COASTAL ZONE
INFORMATION CENTER

THE SAN FRANCISCO BAY AREA SEAPORT PLAN

prepared for

The Metropolitan Transportation Commission

and

The San Francisco Bay Conservation & Development Commission

1982

HE
309
.S37
S32
1982

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

HE309.S37 S32 1982

SEAPORT PLANNING ADVISORY COMMITTEE

Member/Alternate[1]	Representing
Joseph C. Houghteling (Chairman)	San Francisco Bay Conservation & Development Commission
Michael Wilmar	San Francisco Bay Conservation & Development Commission
Doris W. Kahn (1st Vice-Chairman)	Metropolitan Transportation Commission
Robert I. Schroder/William F. Hein	Metropolitan Transportation Commission
Anne Diament	Association of Bay Area Governments[2]
M.E. Hardin/Ann Hansen	California Department of Transportation - District 4
Lt. Col. Edward M. Lee, Jr./ Dennis Thuet	U.S. Army Corps of Engineers, San Francisco District
Samuel W. Galston/John Pullen	U.S. Maritime Administration, Western Region
John Couch/Katherine Strehl	Bay Area Council
Marcella Jacobson/Esther Gulick	Save San Francisco Bay Association
George B. Plant/Adam Vincent	Port of Benicia
Cheng Ben Wang	Encinal Terminals
Walter B. Abernathy (2nd Vice-Chairman)/Gerald Pope	Port of Oakland
L. Meek Mauk/Peter Mel Hughes	Port of Redwood City
John Sheridan/Eugene Serex	Port of Richmond
Jack Morrison/Ed David or Anthony Taormina	Port of San Francisco

PARTICIPATING AGENCY STAFF

Dennis R. Fay, Project Manager	Metropolitan Transportation Commission
Philip Kern	San Francisco Bay Conservation and Development Commission
Jack Knecht[3]	U.S. Maritime Administration
Dennis Thuet	U.S. Army Corps of Engineers
Frank Boerger	Consultant, NORCAL

---

1 A.W. Gatov was the first Chairman of the Committee serving until his death in November 1978. Past members or alternates are: T. J. Patterson, Jr., Col. Paul Bazilwich, Jr., Thomas Corcoran, Thomas Price, Fred Di Pietro, William R. Lucius, Col. John M. Adsit, Milt Louie, Jack Knecht, Thomas R. Eddy, Charles R. Roberts, Elizabeth Osborn, Hugh Converse, Joe Dudziak, Thomas Soules, Greg Moore, Quentin Kopp, Col. Henry A. Flertzheim, Joseph E. Delsol, and Ben E. Nutter.

2 ABAG may designate two members to the Committee; the second appointment is currently vacant.

3 Mr. Knecht is no longer with the Maritime Administration (MarAd), but did represent MarAd throughout the period while the technical studies were being conducted.

Table of Contents

		Page
I.	INTRODUCTION	1
	Bay Area Ports	2
	Steamship Lines	5
	Issues	5
II.	PLAN IMPLEMENTATION	6
	Responsible Organizations	6
	Agency Background	6
	Project Review Coordination	7
III.	FINDINGS, POLICIES AND RECOMMENDATIONS	9
	Findings	9
	Policies	21
	Recommendations	27
	Maps	28
IV.	FACILITY IMPROVEMENTS	40
	Marine Terminals	40
	Channels	40
	Ground Transportation Facilities	41
Glossary		45
References		49

List of Tables

Table Number		Page
1	San Francisco Bay Area Cargo Forecast: Dry Cargo--Baseline Forecast	11
2	San Francisco Bay Area Cargo Forecast: Dry Cargo--High and Low Forecasts	12
3	Demand for New Marine Terminals Through 2000	22
4	Site Names and Key to Their Location	31 & 32
5	Transportation Actions of Regional Concern	43

List of Figures

Figure Number		
1	San Francisco Bay Area Ports	3
2	West Coast Port Development--Chronology	4
3	Forecasts of Waterborne Dry Cargo	10
4	Lead Time Consideration	15
5	San Francisco Bay Deepwater Channels	42

List of Maps

Map Number		
1	Marine Terminal Development Sites and Port Priority Use Areas - Richmond	33
2	Marine Terminal Development Sites and Port Priority Use Areas - Oakland/Alameda	34
3	Marine Terminal Development Sites and Port Priority Use Areas - Redwood City	35
4	Marine Terminal Development Sites and Port Priority Use Areas - San Francisco	36
5	Marine Terminal Development Sites and Port Priority Use Areas - Carquinez Straits	37
6	Marine Terminal Development Sites and Port Priority Use Areas - Benicia	38
7	Marine Terminal Development Sites and Port Priority Use Areas - Suisun Bay	39

I. INTRODUCTION

The Seaport Plan for the San Francisco Bay Area is the result of a cooperative effort sponsored by the Metropolitan Transportation Commission (MTC) and the San Francisco Bay Conservation and Development Commission (BCDC). The Plan responds to state law requiring a maritime element to MTC's Regional Transportation Plan and to BCDC's original Bay Plan policy that called for a regional port development plan. MTC and BCDC set forth the following goals for the Seaport Plan:

- Ensure the continuation of the San Francisco Bay Port system as a major world port and contributor to the economic vitality of the San Francisco Bay Region.
- Maintain or improve the environmental quality of San Francisco Bay and its environs.
- Provide for the efficient use of finite physical and fiscal resources consumed in developing and operating marine terminals.
- Provide for integrated and improved surface transportation facilities between San Francisco Bay Ports and terminals and other regional transportation systems.

To assist in developing the Seaport Plan, MTC and BCDC created the Seaport Planning Advisory Committee. The Committee consists of representatives from various local, state and federal agencies, from the six Bay Area ports, and from environmental and development interest groups. It met over a period of several years and oversaw the preparation of extensive technical studies which are summarized in the Final Technical Report for the planning project. This Plan is the result of extensive deliberations by the Committee.

The Seaport Plan focuses on marine terminals, and more specifically on marine terminals where the transfer of cargo is the primary activity of the business entity operating on the shore. Bay Area marine terminal facilities that serve a manufacturing activity were not analyzed. At present, all marine terminal facilities of concern to this Plan are located within the jurisdictions of the six Bay Area ports: Benicia, Oakland, Redwood City, Richmond, San Francisco, and Encinal Terminals in Alameda. The Plan also addresses the need for privately owned crude oil terminals, due to the large volume of crude oil shipped into the Bay Area. It does not, however, address the development of the Ports of Stockton and Sacramento, which are beyond the jurisdiction of both MTC and BCDC.

On October 27, 1982, MTC adopted revisions to the Regional Transportation Plan including a maritime element based on this Plan. Most important of the policies in the maritime element is Policy 5.1 which states that the Seaport Plan "shall guide MTC in its decisions on seaport development and related proposals for transportation and land use development." MTC also certified the environmental impact report for the Seaport Plan on this date. On December 2, 1982, BCDC adopted the Seaport Plan as part of the Bay Plan. This was accomplished by adopting summary policies which incorporated the Seaport Plan into the Bay Plan by reference, by adopting the findings, policies, recommendations and maps section of the Seaport Plan, and by making other revisions to the text and maps of the Bay Plan and Special Area Plan No. 1.

As a result of public hearings and discussions held by both commissions, changes were made to the original recommendation of the Seaport Planning Advisory Committee. These changes were incorporated in the Plan on which the two commissions acted and have been included in this document. The changes were also endorsed by the Committee.

BAY AREA PORTS

There are six publicly-used ports in the San Francisco Bay Area (see Figure 1). Each of these ports was developed to provide a needed service.

With the advent of the gold rush in 1850, the city of San Francisco rapidly developed, becoming the only major port on the West Coast. Virtually all of the other Bay Area ports were started by an operator offering service to and from San Francisco. San Francisco continued as the major Bay Area port until consolidation of cargo into containers revolutionized shipping in the 1960s. It is still the major break bulk port in the region and provides container handling facilities at two terminals.

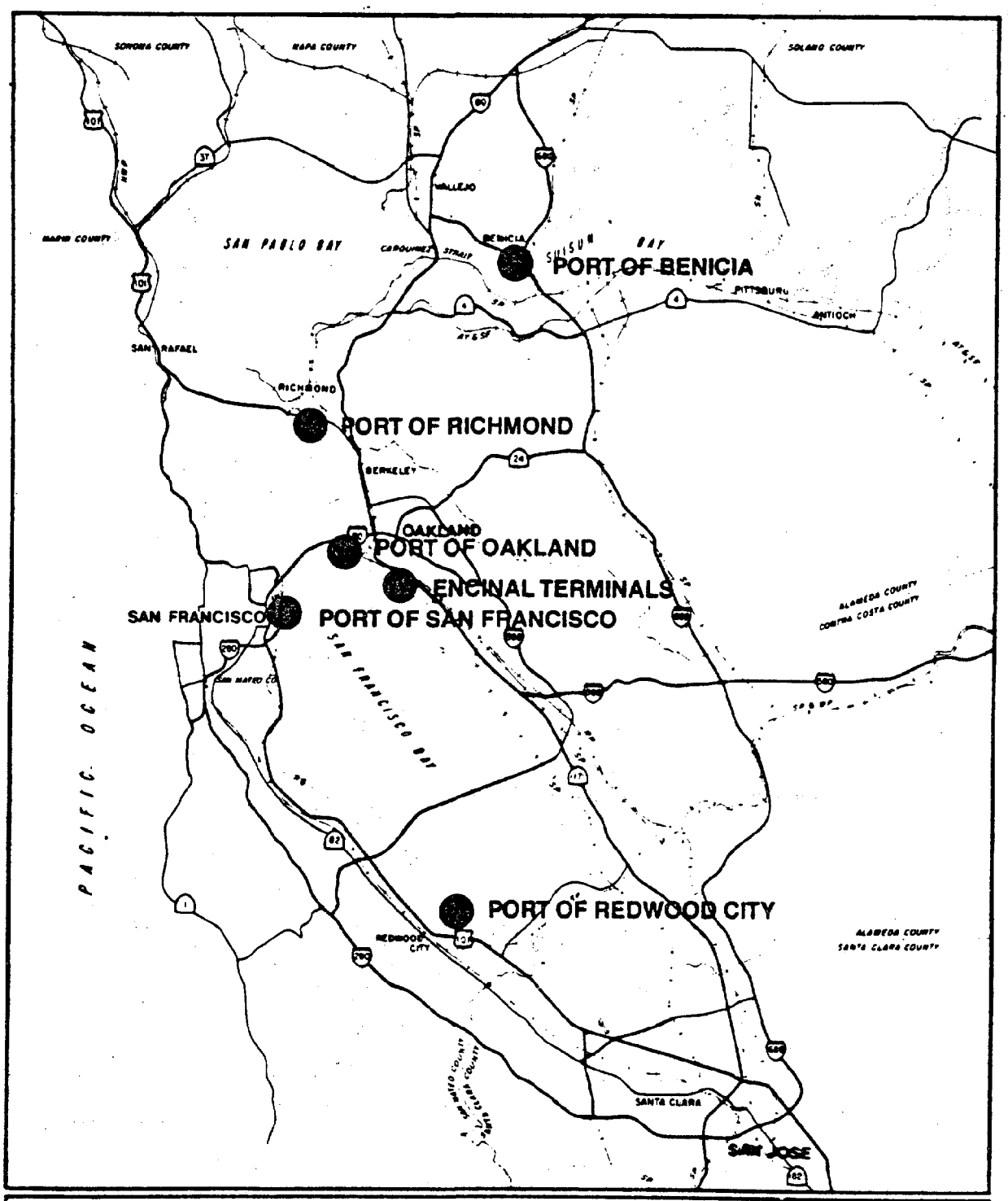
Oakland established a separate port authority in the 1920s, but it developed slowly until the advent of containerization. Good rail connections and the large amount of available land contributed to Oakland's rapid development of container terminals and emergence as the major Bay Area port.

Alameda shares the Oakland Estuary with Oakland, and port activity began by offering service to San Francisco. Encinal Terminals in Alameda was formed in 1924, and has become a major steel importing point. It is also developing modernized container facilities.

After Sante Fe Railroad established its transcontinental rail terminus in Richmond, many industries began to locate there. By 1940, the petroleum industry had become the largest contributor to Bay Area waterborne cargo, and the bulk of the shipments moved through Richmond. The Port of Richmond has recently entered the container handling business with a new facility.

In the South Bay, Redwood City's harbor began as a lumber port serving San Francisco in the mid-1800s. It has remained a relatively small port handling specialized commodities such as scrap and limestone. In the North Bay, Benicia was the site of a military arsenal from the 1850s to 1964 and also the center of considerable shipbuilding. After the arsenal closed, the Port of Benicia was established and has become a center for auto imports.

Figure 2 provides a chronology of major events affecting West Coast port development. Development of ground transportation, particularly rail, has had a major impact on port development. For example, the location of the trans-continental rail terminus in Oakland stimulated harbor development. Also, the development of rail links to the east from the Pacific Northwest caused the lumber trade to shift from San Francisco to Puget Sound. Neither of the world wars seems to have had a long-term major impact on port development even though the federal government did take over the ports during World War II. Since World War II, the emergence of Japan as a major United States trading partner has stimulated considerable port development on the West Coast.

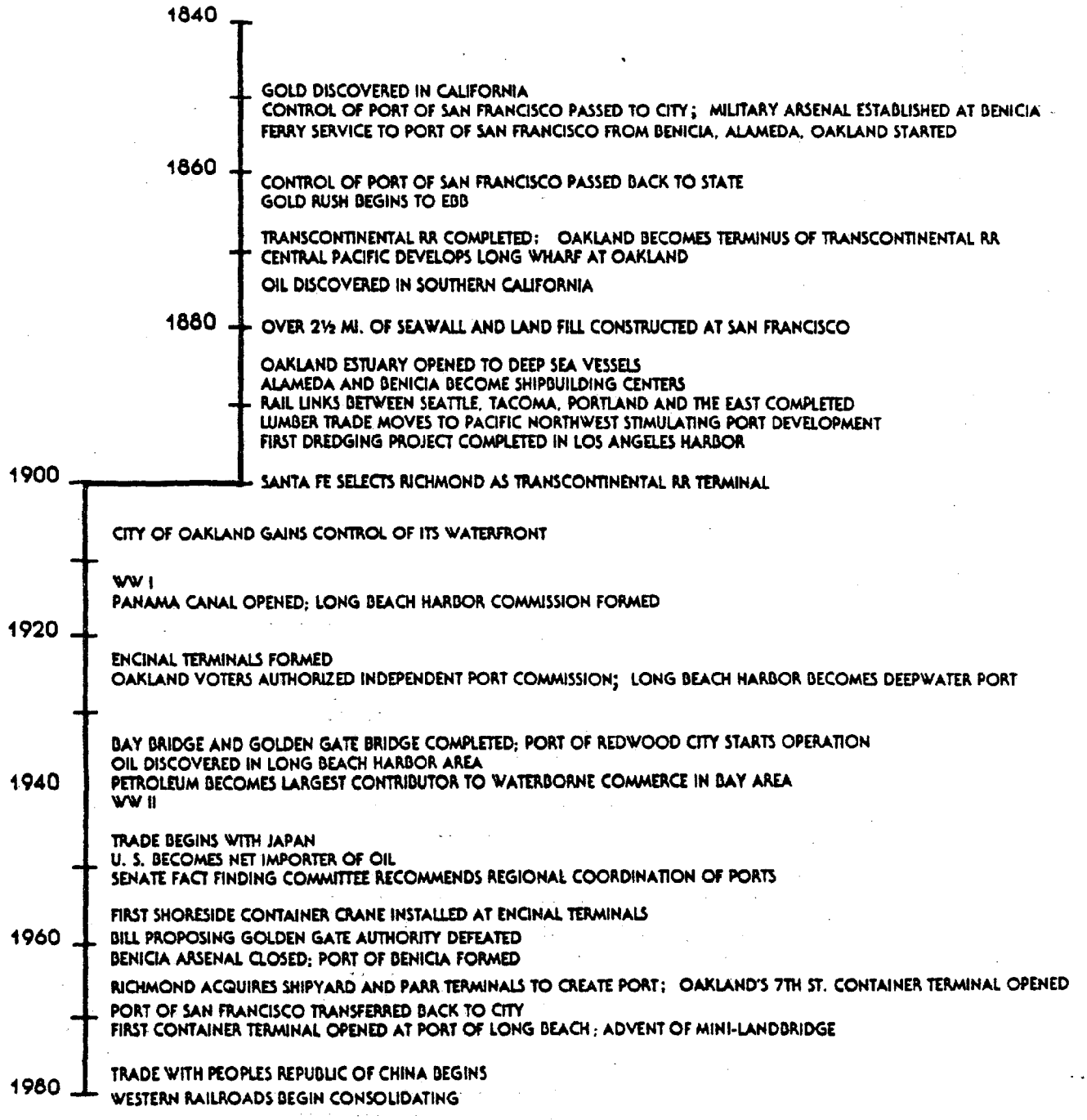


SAN FRANCISCO BAY AREA PORTS

Figure 1

Figure 2

WEST COAST PORT DEVELOPMENT CHRONOLOGY



STEAMSHIP LINES

The steamship lines are the users of the region's port facilities. These ocean carriers of many nations compete for the cargo moving through the Bay Area to and from points all over the world. Their desire for efficient marine terminals creates the demand for new facilities the ports must provide. This demand, of course, also creates competition among the Bay Area and West Coast ports for their business. The steamship industry is currently experiencing a period of change including rationalization of services which may affect the demand for new marine terminal facilities.

ISSUES

Of the many issues pertaining to the development of the port system in the Bay Area, the following are the most relevant to the concerns of MTC and BCDC and have been addressed by this Plan:

- What is the projected growth in waterborne cargo for the San Francisco Bay Area and what factors will affect this growth? How can the need for new facilities be assessed?
- What is the capacity of existing Bay Area terminals and what factors can be expected to affect marine terminal capacity?
- How many new marine terminals will be required to serve the projected cargo?
- Where can the new marine terminals be developed with minimum adverse environmental impacts? How much shoreline must be reserved?
- What improvements are necessary to the channels, roads, and rails?
- What are the environmental impacts and costs of the new facilities? Can the adverse environmental impacts be minimized or mitigated? If so, what methods exist to mitigate these impacts? What methods exist to reduce the overall cost of port system development in the Bay Area?

II. PLAN IMPLEMENTATION

RESPONSIBLE ORGANIZATIONS

Improvements to the channels, marine terminals or ground transportation facilities are the responsibility of:

- the Corps of Engineers in the case of the channels[1];
- the ports or private sector for the marine terminals;
- the cities, counties and/or Caltrans for the roadways and highways; and
- the railroads and/or ports for rail facilities.

The development decisions of these entities are influenced by state and federal laws requiring that projects be reviewed at various stages by a number of agencies. Among these agencies are:

Federal	--	Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Coast Guard, Army Corps of Engineers, Office of Coastal Zone Management, Maritime Administration, Department of Transportation and others;
State	--	Department of Fish & Game, California Transportation Commission, and others;
Regional	--	Regional Water Quality Control Board, Air Quality Management District, Association of Bay Area Governments, MTC, BCDC, and others; and
Local	--	City or county governments.

The purpose of this Plan is to provide MTC with policies for reviewing draft environmental assessments and funding applications, and to provide BCDC with policies for reviewing applications for a permit, draft environmental assessments, and federal actions affecting the Bay. In addition, the Plan calls for city and county governments to institute land use protections for the port areas and for the ports to cooperate through their voluntary organization, the Northern California Ports and Terminals Bureau (NORCAL), or through other agreements among themselves. The primary responsibility for implementing the policies of the Seaport Plan is therefore a shared responsibility of MTC, BCDC, local governments, and the ports.

AGENCY BACKGROUND

MTC is the Regional Transportation Planning Agency (RTPA) for the Bay Area. It is responsible for comprehensive transportation planning and financial programming. The Metropolitan Transportation Commission Act of 1970, which created MTC, provides that:

---

[1] National policy on channel dredging is currently being reassessed, and changes may affect the responsibility for channel deepening. These changes may also require changes to the policies stated in this Plan.

> Any application to the federal or state government for any grant of money, whether an outright or matching grant, by any county, city and county, city, or transportation district within the region shall, if it contains a transportation element, first be submitted to the Commission for review as to its compatibility with the regional transportation plan. The Commission shall approve and forward only those applications that are compatible with the plan.

The Act also required MTC to study harbor accessibility in the region and report to the Legislature. In subsequent legislation (AB 69 and AB 402, Government Code 65080), all RTPAs in California were required to prepare:

> ...a regional transportation plan and a regional transportation improvement program directed at the achievement of a coordinated and balanced regional transportation system, including, but not limited to, mass transportation, highway, railroad, maritime, and aviation facilities and services.

MTC also receives environmental documents for review and comment if the project includes a transportation element.

BCDC is the state agency designated to manage the waters of San Francisco Bay and the development of its shoreline. The Legislature created BCDC in 1965 and charged it with preparing a comprehensive plan for the Bay. In 1969, through the McAteer-Petris Act, the Legislature expressly recognized the San Francisco Bay Plan prepared by BCDC and gave BCDC the authority to implement the Plan. Under the McAteer-Petris Act, approval must be obtained from BCDC for all filling and dredging in the Bay and for all development, including changes in uses, within 100 feet of the shoreline. In addition, BCDC's Bay Plan is an integral part of the federally approved coastal zone management program for San Francisco Bay, and BCDC is the agency responsible for administration of that program.

One of the major objectives of BCDC is to ensure that all filling of the Bay is limited to the six high-priority, water-oriented uses identified in the McAteer-Petris Act--one of which is ports. In order to provide sufficient shoreline sites to accommodate these high-priority uses with the minimum fill necessary, the Bay Plan provides that shoreline sites especially well-suited for these priority uses be reserved for such uses. In the case of ports, BCDC has designated numerous sites around the Bay for port priority use.

Although a proposed fill may be for a priority use and is proposed to be located within a designated priority use area, the BCDC law still requires that the fill proposed be "the minimum fill necessary." Together with other sections of the McAteer-Petris Act, this means two tests must be met: (1) the total Bay fill for all port development in the region must be the minimum necessary; and (2) each project must be designed and constructed so that it avoids unnecessary fill. The former issue is answered by this Plan; the latter issue can usually be addressed in a permit proceeding.

PROJECT REVIEW COORDINATION

To avoid potentially conflicting comments on a maritime development project, a procedure for coordination between MTC and BCDC will be required. Four points exist where MTC and/or BCDC would be asked to comment or take action on a project pertaining to the port system in the Bay Area:

- review of draft environmental documents - both MTC and BCDC receive such documents through federal and state clearinghouses; it is very likely this will be the first opportunity to comment on any proposed maritime project.

- review of applications for federal or state funding - MTC receives funding applications for review if they contain a transportation component and BCDC reviews such applications when the proposed project would affect the Bay or its shoreline; such applications may include street and highway projects, rail assistance, and federal or state grants for economic development; a notice of intent to apply for funding may precede review of environmental documents; MTC will only approve a funding application if the environmental assessment has been certified.

- review of federal actions affecting the coastal zone - BCDC must determine whether federal actions affecting the coastal zone are consistent with its federally approved management program; such actions include, but are not limited to, funding (as described above), surplusing or leasing of federal land, and Corps of Engineers permits.

- review of applications for a BCDC permit - projects having an effect on the Bay or its shoreline must obtain a BCDC permit; BCDC will only accept an application for a permit if an environmental assessment has been certified; while MTC has no responsibility in BCDC's permit process, MTC may be reviewing the same project at the same time under its responsibilities.

III. FINDINGS, POLICIES AND RECOMMENDATIONS

The policies and recommendations are intended to achieve the goals set forth for the Seaport Plan, and to reflect MTC's and BCDC's shared purpose to enhance economic activity while protecting the environment, making efficient use of all resources, and coordinating development. Maritime development must also be consistent with the Regional Transportation Plan, the McAteer-Petris Act and the San Francisco Bay Plan.

FINDINGS

Forecasts of Waterborne Cargo

a. Figure 3 provides a graphic representation of the forecasts, and Tables 1 and 2 show the baseline, high and low forecasts of waterborne dry cargo for the Bay Area. The baseline dry cargo forecast is considered to be the most likely projection while the high and low variations represent possible alternative levels of trade. These forecasts do not include the movement of cargo through the ports of Sacramento and Stockton.

b. The baseline forecast indicates that waterborne dry cargo for the San Francisco Bay Area will more than double by the year 2000. Containerized cargo movements, auto imports, iron and steel imports, and grain exports are all expected to increase, with containerized cargo representing the majority of the growth. In fact, containerized cargo is forecast to increase to four times its present volume by the year 2000. Under the high forecast, coal exports and limestone imports may also add to the growth in Bay Area waterborne cargoes. For all forecast levels, break bulk cargo is forecast to remain at essentially its current level.

c. While detailed forecasts were not prepared for liquid bulk cargoes, the analysis suggests increased movements of liquid cargoes, such as petroleum.

d. A basic precept of the Seaport Plan is that, in order not to limit economic activity, improvements should be made to the Bay Area port system to handle forecast waterborne cargo. However, the ports of the Bay Area compete with each other and with other West Coast ports for cargo and the ocean carriers that transport this cargo. This competition is generally in the public interest because it helps keep shipping costs down, may generate new shipping business for the Bay Area, and keeps the ports sensitive to changes in shipping technology and the needs of shippers. Nevertheless, such competition may have undesirable side effects in the form of investment in facilities that go unused or little used, which in turn may result in unnecessary expenditures of public funds and unnecessary Bay fill. Therefore, another precept of the Seaport Plan is that proposed marine terminal development should be more closely linked to projected regional need for new facilities based upon reasonable forecasts of waterborne cargo.

Figure 3

FORECASTS OF WATERBORNE DRY CARGO
SAN FRANCISCO BAY AREA

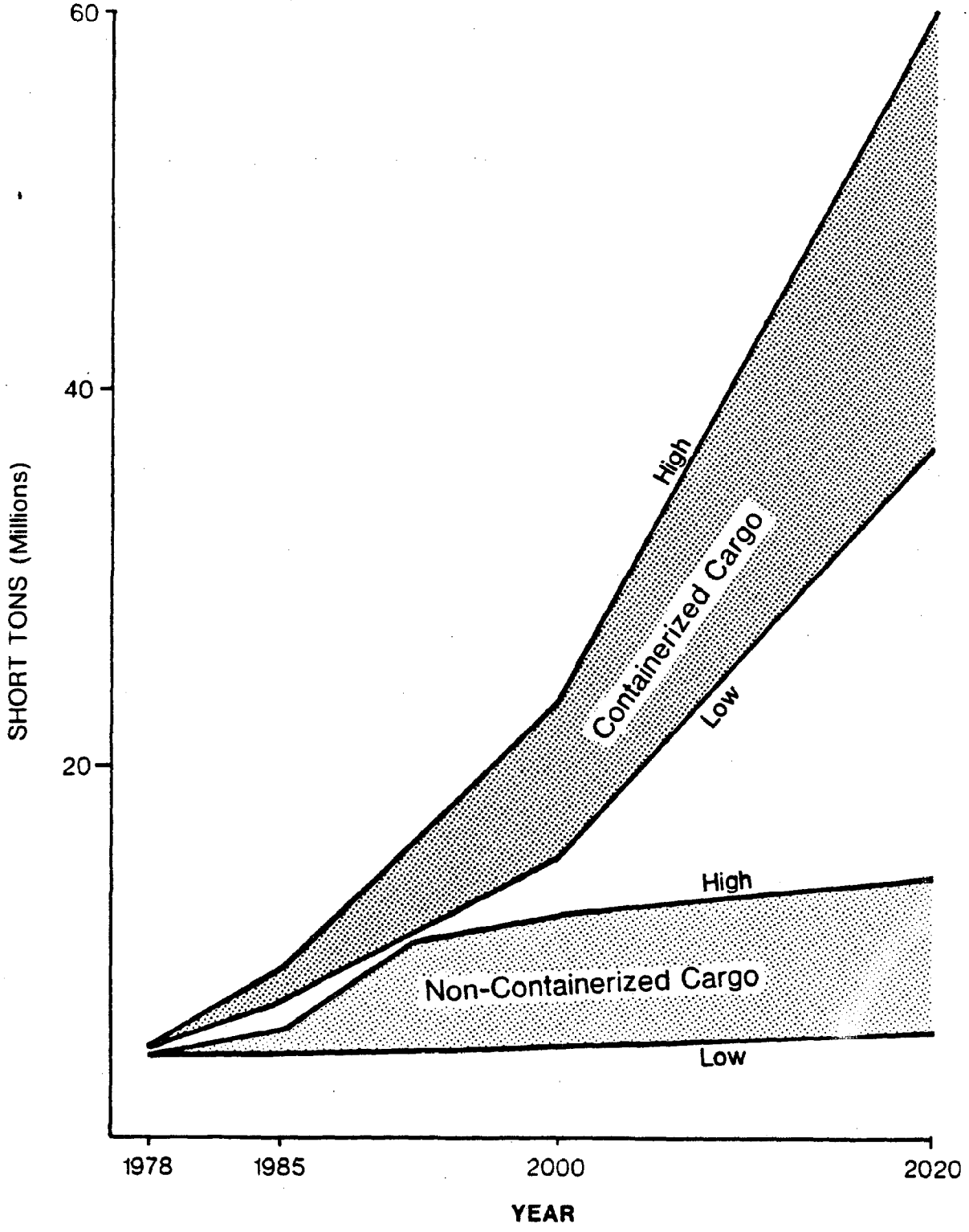


Table 1

SAN FRANCISCO BAY AREA CARGO FORECAST

DRY CARGO

BASELINE FORECAST

(1,000's of short tons)

	1978	FORECAST			
		1985	1990	2000	2020
CONTAINER[1]	5,009	8,260	12,065	19,610	49,020
Foreign Container	3,883	7,010	10,720	18,085	47,065
Domestic Container	1,126	1,250	1,345	1,525	1,955
BREAK BULK	486	465	440	425	320
Foreign Breakbulk	486	465	440	425	320
Domestic Breakbulk	---	---	---	---	---
NEO-BULK	1,476	1,679	1,964	2,304	3,209
Autos - Imports	278	365	445	540	800
- Exports	62	62	62	62	62
- Domestic	64	64	64	64	64
Iron & Steel-Imports	714	820	1,010	1,225	1,805
-Other	103	103	103	103	103
Newsprint - Imports	250	260	275	305	370
- Other	5	5	5	5	5
DRY BULK	2,465	2,735	2,845	3,110	3,930
Grain - Exports	276	595	690	930	1,680
- Other	95	105	120	145	215
Iron & Steel Scrap	564	450	450	450	450
Coke	283	300	300	300	300
Sugar	828	830	830	830	830
Salt	164	200	200	200	200
Other Bulk[2]	255	255	255	255	255
TOTAL BASELINE FORECAST	9,436	13,139	17,314	25,449	56,479

[1] Includes the majority of LASH and RO/RO cargoes; LASH cargo is not expected to increase. LASH and RO/RO cargoes other than those included in the container forecast are included in the other cargo categories. For example, automobile RO/RO cargo is included in the neo-bulk forecast.

[2] Includes limestone, cement, coal, and miscellaneous tonnages of scrap, coke, sugar, and salt.

SOURCE: San Francisco Bay Area Cargo Forecast, U.S. Army Corps of Engineers, San Francisco District, prepared by Recht Hausrath & Associates and Temple, Barker & Sloane, Inc., June 1981.

Table 2
SAN FRANCISCO BAY AREA CARGO FORECAST
DRY CARGO
HIGH AND LOW FORECASTS
(1,000's of short tons)

	1978	FORECAST			
		1985	1990	2000	2020
HIGH FORECAST					
CONTAINER[1]	5,009	8,960	13,720	23,510	60,030
Foreign Container	3,883	7,575	12,115	21,455	56,660
Domestic Container	1,126	1,385	1,605	2,055	3,370
BREAK BULK	486	480	450	445	420
Foreign Breakbulk	486	480	450	445	420
Domestic Breakbulk	---	---	---	---	---
NEO-BULK	1,476	1,789	2,219	2,574	3,524
Autos - Imports	278	390	500	610	905
- Exports	62	62	62	62	62
- Domestic	64	64	64	64	64
Iron & Steel-Imports	714	890	1,180	1,395	1,975
-Other	103	103	103	103	103
Newsprint - Imports	250	275	305	335	410
- Other	5	5	5	5	5
DRY BULK	2,465	3,435	8,680	9,035	10,080
Grain - Exports	276	665	890	1,200	2,100
- Other	95	115	135	180	325
Iron & Steel Scrap	564	600	600	600	600
Coke	283	350	350	350	350
Sugar	828	950	950	950	950
Salt	164	300	300	300	300
Other Bulk[2]	255	455	5,455	5,455	5,455
TOTAL BASELINE FORECAST[3]	9,436	14,579	24,949	35,439	73,944
LOW FORECAST					
CONTAINER[1]	5,009	7,351	9,876	15,146	37,035
Foreign Container	3,883	6,225	8,750	14,020	35,910
Domestic Container	1,126	1,126	1,126	1,126	1,126
BREAK BULK	486	395	330	320	310
Foreign Breakbulk	486	395	330	320	310
Domestic Breakbulk	---	---	---	---	---
NEO-BULK	1,476	1,574	1,679	1,809	2,109
Autos - Imports	278	320	335	370	450
- Exports	62	62	62	62	62
- Domestic	64	64	64	64	64
Iron & Steel-Imports	714	770	860	955	1,175
-Other	103	103	103	103	103
Newsprint - Imports	250	250	250	250	250
- Other	5	5	5	5	5
DRY BULK	2,465	2,350	2,430	2,630	3,260
Grain - Exports	276	500	580	780	1,410
- Other	95	95	95	95	95
Iron & Steel Scrap	564	400	400	400	400
Coke	283	250	250	250	250
Sugar	828	700	700	700	700
Salt	164	150	150	150	150
Other Bulk[2]	255	255	255	255	255
TOTAL BASELINE FORECAST[3]	9,436	11,755	14,435	20,030	42,825

[1] Includes the majority of LASH and RO/RO cargoes; LASH cargo is not expected to increase.
[2] Includes limestone, cement, coal, and miscellaneous tonnages of scrap, coke, sugar, and salt. The high forecast also assumes development of a coal exporting terminal and a limestone importing facility.
[3] Since the level of container trade depends partly on the shift of break bulk to container, the high container forecast was combined with the low break bulk forecast and the low container forecast with the high break bulk, to calculate the total of the forecasts.

SOURCE: San Francisco Bay Area Cargo Forecast, U.S. Army Corps of Engineers, San Francisco District, prepared by Recht Hausrath & Associates and Temple, Barker & Sloane, Inc., June 1981.

e. The forecasts will have to be revised from time to time. Three years of waterborne cargo statistics are considered the minimum necessary to show evidence of long-term variations from the forecasts, because a review of past data shows that economic events, such as recessions, tend to have an effect for two years but, by the third year, growth rates have returned to the long-term trends.

Marine Terminals

f. There are two basic ways of accommodating future waterborne cargo--constructing new terminals and increasing terminal productivity.

g. Measuring the demand for new terminals as a number of marine terminal berths is a practical means of assessing the need for new construction. The demand for new terminals was computed by subtracting the estimates of existing marine terminal capacity from the forecasts (both in short tons) and dividing the remainder by an average capacity per berth (in short tons/berth) for each type of terminal. For container terminals, both the existing capacity and the average capacity figures were adjusted for projected changes in the character of containerized cargo and possible increases in productivity. The various factors used to derive the demand for new terminals will have to be updated from time to time.

h. To accommodate the forecast increase in dry cargo, new marine terminals will be required. The demand for new container terminals will be the greatest by far; however, there will also be a smaller but significant demand for selected neo-bulk terminals--i.e., terminals for autos and iron and steel products. Some of the increased demand for container handling capacity may be accommodated by combination terminals (container/ break bulk). A surplus of break bulk terminals is now anticipated, and much of the forecast break bulk cargo may be handled at combination terminals. Development of new break bulk berths should not be necessary. Break bulk terminals having potential for redevelopment to other marine terminal uses were evaluated by the technical analysis and have been designated for development by this Plan. Other break bulk terminals are assumed to remain in their current use; however, if redevelopment is proposed, it is assumed to occur with minimum adverse impacts. The high dry bulk forecast includes a potential for new coal exporting capacity and limestone importing capacity. Expansion of grain handling capacity may be required if actual exports through the Bay Area exceed the forecasts.

i. There may be a demand for new crude oil tanker berths by the end of the century. These berths would probably be provided at existing privately-owned terminal facilities. While no estimates were made for other types of liquid bulk facilities, demand may exist for new or expanded terminals--particularly petroleum product terminals.

j. Development of a central Bay supertanker terminal does not appear likely at this time for these reasons: the oil companies have expressed little interest due to the high cost; many environmental questions remain unanswered; and the San Francisco Bar Channel would need to be deepened to accommodate supertankers.

k. BCDC permits for marine terminal construction must be issued several years before the terminal is needed. Therefore, information on lead time is as important as the forecasts in determining whether a new terminal is needed and when a permit should be issued. The lead time pertinent to this plan includes not only the construction time, but also the time it takes for the new terminal to reach capacity (see Figure 4 for a graphic presentation of the importance of these two time spans). For a major container terminal project, the typical lead time from an application for a BCDC permit until the terminal reaches capacity appears to be:

	Typical Lead Time (years)[1]
Established operator transfers to new terminal in Bay Area	4-1/2
New single operator terminal	6-1/2
New Multi-user terminal	7-1/2

Relatively simple container terminal projects may have a shorter lead time. If construction or land acquisition is complex, lead time could be longer. The average of the above lead times is six years. In order to provide predictability, this average for container terminals can be considered the appropriate lead time for issuing a BCDC permit. No specific data has been developed for other types of terminals, but the anticipated construction period can be used as a reasonable lead time. Also important is the EIR review period which precedes the above lead time (see Figure 4). The EIR review time, by law, cannot exceed one year. This review must be complete, and the EIR certified, prior to filing a BCDC permit application. As soon as the EIR is certified and local approvals obtained, the BCDC application can be filed and the lead time begin.

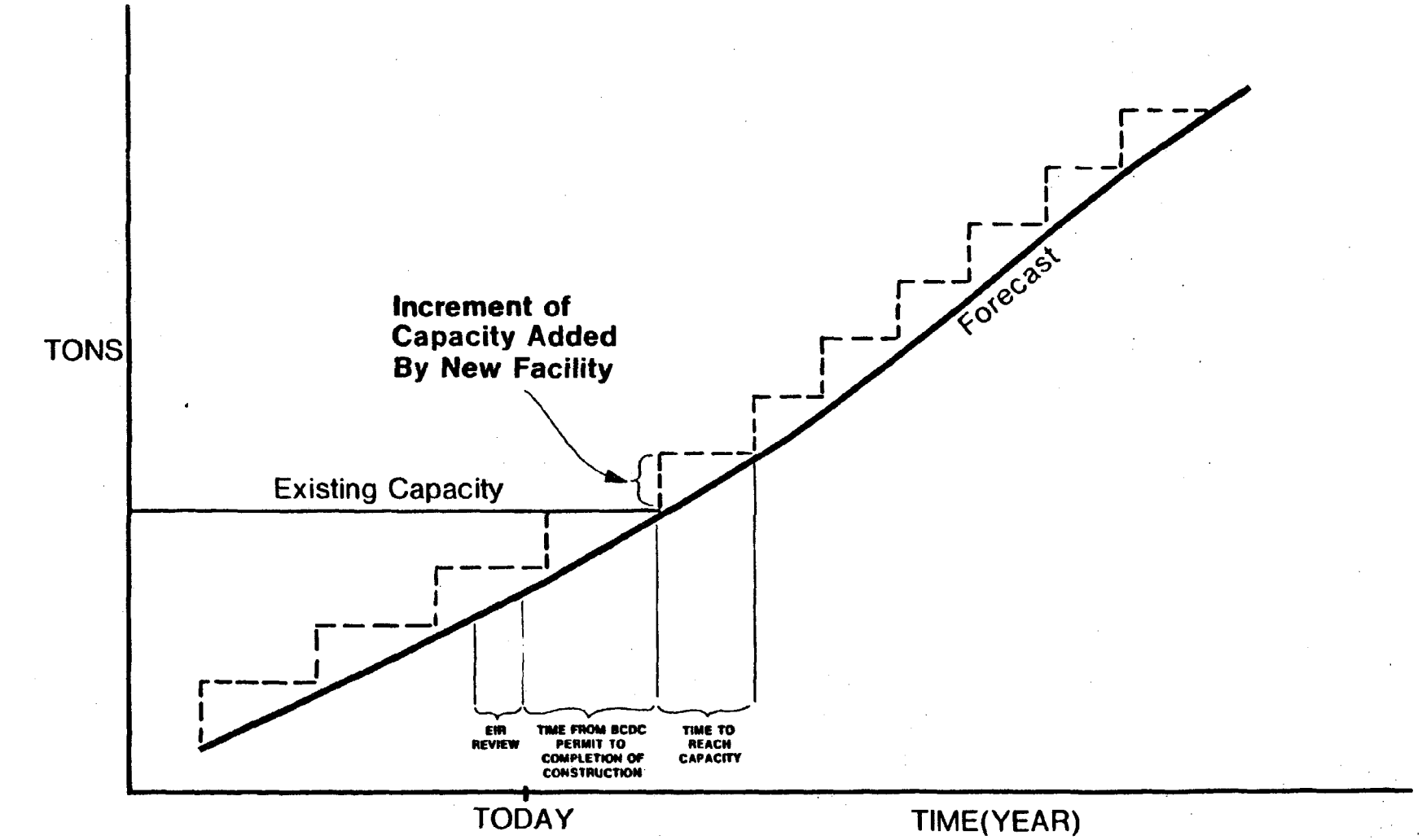
l. The demand for new marine terminals creates a demand for shoreline sites that can accommodate marine terminal development. To select suitable shoreline sites, an extensive screening process was undertaken for the MTC/BCDC port planning project (see text beginning on page 89 of Final Technical Report for details). The selected shoreline sites were classified as near-term, long-term, active or military.

m. Marine terminal development at the near-term sites would result in the minimum potential adverse environmental, land use, and ground transportation impacts when compared with the long-term sites and sites studied but not included in this Plan. The amount of Bay fill will vary among the near-term sites, and some near-term sites may require considerably more Bay fill than others. However, reasonable development of any of these sites would result in roughly comparable environmental, land use, and ground transportation impacts to the region. Furthermore, if actual demand meets projections, development

[1] Of this time, processing of a BCDC permit application can be no longer than 90 days due to restrictions of California law.

Figure 4

LEAD TIME CONSIDERATION



of the near-term sites will meet the demand with the minimum cumulative Bay fill. These sites together with the Bay Area's active marine terminals should accommodate the demand for new terminals through at least the year 2000 and probably beyond.

n. The amounts of fill used for the technical studies in developing this Plan are estimates only, and the actual amounts of fill required for any marine terminal development can only be determined at the time a permit is issued.

o. Other development sites are classified as long-term due to the greater potential for adverse impacts, including greater amounts of Bay fill. Development of the long-term sites plus the near-term sites should accommodate the demand for terminal capacity beyond 2000 and possibly through 2020. If the potential adverse environmental impacts, including Bay fill, can be reduced by project design to levels equal to or below those of the near-term sites, a long-term site could be considered for reclassification as a near-term site.

p. The selected military sites, if and when no longer needed by the military, could provide a reserve capacity for accommodating demand. Marine terminal development at these sites is expected to have less adverse impacts than at the long-term sites and these impacts are expected to be equal to or less than those of the near-term sites. At this time, the military, and particularly the Navy, has no plans to release any of the properties cited in this Plan. In fact, the Navy plans expansion of its current facilities to accommodate a growing Navy.

q. The sites included in this Plan appear to be adequate to meet the projected long-range demand for marine terminal development. There is, however, considerable competition for these sites from uses not necessarily needing a waterfront location, and this could lead to the sites being preempted for uses other than marine terminals. If this occurs and actual demand for marine terminals meets projections, the result will be additional pressure to fill the Bay to create new sites for marine terminals and higher costs for their development, or possible loss of Bay Area shipping activity to other West Coast ports. To protect these sites, this Plan designates shoreline areas for port use. These areas, called "port priority use areas," include the marine terminal sites as well as additional land areas for directly-related ancillary activities. Protection of these port priority use areas is a shared responsibility of MTC, BCDC, local governments and the ports. In fact, these areas cannot be fully protected without the cooperation of local governments and the ports.

r. Port priority use areas include within their premises marine terminals and directly-related ancillary activities such as container freight stations, transit sheds and other temporary storage, ship repairing, support transportation uses including trucking and railroad yards, freight forwarders, government offices related to the port activity, chandlers and marine services. Other uses, especially public access and public and commercial recreational development, are permissible uses provided they do not significantly impair the efficient utilization of the port area.

s. The regional economic benefit of marine terminal activity is provided for by reserving sufficient sites that could be developed to accommodate the forecast cargo movements. However, the economic advantage (jobs and income), if any, to the region of one site over another site was not considered in selecting among sites because:

- this type of data can be developed only when the details of a proposed terminal are known;
- the location of a marine terminal has little effect on its economic advantage to the Bay region; and
- it is difficult to objectively weigh economic advantage against adverse environmental impacts on a site-specific basis.

t. If all near-term and long-term development sites are used, the following impacts could be experienced by 2020 (these impacts are based on planning assumptions, and the associated adverse effects on the physical environment probably can be reduced by careful design):

- nearly 1000 acres of new marine terminal development--this would double the amount of shoreside land and more than double the length of shoreline which is devoted to the marine terminal facilities;
- over 300 acres of potential Bay fill, of which approximately 150 acres is associated with the long-term development sites;
- approximately 4.0 million cubic yards of initial channel dredging from the main ship channels to the sites--all of this dredging is associated with the long-term development sites (this does not include the dredging quantities for the federally maintained ship channels); and
- displacement of industrial activities on the shoreline.

Some sites are currently occupied by industrial activities; however, only those sites where it is reasonably likely the involved industry can be displaced are included in this Plan.

u. At today's cost (1981 dollars) of over $20 million to develop a single container terminal berth, the long-range investment in new marine terminal facilities could reach $1 billion.

v. If some ports in the regional system do not have the funds necessary to complete facilities needed by the region, a regional agency may be required to finance or develop them. Otherwise, there will be tremendous pressure to allow the ports with the strongest finances to provide all of the regional facilities, even though this might result in pressures to fill the Bay unnecessarily.

w. Considering the substantial impact and cost of new marine terminals, the following actions (all of which provide additional terminal capacity without the need for new terminals) become important:

- deepening the channels to the ports of Oakland, Richmond and Benicia, and possibly to Encinal Terminals and the Ninth Avenue Terminal of the Port of Oakland, or increasing terminal backland area where it constrains capacity; and

- increasing the capacity of marine terminals through operator-induced improvements that do not involve new berths or land area.

These actions can increase the productivity of marine terminals as it was measured for this Plan--marine terminal capacity per berth. While channel deepening would, of course, incur a cost, it appears to be substantially less costly than the investment in new marine terminals. Furthermore, increasing terminal productivity can likely provide capacity with the minimum adverse environmental impacts.

x. Channel deepening and land use policies which would permit backland expansion on existing dry land are currently the responsibility of federal and local government, respectively. Other productivity increases are a function of terminal operator practices. Thus, if the productivity of terminals is to be increased and the pressure for new terminals to be reduced, both government and the terminal operators must share the responsibility.

y. Project-by-project mitigation will probably be necessary to achieve the goal of maintaining or improving environmental quality. Furthermore, attaining this goal will depend in large part on the mitigation policies developed by the concerned agencies.

Deepwater Channels

z. Some improvements to the deepwater channel system in the Bay Area will probably be required to economically accommodate the vessels of the future.

aa. The San Francisco Bar Channel limits the size of vessels that can enter San Francisco Bay; therefore, deepening the interior channels to handle vessels that cannot transit the Bar Channel is generally unnecessary. Using Corps of Engineers' design criteria, at present, this places a practical limit on the depth of the interior channels of 50 feet or less at mean lower low water. Since no planning is underway to deepen the Bar Channel, it is unlikely it will be deepened before the end of this century.

bb. Generally, the most significant economic benefits of channel deepening are derived from the movement of containerized cargoes and crude petroleum in larger vessels.

cc. Channels leading to the Port of San Francisco are naturally deep and do not require any significant dredging. At present, the Oakland Inner Harbor Channel east of the Alameda Tubes is at its maximum depth of 35 feet because it is constrained by these tunnels.

dd. The U.S. Army Corps of Engineers is now the only entity that can undertake a federally authorized channel deepening project, and will undertake such a project only if: (1) the deepening is physically

possible; (2) navigation and transportation operational benefits exceed capital and maintenance costs of the deepening; and (3) the deepening is environmentally acceptable.[1] If, however, the channels listed below are deepened to the depths indicated, the following dredging amounts and costs (1978 dollars) could be involved:

	New Depth (ft)	Initial Dredging Quantity CuYd (000)	Initial Dredging Cost $(000)*	Additional Annual Maintenance Dredging** Quantity CuYd (000)	Additional Annual Maintenance Dredging** Cost $(000)*
Oakland Channels	45	15,000	53,500	362	1,016
Richmond Channel	45	6,300	23,200	321	943
Southampton Shoal Channel	45	10,200	36,400	72	204
Pinole Shoal Channel	45	21,700	85,500	201	637
Redwood City Channels	44	21,400	82,600	622	2,091
Total		74,600	$281,200	1,578	$4,891

* 1978 dollars

** This is the added quantity and cost resulting from the deeper channel; total annual maintenance dredging quantities and costs would be the sum of existing maintenance dredging quantities and costs plus these added amounts.

Actual project depths may vary from those shown in the table. This table is not intended to suggest that such deepening should be undertaken; it is only intended to indicate the possible effects of increased Bay Area port activity. These data were prepared for this Plan by consultants using Corps of Engineers methods.

ee. Environmental impacts associated with deepening a channel are largely dependent on the specifics of the deepening project, and would be addressed by the Corps during its detailed investigations. Several general areas of concern with regard to channel deepening are:

- the impacts of aquatic and land disposal of dredge material;
- slower tidal velocities and other hydrologic effects;
- increased sedimentation; and
- salinity intrusion.

In addition to the impacts of any specific deepening project, the cumulative effect of many deepening projects may be significant, but is as yet unknown.

[1] National policy on channel dredging is currently being reassessed, and changes may affect the Corps of Engineers' responsibility with regard to channel deepening.

Ground Transportation

ff. Without improvements, certain key port access routes would become more congested--7th Street in Oakland and Hoffman Boulevard in Richmond. Army Street and 3rd Street in San Francisco and Maritime Street in Oakland could approach their capacity.

gg. In the near future, port activity will not aggravate freeway congestion since the contribution of port traffic is generally small as compared with regional traffic movements. Therefore, congestion on the freeways is not, by itself, a significant reason to question the advisability of further marine terminal development at the existing Bay Area ports. In the more distant future, however, growth of port-related truck traffic will probably increase congestion on I-80 north of the East Bay approach to the Bay Bridge and on Hoffman Boulevard. A large portion of this truck traffic is associated with the movement of containers to and from the three major railyards in the East Bay.

hh. In the near future, the investment in ground transportation facilities necessary to alleviate traffic problems associated with the port development foreseen by this Plan is estimated to exceed $15 million, exclusive of the Hoffman Freeway. Port-related projects must compete with other proposed projects for local or regionwide transportation funds. Such funds are becoming increasingly scarce.

ii. The sites recommended for marine terminal development represent those sites which can be developed with the minimum investment in new ground transportation facilities when land use policy and the environment are considered.

jj. Rail service, and transcontinental rail service in particular, is critical to the movement of waterborne cargo through the Bay Area.

kk. The region's existing major railyards may experience dramatic increases in the movement of waterborne cargo in the future. Energy considerations could shift cargo from trucks to the rails, further increasing the demand for rail services. In addition, the region's highways and streets could be impacted by increased rail usage since all containerized cargo is trucked to or from one of the major railyards. The rail and highway impact of a shift to rail may be somewhat mitigated by the development of railcar loading/unloading facilities at container terminals.

ll. Several types of actions may improve the efficiency of the ground transportation system:

- the development of railcar loading/unloading facilities at container terminals;
- the transportation of cargo to and from marine terminals during the night, if increased terminal operating costs are offset by reduced congestion costs; and
- where port access roads are congested, the relocation of container freight stations to off-terminal sites where congestion is minimal.

POLICIES

In addition to satisfying the goals set forth in Chapter I, the policies are intended:

- to encourage cooperation among the Bay Area ports with regard to their development;
- to foster cooperation between the ports and their parent cities;
- to provide increased predictability to the ports with regard to BCDC permits;
- to steer port development to those sites with the least potential for adverse environmental impacts while still providing for reasonable terminal development;
- to decrease the pressures for Bay fill resulting from actions by the ports and their parent cities;
- to provide a regional context for evaluating the environmental impacts of individual port projects; and
- to provide a clear statement of the actions that will be taken by BCDC and MTC in implementing this Plan.

The Final Technical Report for the MTC/BCDC port planning project should be used to provide further guidance in applying the policies; where there are differences in the text or maps between the Final Technical Report and this Plan, the Seaport Plan takes precedence.

Marine Terminal Policies

1. Major marine terminal developments are significant additions to capacity or developments involving more than a small amount of Bay fill. The need for a major development shall be demonstrated in one of the following ways:

   - The development of new container terminal berths shall be consistent with the baseline demand estimates in Table 3 using a lead time of six years measured from the filing of a BCDC permit application. Demand estimates for the years not shown on Table 3 shall be computed by straight-line interpolation.
   - The need for development of other types of marine terminal berths shall be demonstrated by the project proponent, using the cargo forecasts, the demand estimates in Table 3, and other evidence as necessary. Lead time for such terminals shall be the time for project construction.

   Major marine terminal development shall occur at those sites classified as near-term and active by this Plan (see Maps 1 to 7 at the end of this chapter). Except as provided in Policy 6, the near-term sites shall not be compared with one another.

Table 3

DEMAND FOR NEW MARINE TERMINALS THROUGH 2000[1]
DRY CARGO
(number of berths)

Terminal Category/ Forecast Level	Existing[2]	Projected Demand 1985	1990	2000[3]
CONTAINER[4]				
Baseline	27	(5)	5	22
High		(3)	10	32
Low		(7)	-	11
BREAK BULK				
Baseline	32	(12)	(12)	(12)
High		(11)	(11)	(11)
Low		(13)	(14)	(14)
NEO-BULK[5]				
Baseline	13	1	3	5
High		2	5	8
Low		(1)	-	1
DRY BULK[6]				
Baseline	3 to 4	-	-	-
High		1	2	2
Low		-	-	-

[1] Parentheses indicate a surplus of terminal cargo handling capacity stated as an equivalent number of berths. The figures shown are cumulative; for example, using the baseline container forecast, the 22 new berths required by 2000 include the 5 required by 1990. Although the estimates are stated as a number of berths, they assume each berth is accompanied by the appropriate amount of backland and equipment. See Finding i. for information on the demand for liquid bulk terminals.

[2] Includes currently active, publicly-utilized terminals plus those terminals being modified or under construction and terminals to be constructed that have a BCDC permit. Proprietary terminals on port-owned land are included in figures; those on other lands are not. Estimates of the number of existing berths are approximate (e.g., a container vessel generally requires 700 to 1000 feet of wharf; therefore, 2100 feet of wharf could be viewed as 2 to 3 berths).

[3] Estimates may overstate demand; see text in Chapter IV.

[4] Includes the demand for new roll-on/roll-off (RO/RO) terminals. No new LASH facilities are forecast.

[5] Demand estimates are for terminals to handle autos and iron and steel products. No new scrap or newsprint facilities are forecast.

[6] High demand estimates are for limestone importing and coal exporting facilities; no new grain handling terminals are forecast at this time.

2. Minor marine terminal developments are projects other than major developments. Minor developments, such as rehabilitations of existing facilities, shall not be subjected to a determination of need nor be confined to the active or near-term sites, because of the small increases in capacity and small amounts of Bay fill involved. When the Plan is revised, the added capacity from minor developments shall be counted in estimating the Bay Area demand for new marine terminals.

3. Bay fill authorized for development of any marine terminal must be the minimum necessary to achieve an adequate terminal at the site and must minimize harmful effects to the Bay Area, as provided in Section 66605(c) and (d) of the McAteer-Petris Act.

4. Except as provided in Policy 19, the long-term development sites and sites not designated in this Plan shall be considered for development only after all the near-term sites have been permitted for use.

5. The port priority use areas identified in the Maps section of this Plan shall be protected for marine terminals and directly-related ancillary activities (see definition in Finding r.). Within these areas, the shoreline lands classified as active, near-term, and long-term by this Plan shall be restricted to marine terminal use. Interim uses shall be permissible but must be readily displaceable when the area is needed for marine terminals or directly-related ancillary activities. Local governments and the ports should protect these areas, using land use controls if necessary; otherwise, there may be unnecessary pressures for Bay fill and other adverse environmental impacts. In determining whether the amount of Bay fill is the minimum necessary for a proposed marine terminal development, BCDC shall consider any actions of the responsible local government and port that may have reduced the amount of existing dry land available for such development.

6. To avoid unnecessary Bay fill and other adverse environmental effects, and to encourage prompt construction and full use of authorized facilities:

   - The Bay Area ports are encouraged to cooperate through NORCAL or by other agreements among themselves to avoid facilities being proposed that duplicate needed capacity. If, however, two or more applications for marine terminals of the same type (i.e., container terminal compared to container terminal, auto terminal compared to auto terminal, etc.) are being considered at the same time, and the need for all of them cannot be demonstrated, only those projects with the least adverse environmental effect on the Bay and that are needed shall be authorized.

   - All permits for marine terminals shall contain a schedule that establishes (a) a date prior to the commencement of construction by which the project sponsor must demonstrate the ability to finance the project; and (b) a reasonable timetable for project construction, including specific milestones. Failure to comply with such schedules shall be grounds for termination of the authorization; nevertheless, the schedules may be amended for good cause. If the authorization is terminated, the capacity

assigned to the terminal will be subtracted from the region's capacity; however, if Bay fill has been placed, the capacity shall not be subtracted until BCDC takes legal action to see that any fill is removed.

- Whenever existing terminals remain unused or little used for a significant period of time following adoption of this Plan and whenever BCDC, in consultation with MTC, has determined that this indicates a reevaluation of the cargo forecasts and region's capacity is necessary, no major new terminal development of the same type shall be considered until the Seaport Plan has been promptly reviewed and, if necessary, revised in a timely manner to reflect the results of the reevaluation.

7. When and if the federal government decides that part or all of a military installation identified in this Plan is not needed for active military use, the federal government shall make such lands available for marine terminal development and directly-related ancillary activities as soon as possible, subject to such reasonable conditions as the federal government deems necessary to protect national security. Within these lands, the military sites identified in this Plan shall be restricted to marine terminal use, if and when the site is not needed for active military use. Once the federal government makes a military site available, the site shall be included among the near-term sites unless the conditions under which it has been made available make it unreasonable to do so.

8. Marine terminal development at sites that are adjacent or near to environmentally sensitive areas shall be designed to protect those areas from any significant adverse effects of marine terminal construction and operation.

9. To use existing terminals fully and to lessen the cost and adverse environmental effects associated with development to meet the growth of waterborne cargoes:

   - channels that otherwise would limit the productivity of marine terminals should be deepened when economically feasible and environmentally acceptable;

   - local governments should adopt and implement land use policies that facilitate terminal development on existing dry land;

   - ports and terminal operators should acquire property that permits necessary terminal development on existing dry land; and

   - terminal operators should, where economically feasible, increase terminal productivity.

Deepwater Channels Policies

10. Deepening or widening of San Francisco Bay Channels, including the San Francisco Bar Channel, should proceed only if economically justified or if needed for national defense, and if such deepening or widening conforms to State and national environmental law and poli-

cies. The interior channels of San Francisco Bay should only be deepened as consistent with the depth of the San Francisco Bar Channel.

11. Dredging projects shall be performed consistent with BCDC's Bay Plan policies on dredging and dredge material disposal.

Ground Transportation Policies

12. Local, state and federal governments should not take actions, such as land use decisions, public works projects or rail abandonments, that would impede access to the marine terminal sites identified in the Seaport Plan. Funding for a transportation project shall be approved or endorsed only if the proposed development the project is intended to serve is consistent with the policies of the Seaport Plan.

13. The Bay Area ports, local governments and marine terminal operators should take steps to make the best possible use of existing ground transportation facilities, and shall employ measures to mitigate any significant adverse environmental effects of increased traffic from existing and proposed marine terminal facilities. If mitigation of traffic problems at marine terminal facilities is being considered as part of the environmental review process, the local government or port whichever has the principal responsibility for carrying out or approving the project shall make a realistic estimate of the available resources to fund such mitigation and the likelihood that such measures can be implemented.

14. Local and regional transportation planning and funding priorities shall facilitate the efficient movement of goods by rail and truck to and from the Bay Area ports.

15. Ground transportation improvements needed to serve a proposed marine terminal development shall be included in transportation funding priorities only if such improvements and the development they serve are consistent with the policies of the Seaport Plan. Ground transportation improvements needed to serve an existing marine terminal shall be included in transportation funding priorities only if such improvements are consistent with the Seaport Plan policies.

16. If funding agencies require a choice among or ranking of marine terminal-related ground transportation projects, highest priority shall be given to projects:

    - that best use existing port and transportation facilities; and
    - that best enhance the movement of Bay Area waterborne cargo.

Plan Revision Policies

17. The Seaport Plan shall be reviewed and possibly revised when one or more of the following occurs:

    - five years has elapsed since the last major review;

- three consecutive years of waterborne cargo statistics indicate the forecasts do not represent current trends, or other evidence points to emerging trends which were not considered;

- the sites in the near-term development category have all been permitted for use (in practice, the review would occur in advance of using all near-term sites);

- there is a proposal to delete a near-term site from this Plan; or

- a marine terminal at a site included in this Plan has been unused or little used for a significant period of time.

18. A revision to the Seaport Plan undertaken pursuant to Policy 17 shall include, but not be limited to:

    - a review of the forecasts;

    - an update of the capacity estimates to reflect major and minor marine terminal developments authorized since the last revision to this Plan;

    - a review of all factors used to derive the estimates of demand for new marine terminals in Table 3;

    - an update to the estimates of demand for new marine terminals in Table 3 to reflect any changes to the forecasts or capacity estimates;

    - an assessment of the regionwide environmental impacts of the revision; and

    - an assessment of the extent to which the actions of Policy 9 have been pursued.

    If this Plan is to be revised because all the near-term sites have been permitted for use, the revision shall also include an assessment of alternatives to the use of the long-term sites including a review of the availability of other sites which would involve less adverse environmental effects--including less Bay filling.

19. A revision to the appropriate section of the Seaport Plan shall be considered if:

    - there is reason to believe marine terminal development at a long-term site or site not designated by this Plan can be accomplished with environmental impacts equal to or less than those of the near-term sites; or

    - deepening the San Francisco Bar Channel is found to be economically feasible and environmentally acceptable by the U.S. Army Corps of Engineers.

20. Revisions may be necessary for other reasons; such revisions shall not require a reevaluation of this Plan as provided in Policy 18 unless MTC or BCDC first determines that a reevaluation is required.

RECOMMENDATIONS

In addition to the policies, this plan provides the following recommendations to MTC, BCDC, and other concerned agencies:

- The ports should coordinate their development of marine terminals to avoid duplication which could result in some terminals being unused or little used. Such coordination should take place by strengthening their existing associations or by other agreements among the ports.

- MTC and BCDC should develop procedures for coordinating the review of port-related projects. These procedures should be consistent with the findings and policies of the Seaport Plan, and should be reviewed by the Seaport Planning Advisory Committee prior to implementation by MTC and BCDC.

- The Seaport Planning Advisory Committee should be made a permanent advisory committee to MTC and BCDC, but should meet only as necessary and at the call of MTC or BCDC.

- Mitigation policy in the region should be coordinated among the responsible federal, state and local agencies.

- A statement indicating the constraint the San Francisco Bar Channel places on the interior channels of the Bay should replace the channel depths currently shown in the Bay Plan. The statement should also indicate that any deepening must undergo an extensive investigation. At present, the Corps of Engineers has this responsibility.

- The U.S. Army Corps of Engineers should be authorized to undertake studies as necessary to determine the long-term environmental effects of further channel deepening and spoils disposal in the San Francisco Bay Area. Such studies should consider the channels as a system.

- A central Bay supertanker terminal should not be developed unless the San Francisco Bar Channel is deepened to accommodate supertankers and unless environmental concerns can be resolved. A detailed study should be undertaken to determine the desirability of a supertanker terminal.

- Bay Area waterborne cargo statistics should be compiled annually and uniformly by a single agency. The Corps of Engineers should be authorized to develop a reporting procedure that distinguishes containerized cargo from other cargoes. Whenever the forecasts are revised, both the container forecast and the container terminal capacity estimates should be prepared in units that best reflect demand for container terminal facilities. (It was discovered that short ton measures may not accurately represent the demand for container terminal capacity; see pages 39 to 42 of the Final Technical Report for an explanation.)

- For purposes of revisions to the Seaport Plan, such revisions should, as appropriate, use a technical approach similar to the approach used in the initial Seaport Plan development.

MAPS

Maps 1 to 7 display the location of the near-term development sites, the long-term development sites, the active terminal sites, the military sites, and the port priority use areas. Table 4 provides a listing of the site names and a key to their location on the maps. The result of these designations is to create port priority use areas that are composed of:

- locations most suitable for development or expansion--near-term development sites and active terminals;
- long-term development sites;
- directly-related ancillary activities; and
- military lands

In addition to the sites shown on the maps, two sites were evaluated but eliminated from consideration for marine terminal development at this time. The two sites are the North Harbor site at the Port of Oakland (the water area north of the East Bay approach to the Bay Bridge), and the Bair Island site in Redwood City (the Port of Redwood City refers to this site as its deepwater slough property; it is on the west side of Redwood Creek). Since these sites are within port jurisdictions, the following is noted:

Oakland North Harbor Area. The Oakland North Harbor has not been included on the Seaport Plan maps as a port priority use area because need for it has not been substantiated and it has been found to be less desirable for port development than other sites based on environmental, land use, and access considerations. In addition, other uses having public benefits, such as conservation and recreation, have been proposed for this site. Future studies will be necessary to determine the use of this area.

Deepwater Slough. The Port of Redwood City's Deepwater Slough Property (Bair Island site) has not been included on the Seaport Plan maps as a port priority use area because need for it has not been substantiated and it has been found to be less desirable for port development than other sites based on environmental, land use, and access considerations. In addition, other uses having public benefits, such as conservation and recreation, have been proposed for this site. Future studies will be necessary to determine the use of this area.

The port priority use areas where some change was made by this Plan to the old boundaries in the San Francisco Bay Plan are described below:

1. Richmond Terminal #1 at Point Richmond--this is an active terminal (see Map 1, Bay Plan Map 3). The port priority use area extends from the Bay north to Brickyard Cove Road and from the westerly boundary of the Brickyard Cove Marina west to South Garrard Boulevard.

2. Richmond Terminal #4 at Point San Pablo--this is an active terminal (see Map 1, Bay Plan Map 3). The port priority use area includes only those lands used for cargo transfer and storage and owned by the Port of Richmond.

3. Area west of the Army's Military Ocean Terminal in Oakland--this is the site referred to as the Bay Bridge Site in the planning documents and has a long-term development designation (see Map 2, Bay Plan

Map 4). The port priority use area includes the land area bounded by the Bay on the south and west, by the Army's property on the east, and by property owned by the California Department of Transportation on the north.

4. Encinal Terminals, Alameda (see Map 2, Bay Plan Map 4). The port priority use area includes a portion of the land area owned by Encinal Industries; this is roughly the area bounded by the Oakland Estuary on the north, by the Alameda Belt Line Railroad on the south, by Fortman Basin on the east, and by the proposed residential development called Alameda Marina Village on the west.

5. Selby, Contra Costa County--this area is designated for both water-related industry and port priority use (see Map 5, Bay Plan Map 15). The common area designated for both priority uses includes the land area bounded by the Southern Pacific Railroad tracks on the southeast and the Bay on the northwest, and extend southwest and northeast to the points where the rail tracks are adjacent to the Bay. Port uses should be given preference for use of shoreside lands.

6. San Francisco Waterfront between China Basin and Islais Creek Channel (see Map 4, Bay Plan Map 10). The port priority use area includes an area bounded by China Basin Street on the north; by Islais Creek Channel on the south; by the Bay on the east; and on the west starting at China Basin Street in the north, running south along Third Street to Mariposa Street then east to the west side of Illinois Street, running south along Illinois Street to 24th Street then west to Third Street, and running south along Third Street to Islais Creek Channel. Locations within this port priority use area designated by BCDC's Special Area Plan No. 1 for park use remain so designated.

7. Benicia Waterfront and Port of Benicia (see Map 6, Bay Plan Map 16). Parts of this area are designated for both port and water-related industry priority use. The water-related industry priority use areas are unchanged by this Plan. West of the Benicia Bridge, the port priority use area now encompasses the area bounded by the Carquinez Straits on the south, Interstate 780 on the north, the Benicia Bridge on the east, and the boundary of the water-related industry and the old port priority use area on the west. East of the Benicia Bridge, the port priority use area also encompasses a common area with the water-related industry priority use area; this includes an area bounded on the east by the westerly edge of the waterfront marsh, on the west by the Southern Pacific Railroad drill track, and on the north by the boundary of the water-related industry priority use area. This new port priority use area east of the Bridge is intended for marine terminal backup land and not for port use involving any Bay fill. The effect of these adjustments is to create an area designated for both port and water-related industry use, but with the shoreline west of the Bridge designated only for port use.

8. West side of Redwood Creek, Redwood City (see Map 3, Bay Plan Map 8). This area is no longer in port priority use.

9. Parcel on the East Side of Redwood Creek, Redwood City (see Map 3, Bay Plan Map 8). The area deleted from port priority use is a parcel bounded on the north by the Leslie Salt Terminal and the Redwood City Municipal Yacht Harbor, on the east by Harbor Boulevard, on the south by the boundary of the old port priority use area, and on the west by Redwood Creek. In recommending deletion of this area from port priority use, the Seaport Planning Advisory Committee found that:

   - such deletion will most likely not compromise the use of the remaining port priority area for marine terminal uses;

   - the proposed office/industrial development on the deleted lands is compatible with marine terminal development on the remaining port priority use area; and

   - no additional marine terminal development sites will be necessary to compensate for the loss of the deleted area.

   The remaining port priority use area is an approximately 25 acre parcel occupied, in part, by the Leslie Salt Terminal.

10. Area North of China Basin, San Francisco (see Map 4, Bay Plan Map 10). This area is no longer in port priority use

Table 4

SITE NAMES AND KEY TO THEIR LOCATION

This table lists the sites by name and provides a key to their location on the maps--using the site numbers employed during the technical studies.

RICHMOND

Near-Term Development

29A/D Richmond Shipyard #3
31A(N) Santa Fe Channel-Northwest
33A(S) Richmond Terminal #3-South
33A(N) North of Richmond Terminal #3

Active

25B Richmond Terminal #4
28A Richmond Terminal #1
29B Richmond Terminals #5, 6 & 7
29C ARCO Tanker Dock
30A Union Oil Tanker Dock
32B Texaco Wharf
32C Parr Bulk Commodity Wharf
32D Time Oil Wharf
33A Richmond Terminal #3

OAKLAND/ALAMEDA

Near-Term Development

50C/51A Carnation/Kaiser Yard
52A(E) Western Pacific Mole-East
52D Schnitzer Steel
53C Ship Repair Area
55D(W) Encinal Terminals, Berth 5 (Expansion Area to North)

Long-Term Development

64A Bay Bridge Site

Military

49A, 49B Oakland Army Terminal
51B, 51C Naval Supply Center
57B Naval Pacific Overseas Depot
57C Todd Shipyard
58A, 58B, 58C, 58D, 59A & 60A Alameda Naval Air Station

Active

49C Berth 10
49D Sea Land Terminal
49E Outer Harbor Public Container Terminal, Berths 5 & 6
50A Outer Harbor Public Container Terminal, Berth 4
50B Oakland Container Terminal
50D Matson Terminal
50E, 50F Seventh St. Public Container Terminal
52B U.S. Lines Terminal
52C American President Lines Terminal
52E/F Howard Container Terminal
53D Ninth Avenue Terminal
55D(E) Encinal Terminals, Berths 1 to 4
55D(W) Encinal Terminals, Berth 5

REDWOOD CITY

Near-Term Development

62A Leslie Salt Terminal
62D(W) Wharf 4
62F Ideal Cement

Active

62C Wharf 5
62D Wharf 3
62E Wharves 1 and 2

Table 4 (Continued)

SAN FRANCISCO

Near-Term Development

44A Piers 52 to 64
45A Pier 70
46D WP Ferry Slip
47B(N) Pier 94 North

Long-Term Development

47D Pier 98

Military

48A to 48E Hunters Point

Active

43A Pier 48
43B Mission Rock Terminal
45A Pier 70
46A, 46B & 46C Army Street Terminal
47A Piers 90 & 92
47B Pier 94
47C Pier 96

CARQUINEZ STRAITS

Near-Term Development

12D/E Selby

Military

22A, 22B, 23A & 24A Mare Island Naval Shipyard

BENICIA

Near-Term Development & Active

14A Port of Benicia

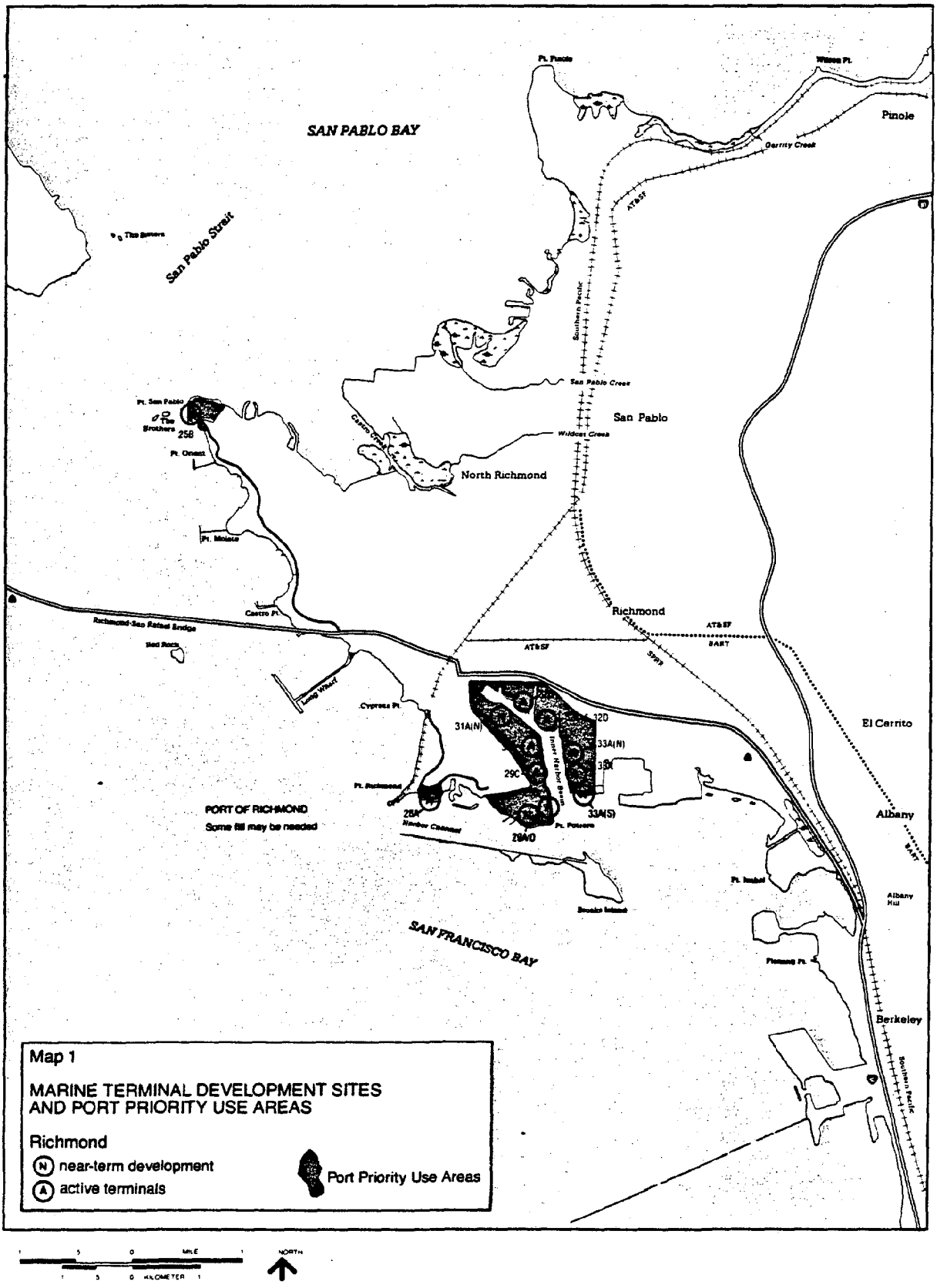
Long-Term Development

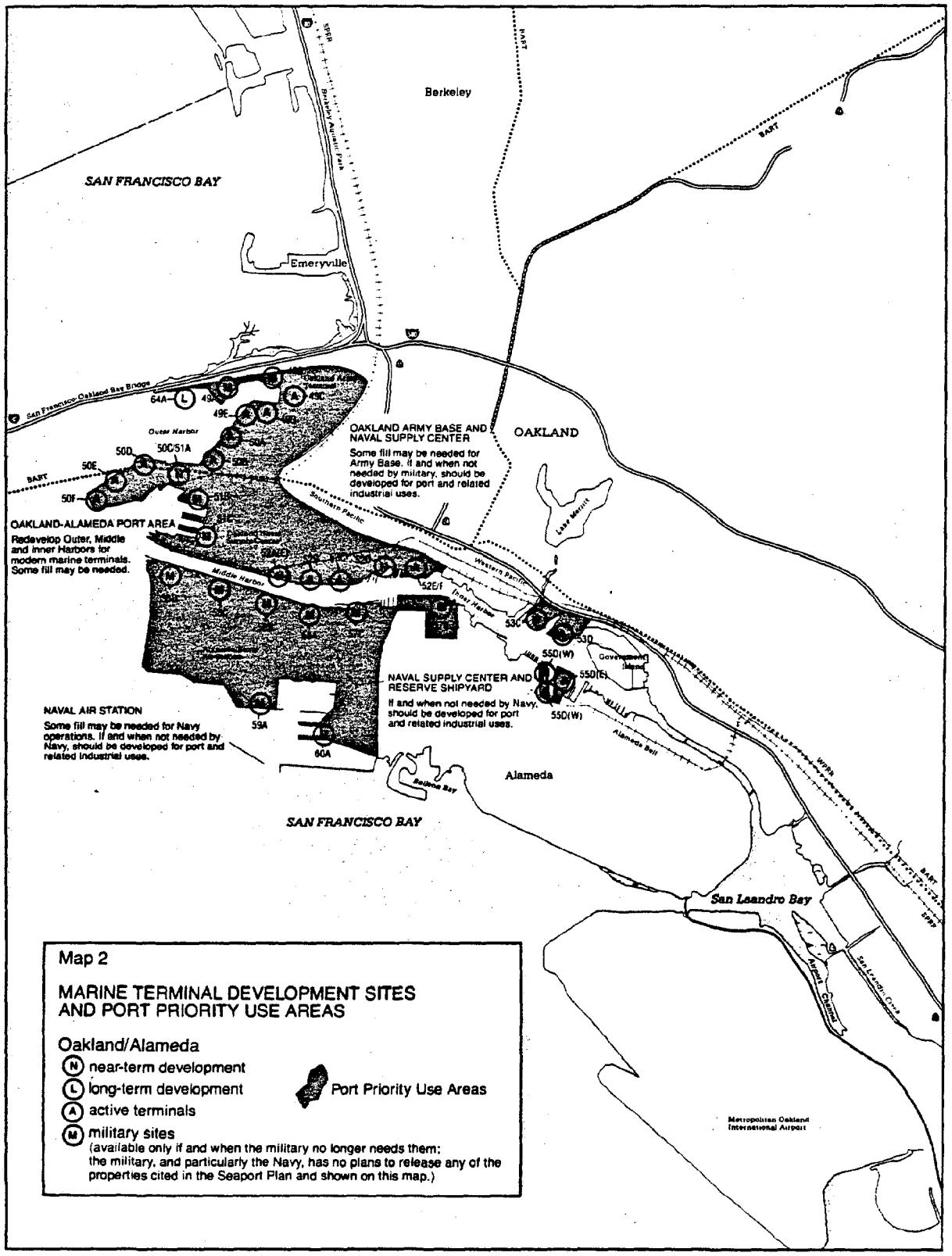
67 Benicia Waterfront

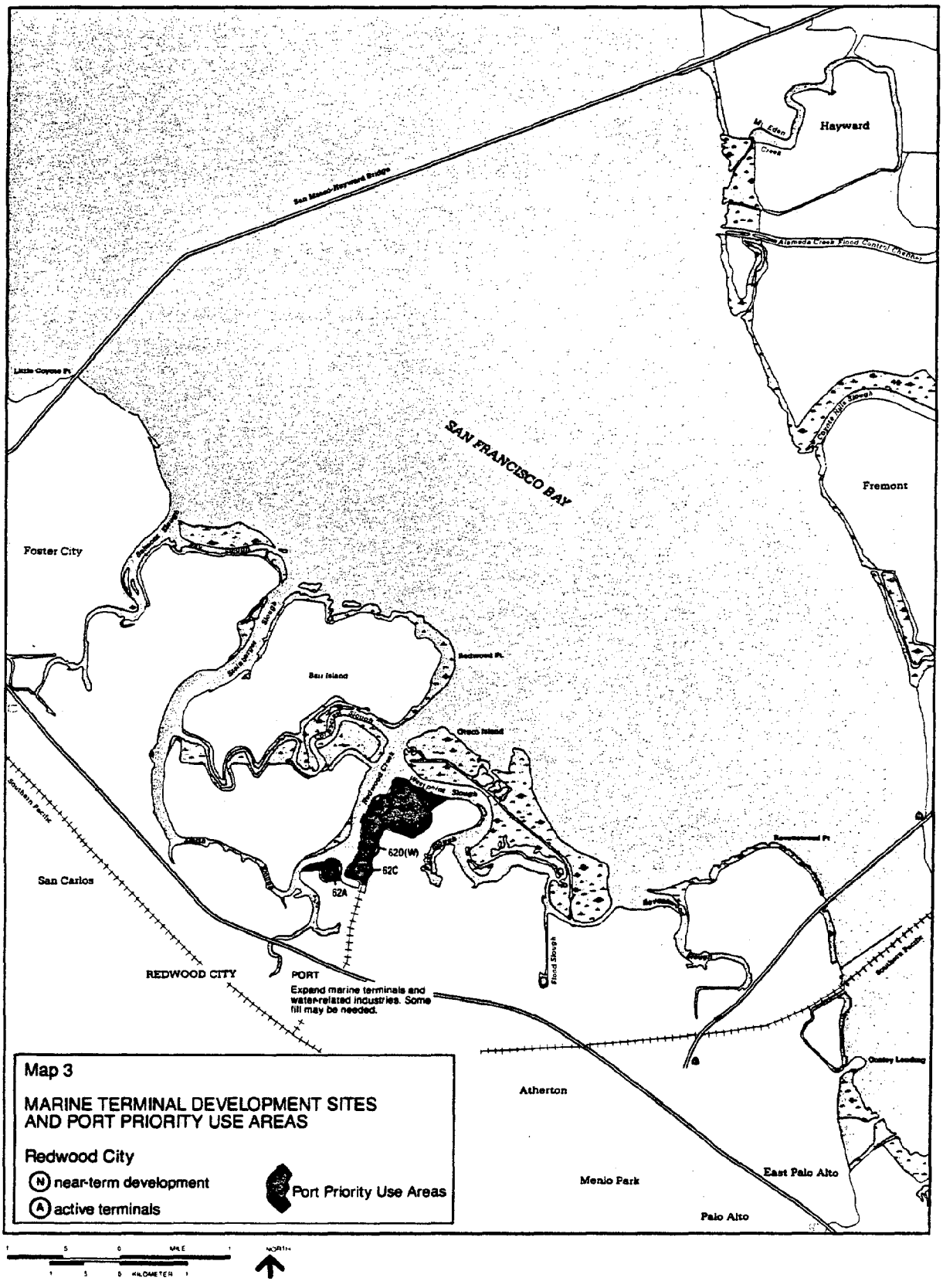
SUISUN BAY

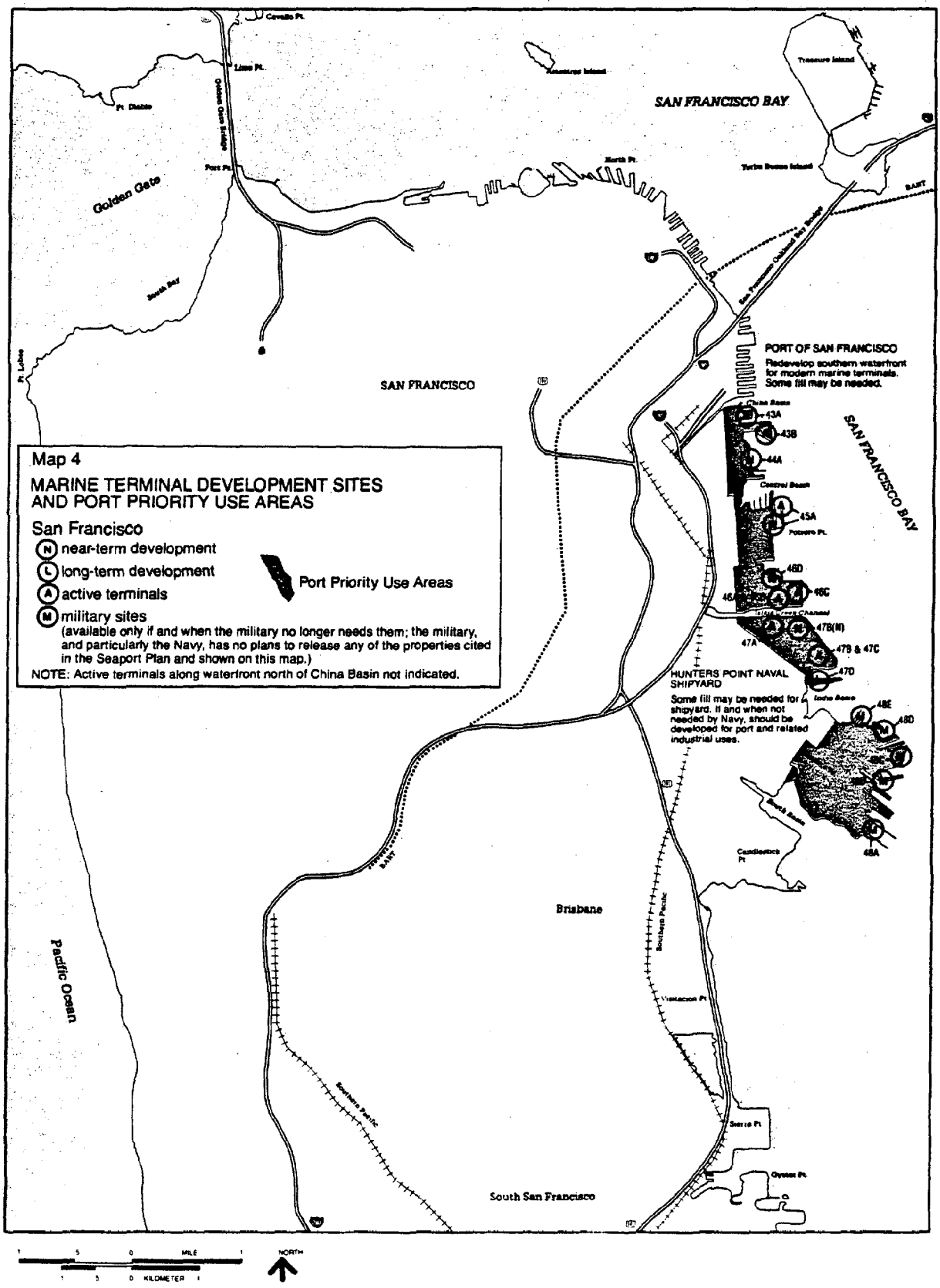
Military

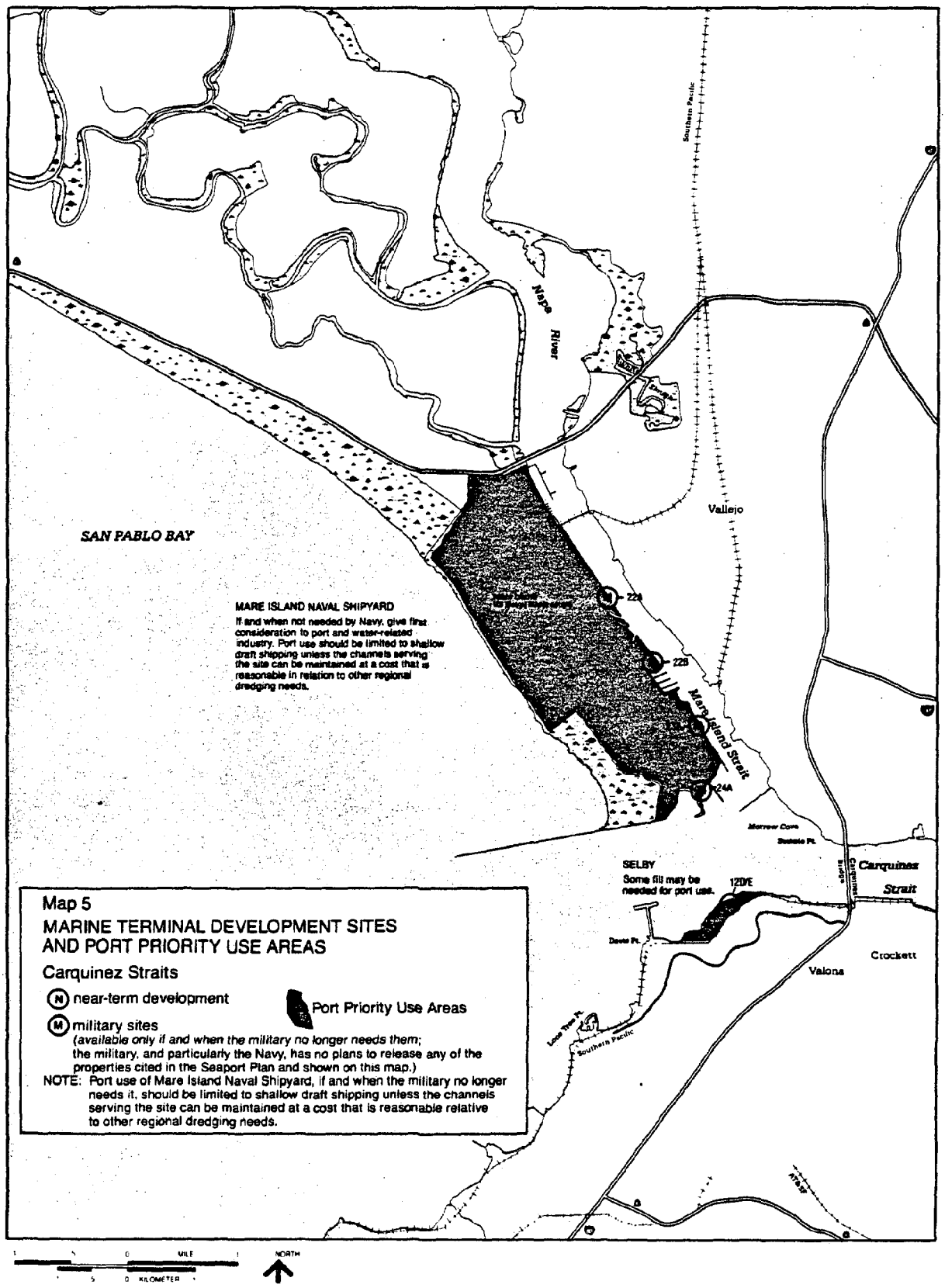
7A, 7B & 7C Concord Naval Weapons Station (Port Chicago)

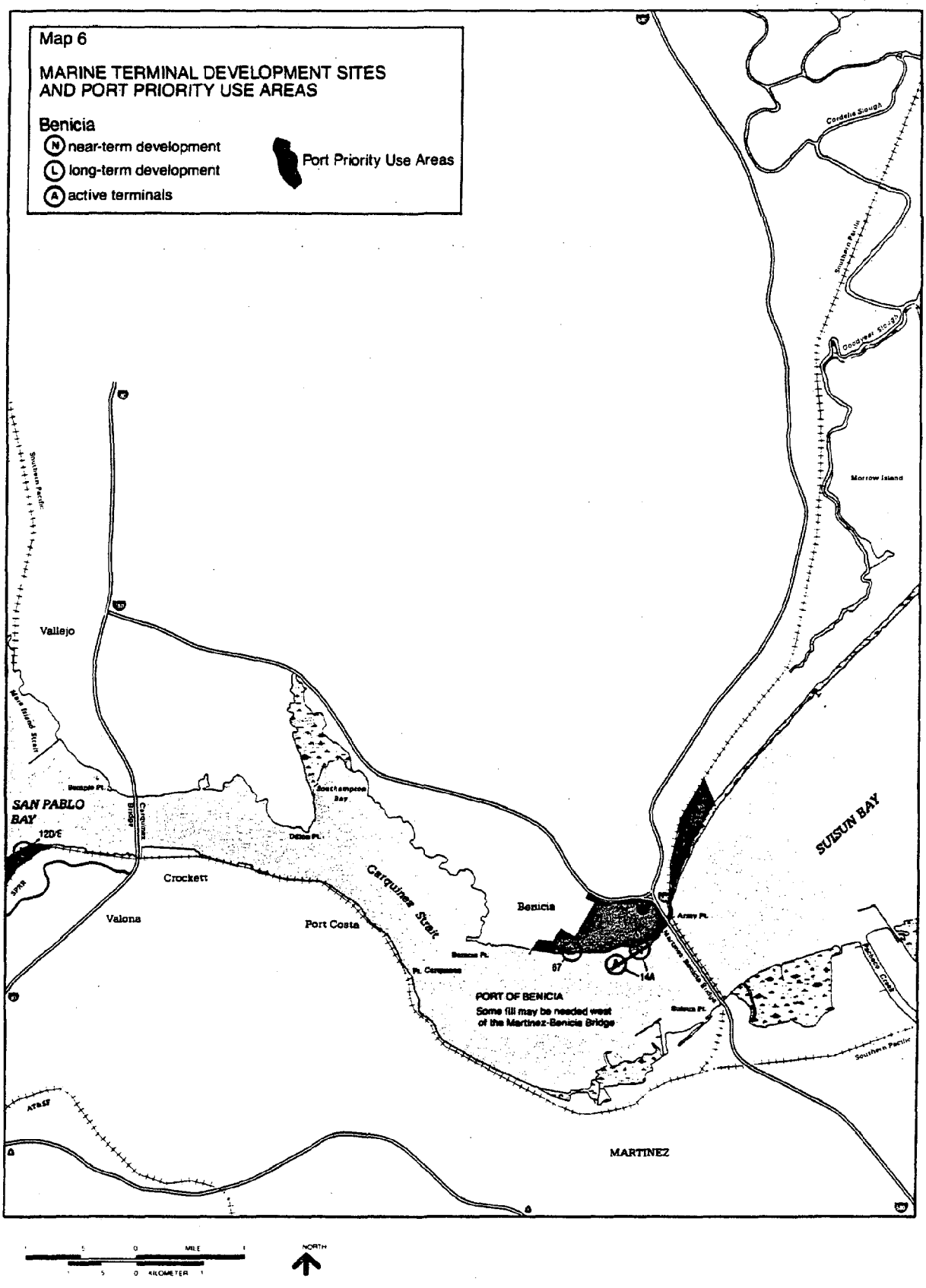

SAN PABLO BAY
San Pablo Strait
Pinole
Garrity Creek
AT&SF
Southern Pacific
San Pablo Creek
San Pablo
Wildcat Creek
North Richmond
Pt. San Pablo
The Brothers
25B
Pt. Orient
Pt. Molate
Castro Pt.
Richmond-San Rafael Bridge
Red Rock
Long Wharf
Cypress Pt.
Richmond
AT&SF
BART
SPRR
El Cerrito
31A(N)
32D
33A(N)
33A(S)
29C
28A
29A/D
Inner Harbor Basin
Harbor Channel
Pt. Potrero
PORT OF RICHMOND
Some fill may be needed
Albany
Pt. Isabel
Albany Hill
SAN FRANCISCO BAY
Berkeley
Map 1
MARINE TERMINAL DEVELOPMENT SITES
AND PORT PRIORITY USE AREAS
Richmond
near-term development
active terminals
Port Priority Use Areas
MILE
KILOMETER
NORTH

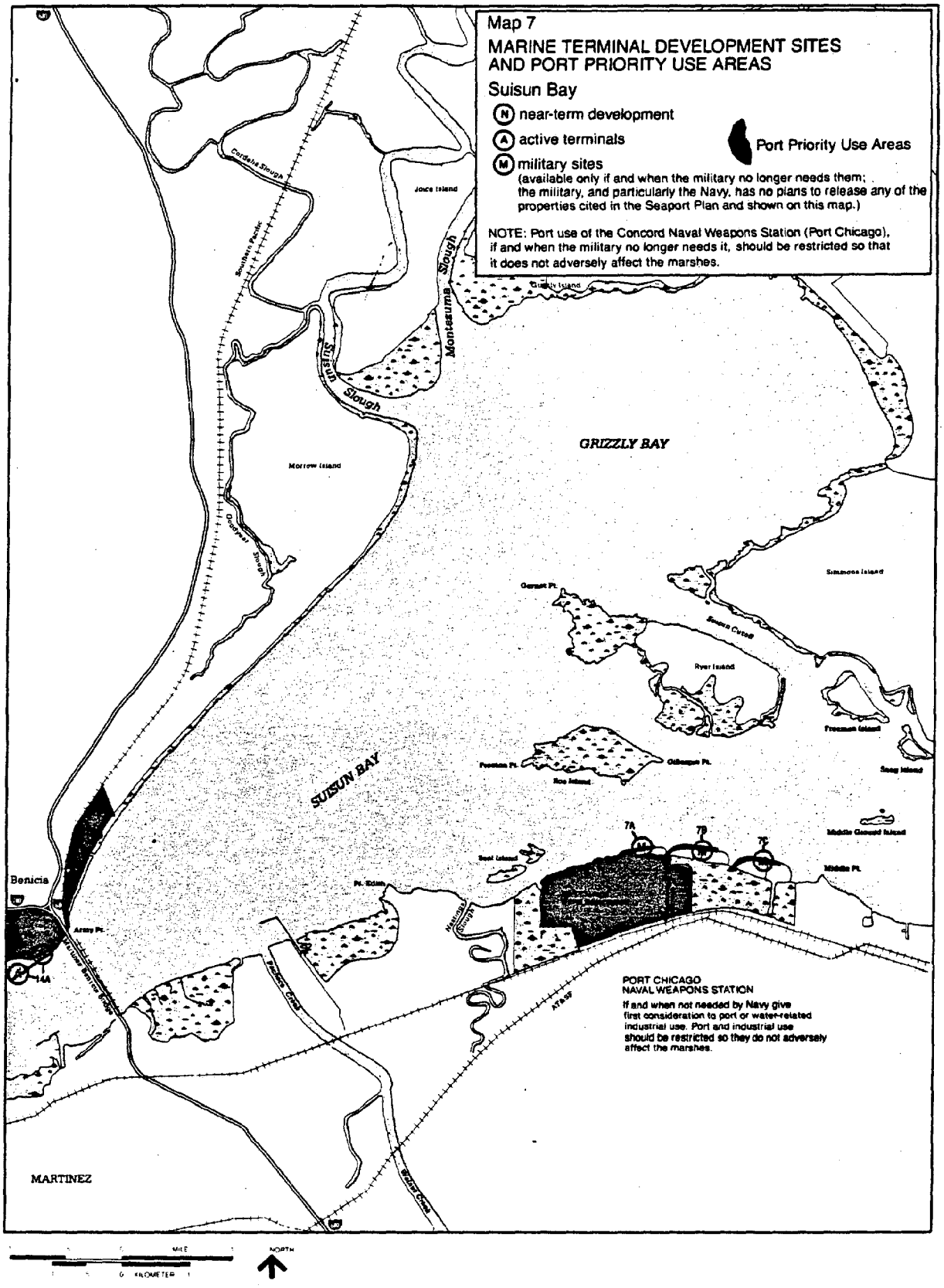

Berkeley
SAN FRANCISCO BAY
Emeryville
OAKLAND ARMY BASE AND NAVAL SUPPLY CENTER
Some fill may be needed for Army Base. If and when not needed by military, should be developed for port and related industrial uses.
OAKLAND
OAKLAND-ALAMEDA PORT AREA
Redevelop Outer, Middle and inner Harbors for modern marine terminals. Some fill may be needed.
NAVAL SUPPLY CENTER AND RESERVE SHIPYARD
If and when not needed by Navy, should be developed for port and related industrial uses.
NAVAL AIR STATION
Some fill may be needed for Navy operations. If and when not needed by Navy, should be developed for port and related industrial uses.
Alameda
SAN FRANCISCO BAY
San Leandro Bay
Metropolitan Oakland International Airport
Map 2
MARINE TERMINAL DEVELOPMENT SITES AND PORT PRIORITY USE AREAS
Oakland/Alameda
(N) near-term development
(L) long-term development
(A) active terminals
(M) military sites
(available only if and when the military no longer needs them; the military, and particularly the Navy, has no plans to release any of the properties cited in the Seaport Plan and shown on this map.)
Port Priority Use Areas


Hayward
San Mateo-Hayward Bridge
SAN FRANCISCO BAY
Fremont
Foster City
Bair Island
Redwood Pt.
Greco Island
Redwood Creek
620(W)
62C
62A
San Carlos
REDWOOD CITY
PORT
Expand marine terminals and water-related industries. Some fill may be needed.
Atherton
Menlo Park
East Palo Alto
Palo Alto
Map 3
MARINE TERMINAL DEVELOPMENT SITES AND PORT PRIORITY USE AREAS
Redwood City
(N) near-term development
(A) active terminals
Port Priority Use Areas
MILE
KILOMETER
NORTH


SAN FRANCISCO BAY
Golden Gate
SAN FRANCISCO
PORT OF SAN FRANCISCO
Redevelop southern waterfront for modern marine terminals. Some fill may be needed.
SAN FRANCISCO BAY
Map 4
MARINE TERMINAL DEVELOPMENT SITES AND PORT PRIORITY USE AREAS
San Francisco
(N) near-term development
(C) long-term development
(A) active terminals
(M) military sites
(available only if and when the military no longer needs them; the military, and particularly the Navy, has no plans to release any of the properties cited in the Seaport Plan and shown on this map.)
Port Priority Use Areas
NOTE: Active terminals along waterfront north of China Basin not indicated.
HUNTERS POINT NAVAL SHIPYARD
Some fill may be needed for shipyard. If and when not needed by Navy, should be developed for port and related industrial uses.
Brisbane
South San Francisco
Pacific Ocean
MILE
KILOMETER
NORTH


Napa River
Southern Pacific
Vallejo
SAN PABLO BAY
MARE ISLAND NAVAL SHIPYARD
If and when not needed by Navy, give first consideration to port and water-related industry. Port use should be limited to shallow draft shipping unless the channels serving the site can be maintained at a cost that is reasonable in relation to other regional dredging needs.
22A
22B
Mare Island Strait
24A
Morrow Cove
Benicia Pt.
Carquinez Strait
SELBY
Some fill may be needed for port use.
12D/E
Davis Pt.
Crockett
Valona
Lone Tree Pt.
Southern Pacific
Map 5
MARINE TERMINAL DEVELOPMENT SITES
AND PORT PRIORITY USE AREAS
Carquinez Straits
(N) near-term development
Port Priority Use Areas
(M) military sites
(available only if and when the military no longer needs them; the military, and particularly the Navy, has no plans to release any of the properties cited in the Seaport Plan and shown on this map.)
NOTE: Port use of Mare Island Naval Shipyard, if and when the military no longer needs it, should be limited to shallow draft shipping unless the channels serving the site can be maintained at a cost that is reasonable relative to other regional dredging needs.
MILE
KILOMETER
NORTH


Map 6
MARINE TERMINAL DEVELOPMENT SITES AND PORT PRIORITY USE AREAS
Benicia
N near-term development
L long-term development
A active terminals
Port Priority Use Areas
Cordelia Slough
Southern Pacific
Goodyear Slough
Morrow Island
Vallejo
Mare Island Strait
Southampton Bay
SAN PABLO BAY
120/E
Carquinez Bridge
Crockett
Valona
Port Costa
Carquinez Strait
Benicia
Army Pt.
SUISUN BAY
67
14A
PORT OF BENICIA
Some fill may be needed west of the Martinez-Benicia Bridge
Southern Pacific
MARTINEZ
MILE
KILOMETER
NORTH


Map 7
MARINE TERMINAL DEVELOPMENT SITES AND PORT PRIORITY USE AREAS
Suisun Bay
N near-term development
A active terminals
M military sites
(available only if and when the military no longer needs them; the military, and particularly the Navy, has no plans to release any of the properties cited in the Seaport Plan and shown on this map.)
Port Priority Use Areas
NOTE: Port use of the Concord Naval Weapons Station (Port Chicago), if and when the military no longer needs it, should be restricted so that it does not adversely affect the marshes.
Cordelia Slough
Joice Island
Southern Pacific
Montezuma Slough
Suisun Slough
Morrow Island
GRIZZLY BAY
Goodyear Slough
Simmons Island
Ryer Island
SUISUN BAY
Benicia
Arary Pt.
14A
7A
7B
7C
Middle Pt.
PORT CHICAGO
NAVAL WEAPONS STATION
If and when not needed by Navy give first consideration to port or water-related industrial use. Port and industrial use should be restricted so they do not adversely affect the marshes.
MARTINEZ
MILE
KILOMETER
NORTH

IV. FACILITY IMPROVEMENTS

MARINE TERMINALS

Development requirements for marine terminals are stated as the regionwide demand for new terminals. No attempt is made to be project or port specific. Table 3 displays the estimates of demand for new dry cargo marine terminals through the year 2000. The estimated number of new berths is in addition to those currently in operation. These estimates are a function of the three forecast levels, the capacity of existing marine terminals, and various assumptions with regard to future actions by government and the marine terminal operators. Specifically, the estimates in this table assume:

- the deepwater channels will remain at their current depths;
- the backland area (i.e., the storage and processing area that constitutes the terminal) of existing marine terminals will not increase; and
- after 1990, container terminal productivity[1] increases by approximately 1% per year due to operator induced improvements.

While certain channels may be deepened or container handling productivity may increase at specific terminals prior to 1990, such changes in the assumptions are not expected to significantly alter the 1985 and 1990 estimates of demand. As a result, the estimates for these two years are believed to be the best estimates of short-range demand for new dry cargo terminals. In the more distant future, it is reasonable to expect that many of the channels may be deepened or that productivity may increase at a rate higher than assumed for the estimates in Table 3. In fact, studies are already underway to deepen the channels to Oakland and Richmond. Therefore, the estimates in Table 3 for 2000 probably overstate the demand.

The demand for liquid bulk terminals, including a central Bay supertanker terminal, was not assessed in detail. The findings in the previous chapter outline the conclusions with regard to this topic.

CHANNELS

Without adequate deepwater channels, marine terminal facilities cannot function efficiently. The economic feasibility of deepening Bay Area shipping channels was analyzed, and relied heavily on the results of completed and ongoing work by the Corps of Engineers. This analysis was not intended to substitute for the detailed analyses done by the Corps in its General Investigations of individual deepening projects.

Major deepwater channels investigated within the Bay are:

- Suisun Bay Channel
- Pinole Shoal Channel
- Richmond Inner Harbor Channel

---

[1] For this plan, productivity is defined as marine terminal capacity per berth.

- Southampton Shoal Channel and Long Wharf Turning Basin
- Oakland Outer Harbor Channel
- Oakland Inner Harbor Channel (west of the Alameda Tubes)
- Oakland Bar Channel (Entrance Channel)
- Redwood City Channel
- San Bruno Shoal Channel

The channel along the San Francisco waterfront (largely a natural channel) was not investigated since any required deepening involves insignificant costs relative to the channels noted above. See Figure 5 for location of these channels.

Analysis concluded that channel deepening up to 45 feet is economically feasible for the following channels: Oakland Outer Harbor, Oakland Inner Harbor (west of the Alameda Tubes), Oakland Bar (Entrance Channel), Richmond Inner Harbor, Southampton Shoal, and Pinole Shoal. This does not imply that these channels should be deepened to 45 feet immediately. The most cost-effective depth for any specific channel would be determined by the Corps depending on the prevailing operating and market conditions at the time of the evaluation. In addition, the westerly portion of the Suisun Bay Channel (west of Pt. Edith) serves refinery operations, and has been authorized by the federal government for deepening to 45 feet. Comparisons were not developed for the deepening costs and benefits for San Bruno Shoal, Redwood City, and Suisun Bay Channels because of the difficulty of quantifying benefits.

GROUND TRANSPORTATION FACILITIES

Just as deepwater channels are crucial, the availability of adequate ground transportation facilities is vital to the efficient functioning of marine terminals. The ground transportation analysis focused on highway and street improvements, since MTC has responsibility in their funding. Rail access requirements were also addressed, but rail improvements are largely a private sector responsibility. Specific ground transportation improvements are only identified for the near future--1985 to 1990.

The evaluation of needed improvements was based partly on traffic studies and partly on interviews with representatives from the ports, marine terminal operators, trucking companies, shippers, railroads, and Caltrans. The potential improvements were reviewed with the affected cities to help refine the proposals and to evaluate possible land use changes in the port area which might alter the proposals.

Table 5 displays the ground transportation projects which address some regional interest in marine terminal accessibility. Each of the projects was assigned a priority by the Seaport Planning Advisory Committee using the following criteria:

Most Desirable - projects that mitigate the growth of port-related traffic; or projects where congestion materially reduces accessibility to a port and, from a regional perspective, significantly impedes the flow of goods.

Figure 5

SAN FRANCISCO BAY DEEPWATER CHANNELS

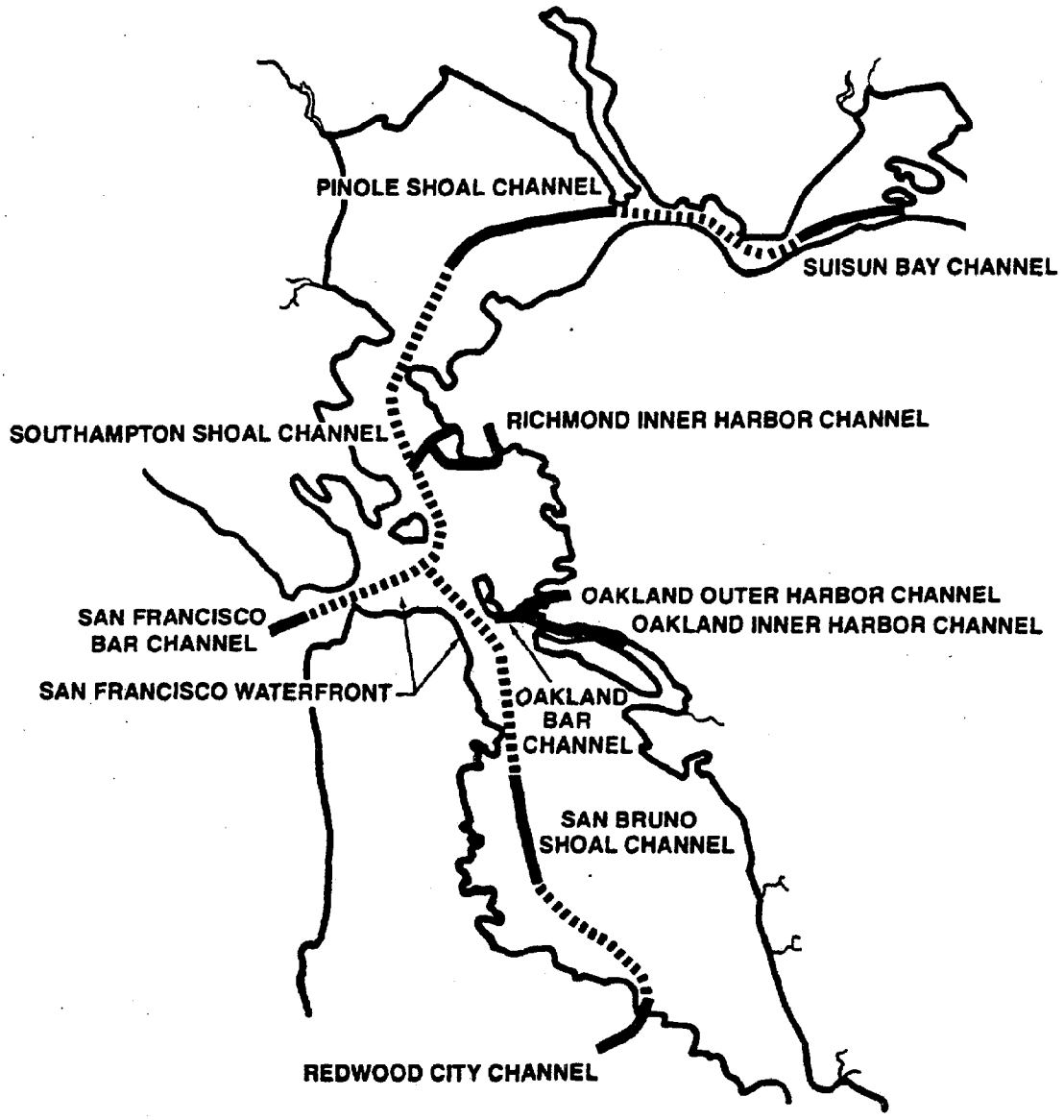


Table 5

TRANSPORTATION ACTIONS OF REGIONAL CONCERN

Area	Project	Lead Agency	Time Frame[1]	Seaport Committee Priority[2]
San Francisco	1. Monitor land use development and traffic growth in area surrounding Piers 94/96; undertake study as necessary.	City of S.F.,	S	M
	2. Improve geometrics of rail access to Piers 94/96.	Port of S.F.	S	H
Oakland/ Alameda	1. Study traffic on Seventh St., Maritime St., and Southern Pacific Rd. to develop solutions to projected congestion caused by Bay Area port growth.	Port & City of Oakland	S	H
	2. Improve intersection at Harrison & 7th Sts.	City of Oakland	M	L
	3. Construct segments of Patton Way & Atlantic Ave. extension, Alameda, that would serve Encinal Terminals.	City of Alameda	S	L
	4. Maintain truck route designation for Buena Vista Avenue.	City of Alameda	S	M
	5. Provide left lane & toll booth for trucks at Bay Bridge Toll Plaza.	Caltrans	S	M
Richmond	1. Develop rail yard at Richmond Container Terminal.	Port of Richmond	S	H
	2. Improve rail access at Meeker Ave. & Hoffman Blvd.	Railroads/ Caltrans	S	H
	3. Improve Harbor Way.	City of Richmond	S	L
	4. Construct Hoffman Freeway.	Caltrans	S	H
	5. Provide temporary solution for westbound, left-turning port traffic at Hoffman & Harbor Way.	Caltrans/ City of Richmond	S	H
Redwood City	1. Improve Harbor Blvd.	Port & City of Redwood City	M	L
Benicia	none			
Regionwide	1. Coordinate development of ground transportation system with proposed port development.	MTC	Annual Review	H
	2. Encourage port operators, trucking companies, marine terminal operators, and railroads to participate in MTC's Commute Alternatives Program.	MTC	S	H
	3. Develop & distribute Bay Area port access maps, and study freeway signing to ports.	MTC	S	M

[1] S - short range; M - medium range
[2] L - desirable; M - more desirable; H - most desirable

Desirable - projects that may improve traffic flow but are not necessary to alleviate congestion; or projects where congestion materially reduces accessibility to a port but, from a regional perspective, does not significantly impede the flow of goods.

More Desirable - project falling between the criteria outlined above.

The time frame--short or medium--is an expression of the urgency of a project. A short-range designation indicates funding should be developed for a project or that action should be taken within the next five years. A medium-range designation indicates funding should be developed or action occur beyond the next five year period.

GLOSSARY

San Francisco Bay (Bay)	For this plan, San Francisco Bay is defined as the four interconnected bays of South San Francisco Bay, Central San Francisco Bay, San Pablo Bay, and Suisun Bay; all areas subject to tidal action from the south end of South San Francisco Bay to the Golden Gate to the eastern end of Suisun Bay (Grizzly Bay and Honker Bay). In practice, the eastern boundary of the study area is defined to include the Contra Costa County shoreline to the Antioch Bridge and the Solano County shoreline to the extent of the BCDC jurisdiction near Collinsville.
San Francisco Bay Area	The City and County of San Francisco and the Counties of Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano and Sonoma.
Shoreline Sites	Shoreline lands or uplands bordering the Bay.
Marine Terminal	Any public, private, proprietary or military waterfront facility utilized for the receipt or shipment of waterborne cargo. Marine terminals serving an industrial function where the product transferred over the wharf is processed (e.g., crude oil refinery) are not included in this plan. For purposes of this plan, a marine terminal includes the wharf, storage area, offices, rail and truck facilities, and other functions necessary to the efficient operation of a terminal; it does not include employee parking.
Marine Terminal Berth	A marine terminal berth includes a wharf and other marine terminal facilities necessary to support a single ship berth.
Port Priority Use Areas	Port priority use areas include within their premises marine terminals and directly-related ancillary activities such as container freight stations, transit sheds and other temporary storage, ship repairing, support transportation uses including trucking and railroad yards, freight forwarders, government offices related to the port activity, chandlers and marine services. Other uses, especially public access and public commercial recreational development, are permissible uses provided they do not significantly impair the efficient utilization of the port area.
Regional Transportation System	The network of railroads, highways, pipelines, airways, and waterways and related facilities and services, and terminal areas, public or private, serving the San Francisco Bay Area.
Waterborne Cargo	Receipts and shipments of foreign and domestic waterborne cargoes.

Marine Terminal Capacity	The maximum practical capability of a marine terminal to handle cargo--measured in short tons per year.
Capacity Estimates or Region's Capacity	The estimated cumulative capacity of the Bay Area's then existing marine terminals. The Final Technical Report, Table 11 displays the estimate of capacity used in this Plan.
Productivity	For this plan, productivity is defined as the per berth capacity of marine terminals.
Cargo Forecast	The projected flow of waterborne cargo through Bay Area ports (measured in short tons).
Demand Estimates	The projected need for future marine terminal development (measured as a number of berths).
Near-Term Sites	Those shoreline sites considered to be the best for marine terminal development.
Long-Term Sites	Those shoreline sites that could be considered for development after the near-term sites have been used.
Active Terminal Sites	Existing marine terminal facilities that are expected to remain active for the foreseeable future.
Military Sites	Shoreline sites within military installations that have potential for marine terminal use, if and when the military no longer needs them.

INSTITUTIONS/LEGISLATION

Bay Area Ports	Encinal Terminals and the ports of Benicia, Oakland, Redwood City, Richmond, and San Francisco.
Association of Bay Area Governments (ABAG)	Created in January 1961 as a Bay Area regional land-use planning agency; primary function is to provide a framework for dealing with regional problems on a cooperative and coordinated basis. Not a governmental body; formal organization provided by contractual agreement between member cities and counties.
California Department of Transportation (Caltrans)	Created in July 1973 by the state Legislature as an agency responsible for the statewide coordination of multi-modal comprehensive transportation planning and development.
Maritime Administration (MarAd)	A federal agency, recently transferred to the Department of Transportation, responsible for promoting the U.S. merchant marine and the development of U.S. ports and marine terminal facilities.

INSTITUTIONS/LEGISLATION (cont.)

Metropolitan Transportation Commission (MTC)	Created by the State Legislature to provide multi-modal, comprehensive regional transportation planning and financial programming for the nine county San Francisco Bay Area. Has responsibilities for reviewing any applications for federal or state funds, if such application has a transportation element.
Northern California Ports and Terminals Bureau (NORCAL)	Created in 1952 for rate making purposes; recently reactivated to advocate the views of the Bay Area and Delta port-industry with respect to regional port planning. Membership includes Encinal Terminals and the ports of Redwood City, Oakland, San Francisco, Richmond, Benicia, Stockton, and Sacramento. Industrial development associations of Solano and Contra Costa Counties are also represented.
San Francisco Bay Conservation and Development Commission (BCDC)	Created by the State Legislature in 1965; has responsibilities for regulating the use of the Bay shoreline, and has the power to grant or deny permits for all Bay filling and dredging.
U.S. Army Corps of Engineers	A Federal agency under the Department of Defense responsible for maintaining the navigable waters of the United States.
McAteer-Petris Act (1965) (Sections 66600-66658, Title 7.2, California Government Code)	Created BCDC and set criteria for evaluating proposed Bay fill and dredging projects. Used in conjunction with the BCDC San Francisco Bay Plan to evaluate all permit applications for Bay port development and related fill or dredging.

REGIONAL PLANS

Regional Transportation Plan (RTP)	First adopted by the Metropolitan Transportation Commission in June 1973, to guide development of a safe, efficient and environmentally responsive regional transportation system at a reasonable cost for the movement of people and goods. Revisions are incorporated annually.
San Francisco Bay Plan	Adopted in 1969, by BCDC as a plan to guide future uses of San Francisco Bay and its shoreline area. Used in conjunction with the McAteer-Petris Act to evaluate all permit applications for Bay port development and related fill or dredging.

COMMODITY CATEGORIES/MEANS OF CARRIAGE

Break Bulk Cargo	Cargo handled in individually packaged units.

COMMODITY CATEGORIES/MEANS OF CARRIAGE (cont.)

Containerized Cargo	General cargo packed in standard size (10-40 ft. x 8 ft. x 8 ft.) weather-tight boxes. Cargo remains in container from origin to destination.
Neo-Bulk Cargo	Cargoes generally shipped in large quantities and having some characteristics of bulk commodities. Neo-bulk cargoes in the Bay Area are generally autos, steel products, and newsprint.
Dry Bulk Cargo	Cargoes loaded or unloaded in conveyor belts, spouts or scoops, and not placed individually; flowable cargoes; rice, grain, various ores, etc.; stored loose.
Dry Cargo	All break bulk, containerized, neo-bulk, and dry bulk cargoes.
Liquid Bulk Cargo	Liquid cargoes, such a petroleum or vegetable oil, that are shipped in tanks rather than small individual units.
Roll-on/Roll-off (RO/RO)	A method of ocean transport which permits wheeled vehicles (e.g., autos, trucks, forklifts) to drive on and off the vessel under their own power.
Lighter Aboard Ship (LASH)	A method of ocean transport which uses lighters (i.e., barges) capable of carrying smaller standard sized containers, general cargo or bulk cargo. LASH barges are taken aboard ship or discharged by shipboard cranes.

REFERENCES

Metropolitan Transportation Commission, Regional Transportation Plan for the Nine County San Francisco Bay Area.

Metropolitan Transportation Commission, Regional Port Planning Project, Phase I, Report and Appendices, October 1977.

Metropolitan Transportation Commission & San Francisco Bay Conservation and Development Commission, MTC/BCDC port planning project, Phase II working papers:

- Working Paper #1, User's Manual for Data Base, July 1978.
- Working Paper #2, Petroleum Terminal Analysis, July 1978.
- Working Paper #3, Harbor Capacity Analysis, July 1978.
- Working Paper #4, Overview of Economic Impact Analysis Relevant to Regional Port Planning, July 1979.
- Working Paper #5, Channel Deepening Analysis, September 1978.
- Working Paper #6, Identification of Feasible Marine Terminal Sites, February 1979.
- Working Paper #7, Environmental Analyses for Potential Marine Terminal Sites, May 1979.
- Working Paper #8, Land Use Compatibility Analysis, July 1980.
- Working Paper #9, An Investigation of Marine Terminal Site Selection by Steamship Lines: A Case Study of the San Francisco Bay Area, February 1980.
- Working Paper #10, Analysis of Future Demand for Marine Terminal Facilities, May 1981.
- Marine Terminal Traffic Generation Manual, June 1980.
- Working Paper #11, Ground Access to Bay Area Ports: A Transportation Systems Management Approach, September 1980.
- Working Paper #12, Ground Access Analysis, November 1980.
- Working Paper #13, Evaluation of Marine Terminal Sites: Composite Site Grouping, July 1980.
- Working Paper #14, Evaluation of Military-Owned sites, July 1981.

Metropolitan Transportation Commission & San Francisco Bay Conservation and Development Commission, MTC/BCDC Port Planning Project, Final Technical Report, April 1982.

San Francisco Bay Conservation & Development Commission, San Francisco Bay Plan.

U.S. Army Corps of Engineers, San Francisco Bay Area In-Depth Study: Waterborne Commerce Projections and Commodity Flow Analysis, September, 1976.

U.S. Army Corps of Engineers, San Francisco Bay Area Cargo Forecast, June 1981.

U.S. Maritime Administration, Port Handbook for Estimating Marine Terminal Cargo Handling Capability, September 1979.