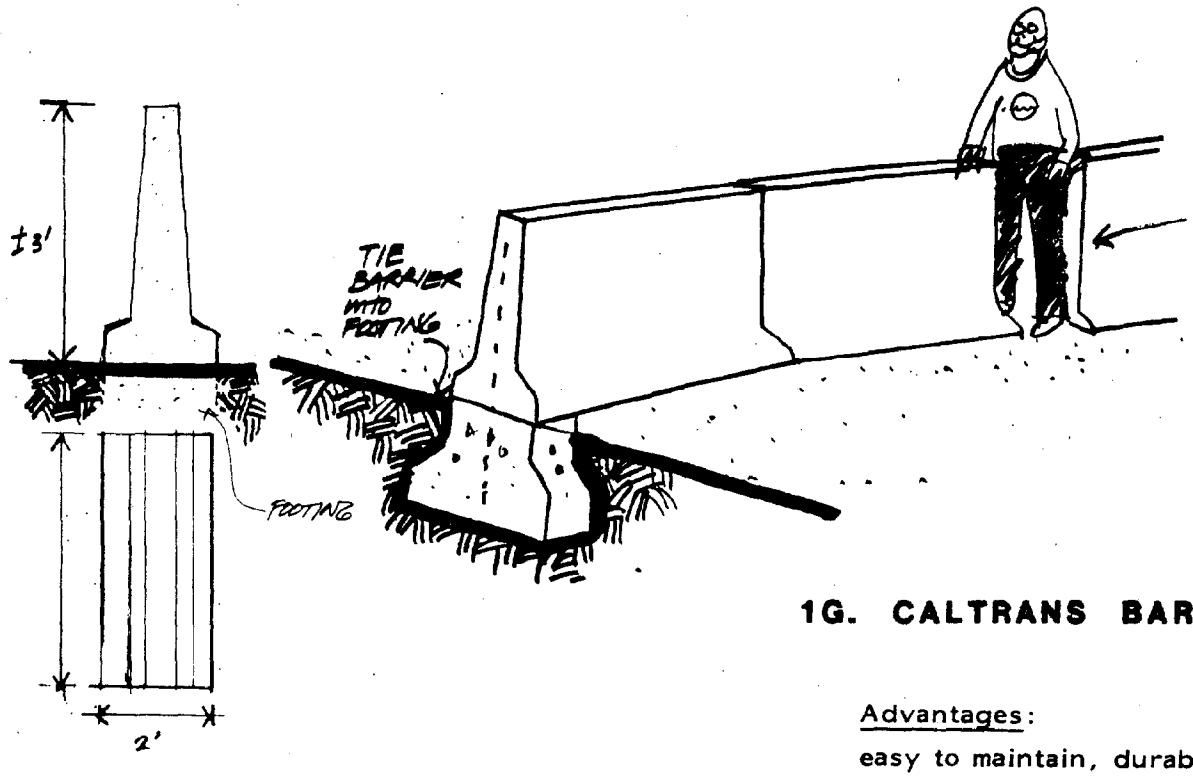
Disadvantages: construction and safety/liability problems



1F. FAN WALL BARRIER

Advantages: durable, reliable, secure

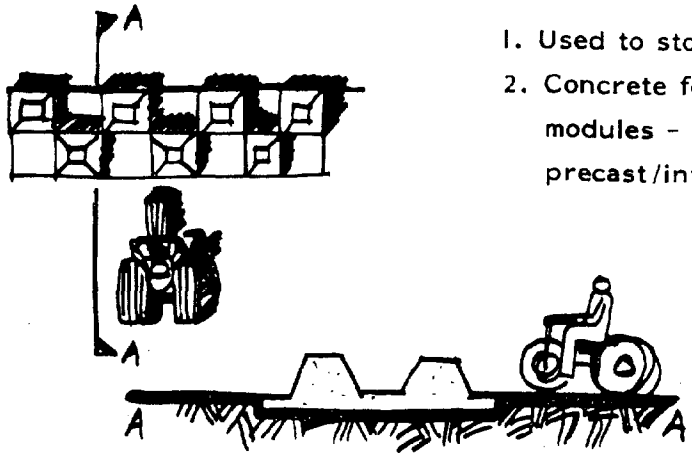
Disadvantages: high-moderate costs, difficult to construct, may not be compatible with environment.



1G. CALTRANS BARRIER

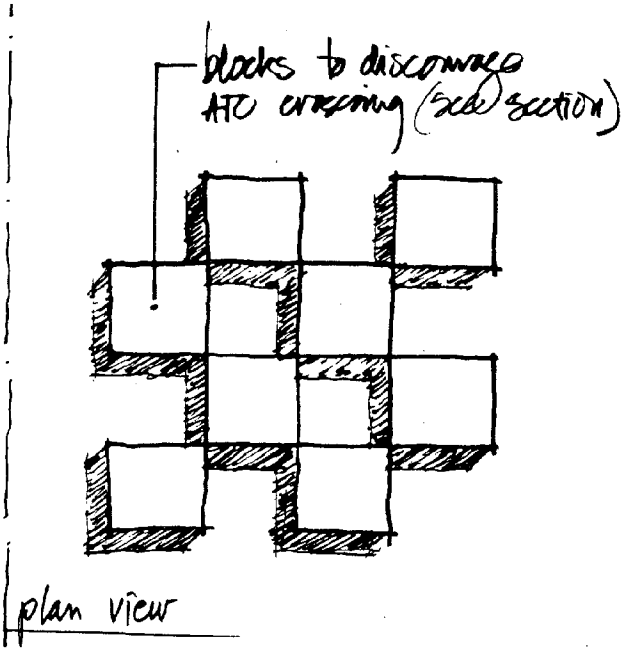
Advantages: easy to maintain, durable, reliable, secure, aesthetically pleasing, easy to build, requires no footings.

Disadvantages: moderate to high costs, may impact environment.



1. Used to stop tanks.
2. Concrete formed modules - maybe precast/interlocking.

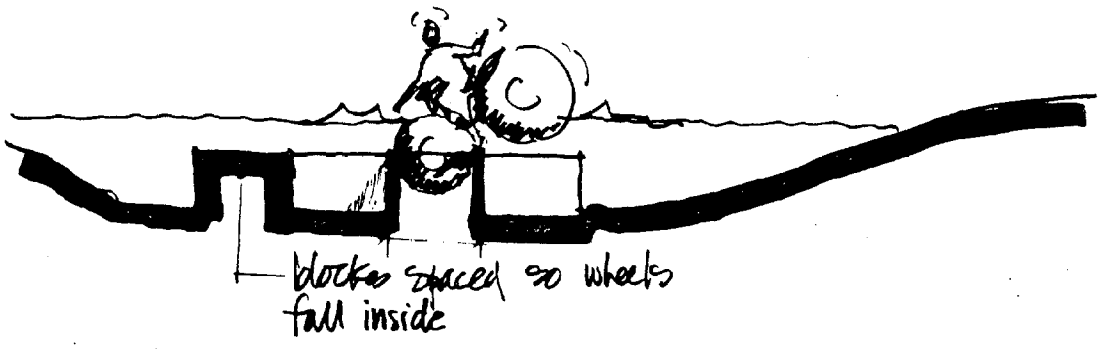
1H DRAGONS TEETH



Advantages:
durable, reliable, secure.

Disadvantages:
high-moderate costs, difficult to construct, may not be compatible with environment.

Some ATC and motorcycles can negotiate this barrier.



Variation in Shallow Ditch

Landform Barrier Alternative

There are eight design concepts in this category. These design concepts primarily focused upon the use of earth, large rocks and combination with man-made barriers. These concepts are described in the following pages.

2A Rocks/Boulders

2B Steep Berm

2C Multiple Berms

2D Berm/Fence/Wall

2E Berm & Ditch

2F Ha-Ha

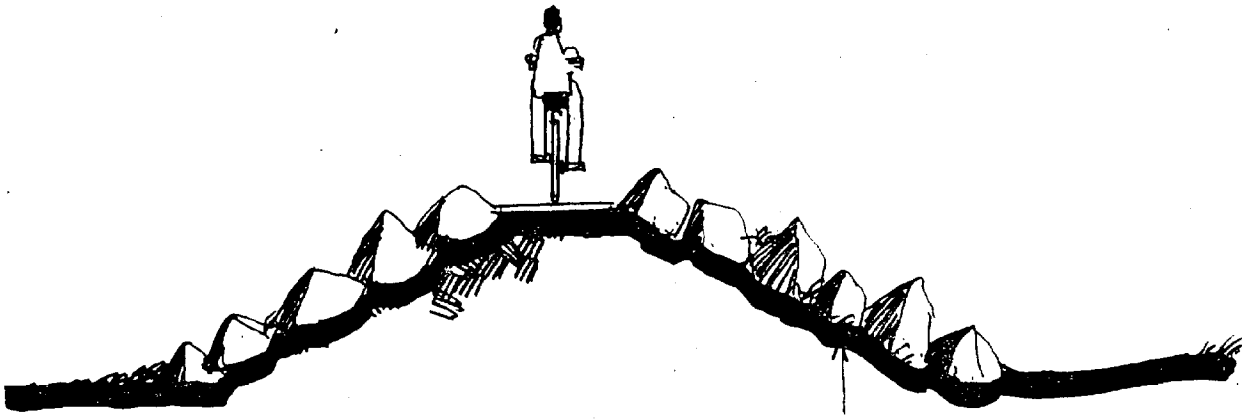
2G Berm & Hedgerow

2H Vegetation

2 LANDFORM BARRIERS

Advantages: low cost, easy to maintain, durable, reliable, available materials, easy to construct, secure, compatible with environment and adaptable to other areas.

Disadvantages: no major disadvantages.



2:1 Slope with Large Boulders

Variation at Beach Area

2A. ROCKS / BOULDERS

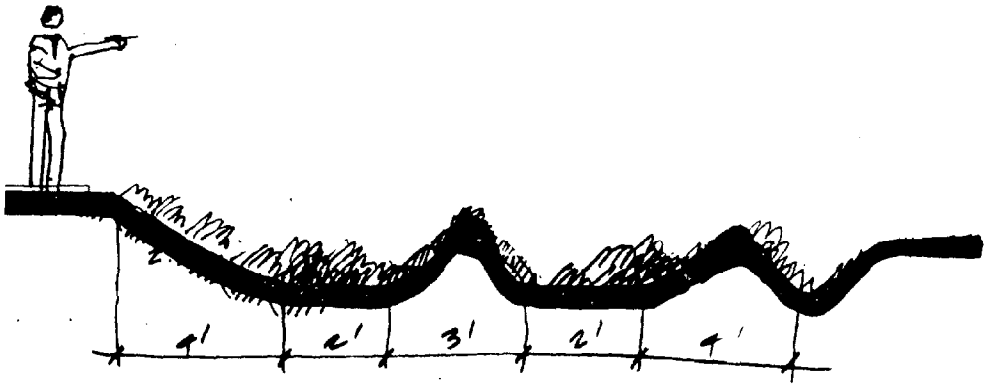
Advantages: low cost, made with available materials, easily constructed, safe, aesthetically pleasing, compatible with environment and adaptable to other areas.

Disadvantages: may require moderate maintenance.

2B. STEEP BERM

Advantages: low costs, reliable, made with available materials, easily constructed, secure, aesthetically pleasing, compatible with enviroment and adaptable to other areas.

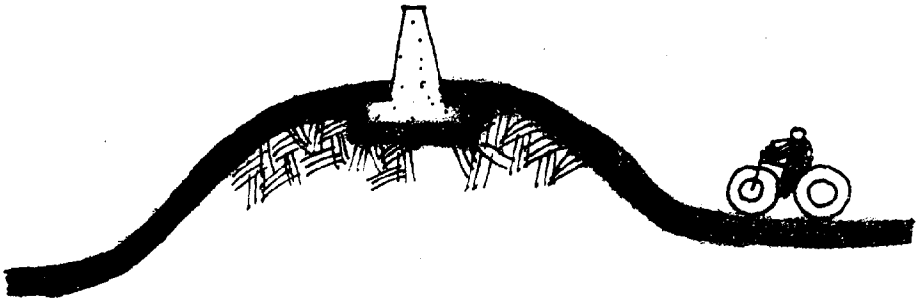
Disadvantages: moderate maintenance problems.



2C. MULTIPLE BERMS

Advantages: reliable, ease of construction, can be made with available materials, adaptable to other areas.

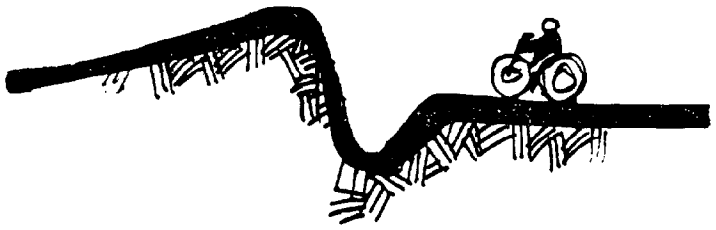
Disadvantages: moderate costs, maintenance and environmental compatibility problems.



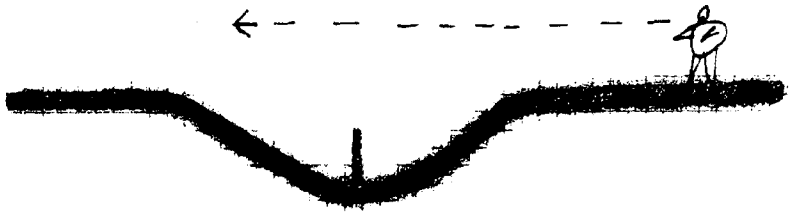
2D. BERM & FENCE OR WALL

Advantages: low cost, reliable, made with availalbe materials, easily constructed, secure, aesthetically pleasing, adaptable to other areas.

Disadvantages: some moderate maintenance, durability, safety and environmental problems.



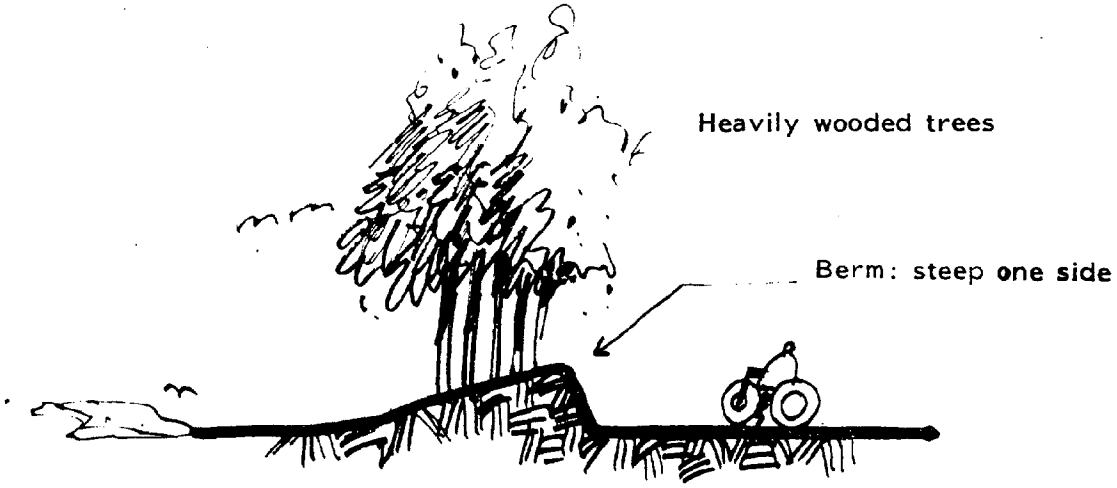
2E. BERM & DITCH



2F. HA - HA

Advantages: low cost, aesthetically pleasing

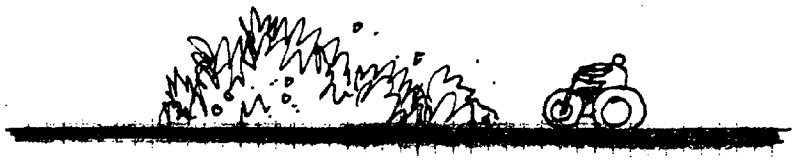
Disadvantages: safety/liability problems, moderate security, construction and adaptability problems.



Advantages: can be constructed with available materials, safe, aesthetically pleasing, compatible with environment and adaptable.

Disadvantages: moderate-high maintenance and costs, moderate security -- trees take a long time to mature.

2G. BERM & HEDGEROW



Advantage: safe and aesthetically pleasing

Disadvantage: maintenance, not durable or reliable, will not provide security

2H. VEGETATION

Water Barrier Alternatives

There are five design concepts in this category. The alternatives ranged from costly moats to simple ditch designs. These concept alternatives are depicted and described in the following pages.

3A Softside Channel/Dike

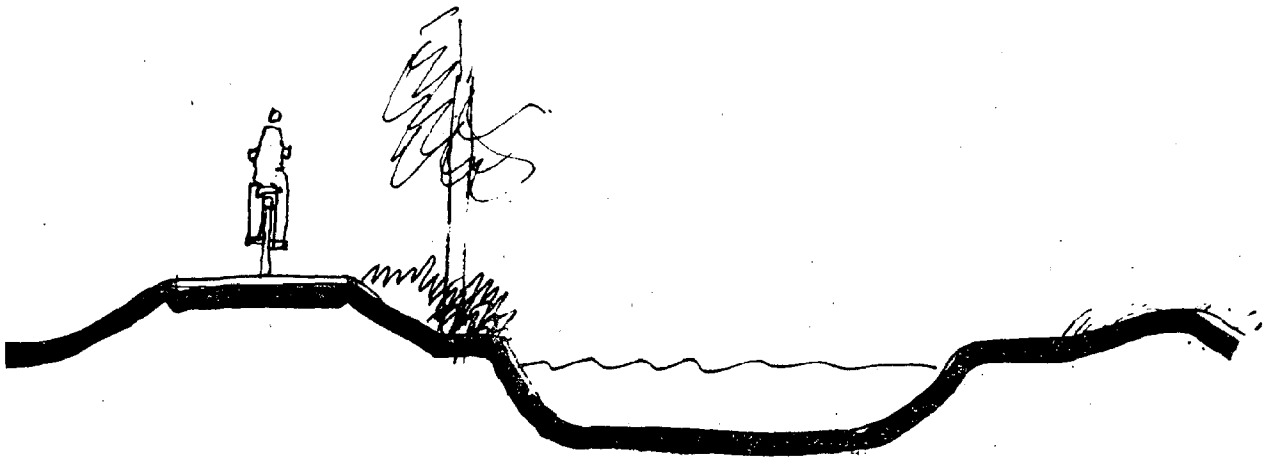
3B Moat

3C Shallow Channel/Dike

3D Narrow Channel/Dike

3E Ditch

3 WATER BARRIERS

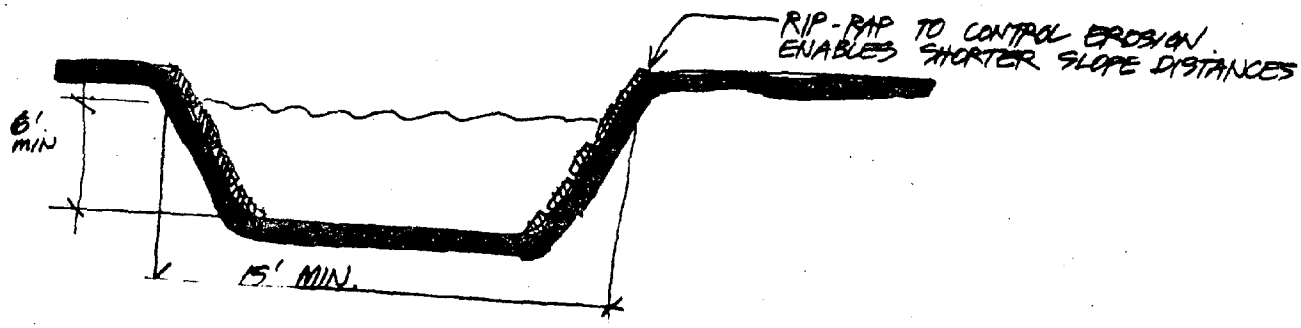


3A. SOFT SIDE CHANNEL / DIKE

Advantages: can be constructed with available materials, secure, aesthetically pleasing.

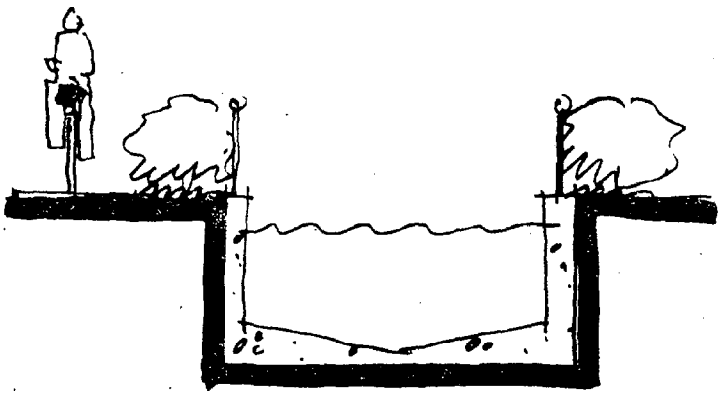
Disadvantages: may impact the environment and moderate problems due to costs, maintenance, construction, safety and adaptability.

3B. MOAT



Advantages: durable, reliable, safe and adaptable to other areas.

Disadvantages: high costs, maintenance, difficult construction.

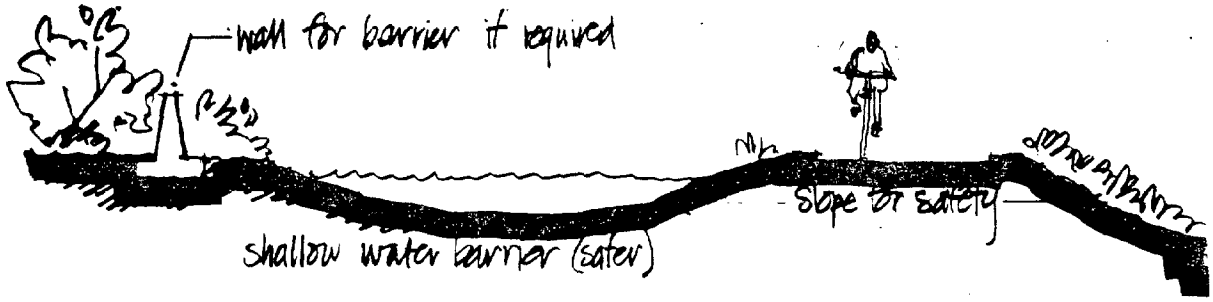


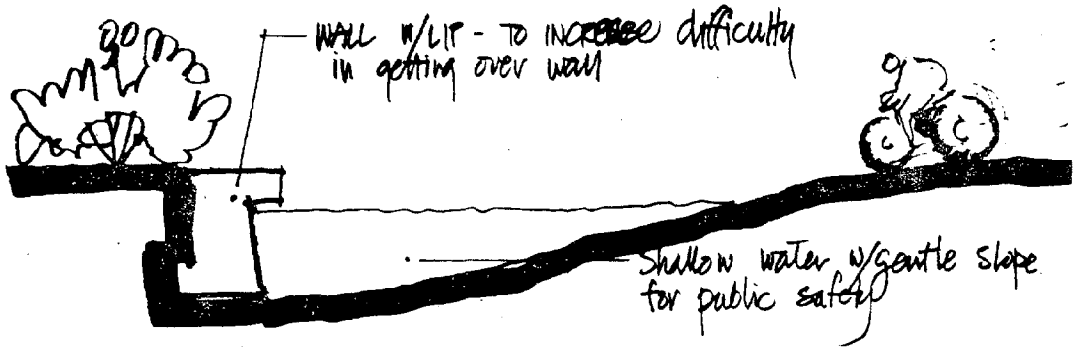
TYPICAL FLOOD CONTROL DEVICE CONCRETE CHANNEL W/FENCE and SCREENING PLANTS.

MOAT: FLOOD CONTROL VERSION

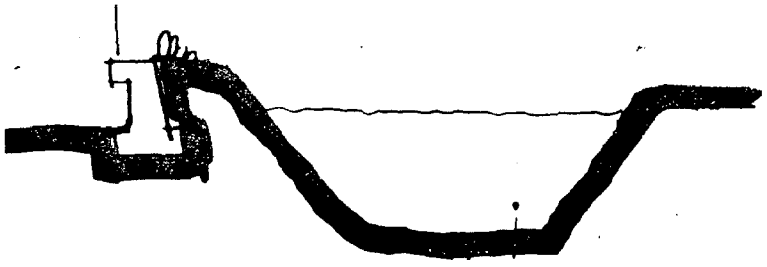
Advantages: ease of construction, can be made with available materials.

Disadvantages: impacts to environment: moderate probelms in regards to cost, maintenance, safety, security and adaptability.

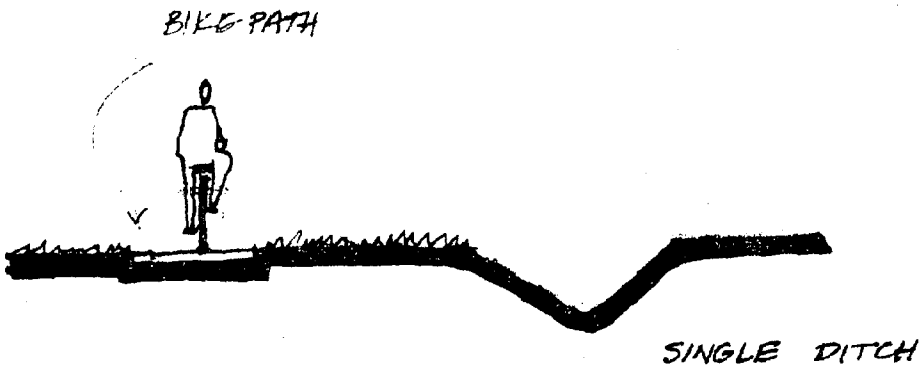


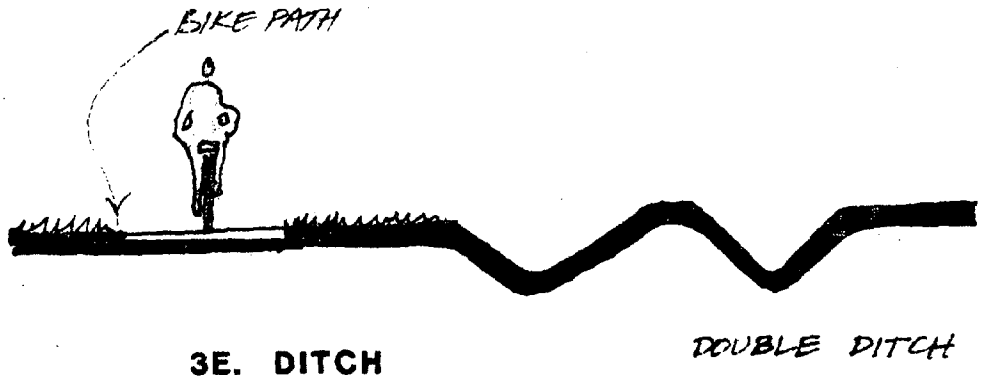


3C. SHALLOW CHANNEL / DIKE



3D. NARROW CHANNEL / DIKE





3E. DITCH

Advantages: low cost, ease of construction, available materials, secure and adaptable to other areas.

Disadvantages: moderate problems in regards to maintenance, durability, reliability, safety and environmental compatibility.

Controlled Access Alternatives

There are eight design concepts in this category. Primary design determinants for this category included emerfency vehicle access and the ability to withstand heavy abuse from vandals. The alternatives are summarized in the following pages.

4A Swivel Gate

4B Hinged Gate

4C Welded Steel Gate

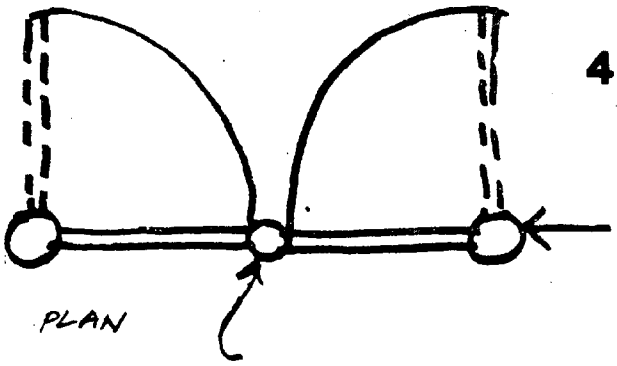
4D Space Frame Gate

4E Metal/Wood Gate

4F Concrete/Steel Gate

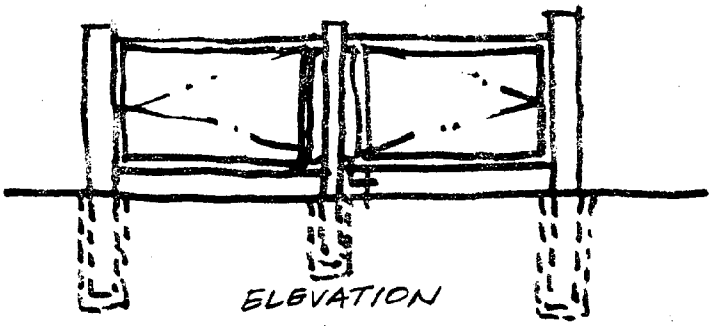
4G Drawbridge

4H Tire Puncture Devices



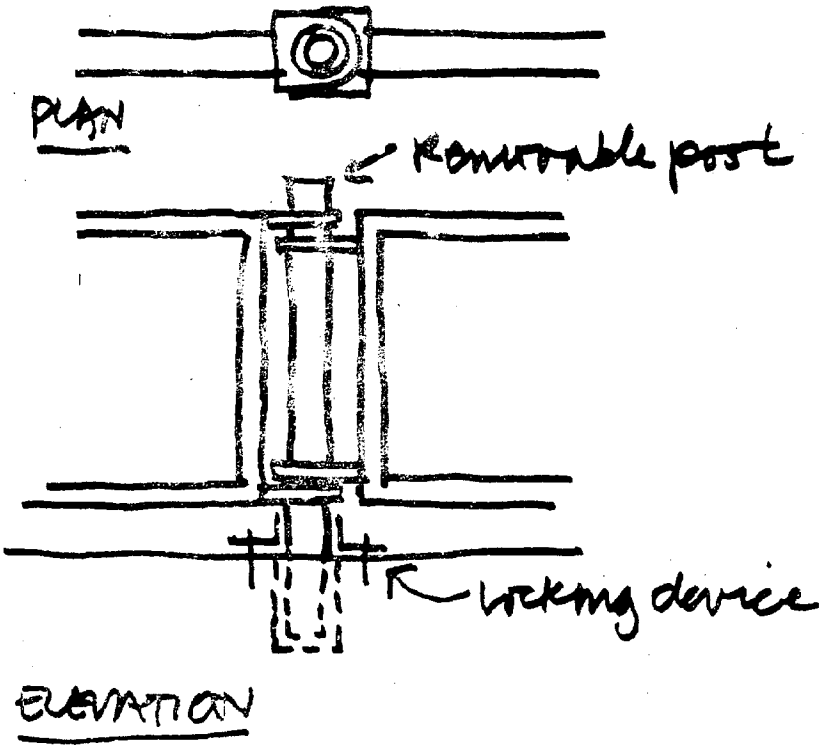
4 CONTROLLED ACCESS

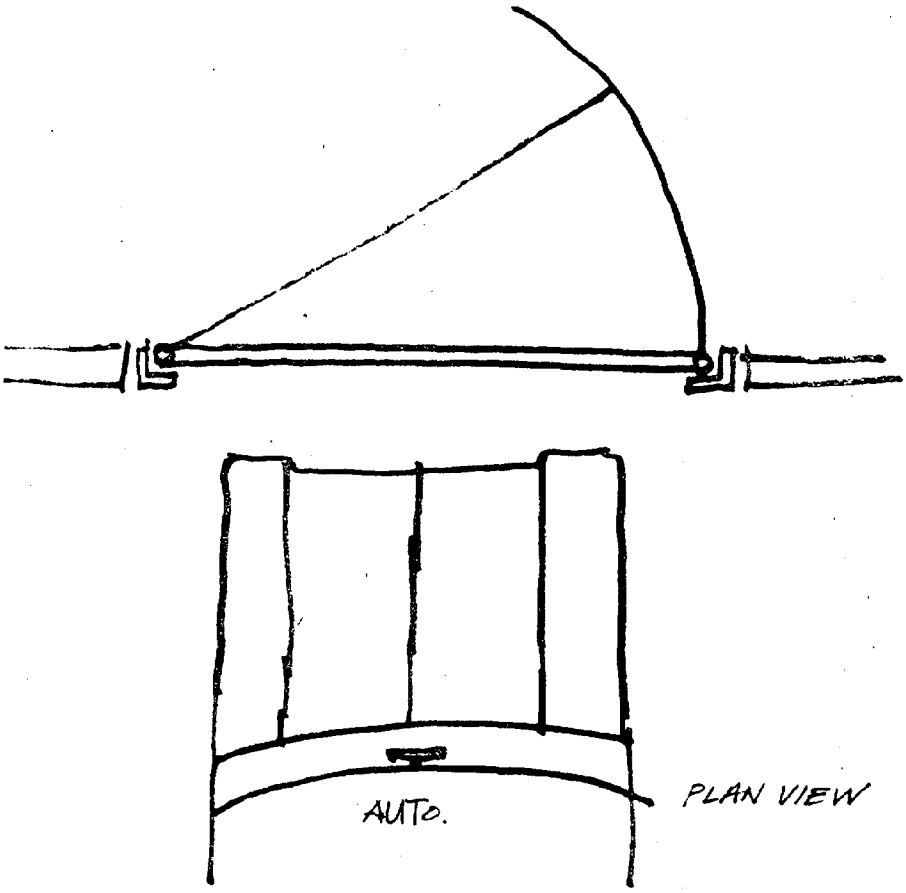
4A. SWIVEL GATE



Advantages: easy to maintain, durable, reliable, available materials, secure, safe, compatible, adaptable to other areas and has access for emergency vehicles.

Disadvantages: moderate problems in regards to cost, ease of construction, aesthetics.

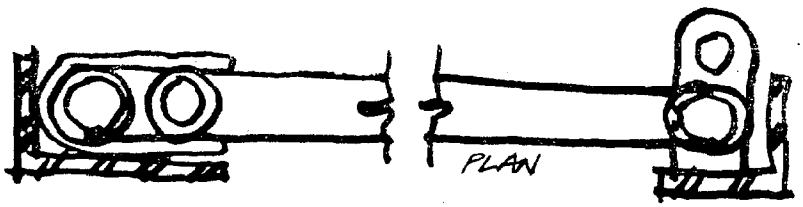


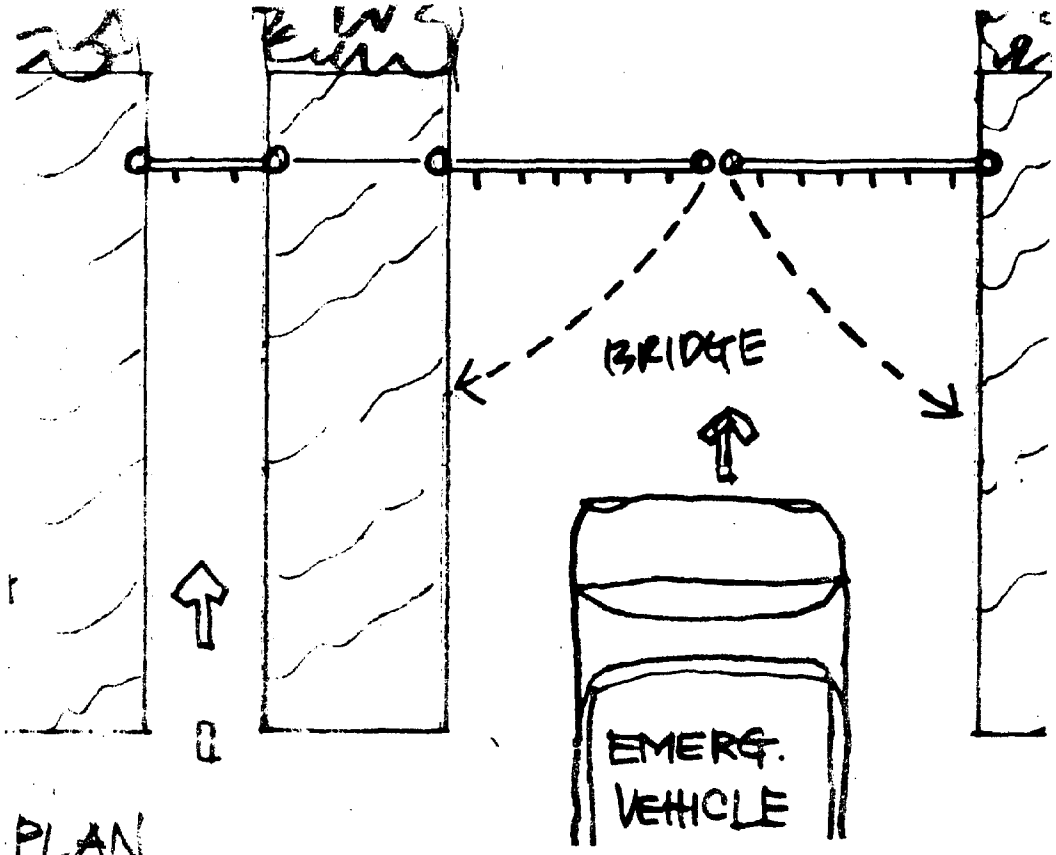


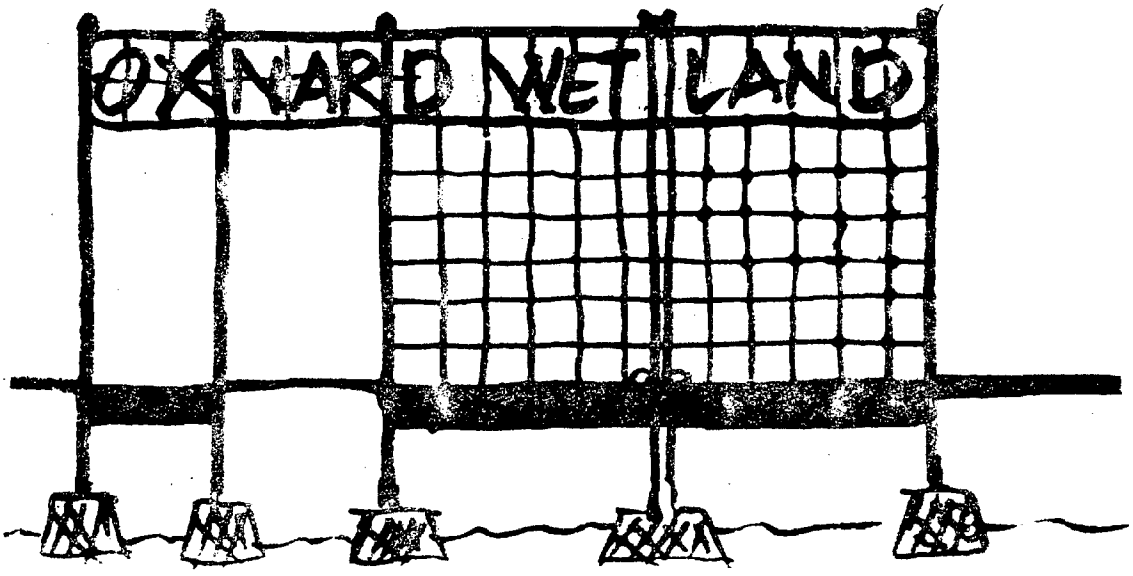
4B. HINGED GATE

Advantages: See 4 A

Disadvantages: See 4 A



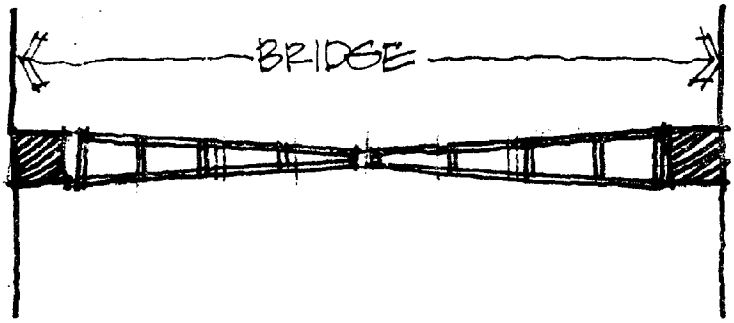




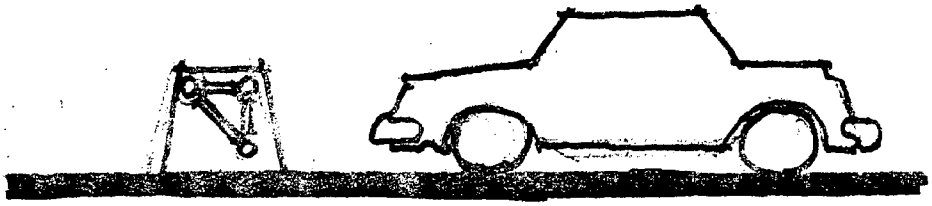
4C. WELDED STEEL GATE

Advantages: durable, reliable, secure, attractive, compatible, adaptable, provides for emergency access.

Disadvantages: cost, materials not easily available, difficult construction, safety.



PLAN VIEW

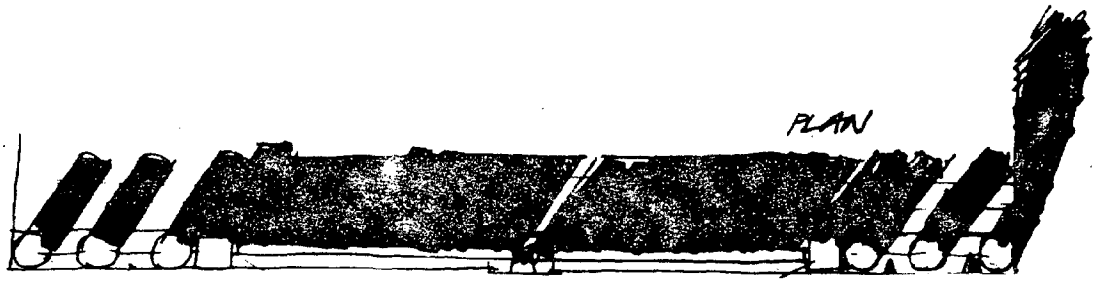


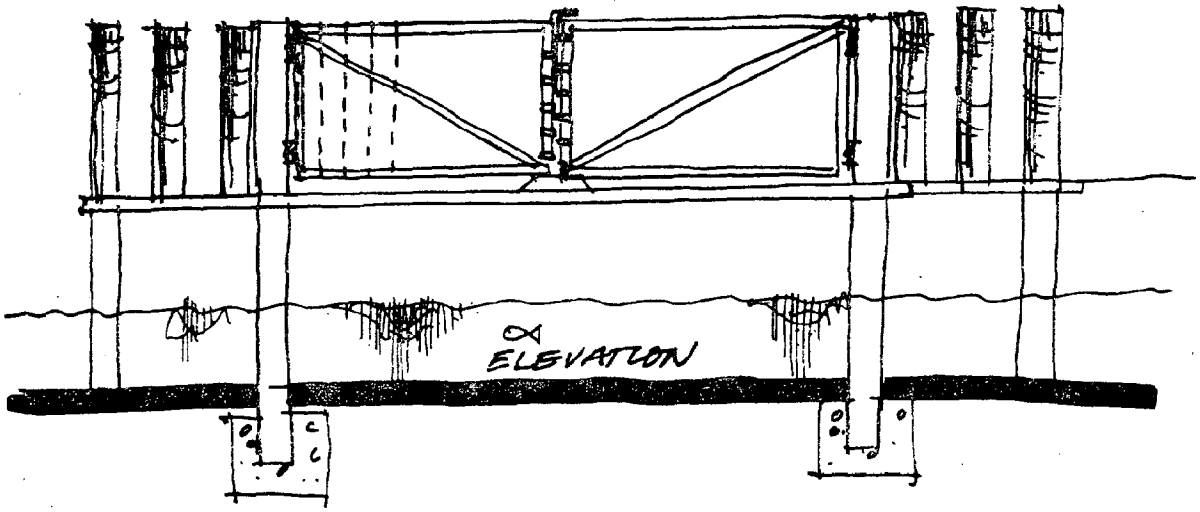
SECTION

4D. SPACE FRAME GATE

Advantages: costs, maintenance, reliable, ease of construction, adaptable and has access for emergency vechicles.

Disadvantgages: aesthetics, safety.

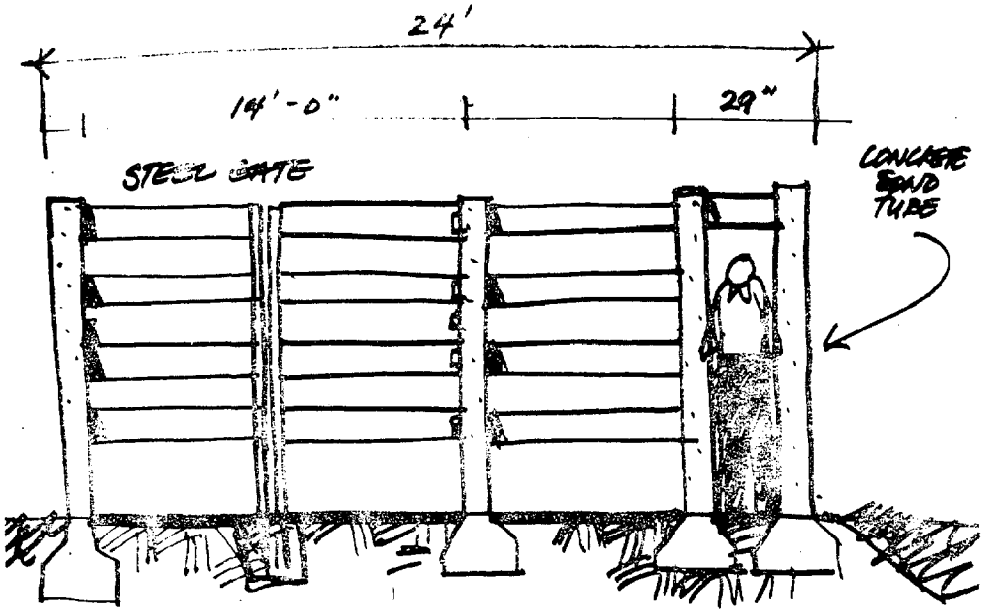


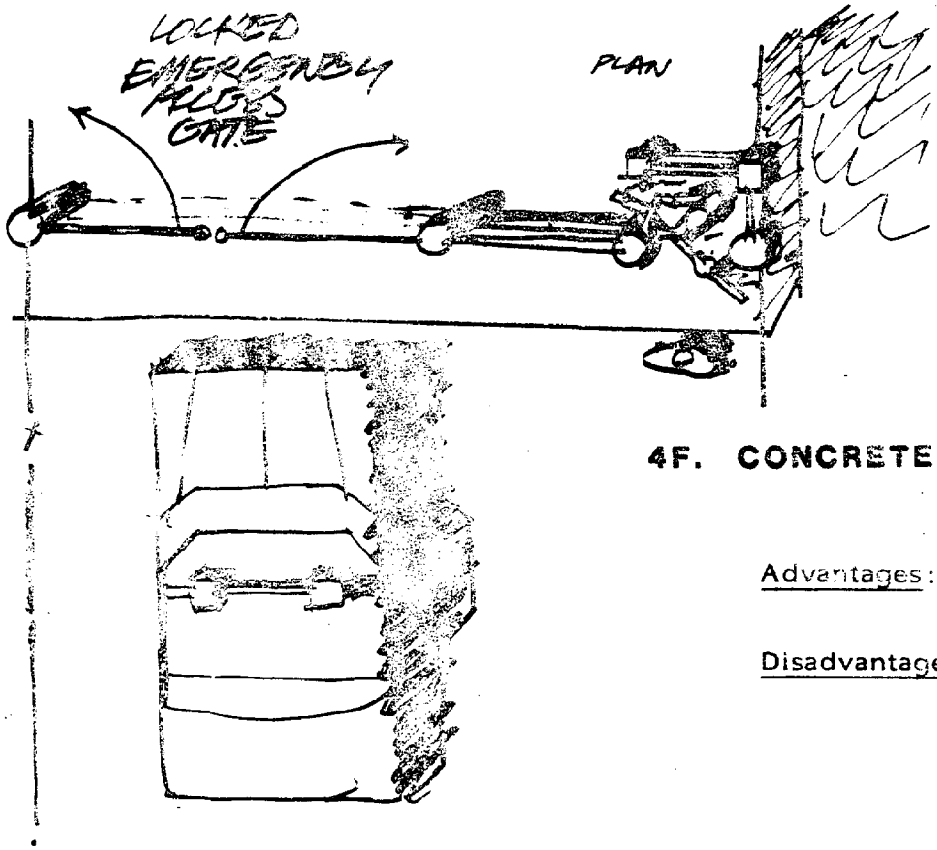


4E. METAL / WOOD GATE

Advantages: cost, reliability, available materials, safe, attractive, compatible, adaptable and allows emergency access.

Disadvantages: maintenance, durability, security.

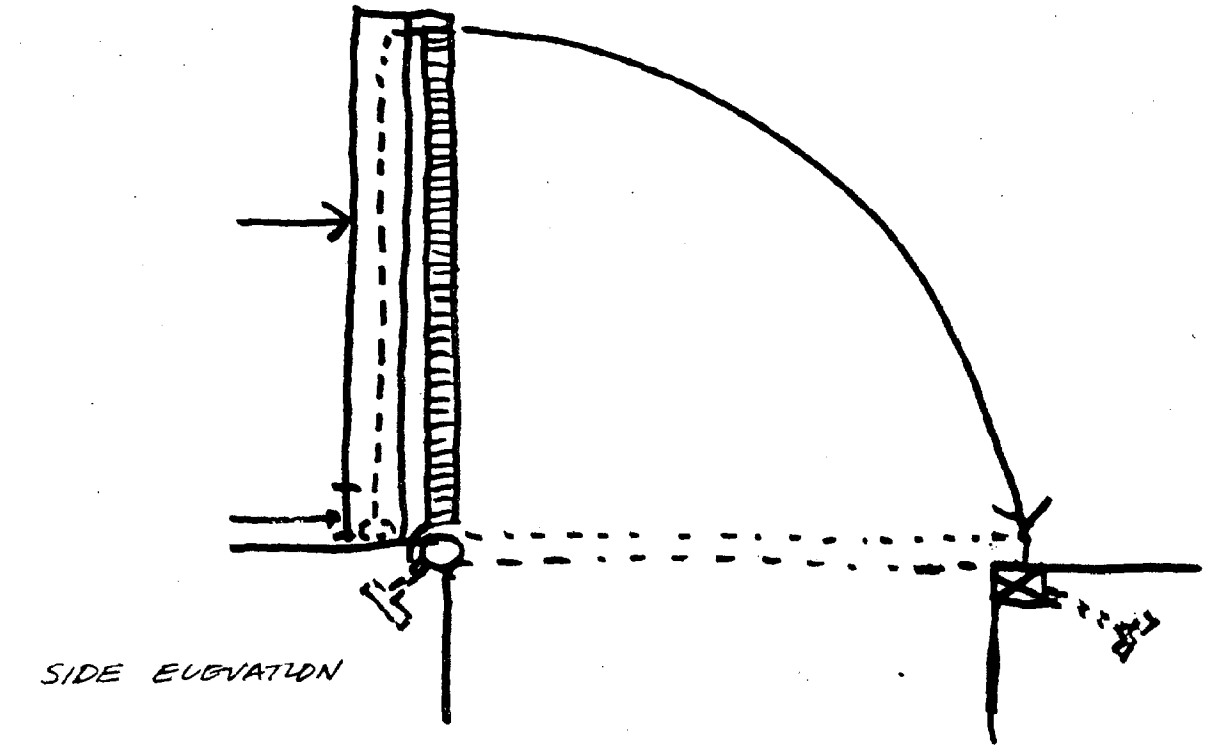


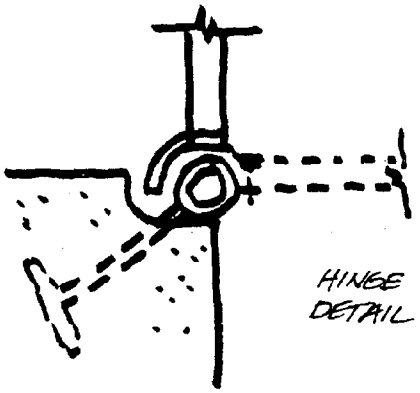


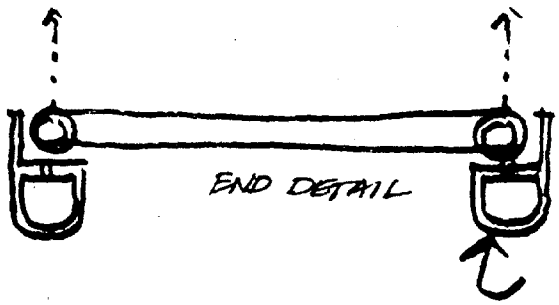
4F. CONCRETE / STEEL GATE

Advantages: See 4 A.

Disadvantages: See 4 A.







4G. DRAWBRIDGE

Advantages: durable, secure, compatible

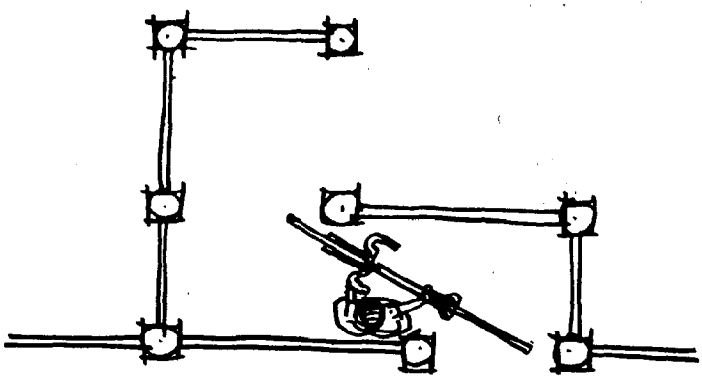
Disadvantages: costs, maintenance, difficult construction not easily adaptable to other areas,

Pedestrian/Bicycle Access Alternatives

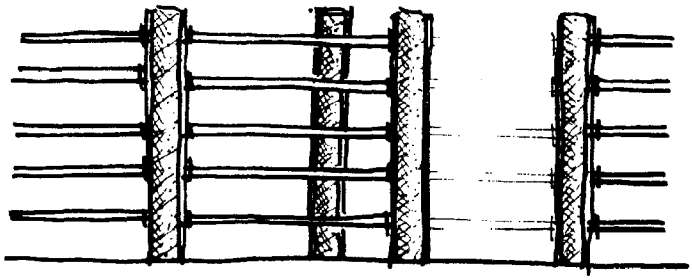
There were six design concepts for pedestrian and bicycle access. These concepts concentrated upon the exclusion of ORV's while providing pedestrian and bicycle access. These concepts are found in the following pages:

5A Concrete Pipe Maze
5B Handle Bar Constraints
5C Angled Wall
5D Wall w/ Bollard
5E Poles/Pilings
5F Elevation Change

5 PEDESTRIAN / / BICYCLE ACCESS



PLAN
SC.: 1/2"=1'-0"

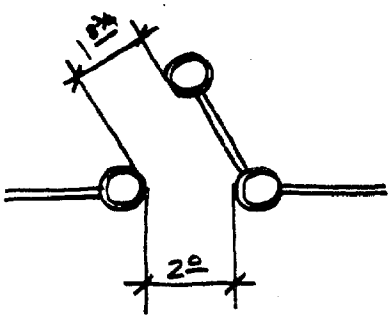


ELEVATION

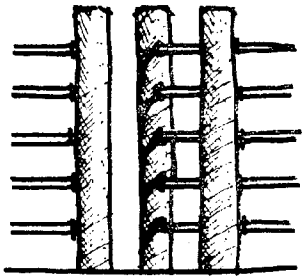
5A. CONCRETE PIPE MAZE

Advantages: durable, reliable, easily constructed with available materials, secure, safe, good pedestrian and bicycle access.

Disadvantages: moderate costs.



PLAN

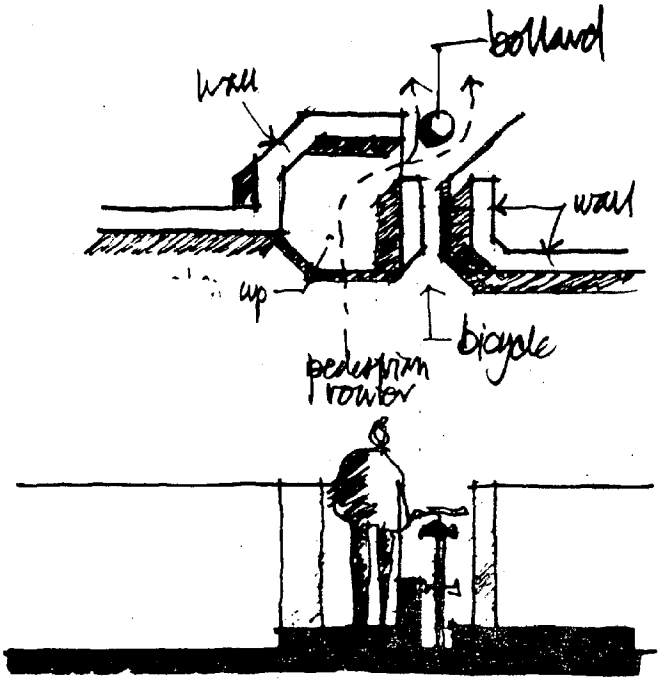


ELEVATION

5B. HANDLE BAR CONSTRAINTS

Advantages: durable, reliable, easy to build, from available materials, secure, good pedestrian and bicycle access and adaptable to other areas.

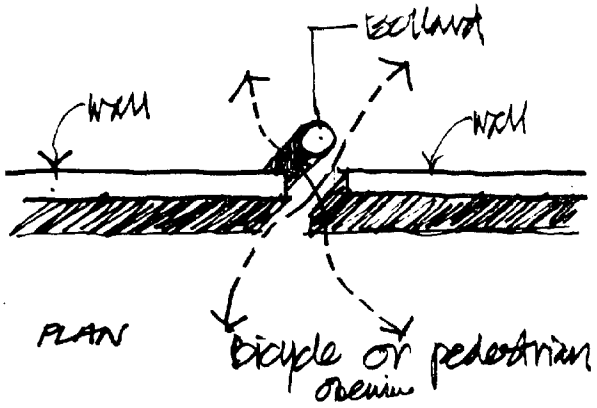
Disadvantages: moderate costs.



Advantages: maintenance, durable reliable, materials availalbe, safe, attractive, compatible, allows pedestrian and bicycle access.

Disadvantages: moderate problems with cost, construction, security and adaptibility.

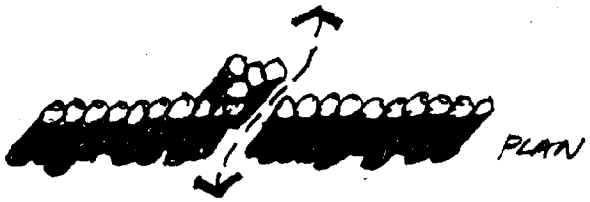
5C. ANGLED WALL

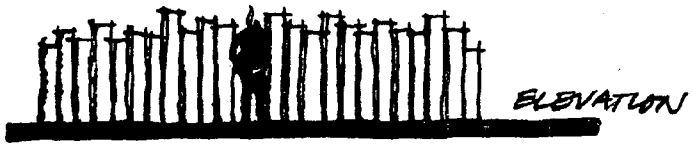


Advantages: same a 5 C above, with good adaptibility

Disadvantages: moderate problems with security, costs and construction.

5D. WALL / BOLLARD

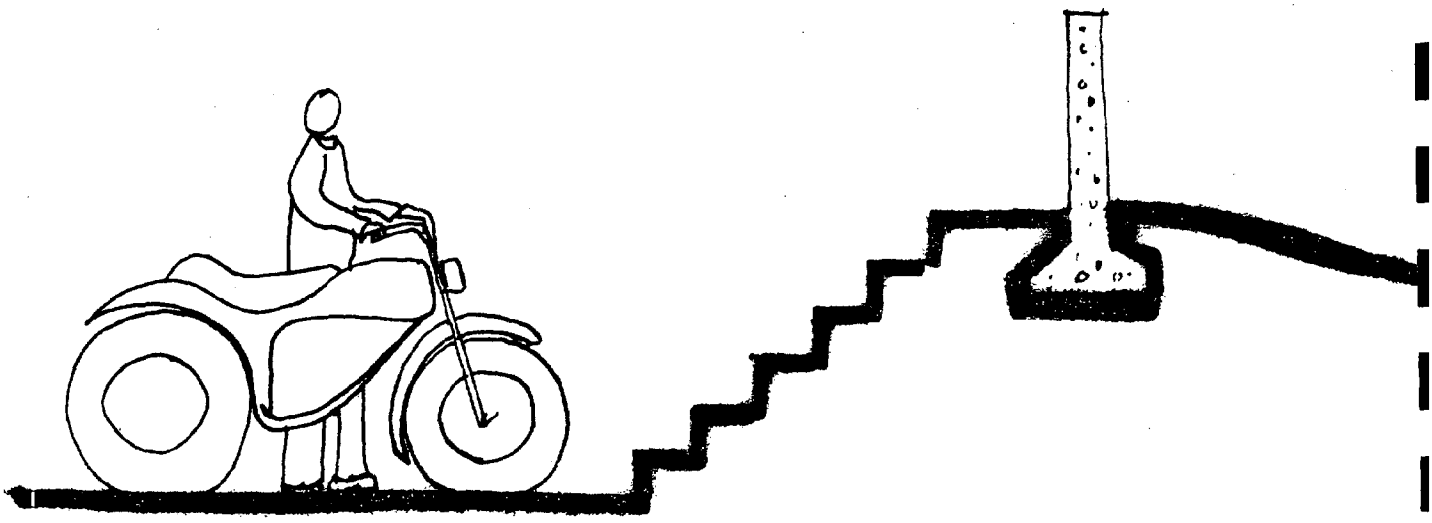




Advantages: See 1 B.

Disadvantages: See 1 B.

5E. POLES / PILINGS



5F. ELEVATION CHANGE

Advantages: cost, durability, available materials, ease of construction, secure, safe, compatible, adaptable and has access for bicycles and pedestrians.

Disadvantages: moderate problems w/maintenance, reliability and aesthetics.

DESIGN CONCEPT EVALUATION AND RECOMMENDATIONS

Each design concept was evaluated by arranging them with a matrix of evaluation factors consisting of the design criteria developed in the first part of this section. Each alternative was rated on the basis of its relative compatibility with each factor or criterion. In addition, two factors, enforcement capability and responsibility, were added to identify possible patrol and maintenance resonsibilities.

A preferred concept was selected for each of the five categories on the basis of cumulative scores. The evluations and rankings are summarized by the following paragraphs and tables.

Fenced/Wall Barriers

As indicated in Table 1, design concept 1G, Caltrans Barrier, a pre-cast modular wall, was ranked first. This alternative scored well in regards to cost, maintenance, ease of construction, security, safety and adaptability to other coastal areas.

1. FENCE/WALL BARRIERS

ACCESS/BARRIER DESIGN ALTERNATIVES	COST	MAINTENANCE	DURABILITY	RELIABILITY	AVAILABLE MATERIALS	EASE OF CONSTRUCTION	SECURITY	SAFETY/LIABILITY	AESTHETICS	ENVIRONMENTAL COMPATIBILITY	ADAPTABILITY				ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
A. CHAIN LINK FENCE	●	●	◉	◉	●	●	◉	●	◉	◒	◒	○	○	○	○	O,P		5
B. POLES/PILINGS/BOLLARDS	●	◒	◒	◒	●	◒	◒	●	◒	◒	◒	○	○	○	○	O,P		3
C. STEEL/METAL FENCE	◉	◒	●	●	◒	◉	●	●	◒	●	◒	○	○	○	○	O,P		3
D. BLOCK WALL	◉	●	●	●	◒	◉	●	◉	◒	◒	●	○	○	○	○	O,P		4
E. CONCRETE WALL	◒	●	●	●	◒	◉	●	◉	◒	◒	●	○	○	○	○	O,P		3
F. FAN WALL	◒	●	●	●	◉	◒	●	●	●	◉	◒	○	○	○	○	O,P		2
G. CALTRANS WALL	●	●	◒	●	●	●	●	●	◒	◒	●	○	○	○	○	O,P		1
H. "DRAGONS" TEETH	◒	◒	●	●	◉	◉	●	◒	◒	◉	◒	○	○	○	○	O,P		6

● HIGH COMPATIBILITY
◒ MODERATE COMPATIBILITY
◉ LOW COMPATIBILITY

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TABLE 1

Landform Barriers

Table 2, depicts design concept 2A. Rocks/Boulders ranked first. This alternative scored high in all categories and moderately high in the safety/liability category. This design solution has been used in other coastal areas for jetties and seawalls.

2. LANDFORM BARRIERS

ACCESS/BARRIER DESIGN ALTERNATIVES	COST	MAINTENANCE	DURABILITY	RELIABILITY	AVAILABLE MATERIALS	EASE OF CONSTRUCTION	SECURITY	SAFETY/LIABILITY	AESTHETICS	ENVIRONMENTAL COMPATIBILITY	ADAPTABILITY				ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
A. ROCKS/BOULDERS	●	●	●	●	●	●	●	◒	●	●	●	○	○	○	○	O,P		1
B. STEEP BERM	●	◒	◒	◒	●	●	◒	●	●	●	●	○	○	○	○	O,P		3
C. MULTIPLE BERMS	●	◒	◒	●	●	●	●	◒	●	●	●	○	○	○	○	O,P		2
D. BERM & FENCE/WALL	◒	◒	◒	●	●	●	◒	◒	●	◒	●	○	○	○	○	O,P		4
E. BERM & DITCH	●	◒	◒	●	●	●	●	◒	●	◒	●	○	○	○	○	O,P		3
F. HA-HA	●	◒	◒	◒	◒	◒	◒	⊙	●	◒	◒	○	○	○	○	O,P		5
G. BERM & HEDGEROW	◒	◒	◒	◒	●	◒	◒	●	●	●	●	○	○	○	○	O,P		4
H. VEGETATION	◒	⊙	⊙	⊙	◒	◒	⊙	●	●	◒	◒	○	○	○	○	O,P		6

● HIGH COMPATIBILITY
◒ MODERATE COMPATIBILITY
⊙ LOW COMPATIBILITY

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TABLE 2

Water Barriers

As indicated in Table 3, the water barrier design concept 3E, Ditch, was ranked first. In comparison to the other alternatives, this solution was the least cost while still providing security, ease of construction with available materials and adaptability to other coastal areas.

3. WATER BARRIERS

ACCESS/BARRIER DESIGN ALTERNATIVES	COST	MAINTENANCE	DURABILITY	RELIABILITY	AVAILABLE MATERIALS	EASE OF CONSTRUCTION	SECURITY	SAFETY/LIABILITY	AESTHETICS	ENVIRONMENTAL COMPATIBILITY	ADAPTABILITY				ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
A. SOFTSIDED CHANNEL/DIKE	◒	◒	◒	◒	●	◒	●	◒	●	⊙	◒	○	○	○	○	O,P		2
B. MOAT	⊙	⊙	●	●	◒	⊙	●	◒	●	◒	◒	○	○	○	○	O,P		3
C. SHALLOW CHANNEL/DIKE	◒	◒	◒	◒	●	●	◒	◒	●	⊙	◒	○	○	○	○	O,P		2
D. NARROW CHANNEL/DIKE	◒	◒	◒	◒	●	●	◒	◒	●	⊙	◒	○	○	○	○	O,P		2
E. DITCH	●	◒	◒	◒	●	●	●	◒	◒	◒	●	○	○	○	○	O,P		1
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			

● HIGH COMPATIBILITY
◒ MODERATE COMPATIBILITY
⊙ LOW COMPATIBILITY

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TABLE 3

Controlled Access

As Table 4 indicates, both design concepts 4A, swivel gate, and 4B, hinged gate, were ranked first. Both gates can probably withstand the anticipated abuse from vandals. These solutions would be adaptable to other coastal areas.

4. CONTROLLED ACCESS

ACCESS/BARRIER DESIGN ALTERNATIVES / EVALUATION FACTORS	COST	MAINTENANCE	DURABILITY	RELIABILITY	AVAILABLE MATERIALS	EASE OF CONSTRUCTION	SECURITY	SAFETY/LIABILITY	AESTHETICS	ENVIRONMENTAL COMPATIBILITY	ADAPTABILITY	EMERGENCY VEHICLE ACCESS			ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
A. SWIVEL GATE	◒	●	●	●	●	◒	●	●	◒	●	●	●	○	○	○	O,P S		1
B. HINGED GATE	◒	●	●	●	●	◒	●	●	◒	●	●	●	○	○	○	O,P S		1
C. WELDED STEEL GATE	⊙	◒	●	●	⊙	⊙	●	⊙	●	●	◒	●	○	○	○	O,P S		5
D. SPACE FRAME GATE	●	●	◒	●	◒	●	◒	⊙	⊙	●	●	●	○	○	○	O,P S		3
E. METAL/WOOD GATE	●	⊙	⊙	●	●	◒	⊙	●	●	●	●	●	○	○	○	O,P S		4
F. CONCRETE/STEEL GATE	◒	●	●	●	●	◒	●	●	◒	●	●	●	○	○	○	O,P S		2
G. DRAWBRIDGE	⊙	⊙	●	◒	◒	⊙	●	◒	◒	●	⊙	●	○	○	○	O,P S		6
H. TIRE PUNCTURE DEVICES	◒	●	●	◒	◒	◒	⊙	◒	◒	●	●	◒	○	○	○	O,P S		4

● HIGH COMPATIBILITY
◒ MODERATE COMPATIBILITY
⊙ LOW COMPATIBILITY

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TABLE 4

Pedestrian/Bicycle Access

Table 5 indicates two design concepts, 5A, concrete/pipe maze, and 5B, handlebar constraints, as ranking number one. Both design solutions scored high in almost all cate and moderately high in the cost category. Either design proposal would provide access for pedestrians and bicycyles and prohibit ORV entry.

5. PEDESTRIAN/ BICYCLE ACCESS

ACCESS/BARRIER DESIGN ALTERNATIVES	COST	MAINTENANCE	DURABILITY	RELIABILITY	AVAILABLE MATERIALS	EASE OF CONSTRUCTION	SECURITY	SAFETY/LIABILITY	AESTHETICS	ENVIRONMENTAL COMPATIBILITY	ADAPTABILITY	PEDESTRIAN ACCESS	BICYCLE ACCESS		ENFORCEMENT CAPABILITY	RESPONSIBILITY		Ranking
A. CONCRETE/PIPE MAZE	◐	●	●	●	●	●	●	●	●	●	●	●	●	○	○	O,P S		1
B. HANDLE BAR CONSTRAINTS	◐	●	●	●	●	●	●	●	●	●	●	●	●	○	○	O,P S		1
C. ANGLED WALL	◐	●	●	●	●	◐	◐	●	●	●	◐	●	●	○	○	O,P S		5
D. WALL w/ BOLLARD	◐	●	●	●	●	◐	◐	●	●	●	●	●	●	○	○	O,P S		4
E. POLES/PILINGS	●	●	●	●	●	●	◐	●	●	●	●	●	◐	○	○	O,P S		2
G. ELEVATION CHANGE	●	◐	●	◐	●	●	●	●	◐	●	●	●	●	○	○	O,P S		3
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			

● HIGH COMPATIBILITY
◐ MODERATE COMPATIBILITY
○ LOW COMPATIBILITY

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TABLE 5

COST ESTIMATES OF THE DESIGN ALTERNATIVES

The cost estimates for each design alternative are identified in the following pages. The costs are separated into three catagories: labor cost, material costs and total costs. These cost estimates are relative and are variable due to regional differences in labor and material costs. The estimates do not include the contractor's overhead, profit and contingency. Therefore, an additional 25% should be included in the final estimate. Local delivery costs should also be added to the material cost when delivery to the job site will be a significant part of the material costs.

The following abbreviations have been used in the cost estimate sheets:

CY	Cubic yards
EA	Each
GC	Gallon can size
K	Thousand
LB	Pounds
LF	Linear Feet
SF	Square Feet

Takata/Associates, Inc.
Urban Design/Environmental Planning/Landscape Architecture

JOB NO: 029
JOB : OXNARD WETLANDS ACCESS STUDY
DATE: MAY 4, 1982
BY:
CHECK:

COST ESTIMATE

SPEC NO.	DESCRIPTION	LABOR COSTS/HOUR	UNIT	UNIT COST	SUB-TOTAL	TOTAL $
1	**Fence/Wall Barriers**					
1A	CHAIN LINK FENCE	5.00	LF	2.80		7 80
1B	POLES/PILINGS/BOLLARDS	4.45	LF	3.85		8 30
1C	STEEL/METAL FENCE	-	SF	-		8 50
1D	BLOCK WALL	2.75	SF	2.15		4 90
1E	CONCRETE WALL	-	LF	-		90 00
1F	FAN WALL	-	SF	-		9 60
1G	CALTRANS BARRIER	-	LF	-		35 00
1H	DRAGONS TEETH	-	CY	-		295 00
1J	SNOW FENCE	.75	LF	1.50		2 75
2	**Land Form Barriers**					
2A	ROCKS/BOULDERS (RIP-RAP)	13.20	CY	13.80		27 00
2B	STEEP BERM	1.15	CY	2.75		3 90
2C	MULTIPLE BERM	1.15	CY	2.75		3 90
2D	BERM & WALL					
	1) BERM	1.15	CY	2.75		3 90
	2) BLOCK WALL	2.75	SF	2.15		4 90
2E	BERM & DITCH					
	1) BERM	1.15	CY	2.75		3 90
	2) DITCH	1.80	CY	1.95		3 75
2F	HA-HA (W/O FENCE)	1.15	CY	2.75		3 90
2G	BERM/HEDGEROW					
	1) BERM	1.15	CY	2.75		3 90
	2) HEDGEROW	46.00	15 GC	39		85 00
2H	VEGETATION	3.85	1 GC	3.85		7 70
3	Water Barriers					
3A	SHALLOW CHANNEL/DIKE	.40	CY	1.00		1 40
3B	MOAT					
	1) CHANNEL	.40	CY	1.00		1 40
	2) RIP-RAP	13.20	CY	13.80		27 00
3C	SHALLOW CHANNEL/DIKE	.40	CY	1.00		1 40
3D	NARROW CHANNEL/DIKE	.40	CY	1.00		1 40
3E	DITCH	1.80	CY	1.95		3 75

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JOB NO: 029
JOB : OXNARD WETLANDS ACCESS STUDY
DATE: MAY 4, 1982
BY:
CHECK:

COST ESTIMATE

SPEC NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUB-TOTAL	TOTAL
4	**Controlled Access**					
4A	SWIVEL GATE	-	EA	-	ALLOW	3 000 00
4B	HINGED GATE	-	EA	-	ALLOW	3 000 00
4C	WELDED STEEL GATE	,50	LB	,20		70
4D	SPACE FRAME GATE	2.30	SF	3.95		6 25
4E	METAL/WOOD GATE	-	EA	-	ALLOW	2 500 00
4F	CONCRETE/STEEL GATE	-	EA	-	ALLOW	4 000 00
4G	DRAWBRIDGE	VARIABLE	ALLOW	30 K	TO 80 K	
4H	TIRE PUNCTURE DEVICES	-	EA	-	ALLOW	5 000 00
5	**Pedestrian/Bicycle Access**					
5A	CONCRETE/PIPE MAZE	-	EA	-	ALLOW	4 600 00
5B	HANDLE BAR CONSTRAINTS	-	EA	-	ALLOW	2 700 00
5C	ANGLED WALL	2.75	SF	2.15		4 90
5D	WALL & BOLLARD	2.75	SF	2.15		4 90
5E	POLES/PILINGS	4.45	LF	3.85		8 30
5F	ELEVATION CHANGE					
	1) BERM	1.15	CY	2.75		3 90
	2) BLOCK WALL	2.75	SF	2.15		4 90
	3) STAIRS (CONCRETE)	-	CY	-		590 00

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