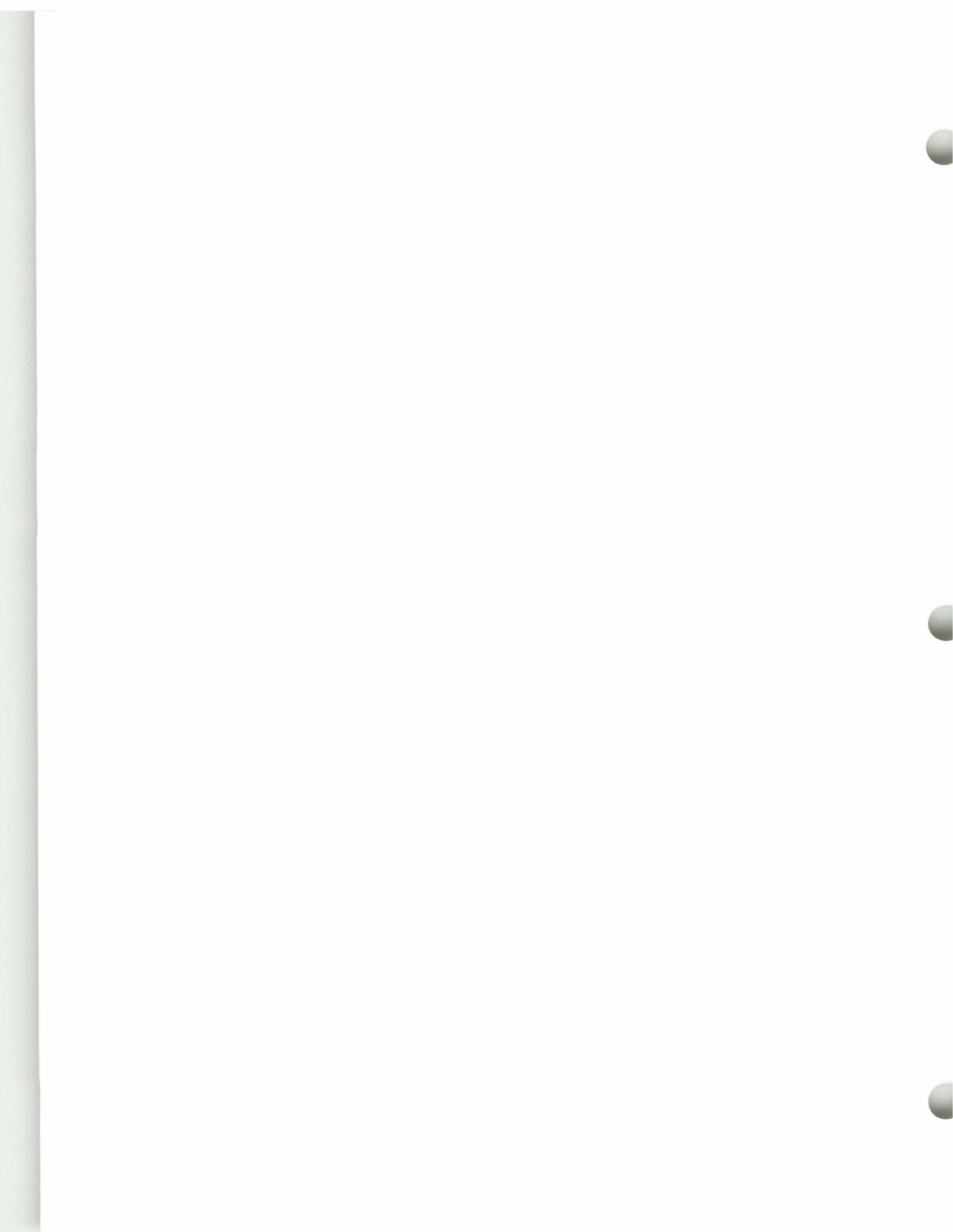


PORT OF PORT HUENEME PORT HUENEME, CALIFORNIA





I. GENERAL DATA

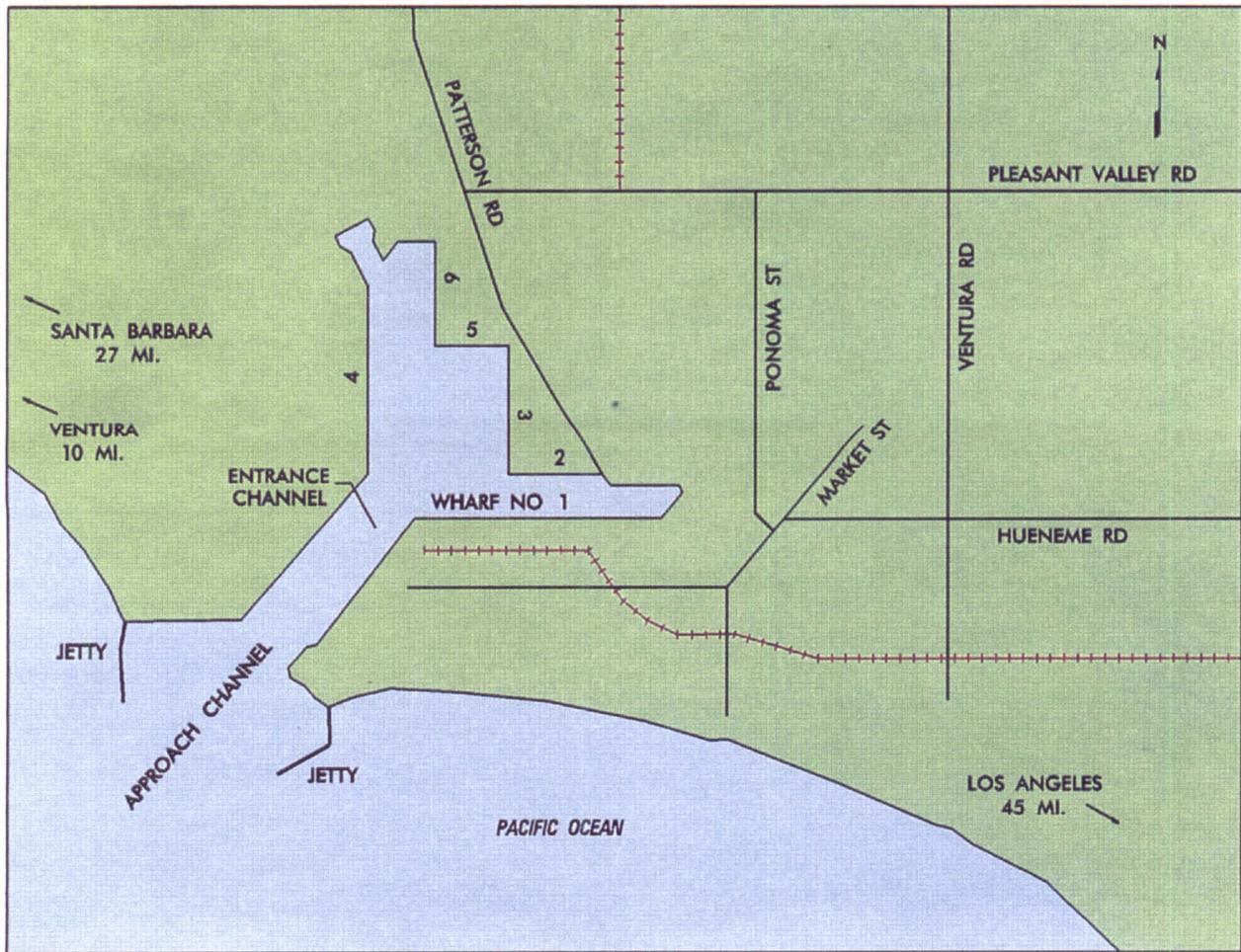
TRANSPORTATION ACCESS

Water

Port Hueneme is in a basin, just inland of the Pacific Ocean. The Oxnard Harbor District owns the southeast portion of the basin and operates it as a commercial deep-draft port. The remainder of the basin is under the control of the US Naval Construction Battalion Center (NCBC).

A dredged approach channel between two jetties leads to the entrance channel. The entrance channel leads to the port harbor. These channels vary from 37 to 40 feet deep mean low water (MLW) and from 330 to 600 feet wide. No overhead restrictions lead into the port.

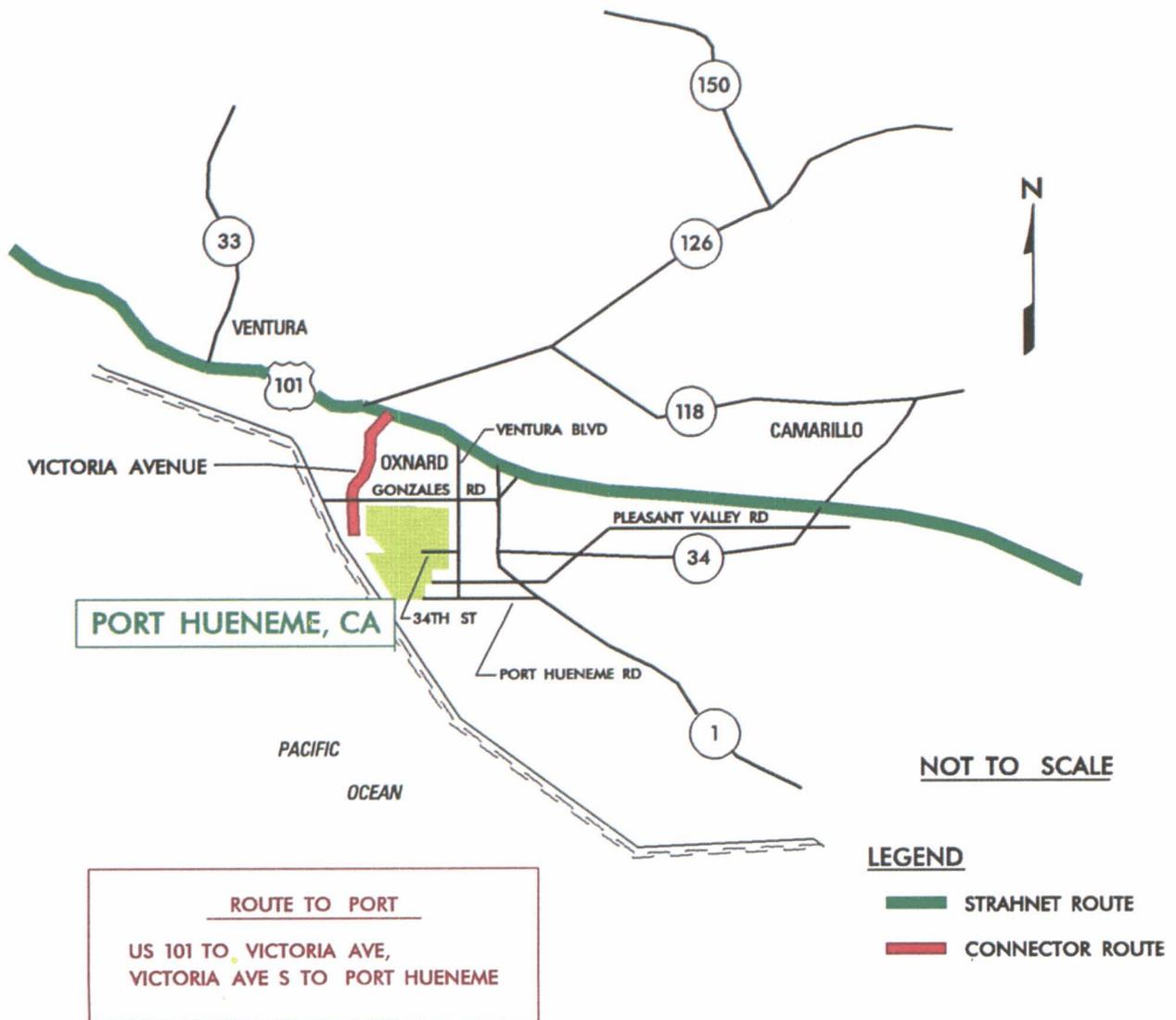
A small turning basin between wharves 3 and 4 will accommodate a ship length of 827 feet. The port has no anchorages; however, offshore anchorages are available about 1.5 miles southwest of the channel entrance. The tidal range is 5.4 feet, with an extreme range of 9 feet.



Water Access

Highway

Shown below are the highway routes to the Port of Port Hueneme. The major routes to the Port Hueneme area are Ventura Freeway (US Route 101) and Pacific Coast Highway (California Route 1). Several roads lead from these major routes to the port area - Victoria Avenue and Ventura Road from the north and Port Hueneme Road and Pleasant Valley Road from the east. Victoria and Pleasant Valley Gates provide entrance to the port. Any transport configuration higher than 14 feet and/or wider than 102 inches is an oversize transport item for the State of California.

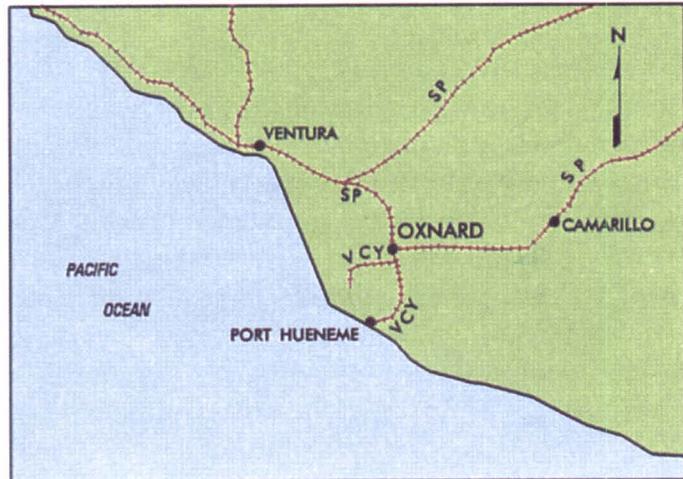


Highway Access

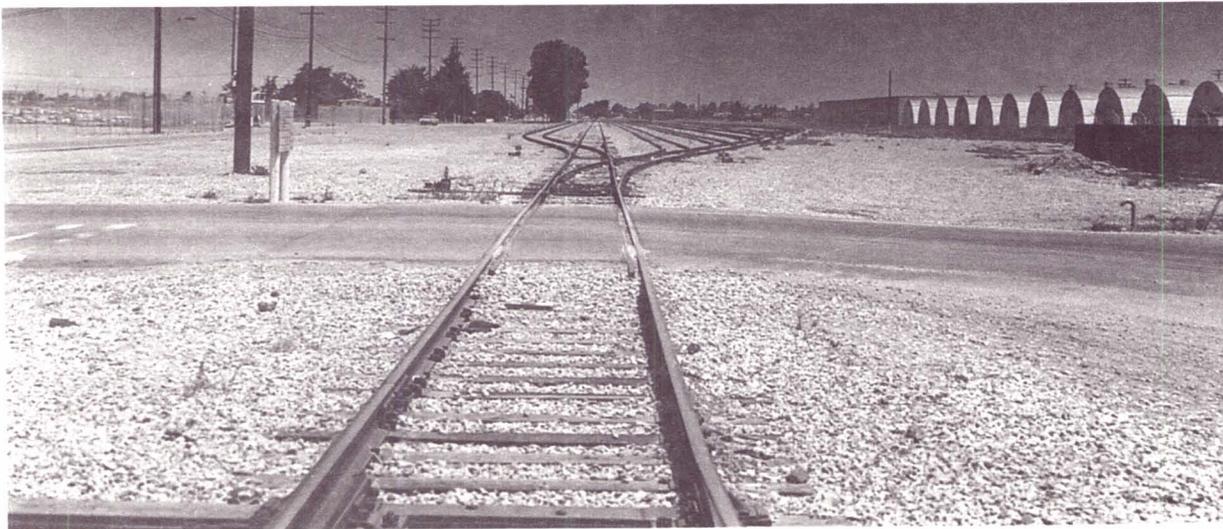
Rail

The Southern Pacific Transportation Company (SP) provides rail service to the port via the Ventura County Railway (VCY). SP trains bring railcars to the SP Oxnard switching yard. The Oxnard local rail crew switches the railcars to the VCY railyard. VCY then provides the rail service to the NCBC railyard 1 mile from the port. The Navy owns and operates a locomotive on the center to provide an internal switching capability.

The VCY and NCBC railyards can store railcars. The SP railyard is a short-term holding yard rather than a storage yard. No rail clearance restrictions exist along the port access.



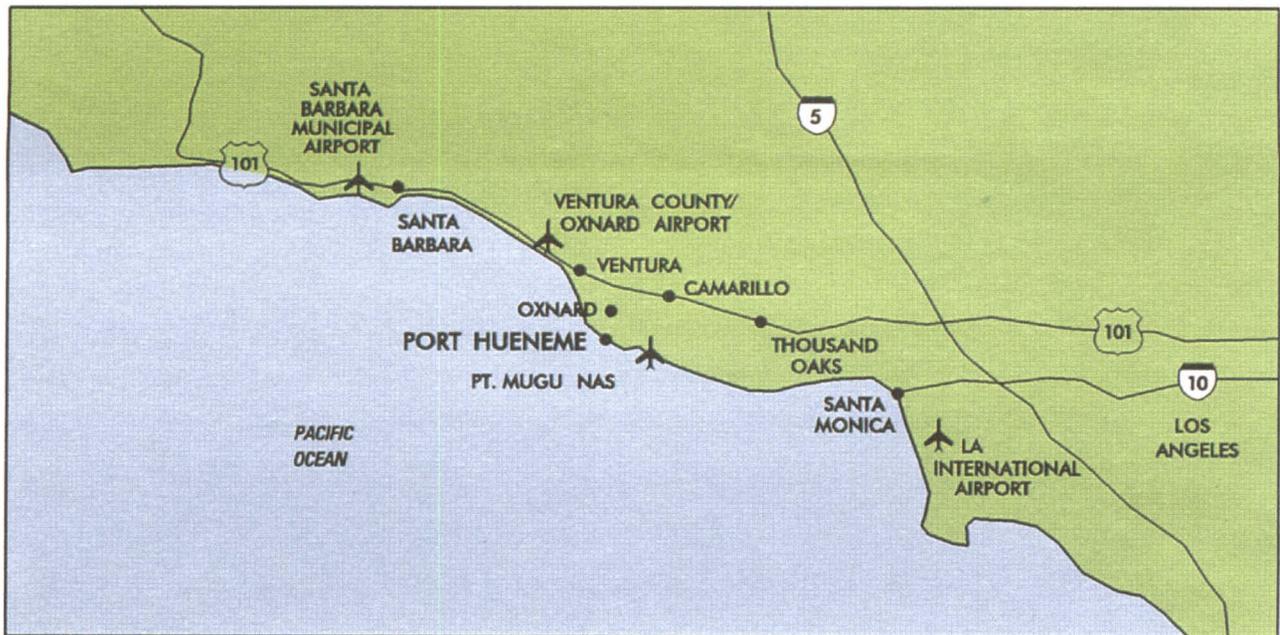
Rail Access



NCBC Railyard

Airport

The nearest airport to the Port of Port Hueneme is Ventura County/Oxnard Airport. It is 3 miles from the port and has one asphalt runway, measuring 5,950 feet long and 100 feet wide. The nearest major airports are LA International (50 miles southeast of the port) and Santa Barbara Municipal (50 miles northwest of the port). The airport at Santa Barbara has three asphalt runways; the longest is 6,050 feet long by 150 feet wide. LA International has four concrete runways; the longest is about 12,100 feet long by 150 feet wide. The nearest military airfield is the Naval Air Weapons Station at Point Mugu. This airfield is 7 miles southeast of the port and has two asphalt runways; the longest is 11,100 feet long by 200 feet wide.



Airport Access

PORT FACILITIES

Berthing

The Port of Port Hueneme is a multicargo terminal consisting of long and short marginal wharves. Pier construction is generally either concrete decking supported by concrete piles or concrete bulkhead with concrete surface solid fill. All berths are fronted with timber or rubber and timber fendering systems. All berths have lights for night operations.

Figures 1 and 2 are land-use maps of the port, which show the berthing and port facilities. Figure 3 shows an aerial view of the port and includes a table identifying berth characteristics.

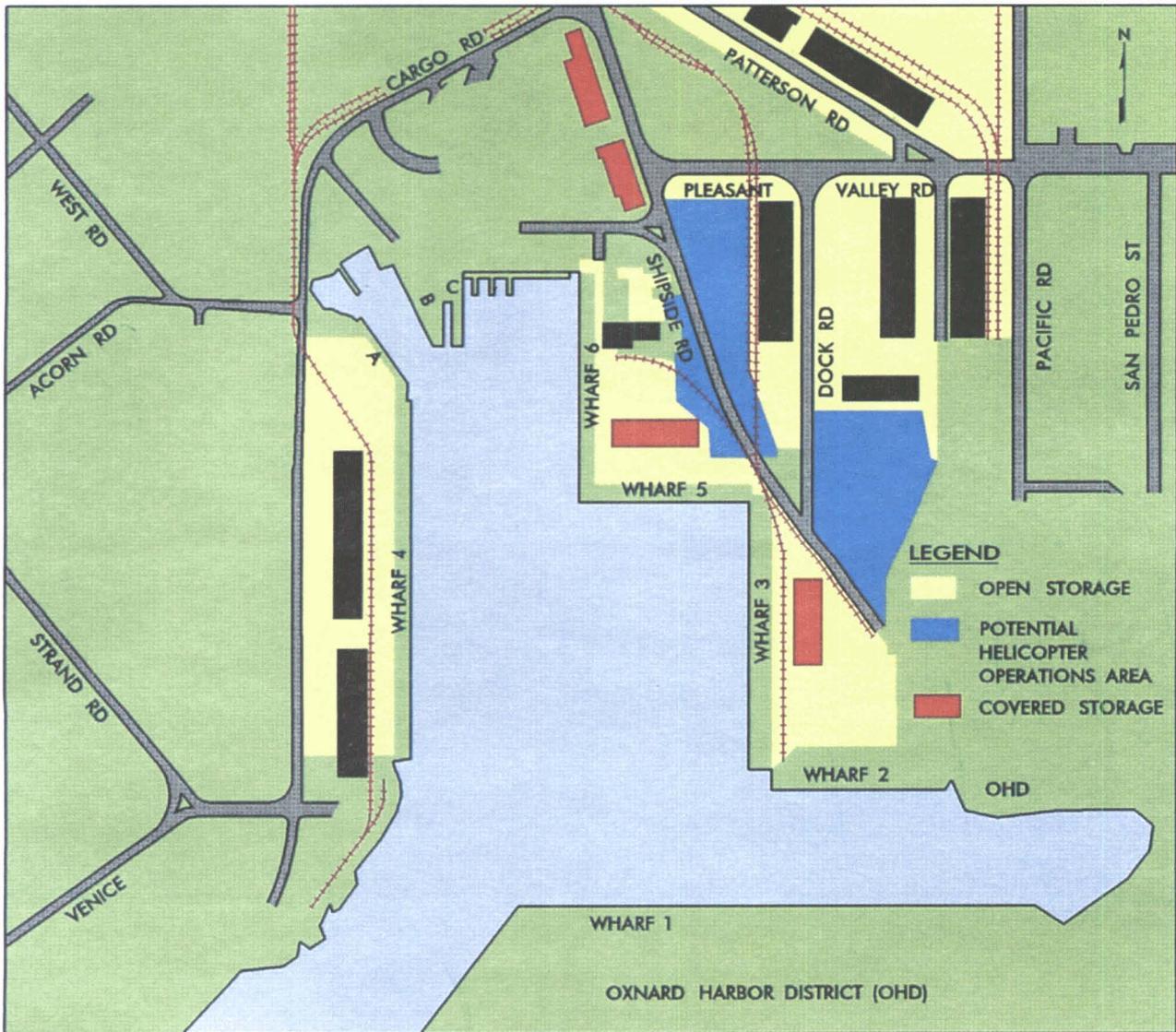


Figure 1. Land-use map for immediate port area.

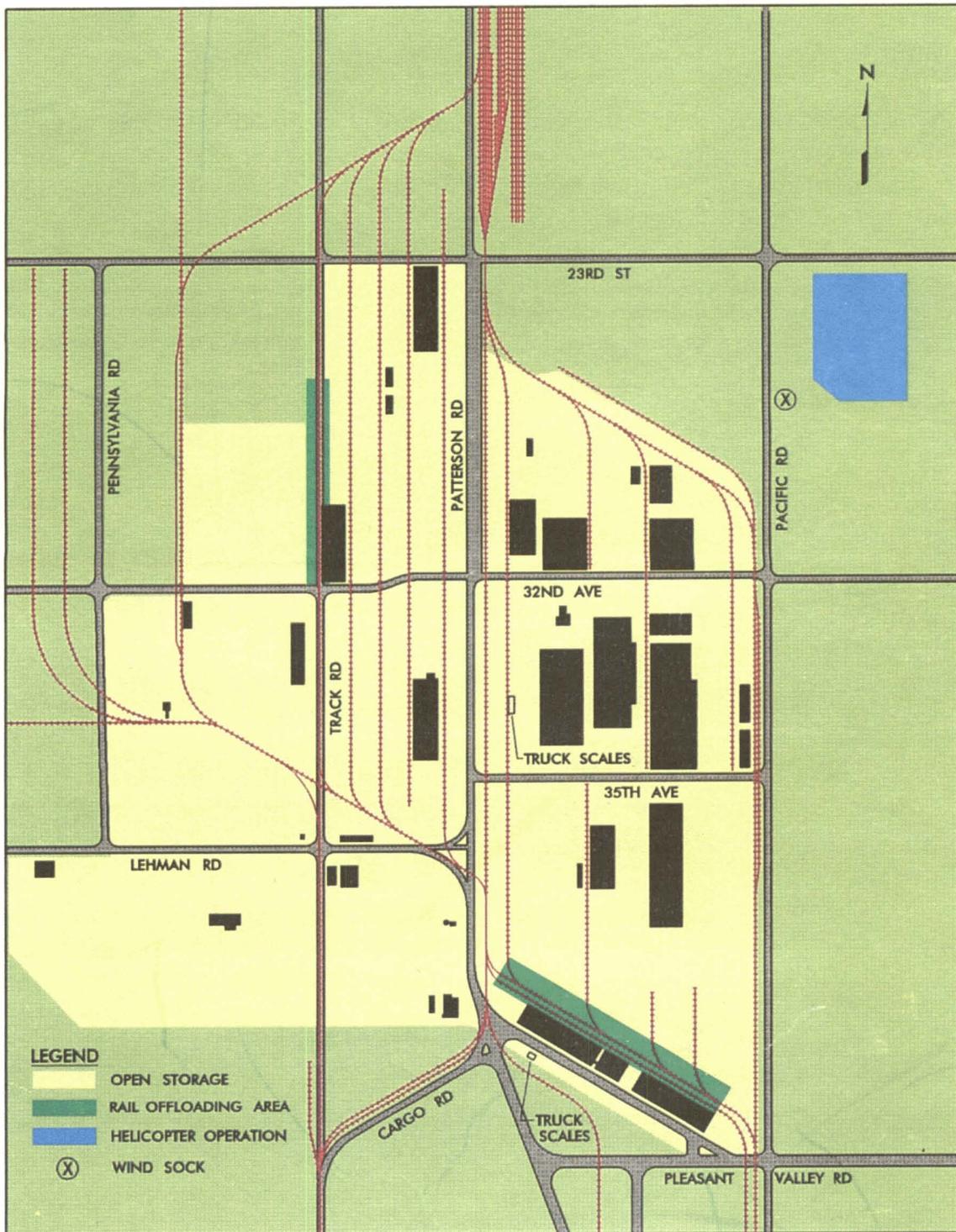


Figure 2. Land-use map for area north of port area.

BERTH CHARACTERISTICS

CHARACTERISTICS	BERTHS								
	1	2	3	4	5	6	A	B	C
Length (ft)	1,800	1,400	1,025	1,202	600	784	250	350	391
Depth alongside at MLW (ft)	35	35	35	35	35	35	16	18	21
Deck strength (psf)	600	600	600	600	600	600	600	600	600
Apron width (ft)	Open	Open	Open	Open	Open	Open	Open	Open	Open
Apron height above MLW (ft)	14	14	14	14	14	14	14	14	14
Number of container cranes	0	0	0	0	0	0	0	0	0
Number of wharf cranes	0	0	0	0	0	0	0	0	0
Apron lighting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	Yes	No	No	No	No	No	No
Apron length served y rail (ft)	0	0	0	0	0	0	0	0	0

Notes:

1. Terminal open staging area is 220 acres.
2. Terminal covered storage area is 281,090 square feet.



Figure 3. Port facilities.

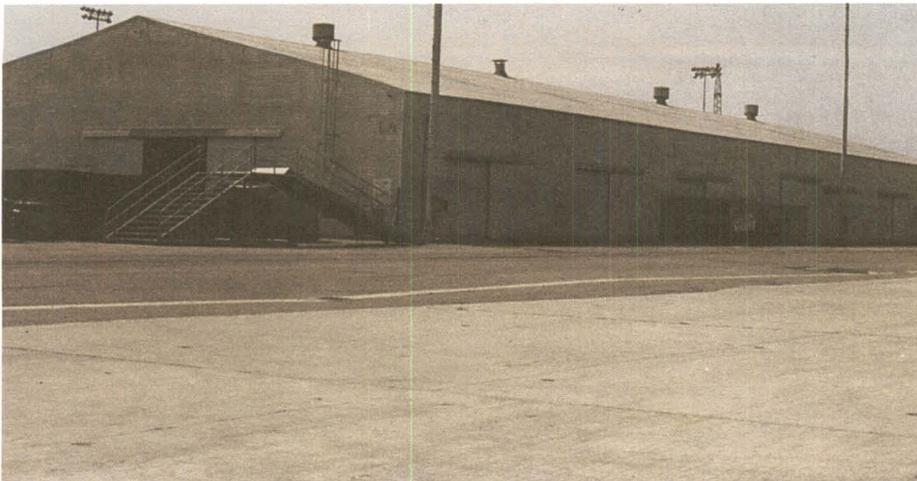
Staging

OPEN STAGING

The Port of Port Hueneme has about 35 acres of open storage in the immediate port area. Dispersed throughout NCBC are another 185 acres of available open storage. All open storage areas are paved and provide storage for a variety of cargo. The port has two areas with potential for helicopter operations. One area, 10 acres, is north and east of wharf 5 (fig 1). The other area, 20 acres, is southeast of the intersection of Pacific Road and 23rd Avenue, across the street from Building 372 (fig 2).

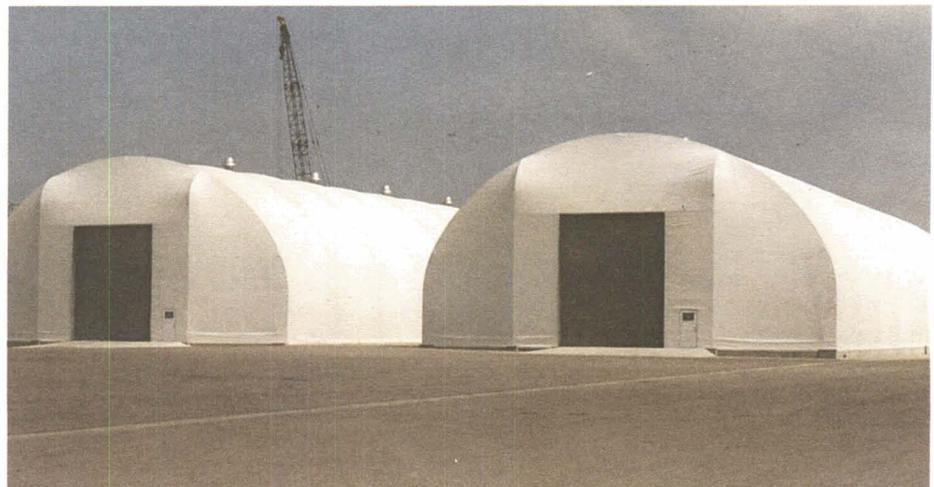
COVERED STAGING

Three warehouses and one transit shed are available for covered storage use. These facilities provide 105,090 square feet of covered storage. In addition, the port has three 400- by 80-foot and five 200- by 80-foot tension fabric structures. These structures provide 176,000 square feet of covered storage.



Transit Shed,
Building 546,
Wharf 3

Tension Fabric
Structures



Rail

Rail trackage links the railyards to various rail spurs and storage tracks throughout the installation. The port's wharves do not have apron tracks.

Almost 25 miles of rail are within the NCBC installation. The port railyard has a capacity of about 200 89-foot railcars. Rail spurs and other installation trackage provide storage for about another 200 89-foot railcars.

Highway

The port has about 44 miles of paved roadways. All of these roads, including gate entrances, are two laned with no clearance restrictions.

NCBC has two truck scales. One is at Building 516, off Patterson Road across the street from Building 510. The other, near Building 801, is off Patterson Road between 32nd and 35th Avenues (fig 2).

Truck Entrance,
Victoria Gate



Truck Scales,
Building 801
Compound

Unloading/loading Positions

RAMPS

The port has a variety of ramps for railcar and semitrailer offloading operations. The following table provides information on the number and types of ramps, as well as offloading use, available at the Port of Port Hueneme.

END-RAMP INFORMATION

TYPE	QUANTITY	USE (OFFLOAD)
Portable Steel	3	Railcar or Semitrailer
Trilevel	1	Railcars
Fixed Concrete	1	Flatcars/Boxcars/Lowboys/Vans
Forklift Width, Portable	5	Boxcars/Vans
Bridge Unit Sets	8	Lowboy Semitrailers

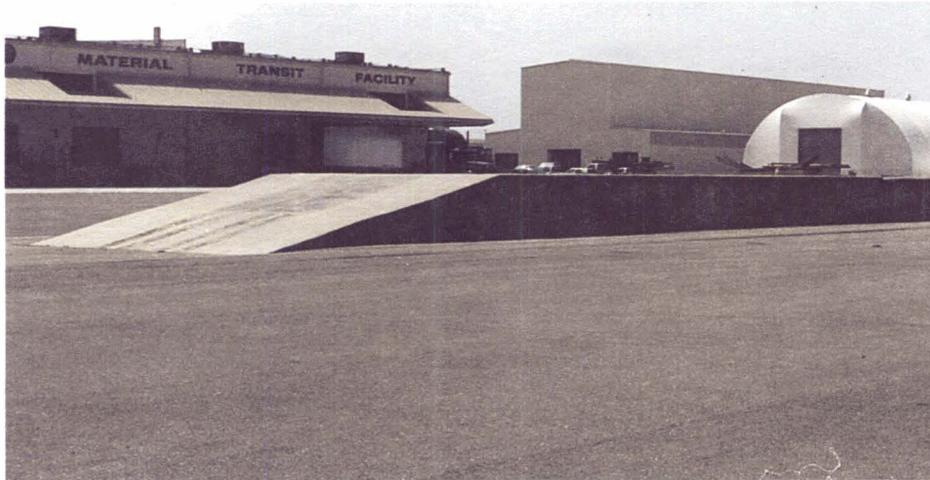
The most commonly used rail offloading areas are the rail spur near Buildings 510 and 513, off Patterson Road, and the track at Building 410, off 32nd Avenue (fig 2).



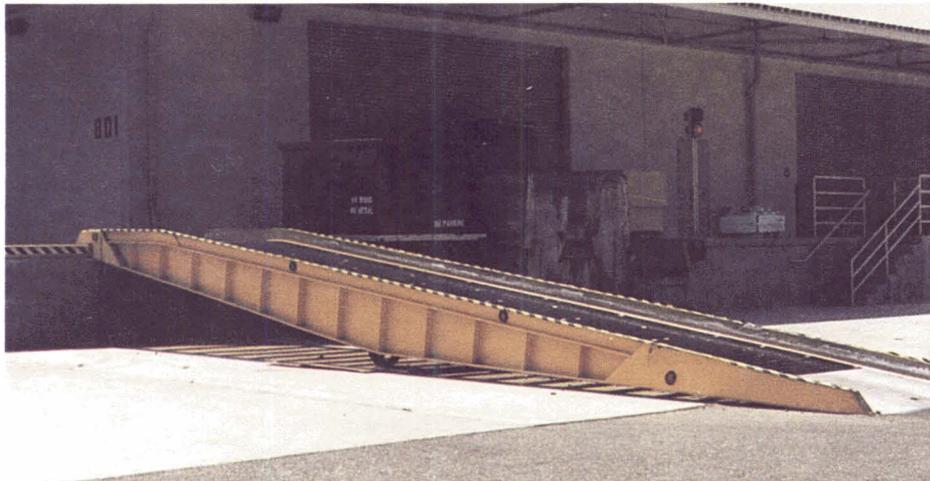
Portable Steel End Ramps



Trilevel End Ramp



Fixed Concrete Ramp Near Building 801



Portable, Forklift-Width Ramp

DOCKS

The port did not identify any docks available for use during a deployment. Many of the buildings on NCBC contain pre-positioned Navy war material and are not readily available for use during deployment. Because the climate in the Port Hueneme area is dry, the port authority states that there is usually little need for covered storage and dock operations. In many cases, the port uses the five narrow, forklift width, portable end ramps as a means for forklifts to offload vans and boxcars instead of using truck or rail docks.

Marshaling Areas

The 185 acres of additional open storage identified in the open staging section could be used for marshaling if desired. There are no designated marshaling areas off the installation.

MATERIALS HANDLING EQUIPMENT

The Port of Port Hueneme has one 112-ton floating crane and three mobile cranes available for loading ships. The capacities of the mobile cranes are 140, 50, and 24 tons. Many forklifts are available for materials handling. The largest have 40- and 24-ton capacities. More materials handling equipment (MHE) is available through local stevedore companies.

NAVY-OWNED MHE

EQUIPMENT TYPE	CAPACITY (STON)	QUANTITY
Container Handlers RT	50	2
Floating Crane	112	1
Mobile Crane	140	1
Mobile Crane	50	1
Mobile Crane	24	1
Forklift	40	1
Forklift	24	1
Forklift	10	8
Forklift	7.5	17
Forklift	5	2
Forklift	3	31
Forklift	2	12
Forklift, electric	2	8
Dock Trailers	25	63



Rough Terrain Container Handler (RTCH)



Floating Crane

INTERMODAL FACILITIES

The nearest intermodal railyards are in the Los Angeles/Long Beach area. The chapter on the Port of Los Angeles/Long Beach provides information on these facilities.

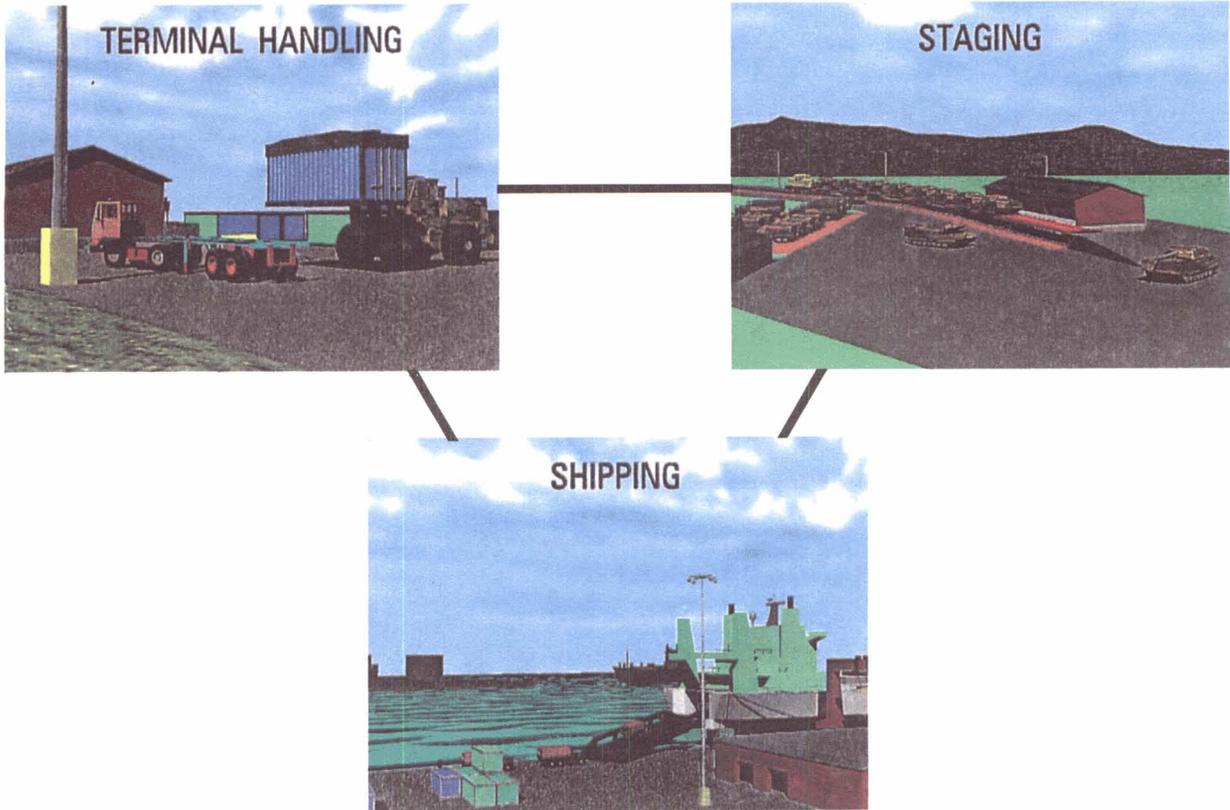
FUTURE DEVELOPMENT

The US Army Corps of Engineers (COE) will conduct a study of the port in 1993. Port officials will ask COE to address recommendations for widening the turning basin, dredging to 45 feet, and adding finger piers.

II. THROUGHPUT ANALYSIS

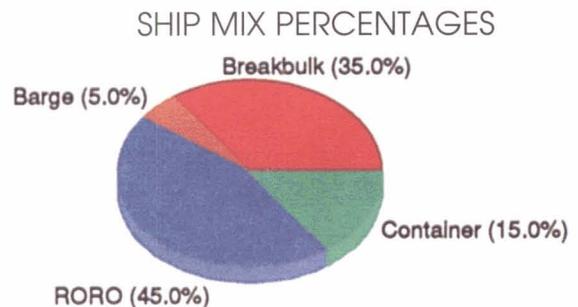
GENERAL

This section evaluates the theoretical throughput capability of the Port of Port Hueneme using the port operational performance simulator (POPS) computer model. A weak-link analysis provides the basis for the model in which each subsystem is analyzed separately and then compared to find the least capable subsystem. The weakest subsystem defines the maximum throughput capability of the terminal. The model yields throughput capability values for three subsystems - shipping, staging, and terminal processing/handling - in short tons (STON) and measurement tons (MTON) per day.



Terminal Throughput Subsystems

The analysis assumed that 80 percent of the port facilities will support the military deployment. Also, Desert Shield and Desert Storm statistics provide the basis for the ship mix. We weighted the percentages to adjust for differences in cargo deadweights and expectations for future deployments.



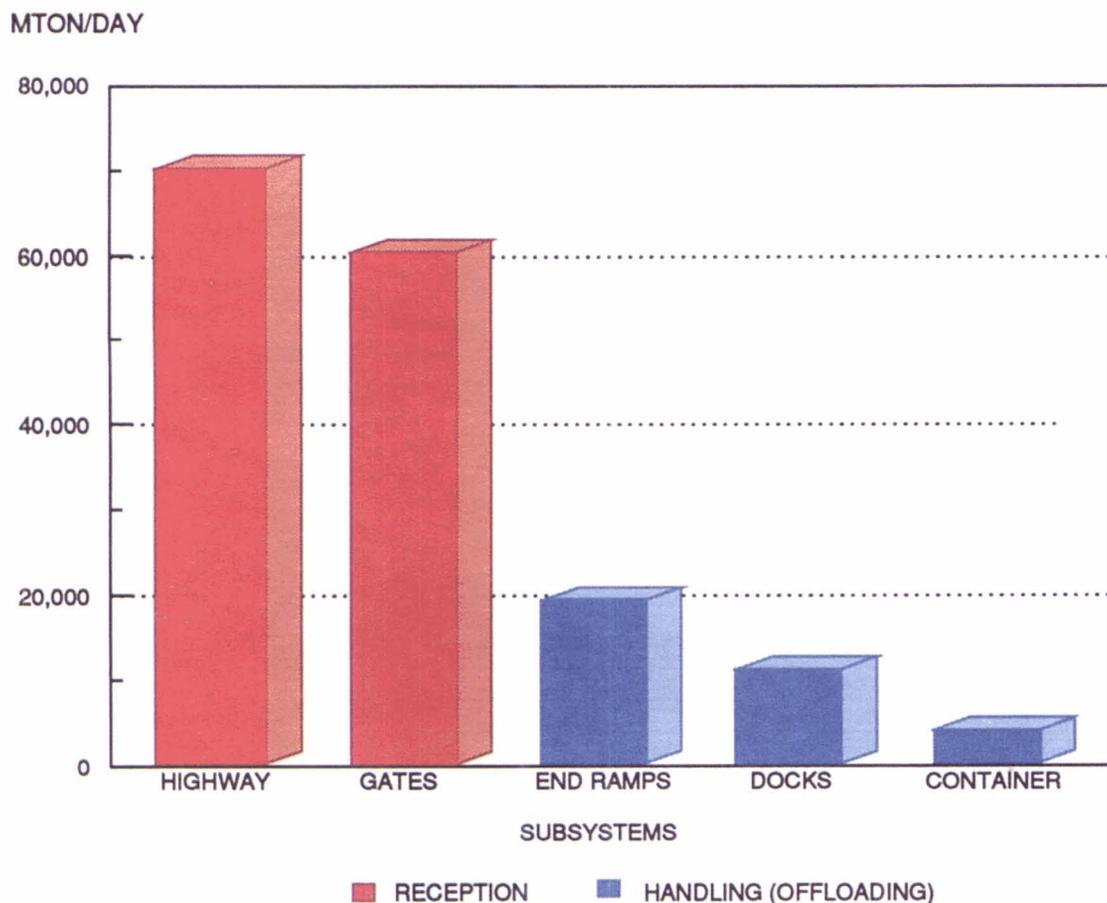
TERMINAL RECEPTION/ HANDLING

Highway

The major routes (US Route 101 and California Route 1) and connectors (Victoria Avenue and Ventura, Port Hueneme, and Pleasant Valley Roads) provide good access to the port area. Two gates - Victoria Gate (off Victoria Avenue) and Pleasant Valley Gate (off Pleasant Valley Road) - provide entrance to the port. The roadways from these gates provide access to staging and wharf areas. The gate reception of the two roadways providing access/egress could handle about 17,600 STON (60,665 MTON) of equipment and supplies per day.

Roadable vehicles in convoys will process directly to staging areas. Vehicles on commercial or military flatbed semitrailers will offload at portable ramp areas. These ramps could offload about 6,400 STON (19,200 MTON) per day. NCBC uses the narrow mobile ramps and forklifts for offloading supplies in van semitrailers. With this method, the van semitrailer offloading rate will be 4,350 STON (10,880 MTON) per day. Containers on trucks would move to a staging area or pier for offloading. Container MHE such as a rough terrain container handler (RTCH) and/or cranes could offload containers at a rate of 1,500 STON (3,750 MTON) per day.

HIGHWAY RECEPTION/HANDLING CAPABILITY



Rail

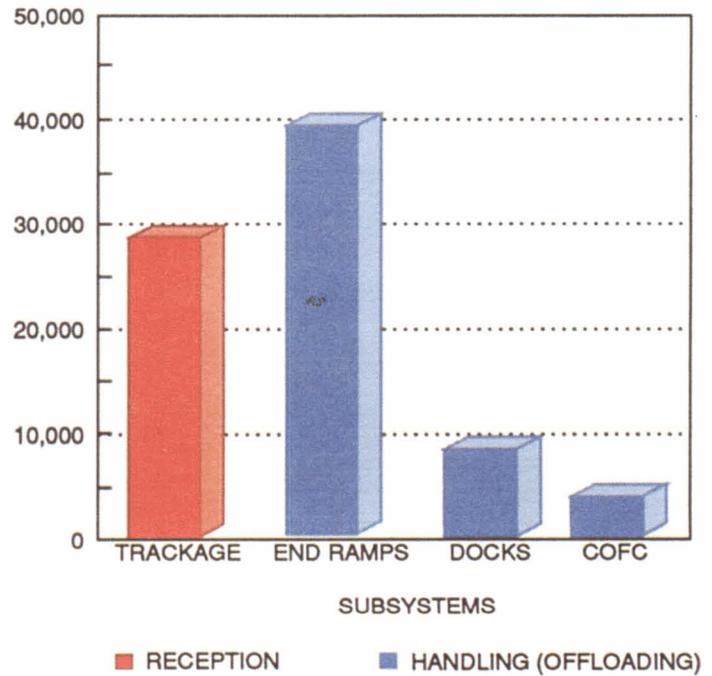
Southern Pacific (SP) provides rail access to the port via Ventura County Railway (VCY). The railyard within the port could store about 200 89-foot railcars. Rail spurs throughout NCBC could store an additional 200 89-foot railcars. The VCY railyard can store about 100 89-foot railcars. Current rail service to the port is about three 80-car trains per day.

Vehicles on flatcars could offload at various locations using portable end ramps. As with van semitrailers, deploying units will offload boxcars by using the narrow ramps for forklift operations. An RTCH and/or crane will offload containers.

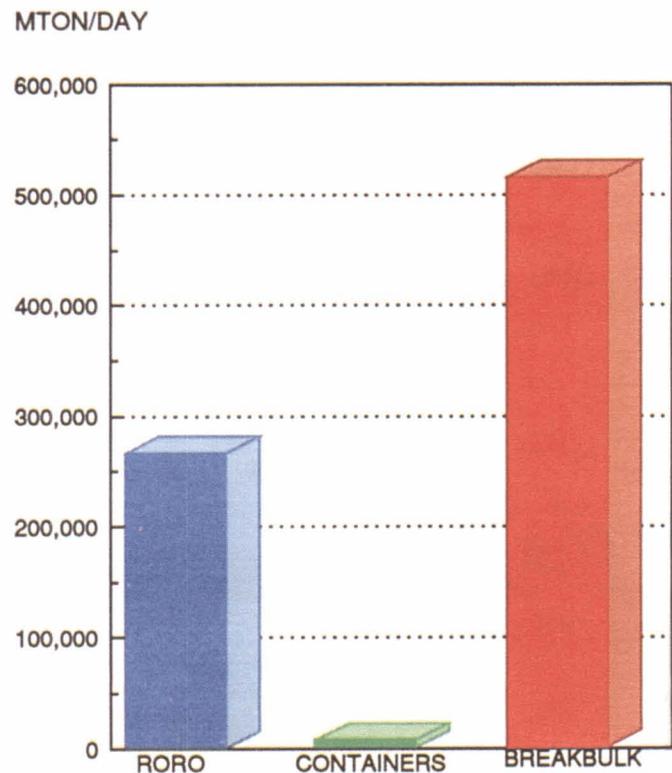
STAGING

The port has 220 acres of open storage for vehicles and/or containers. Of this total, a 35-acre area is near the port. This staging area can store about 66,504 STON (266,016 MTON) of rolling stock, or 3,000 STON (7,500 MTON) of containers, or 183,614 STON (513,660 MTON) of breakbulk cargo. Also, about 281,090 square feet of covered storage provides protection for about 4,500 STON (11,250 MTON) of palletized cargo.

RAIL RECEPTION/HANDLING CAPABILITY
MTON/DAY



OPEN STAGING CAPABILITY
MTON/DAY

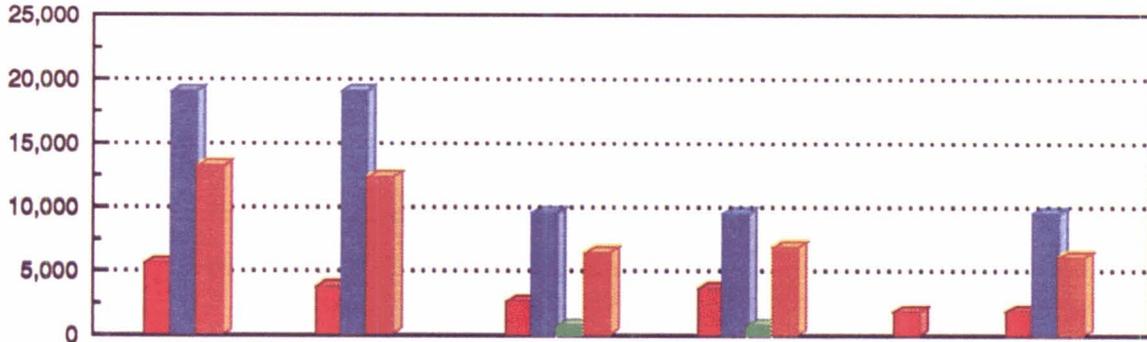


SHIPPING

We identified the throughput capability per berth in MTON per day for breakbulk, RORO, container, and mixed vessels. Various factors including MHE used; loading, operational, and berth usage rates; and berth/ship compatibility provide the basis for these results.

BERTH THROUGHPUT CAPABILITY

MTON/DAY



BERTH	1*	2*	3	4	5	6
BREAKBULK	5,574	3,716	2,654	3,716	1,858	1,858
RORO	18,874	18,874	9,437	9,437	0	9,437
CONTAINER	0	0	625	625	0	0
BARGE	0	0	0	0	0	0
MIXED	13,055	12,243	6,470	6,834	0	6,121

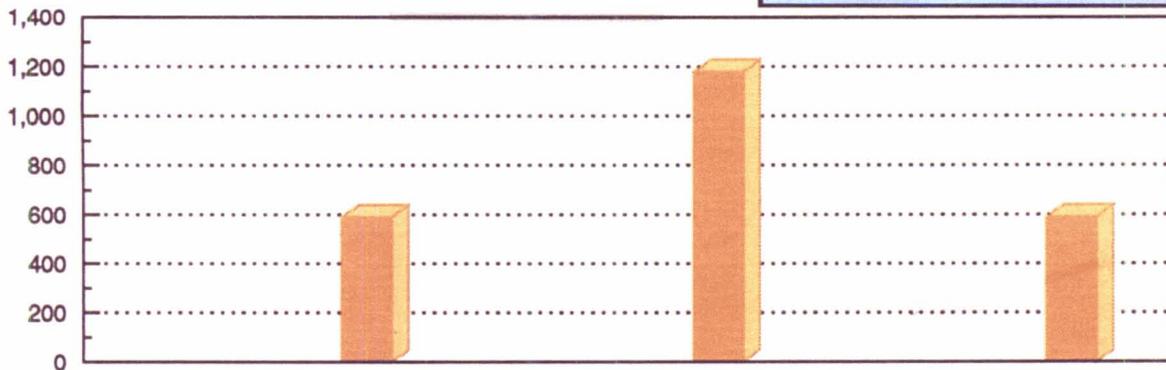
*OXNARD HARBOR DISTRICT

BERTH THROUGHPUT CAPABILITY - cont

CONVERSION FACTORS

Breakbulk	.4	STON per MTON
RORO	.25	STON per MTON
Containers	.4	STON per MTON

MTON/DAY



BERTH	A	B	C
BREAKBULK	0	0	0
RORO	0	0	0
CONTAINER	0	0	0
BARGE	590	1,180	590

Table 1 shows the compatibility for various vessel types. This table shows for each type of ship, the number of vessels that can berth at a particular wharf. Also, it provides the limitations that can hinder shipping operations.

Methodology that gives a snapshot view of the current physical characteristics of the berths and the MHE available provides the basis for the type of ship preferred at each berth. The evaluation gives no considerations for enhancements, such as equipment.

The berth preference analysis shows that wharf 4 is the most compatible for all ship types.

PREFERENCE BERTH SELECTION

<i>LOADING TYPE</i>	<i>BERTHS</i>								
	1*	2*	3	4	5	6	A	B	C
Breakbulk	3	5	3	1	5	1	-	-	-
RORO	3	5	2	1	-	4	-	-	-
Container	2	5	2	1	-	4	-	-	-
Barge	3	5	3	1	5	2	8	8	7
Note: Berths marked with "-" are not recommended for these operations. *These berths are commercial wharves in the Oxnard Harbor District and are subject to commercial rates.									

**TABLE 1
SUMMARY OF PORT HUENEME BERTHING CAPABILITIES**

VESSEL	BERTHS					
	1	2	3	4	5	6
Breakbulk						
C3-S-33a	3	2	2	2	1	1
C3-S-37c	3	2	1	2	1	1
C3-S-37d	3	2	1	2	1	1
C3-S-38a	3	2	1	2	1	1
C4-S-1a	3	2	1	2	1	1
C4-S-1qb and 1u	3	2	1	2	1	1
C4-S-58a	3	2	1	2	1	1
C4-S-65a	3	2	1	2	1	1
C4-S-66a	3	2	1	2	1	1
C4-S-69b	2	2	1	1	1	1
Seatrain						
GA and PR-class	3	2	1	2	1	1
Barge						
LASH C8-S-81b	2	1	1	1	c	c
LASH C9-S-81d	a,g	a,g	a,g	a,g	a,c,g	a,c,g
LASH lighter	12	10	7	8	4	5
SEABEE C8-S-82a	a,g	a,g	a,g	a,g	a,c,g	a,c,g
SEABEE barge	9	7	5	6	3	3
RORO						
Comet	d,i,j	d,i,j	ij	d,i,j	d,i,j	d,i,j
C7-S-95a/Maine-class	2	1	1	1	c	1
Ponce-class	h	h	h	h	c,h	h
Great Land-class	h	h	h	h	c,h	c,h
Cygnus/Pilot-class	2	2	1	1	c	1
Meteor	d,i,j	d,i,j	ij	d,i,j	d,i,j	d,i,j
AmEagle/Condor	ij	ij	ij	ij	c	ij
MV Ambassador	d	d	1,m	d	d	d
FSS-class	1	1	1	1	c	c
Cape D-class	ij	ij	ij	ij	c	ij
Cape H-class	a	a	a	a	a,c	a
Container						
C6-S-1w	2,e	2,e	1,e	1,e	c,e	1,e
C7-S-68e	2,e	1,e	1,e	1,e	c,e	1,e
C8-S-85c	2,e	1,e	1,e	1,e	c,e	c,e
Combination						
C5-S-78a	2,e	2,e	1,e	1,e	c,e	1,e
C5-S-37e	2,e	2,e	1,e	1,e	1,e	1,e
<p>a = maximum vessel draft limited to berth depth b = inadequate apron width c = inadequate berth length d = no straight stern-ramp facilities e = no container-handling equipment f = inadequate berth depth, adequate anchorage depth g = inadequate channel depth h = no shore-based ramps available i = insufficient ramp clearance at low tide j = insufficient ramp clearance at high tide k = excessive ramp angle at low tide m = excessive ramp angle at high tide n = parallel ramp operation only o = insufficient apron width for side-ramp operation</p>						
Note: Ramp clearance and ramp angle based on maximum vessel draft.						

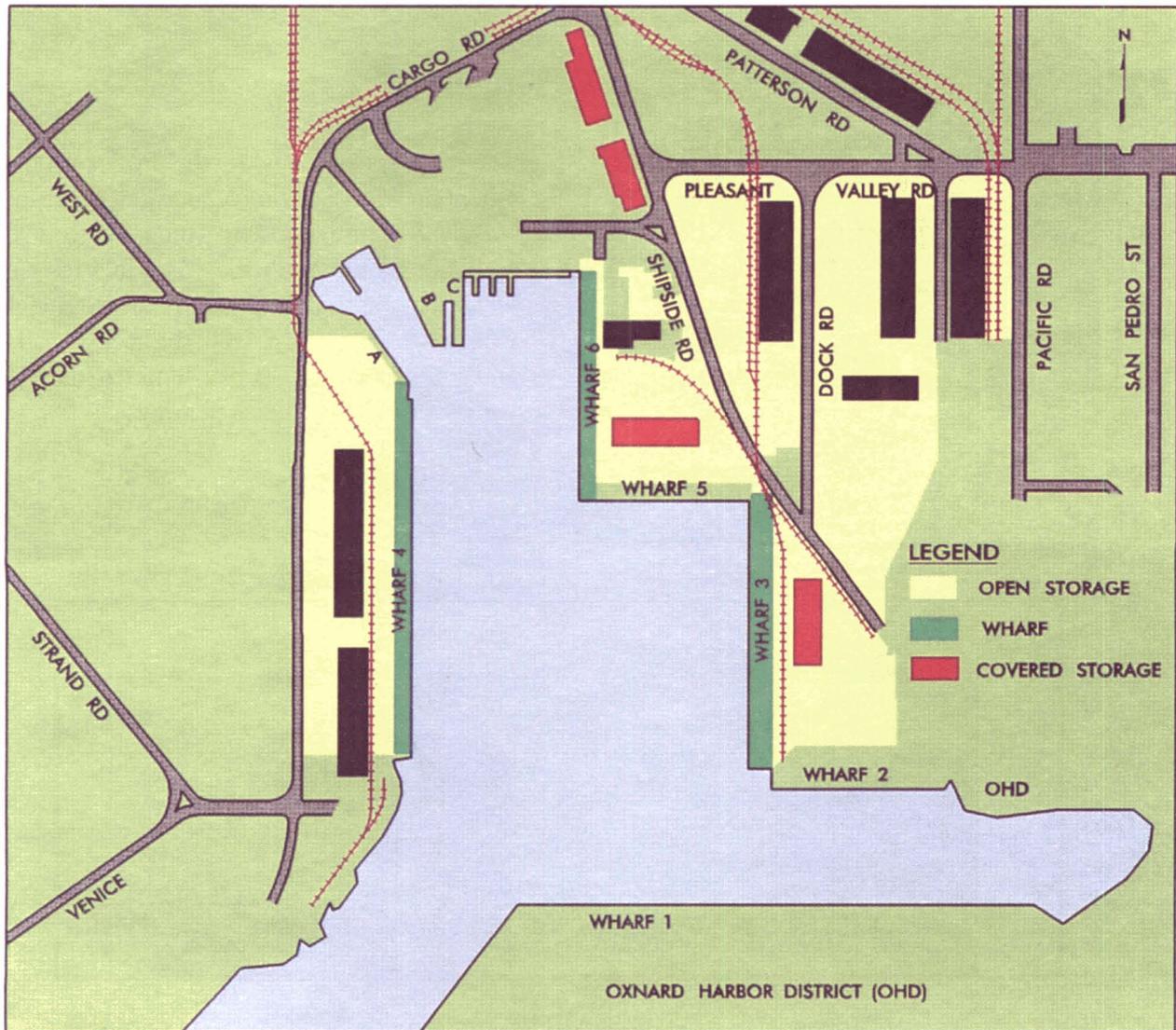
TABLE 1 - cont
SUMMARY OF PORT HUENEME BERTHING CAPABILITIES

VESSEL	BERTHS		
	A	B	C
Breakbulk			
C3-S-33a	a,c	a,c	a,c
C3-S-37c	a,c	a,c	a,c
C3-S-37d	a,c	a,c	a,c
C3-S-38a	a,c	a,c	a,c
C4-S-1a	a,c	a,c	a,c
C4-S-1qb and 1u	a,c	a,c	a,c
C4-S-58a	a,c	a,c	a,c
C4-S-65a	a,c	a,c	a,c
C4-S-66a	a,c	a,c	a,c
C4-S-69b	a,c	a,c	a,c
Seatrain			
GA and PR-class	a,c	a,c	a,c
Barge			
LASH C8-S-81b	a,c,f	a,c,f	a,c,f
LASH C9-S-81d	a,c,g	a,c,g	a,c,g
LASH lighter	1	2	2
SEABEE C8-S-82a	a,c,g	a,c,g	a,c,g
SEABEE barge	1	1	1
RORO			
Comet	a,c,d	a,c,d	a,c,d
C7-S-95a/Maine-class	a,c	a,c	a,c
Ponce-class	a,c,h	a,c,h	a,c,h
Great Land-class	a,c,h	a,c,h	a,c,h
Cygnus/Pilot-class	a,c	a,c	a,c
Meteor	a,c,d	a,c,d	a,c,d
AmEagle/Condor	a,c	a,c	a,c
MV Ambassador	a,c,d	a,c,d	c,d
FSS-class	a,c	a,c	a,c
Cape D-class	a,c	a,c	a,c
Cape H-class	a,c	a,c	a,c
Container			
C6-S-1w	a,c,e	a,c,e	a,c,e
C7-S-68e	a,c,e	a,c,e	a,c,e
C8-S-85c	a,c,e	a,c,e	a,c,e
Combination			
C5-S-78a	a,c,e	a,c,e	a,c,e
C5-S-37e	a,c,e	a,c,e	a,c,e
a = maximum vessel draft limited to berth depth	h = no shore-based ramps available		
b = inadequate apron width	i = insufficient ramp clearance at low tide		
c = inadequate berth length	j = insufficient ramp clearance at high tide		
d = no straight stern-ramp facilities	k = excessive ramp angle at low tide		
e = no container-handling equipment	m = excessive ramp angle at high tide		
f = inadequate berth depth, adequate anchorage depth	n = parallel ramp operation only		
g = inadequate channel depth	o = insufficient apron width for side-ramp operation		
Note: Ramp clearance and ramp angle based on maximum vessel draft.			

III. APPLICATION

GENERAL

In this section, we evaluate the port's throughput capability for deploying a notional mechanized infantry brigade mainly by FSS vessels. The MARAD *Planning Orders Digest* does not call for use of the Port of Port Hueneme facilities during national emergencies. Therefore, we analyzed only those wharves, including accompanying facilities, that could possibly accommodate an FSS vessel. These include berths 3, 4, and 6. We assumed that the Army will have access to all of the open and covered storage identified in section I of this analysis.

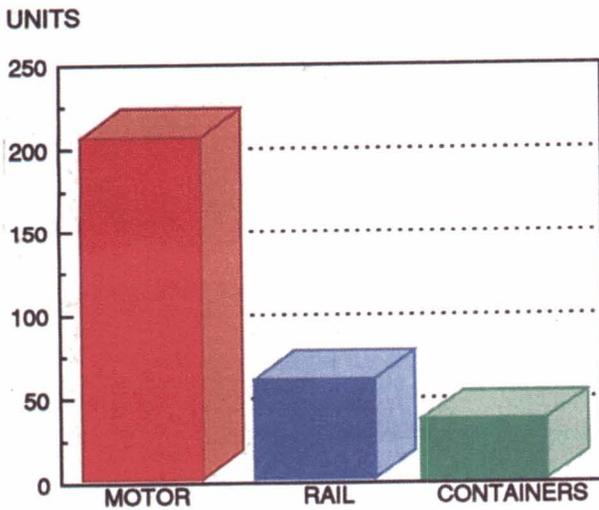


Port Hueneme's Designated Facilities for Berthing FSS Vessels

REQUIREMENTS

The likely requirement for the Port of Port Hueneme is to deploy a notional mechanized infantry brigade in 6 days. The brigade has to move about 2,600 vehicles and 220 containers. Movement of this brigade to the port will require 360 railcars (60 per day) for the convoy/rail option. Under this option, deploying units would drive about 1,220 vehicles (205 per day) and tow another 775 pieces of equipment (130 per day).

DAILY REQUIREMENTS



MECHANIZED INFANTRY BRIGADE DEPLOYMENT DATA

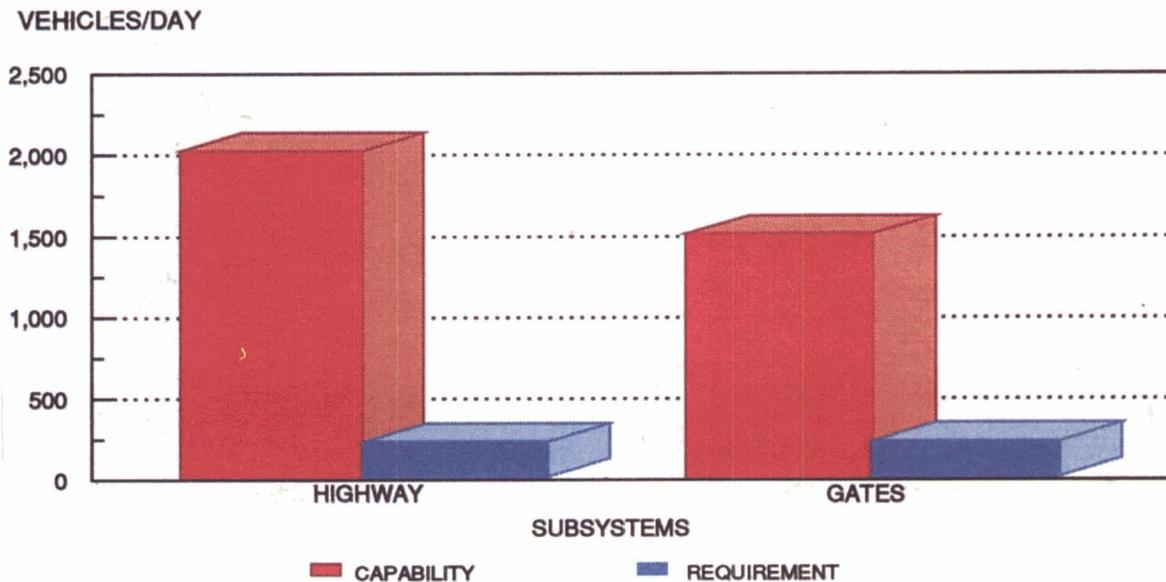
Total Equipment	
Volume	91,506 MTON
Weight	31,6710 STON
Area	474,300 SQ FT
Vehicles	2,600
Containers (20 ft)	220

TERMINAL HANDLING

Highway

The connector roads to the Port of Port Hueneme are Victoria Avenue and Pleasant Valley, Ventura, and Port Hueneme Roads. Vehicles would enter the port via Victoria and Pleasant Valley Gates for deployment from berths 3, 4, and 6. Both the access roads and gates processing subsystems can handle well over 1,500 vehicles per day.

HIGHWAY INPROCESSING CAPABILITY



Rail

The classification yard and additional rail spurs could store about 400 railcars per day. The VCY railyard could store an additional 100 railcars per day. Current service to the port is about 3 trains per day (potentially 240-300 railcars per day).

The port has a variety of end ramps available for offloading operations. If the port uses four end ramps for offloading, it could offload about 40 railcars every 5 hours, or more than 160 railcars per day.

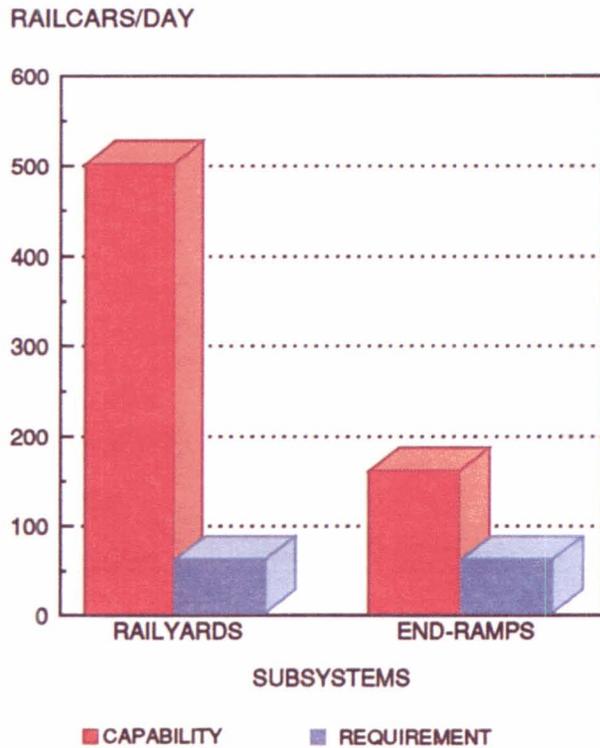
STAGING

The Port of Port Hueneme has about 220 acres of open storage area (35 acres are near the port) for military operations. We estimate that a mechanized infantry brigade needs at least 30 acres of open staging to support the concurrent nonsustained loading of three FSS vessels. Divided between vehicles and containers, the staging area requirement becomes 4 and 26 acres for containers and vehicles, respectively.

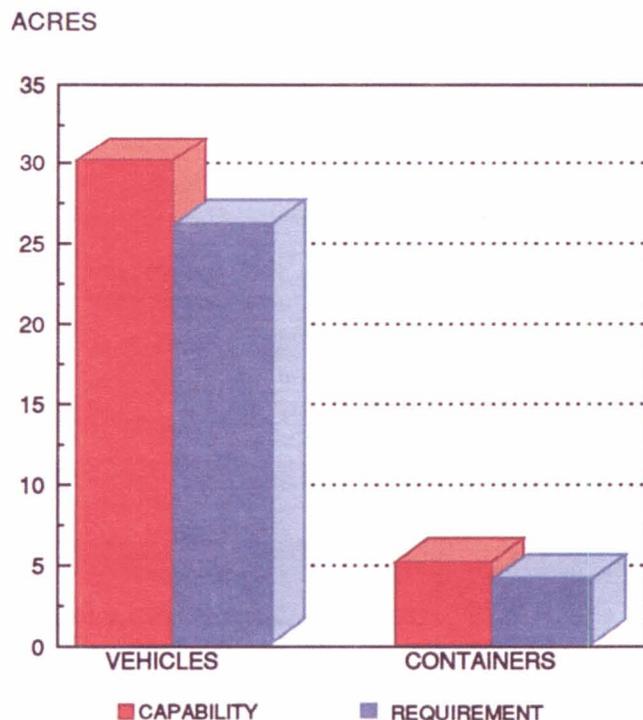
SHIPPING

The number of ships needed to load this requirement depends on the shipping mix selected. The best ship mix would require three FSS vessels and one Cape H RORO ship. However, the port harbor and ship berths are too shallow to allow passage and berthing of a fully loaded FSS or Cape H RORO ship. Based on this, a brigade cannot outload in 6 days using FSS and RORO vessels. However, deploying units could outload using selected breakbulk and containership vessels.

RAIL INPROCESSING/HANDLING CAPABILITY



OPEN STAGING CAPABILITY

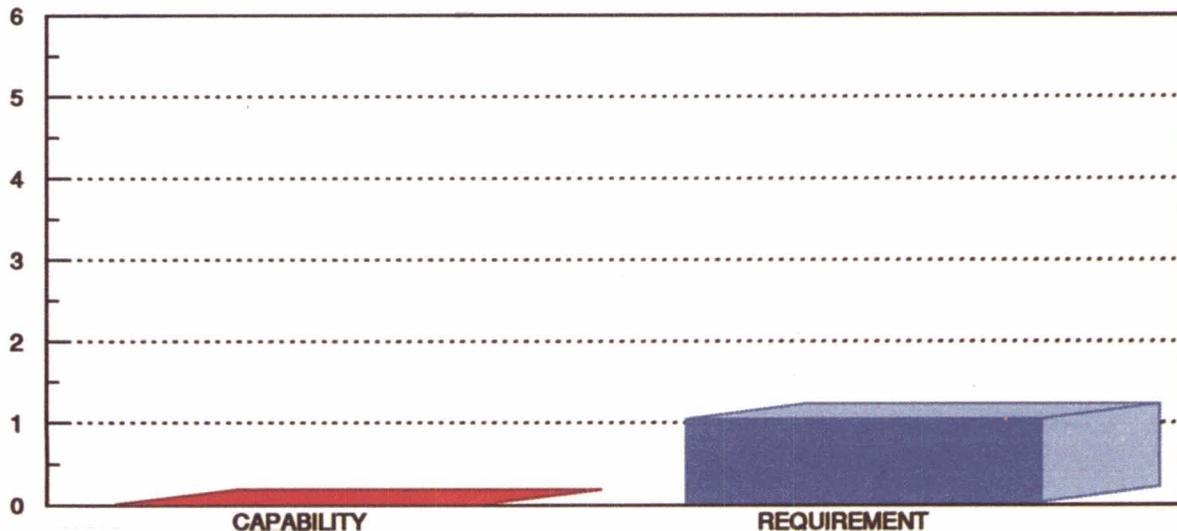


UNIT MOVEMENT REQUIREMENTS MECHANIZED BRIGADE

LOADING CONDITION/ SAMPLE SHIP MIX	VESSEL TYPES			
	FSS (RORO/COMB)	CAPE H (RORO/COMB)	C3/C4 (BREAKBULK)	C6/C7/C8 (CONTAINER)
<i>Minimum Containerization</i>				
All FSS*	2.67	0.64		
FSS and Cape H	2.22	1.00		
All Breakbulk			12.57	
<i>Maximum Containerization</i>				
FSS and Container	2.64			0.67
FSS, Cape H, and Container	1.54	1.00		0.67
Breakbulk and Container			9.86	0.67
<p>*Only 8 FSSs are available. Unit shipping requirements exceed the capacity of these 8 vessels. Other vessel types are required to make up the FSS shortfall (Cape H).</p> <p><i>Legend:</i></p> <p>RORO - roll on/roll off</p> <p>FSS - fast sealift ship</p>				
Source: MTMCTEA Report OA 90-4f-22, Deployment Planning Guide, Aug 91.				

FSS SHIPPING CAPABILITY

BERTHS



SUMMARY

The port harbor and ship berth shallow draft (35 feet MLW) limit the Port of Port Hueneme to selected breakbulk, containership, and RORO vessels unless the Army deploys partial FSS and Cape H shiploads.

Presently, FSS operations have not occurred at the Port of Port Hueneme. The wind and current conditions affect the steering of an FSS vessel when entering the approach channel. The Naval Construction Battalion Center (NCBC) is currently researching wind and current conditions at the port to determine the feasibility of FSS operations.

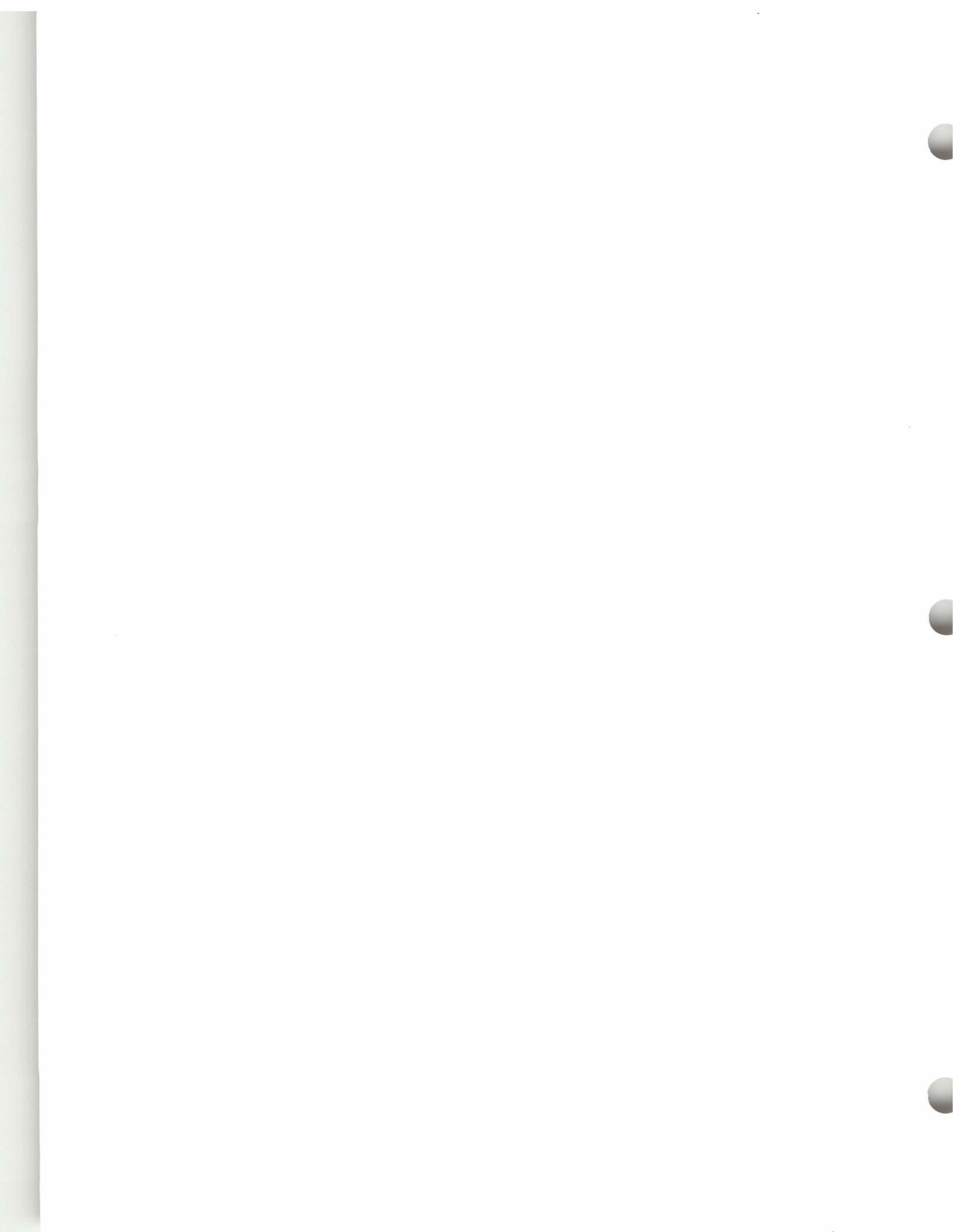
The port harbor turning basin is too small to accommodate FSS vessels. This limits ship movement to "pull in, back out" operations.

RECOMMENDATIONS

We do not recommend deploying a mechanized infantry brigade from the Port of Port Hueneme unless select ships are available for deployment. The shallow port harbor and ship berths limit deployments to selected breakbulk, RORO, and containership vessels. The wind and current could cause unsafe conditions for steering an FSS vessel when entering the port approach channel. Also, the harbor turning basin is too small to accommodate FSS vessels.

We recommend a reevaluation of the Port of Port Hueneme upon completion of dredging the harbor to 45 feet. The port authority for the Port of Port Hueneme has not established a date for completing the harbor dredging.

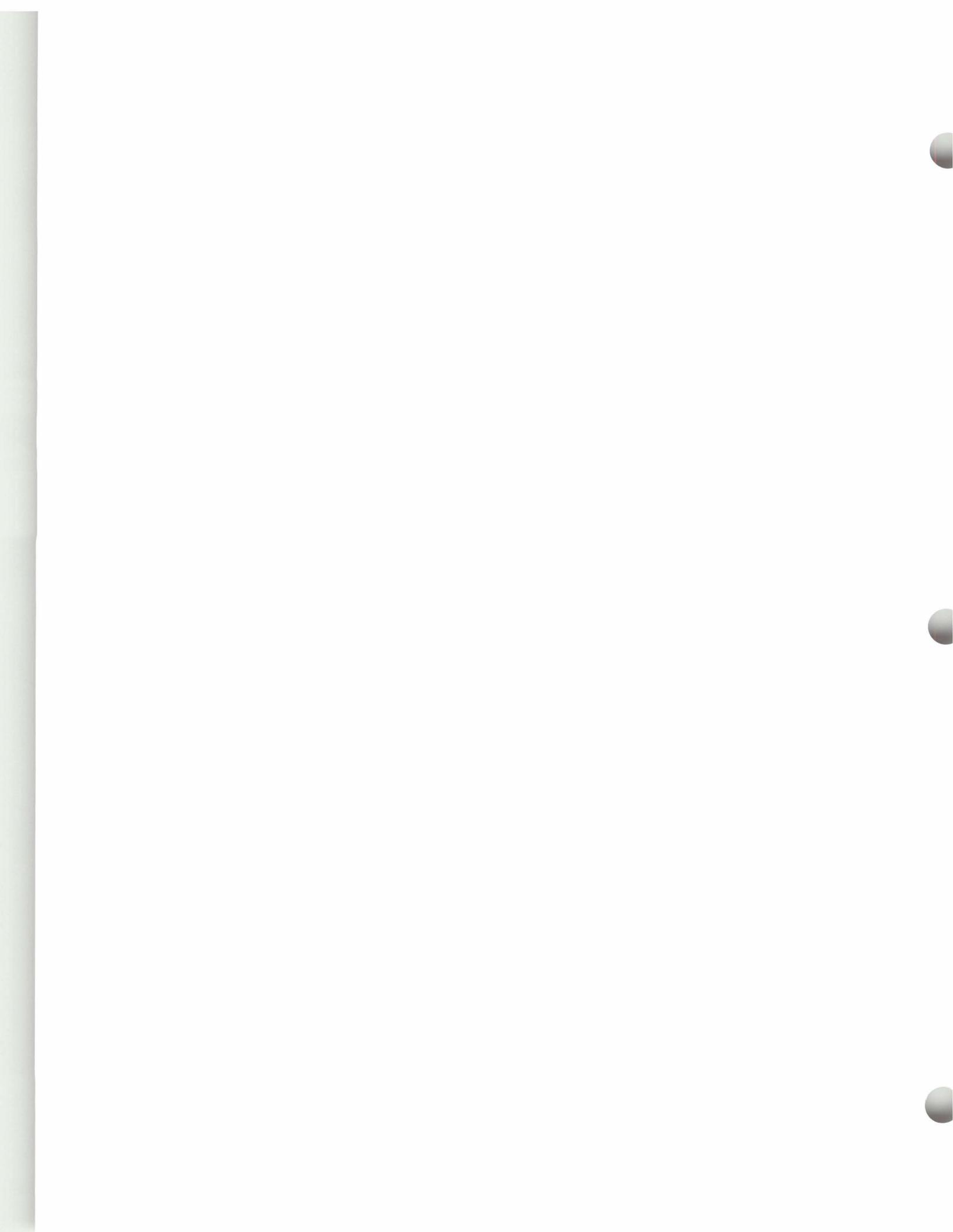
We recommend that NCBC continue their research to determine the possibility of FSS operations at the Port of Port Hueneme. Computer simulations have shown that, under appropriate conditions, FSS operations may be possible.



PORILAND

PORT OF PORTLAND
PORTLAND, OREGON



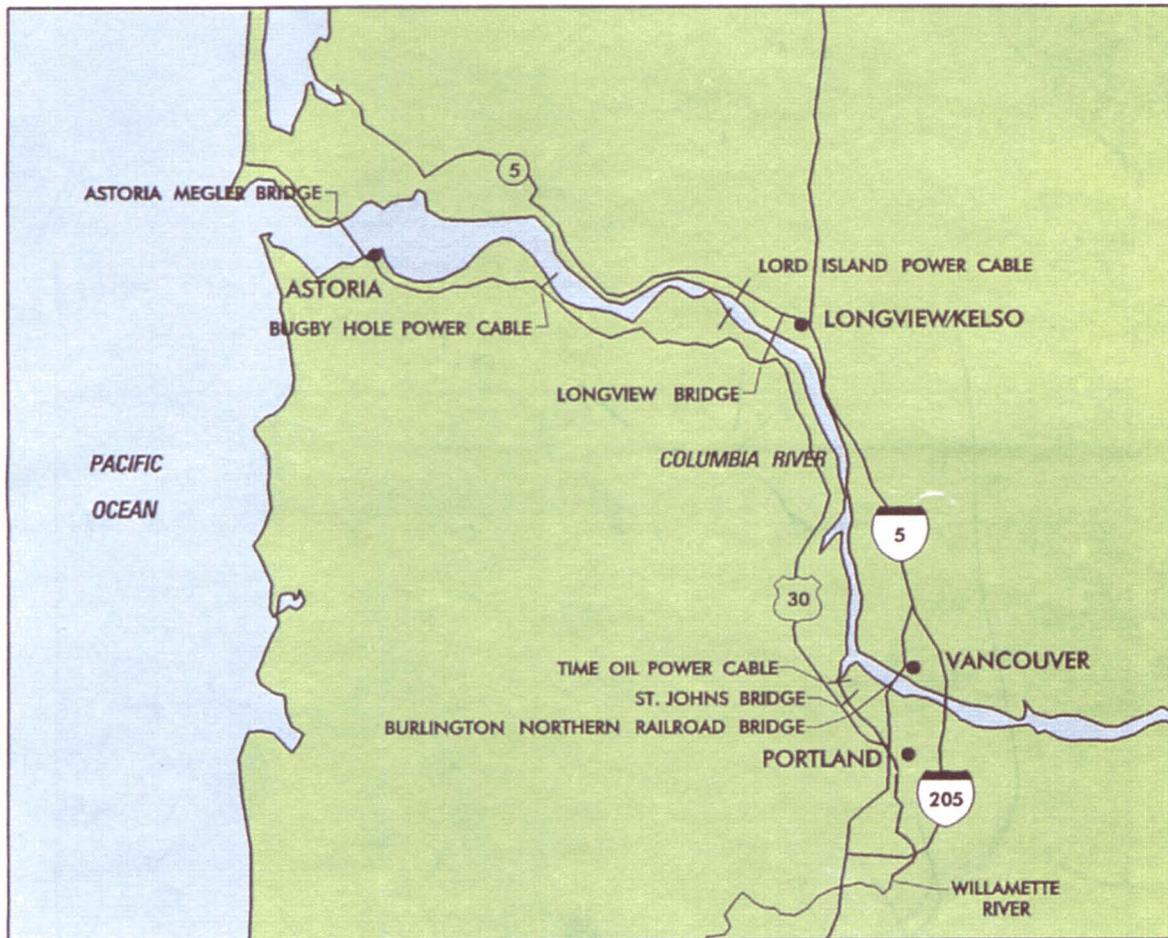


I. GENERAL DATA

TRANSPORTATION ACCESS

WATER

The Port of Portland is in northwest Oregon near the confluence of the Columbia and Willamette Rivers. It is about 100 miles up the Columbia River from the Pacific Ocean. The Columbia and Willamette River channels to Portland have a project depth of at least 40 feet mean low water (MLW). Bridge and overhead power cable restrictions are shown in the figure below and listed in the tables on the following page.



Water Access

**WATER ACCESS RESTRICTIONS TO
COLUMBIA RIVER**

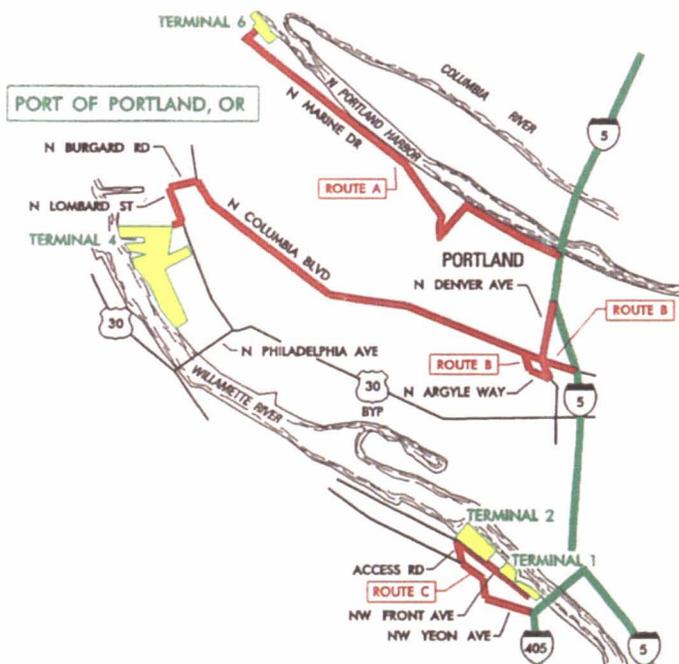
<i>RESTRICTION</i>	<i>RIVER MILE</i>	<i>VERTICAL CLEARANCE (MHW)</i>	<i>HORIZONTAL CLEARANCE</i>
ASTORIA MEGLER BRIDGE	13.5	186 FT	1,070 FT
LONGVIEW BRIDGE	66.1	176 FT	1,085 FT
BUGBY HOLE POWER CABLE	39.9	213 FT	
LORD ISLAND POWER CABLE	62.4	207 FT	

**WATER ACCESS RESTRICTIONS TO
WILLIAMETTE RIVER**

<i>RESTRICTION</i>	<i>RIVER MILE</i>	<i>VERTICAL CLEARANCE (MHW)</i>	<i>HORIZONTAL CLEARANCE</i>
TIME OIL POWER CABLE*	3.3	199 FT	
ST. JOHNS BRIDGE**	6	174 FT	1,068 FT
BURLINGTON NORTHERN RAILROAD BRIDGE***	7	177 FT	489 FT
*Affects terminals 1, 2, and 4 only.			
**Affects terminals 1 and 2 only.			
***Affects terminals 1 and 2 only.			

HIGHWAY

The Strategic Highway Corridor Network (STRAHNET) route to the Port of Portland is Interstate 5. North Marine Drive is the major connector from I-5 to terminal 6. North Columbia Boulevard, North Burgard and North Lombard Streets are the major connectors to terminal 4. Interstate 405, Northwest Yeon and Northwest Front Avenues are the major connectors to terminals 1 and 2. Clearances are not a problem on these routes. The Oregon State highway legal limit for height is 14 feet.



WARNING
SEE PAGE i



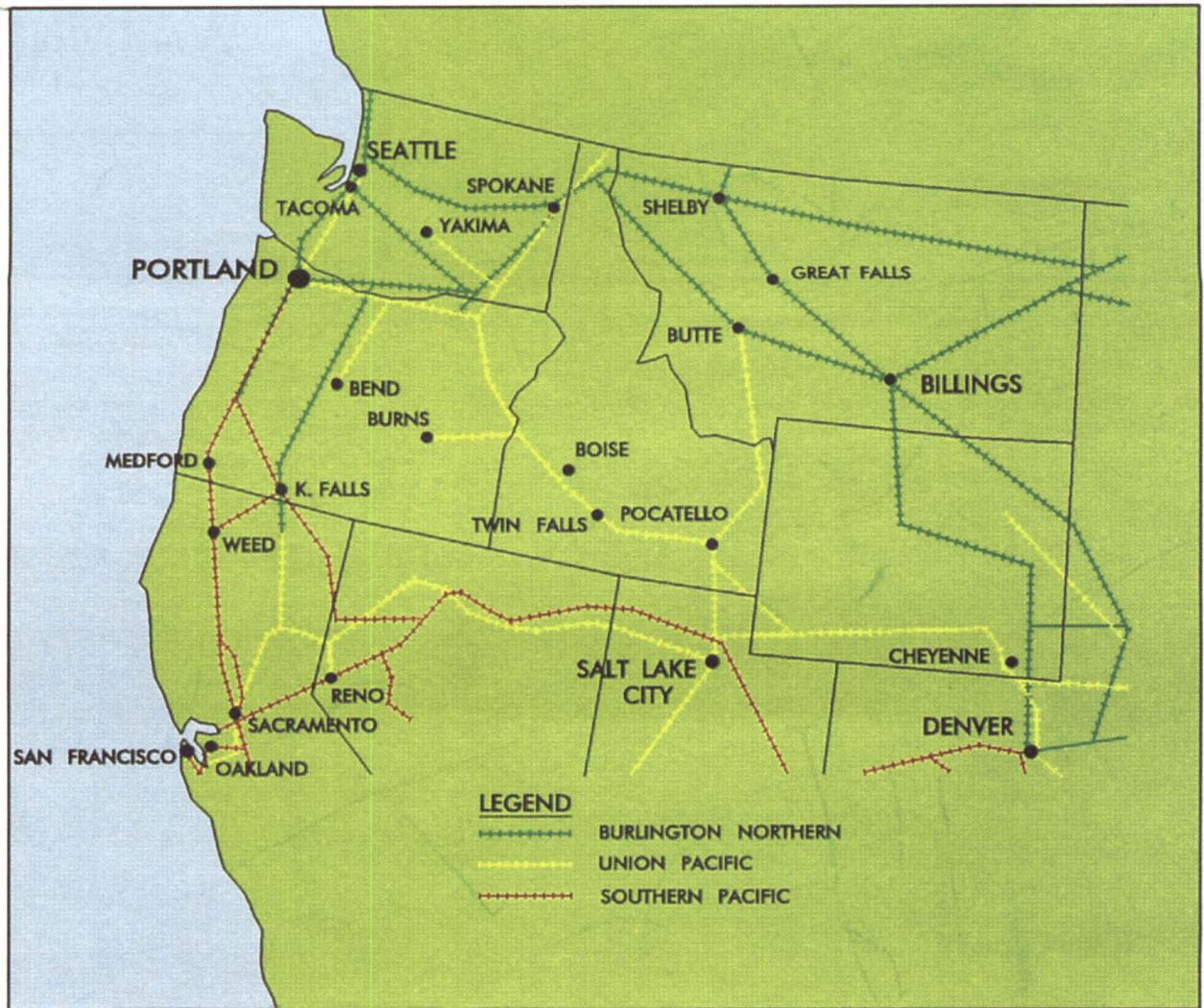
LEGEND
— STRAHNET ROUTE
— CONNECTOR ROUTE
NOT TO SCALE

NOTE
CONNECTOR ROUTES FOR THIS INSTALLATION HAVE NOT BEEN EVALUATED BY THE STATE FOR HEIGHT AND WEIGHT RESTRICTIONS.

ROUTE TO PORT	
<p>ROUTE A: I-5 TO N MARINE DR, N MARINE DR W TO PORT OF PORTLAND (TERMINAL 6)</p> <p>ROUTE B: (NB, WB TRAFFIC) I-5 TO N COLUMBIA BLVD, N COLUMBIA BLVD W TO N BURGARD RD, N BURGARD RD W TO N LOMBARD ST, N LOMBARD ST S TO PORT OF PORTLAND (TERMINAL 4)</p> <p>ROUTE B: (SB TRAFFIC) I-5 TO N DENVER AVE, N DENVER AVE S TO N ARGYLE WAY,</p>	<p>N ARGYLE WAY W TO N COLUMBIA BLVD, N COLUMBIA BLVD W TO N BURGARD RD, N BURGARD RD W TO N LOMBARD ST, N LOMBARD ST S TO PORT OF PORTLAND (TERMINAL 4)</p> <p>ROUTE C: I-405 TO NW YEON AVE, NW YEON AVE NW TO ACCESS RD, ACCESS RD N TO NW FRONT AVE, NW FRONT AVE SE TO PORT OF PORTLAND (TERMINALS 1 & 2)</p>

RAIL

The Port of Portland is the only Pacific Northwest port served by three major railroads - Burlington Northern (BN), Union Pacific (UP), and Southern Pacific (SP). All three major railroads have railyards near the port. The Portland Terminal Railyard Company (PTRR) is owned by these railroads and does switching for terminals 1 and 2. Rail access to the other terminals is through reciprocal switching agreements. Rail clearances are sufficient for bilevel and trilevel railcars to access the port.



Rail Access

AIRPORTS

Four commercial airfields are near the Port of Portland. The chart below provides information on these airfields. The Oregon Air National Guard has facilities at Portland International Airport and shares runway space.

AIRFIELDS IN THE PORTLAND AREA

<i>AIRFIELD</i>	<i>NUMBER OF RUNWAYS</i>	<i>LONGEST RUNWAY DIMENSIONS (FT)</i>	<i>DISTANCE FROM PORT (MILES)</i>
PORTLAND INTERNATIONAL	3	11,000 X 150	12
PORTLAND-TROUTDALE	1	5,400 X 100	20
PORTLAND-HILLSBORO	2	6,600 X 150	23
MULINO	1	3,600 X 100	35



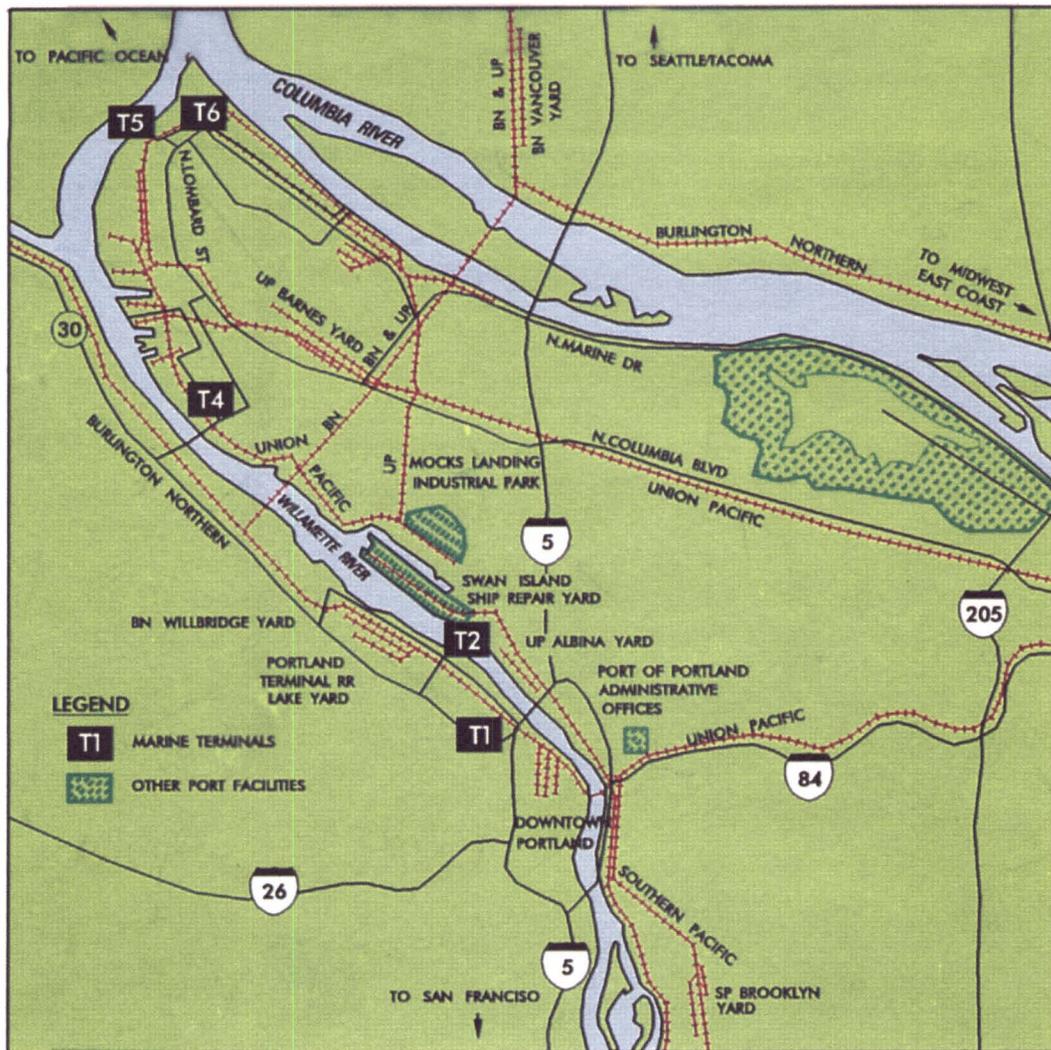
Air Access

PORT FACILITIES

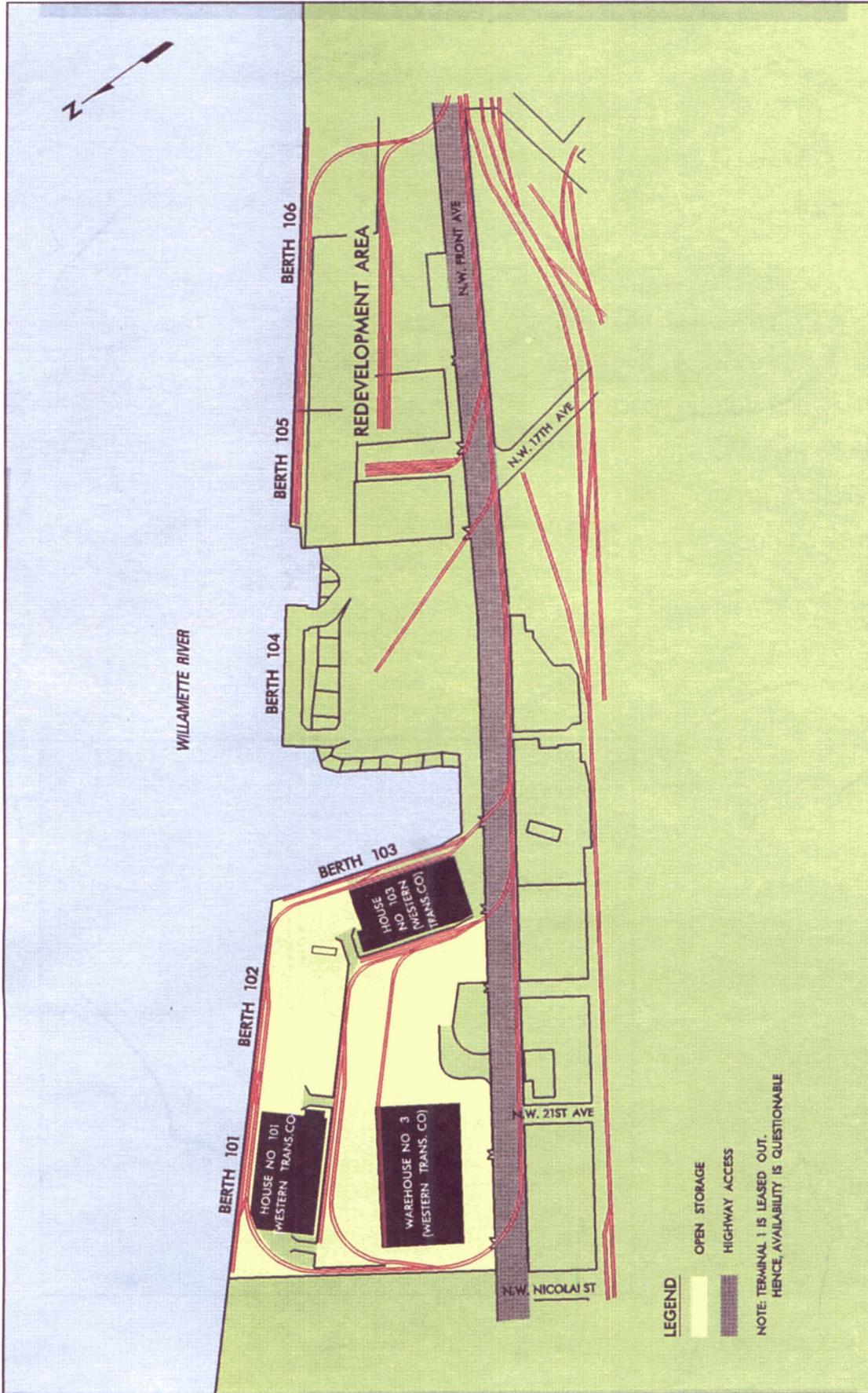
Berthing

The Port of Portland is a multicargo operation that specializes in shipping containers. The port consists of marginal wharves and finger piers. Pier construction varies from terminal to terminal. Terminal 6 and part of terminal 4 pier construction consists of steel sheet pile and cellular bulkhead with concrete capped solid fill. Part of terminal 4 and terminals 1 and 2 generally consist of timber or concrete piling with concrete decking or timber decking with asphalt surface. All berths have a timber fendering system.

Following are the land-use maps, aerial views, and tables identifying berth characteristics of the port.



Vicinity Map



Terminal 1 Site Map



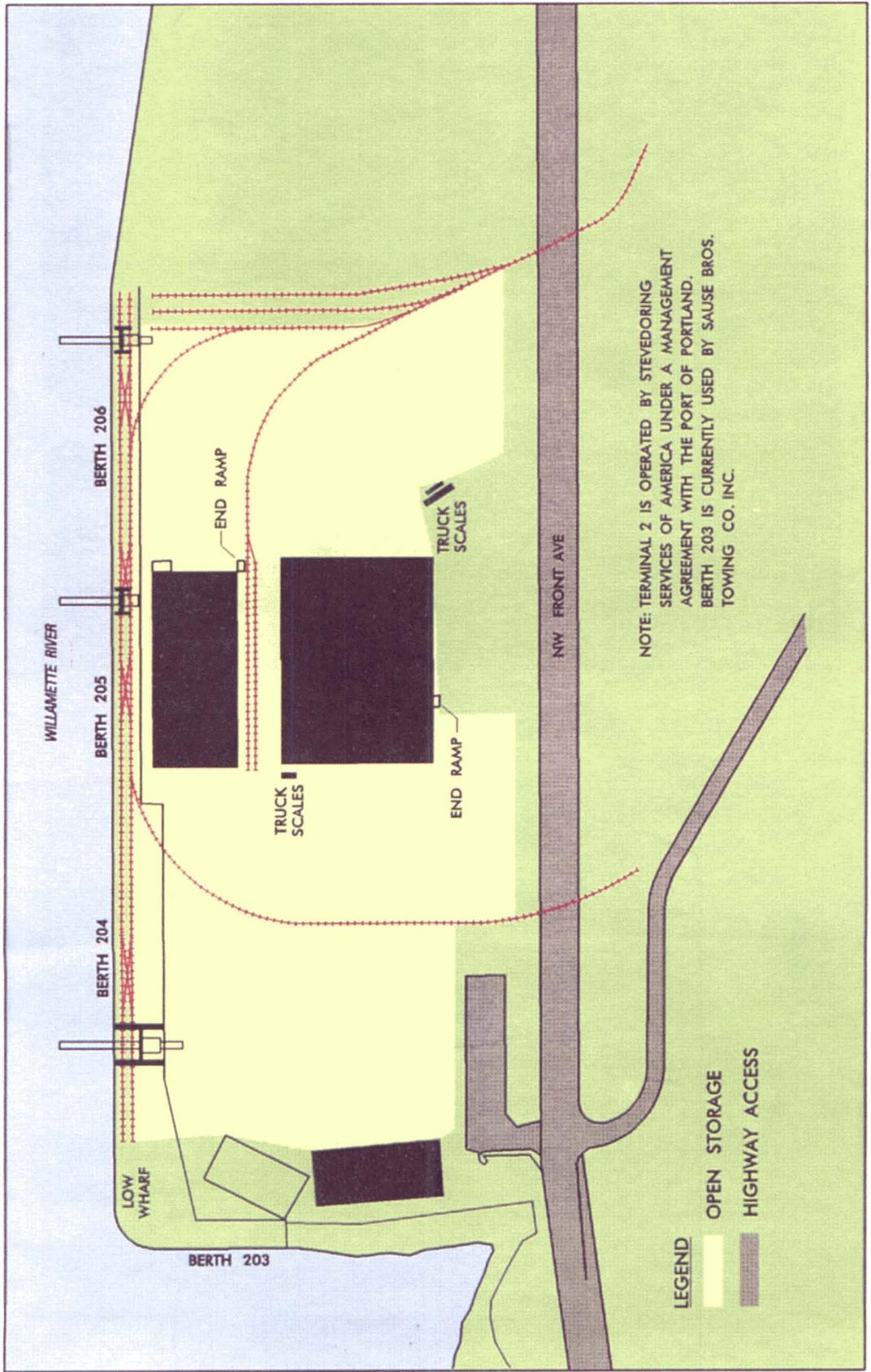
STORAGE AND DISTRIBUTION FLEXIBILITY

- Assembly and storage space
- Distribution warehousing
- Low-level barge dock
- Rail track on dock



TERMINAL 1

<i>CHARACTERISTICS</i>	<i>BERTHS</i>	
	<i>101-102</i>	<i>103</i>
Length (ft)	1,100	550
Depth alongside at MLW (ft)	35	22
Deck strength (psf)	500	500
Apron width (ft)	Open	35
Apron height above MLW (ft)	29	29
Number of container cranes	0	0
Number of wharf cranes	0	0
Apron lighting	Yes	Yes
Straight-stern RORO facilities	No	No
Apron length served by rail (ft)	1,100	550
Notes:		
1. Terminal open storage area is 5 acres.		
2. Terminal covered storage is 225,596 square feet.		

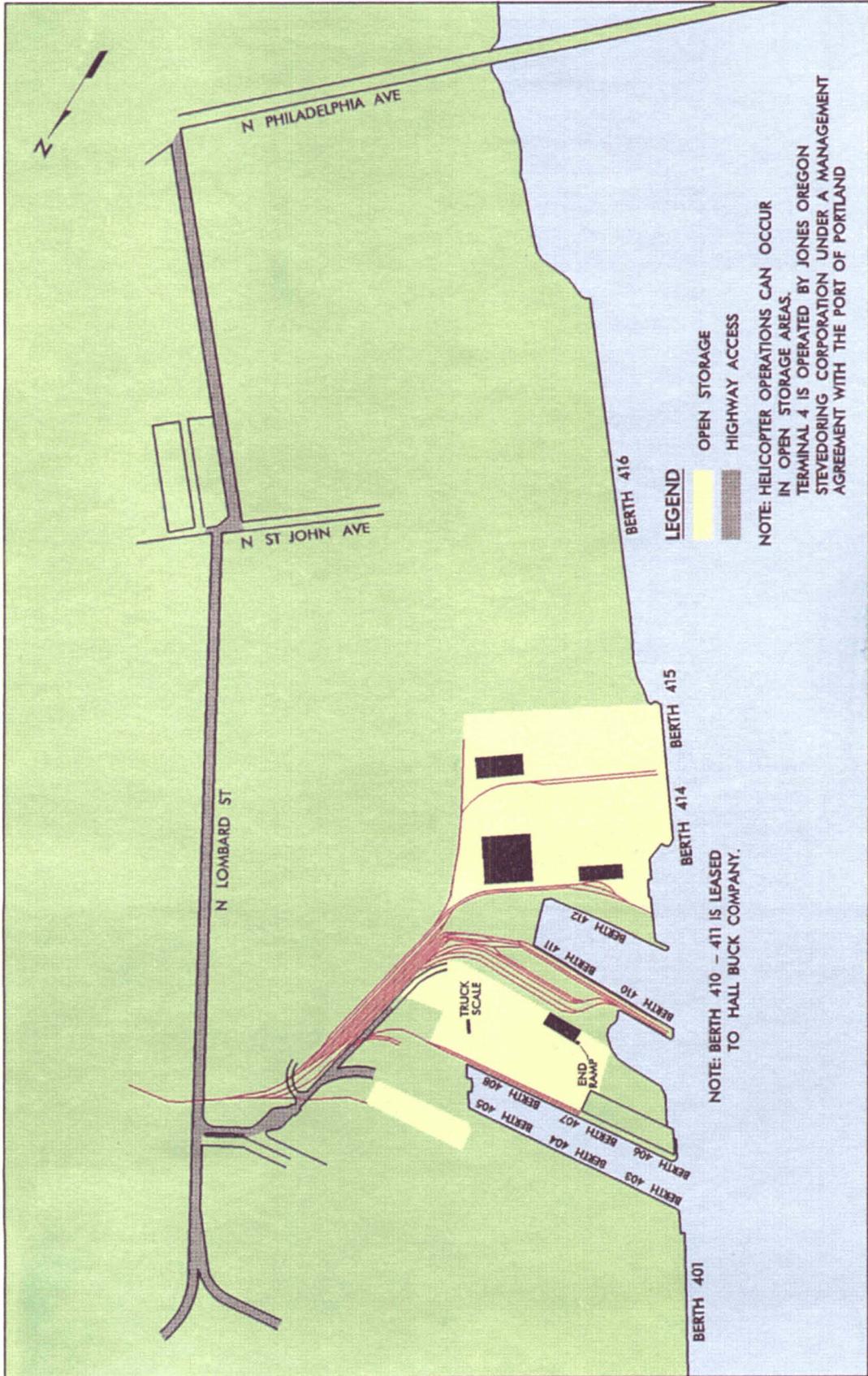


Terminal 2 Site Map



TERMINAL
2

<i>CHARACTERISTICS</i>	<i>BERTHS</i>		
	<i>203</i>	<i>204-206</i>	<i>204 (RORO)</i>
Length (ft)	400	2,535	1,005
Depth alongside at MLW (ft)	25	40	40
Deck strength (psf)	800	800	800
Apron width (ft)	Open	70 ft to- Open	Open
Apron height above MLW (ft)	20	26	20
Number of container cranes	0	3	0
Number of wharf cranes	1	0	0
Apron lighting	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	No
Apron length served by rail (ft)	0	2,295	0
Notes:			
1. Terminal open storage area is 27 acres.			
2. Terminal covered storage area is 304,279 square feet.			
3. Berth 204 (RORO) is a portion of Berths 204-206.			



Terminal 4 Site Map



MOST DIVERSE ON WEST COAST

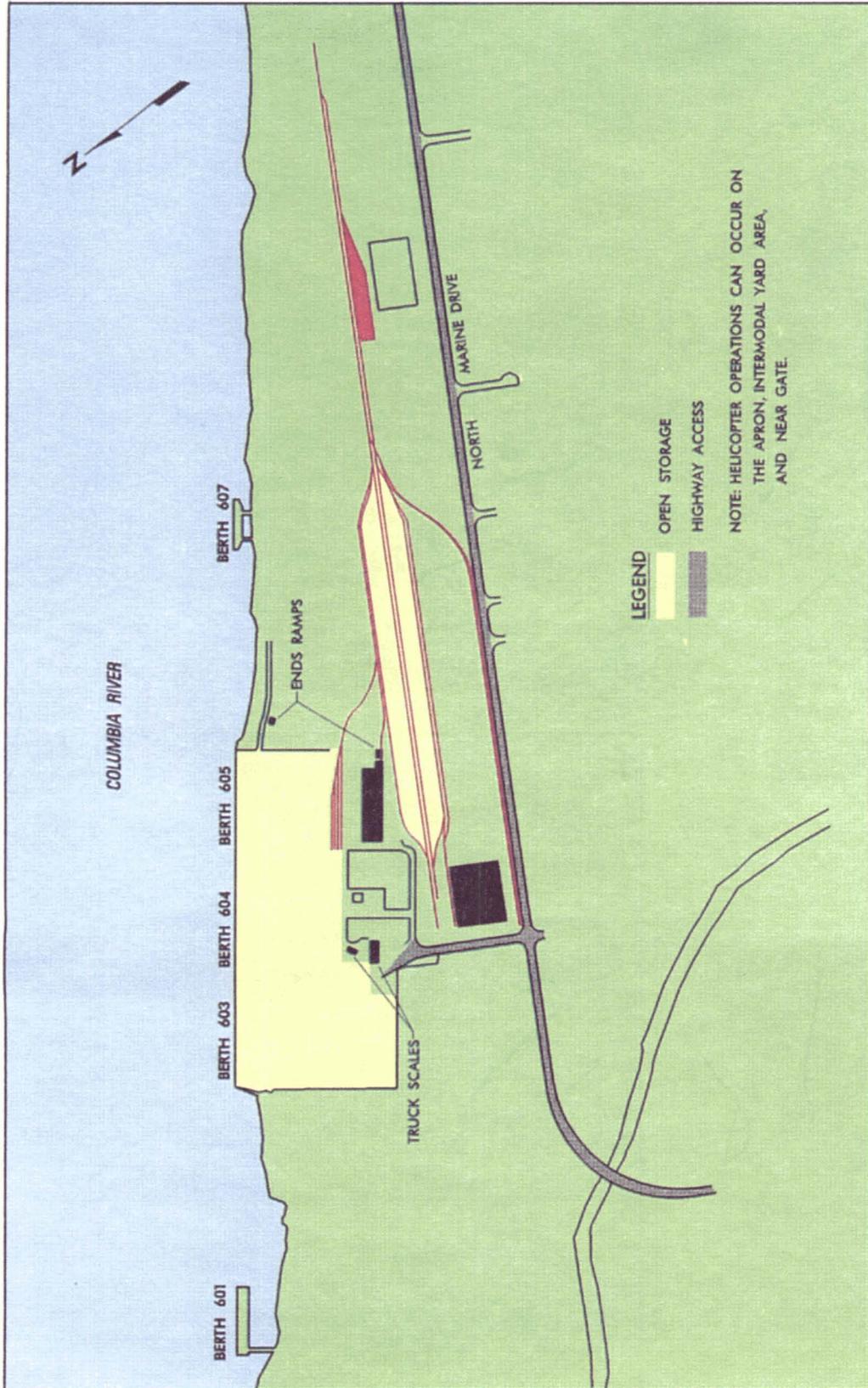
TERMINAL 4

CHARACTERISTICS	BERTHS				
	403-405	406-408	408 (RORO)	410-411	414-415
Length (ft)	1,500	1,400	98	1,140	944
Depth alongside at MLW(ft)	35	35	35	40	40
Deck strength (psf)	375	650	1,000	450	1,000
Apron width (ft)	23	32	Open	60	Open
Apron height above MLW (ft)	35	30	20	33	25
Number of container cranes	0	1	0	0	0
Number of wharf cranes	0	0	0	0	0
Apron lighting	Yes	Yes	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	Yes	No	No
Apron length served by rail (ft)	1,500	1,400	0	1,140	0

Notes:

1. Terminal open storage area is 57 acres.
2. Terminal covered storage area is 206,160 square feet.
3. Berth 408 (RORO) is a part of Berth 408.
4. With dolphins, the length of Berths 414 - 415 is 1,344 feet.





Terminal 6 Site Map



PORTLAND'S PREMIER CONTAINER FACILITY

TERMINAL 6

CHARACTERISTICS	BERTHS		
	603-605	601 (RORO)	607 (RORO)
Length (ft)	2,876	400	414
Depth alongside at MLW (ft)	40	35	35
Deck strength (psf)	800	1,000	1,000
Apron width (ft)	Open	101	101
Apron height above MLW (ft)	26	12	12
Number of container cranes	5	0	0
Number of wharf cranes	0	0	0
Apron lighting	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	No
Apron length served by rail (ft)	0	0	0
Notes:			
1. Terminal open storage is 122 acres.			
2. Terminal covered storage is 266,282 square feet.			
3. With dolphins, the length of Berth 601 (RORO) is 1,020 feet.			
4. With dolphins, the length of Berth 607 (RORO) is 1,014 feet.			

STAGING

a. *Open Staging.* The port has 167.8 acres of open storage of which 154.8 acres are paved. The following chart provides the distribution of open staging acreage per terminal. Helicopter operations are possible at terminal 4, and the dock apron, intermodal yard, and gate areas of terminal 6.

OPEN STAGING

<i>TERMINAL</i>	<i>OPEN STAGING ACREAGE</i>
1	5.3
2	27.3
4	57.0
6	78.0
TOTAL	167.8



Terminal 4 Open Staging (Southwest View)

b. *Covered Staging.* The Port of Portland has about 13 covered storage facilities (transit sheds, container freight stations, and warehouses) providing 1,002,317 square feet of covered storage.



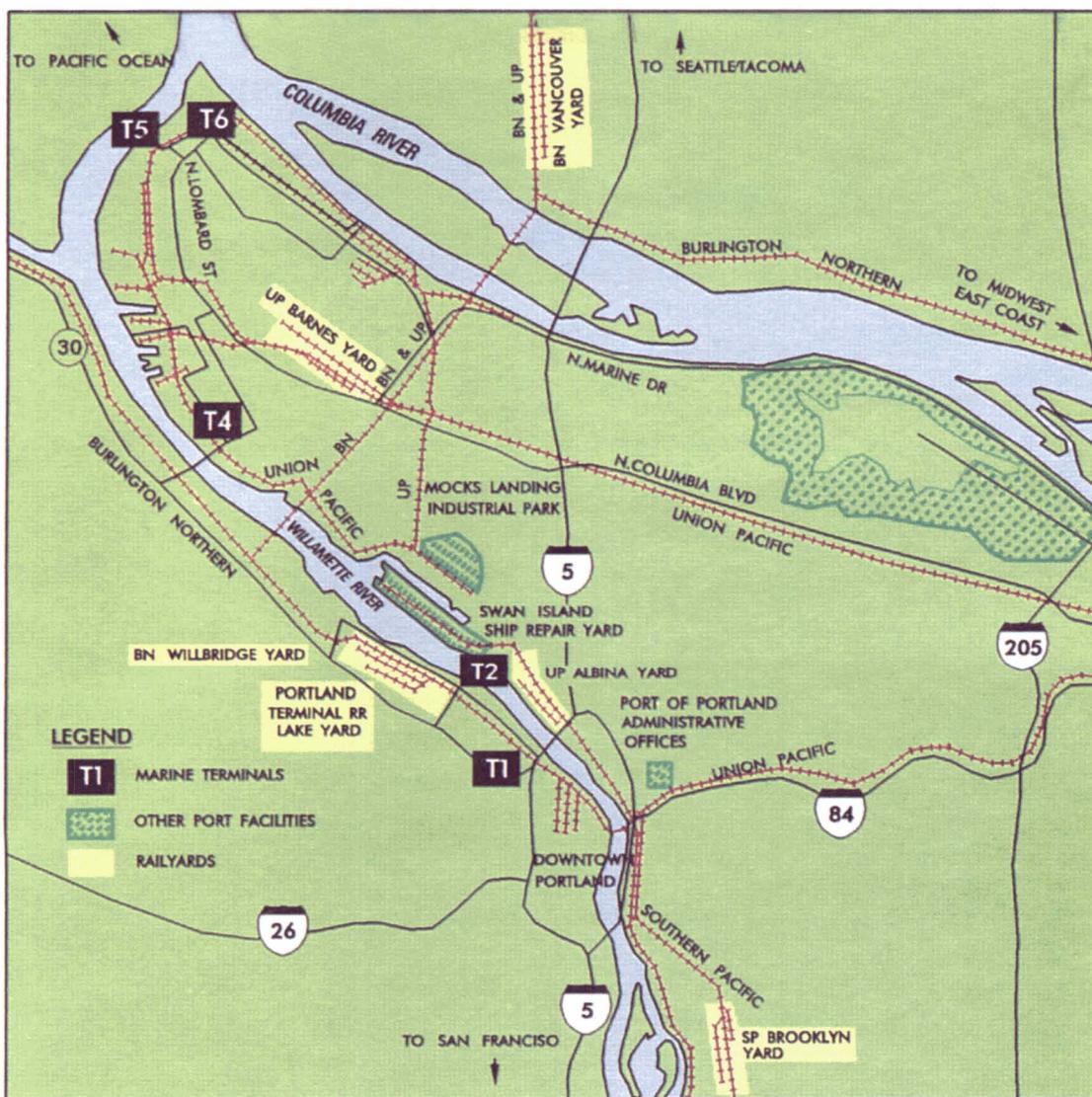
Warehouse 6, Terminal 4



Dock Operations at Container Distribution Center, Terminal 6

RAIL

Rail trackage links the railyards to the port's apron tracks, storage sheds, and storage tracks. Apron tracks are in terminals 1, 2, and 4. Rail trackage totals about 17.5 miles. The port has three railyards available for temporary railcar storage that can hold about 570 89-foot railcars. The commercial railyards near the port can handle about 4,210 89-foot railcars. Day-to-day availability of this storage space varies. Availability at the port railyards ranges from 25 to 50 percent. Availability at commercial railyards ranges from 10 to 30 percent.



Rail Access



Southern Pacific Brooklyn Yard, 12 Miles South of the Port



Union Pacific Albina Yard, 8 Miles South of the Port



Burlington Northern Vancouver Yard, 4 Miles North of the Port

HIGHWAY

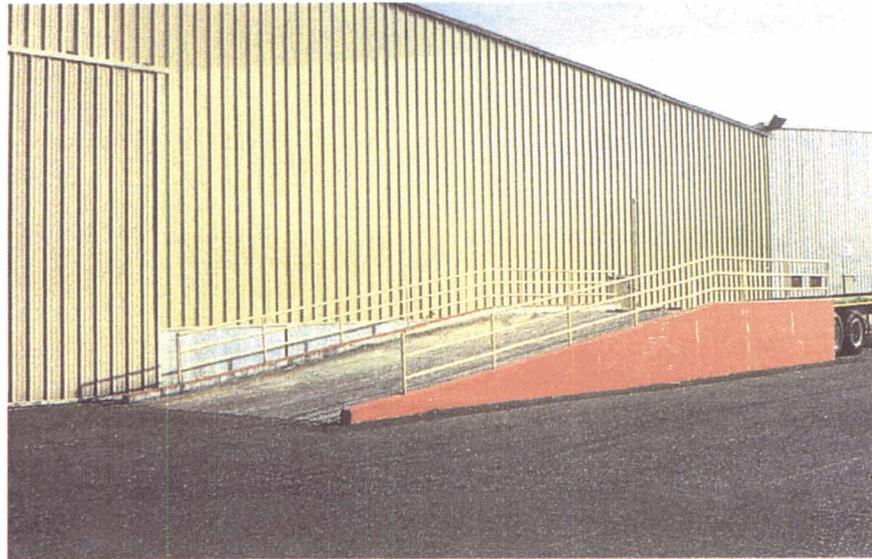
Highways accessing the port are four lanes, except for North Lombard Street, which is two lanes. Highway clearances vary, but are generally around 14 feet for vertical clearance (Oregon highway legal limit). Truck scales are available at terminals 2, 4, and 6.



Truck Scales, Terminal 6

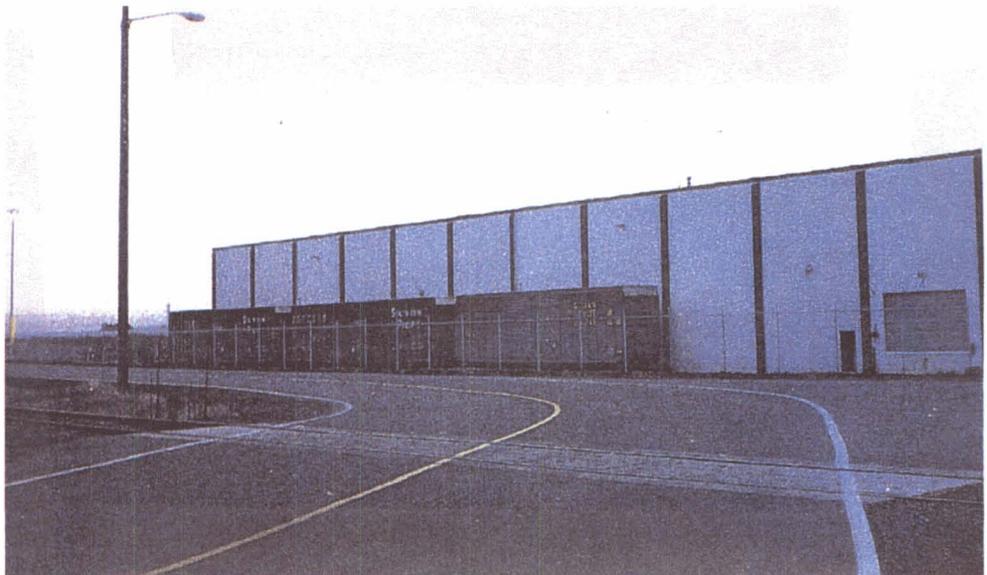
Ramps. The Port of Portland has six end ramps, one of which is a light portable ramp. Two of the five permanent end ramps can serve as truck or rail end ramps. The other three end ramps are strictly truck end ramps. The SP Brooklyn Yard south of the port has a permanent rail end ramp. The UP Barnes Yard and BN Vancouver Yard have light portable end ramps. These railyards, however, are not close enough to the port for offloading tracked vehicles. Also, the portable ramps do not have the capacity for offloading heavy vehicles.

*Truck Ramp
at
Terminal 2*



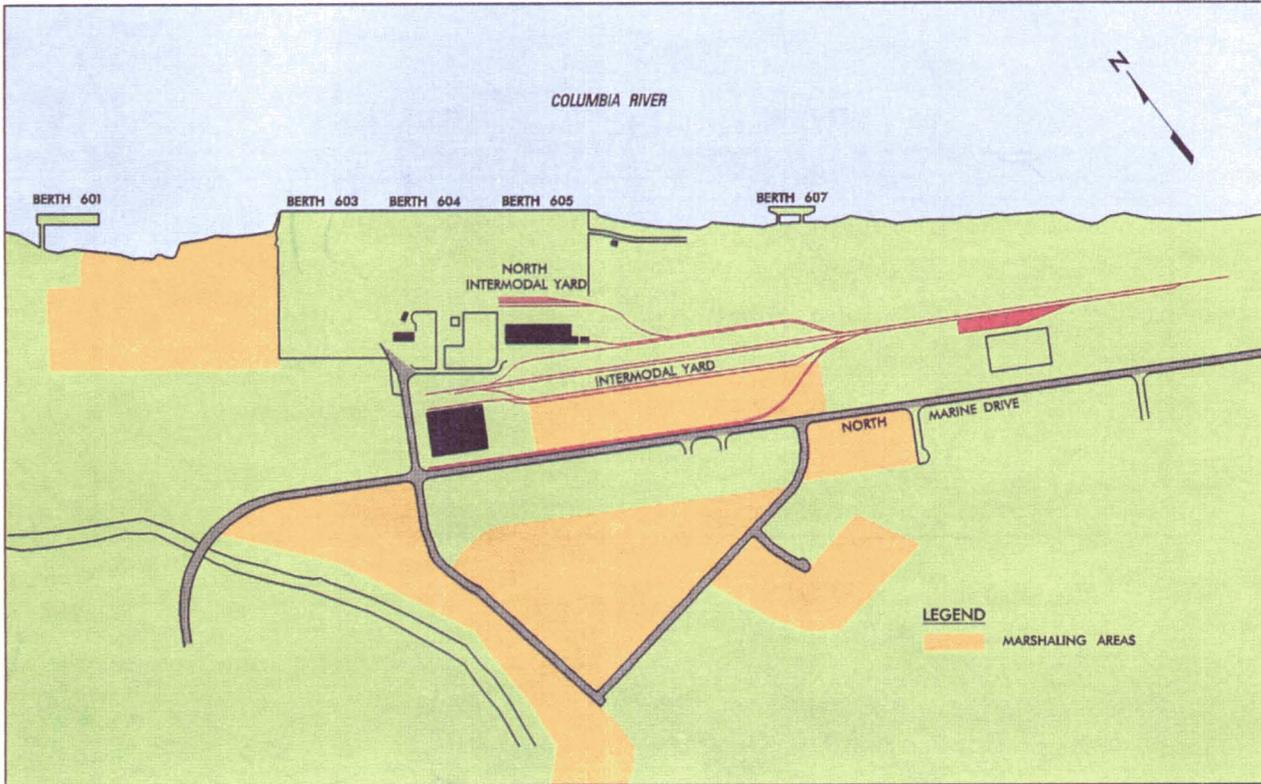
Docks. The Port of Portland has a combined total of 60 truck and rail dock handling positions available for military use. Of this total, 17 of these double as truck or boxcar handling positions. Forty nine of the handling positions are located on terminal 6 at the Container Freight Station (CFS) and Cargo Distribution Center (CDC). Seven positions are at terminal 2 and four are at terminal 4.

*Boxcars Docked
at CDC Terminal 6*



MARSHALING AREAS

The Port of Portland lists almost 290 acres of land that could be used for marshaling. Of this total, 263.4 acres are in vacant sand fill lots in and around terminal 6. The other 26 acres are in the shipyard repair facility near the oil platform modules. The Swan Island Ship Repair Yard is in the vicinity map.



Marshaling Area South of N Marine Drive Near Terminal 6

MATERIAL HANDLING EQUIPMENT

The Portland port has nine container cranes and one wharf crane. Five of the container cranes are at terminal 6, three at terminal 2, and one at terminal 4. The wharf crane is at terminal 2. Capacities on these cranes range from 36 to 85 STON. Other material handling equipment is in the following table for each terminal.

MATERIAL HANDLING EQUIPMENT

<i>TERMINAL</i>	<i>EQUIPMENT</i>	<i>NUMBER</i>	<i>CAPACITY RANGE</i>
2	Forklifts	40	4-40 STON
4	Forklifts	135	2-25 STON
6	Toploaders	18	40 STON
6	Sideloaders	6	6.5 STON
6	Forklifts	36	2.5-26 STON
6	Yard Tractors	42	-----
6	Yard Chassis	74	-----



Container Cranes at Terminal 6



Toploader at CDC, Terminal 6



Sideloader at CFS, Terminal 6

INTERMODAL FACILITIES

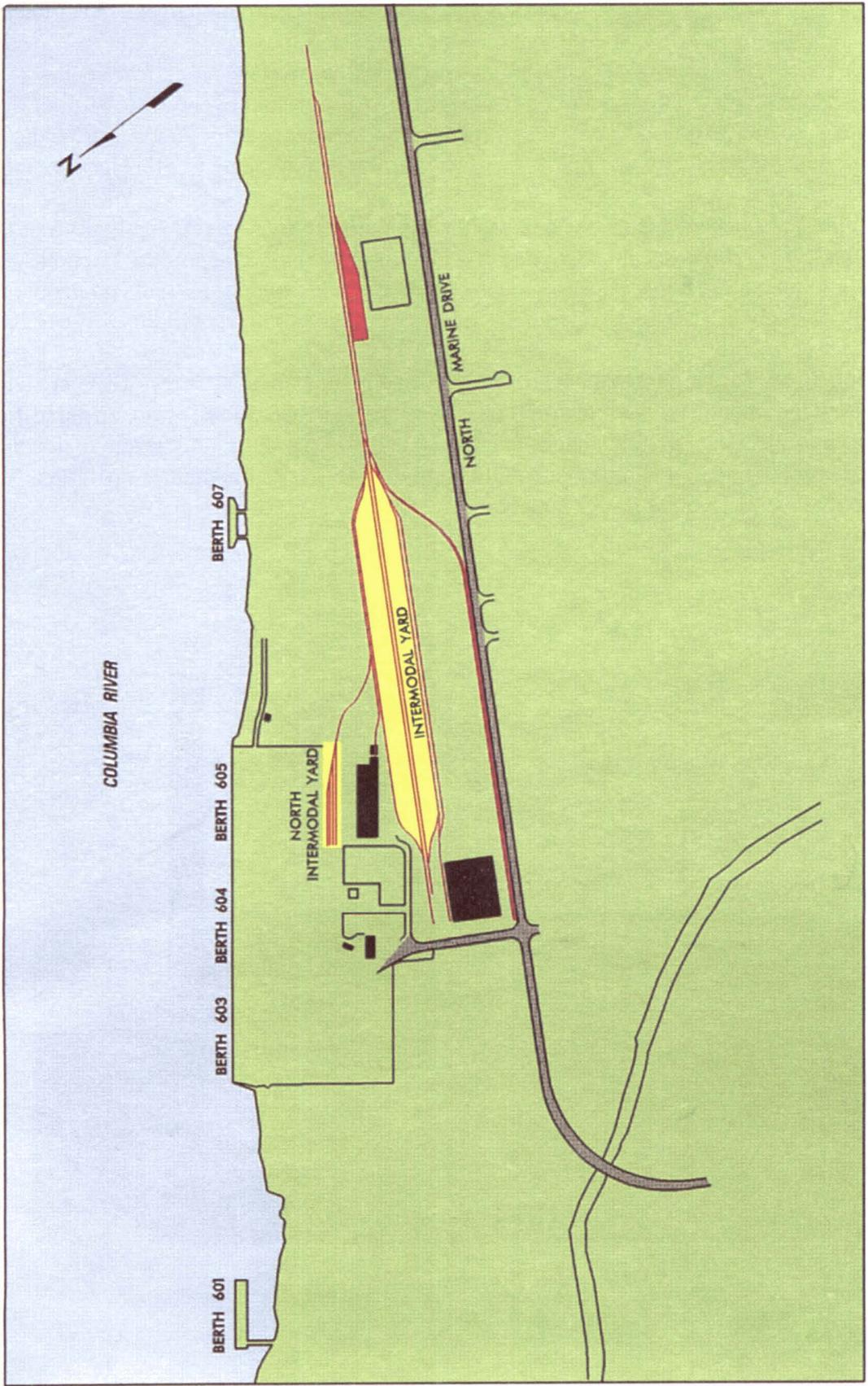
The port has two intermodal facilities at terminal 6 (the new and old intermodal facilities).

The new terminal 6 intermodal yard is on 33.4 acres and has the capability to stage about 360 40-foot truck chassis. Transfer operations occur on 6 tracks providing about 180 89-foot flatcar lengths. This yard has 17 toploaders (3 used at once) available for container operations and can handle both TOFC and double-stacked container operations. The current activity level is 2,000 lifts per month.

The old terminal 6 intermodal yard is on 5 acres and has the capability to stage about sixteen 40-foot truck chassis. Transfer operations occur on five tracks providing a total of about twenty-five 89-foot flatcar lengths. This yard has one toploader available for container operations and can handle both TOFC and double-stacked container operations. The current activity level is 100 lifts per month.



New Intermodal Railyard, Terminal 6



Terminal 6 Intermodal Yards

The SP, UP, and BN are the three commercial rail lines that have intermodal yards near the port.

The SP Brooklyn Yard occupies 21 acres and has the capability to stage about forty-eight 40-foot truck chassis. Transfer operations occur on two tracks providing about twenty-four 89-foot flatcar lengths. This yard has two straddle carriers available for container operations and can handle both TOFC and double-stacked container operations. The current activity level is 9,000 lifts per month.

The UP Albina Yard occupies 20 acres and has the capability to stage about eighty 40-foot truck chassis. Transfer operations occur on two tracks providing about forty 89-foot flatcar lengths. This yard has four sideloaders (piggy packers) available for container operations and can handle both TOFC and double-stacked container operations. The current activity level is 13,000 lifts per month.

The BN Yeon Street Yard is next to the PTRR railyard and is situated on 40 acres. This yard has the capability to stage about 160 40-foot truck chassis. Transfer operations occur on three tracks providing a total of eighty 89-foot flatcar lengths. This yard has four sideloaders available for container operations and can handle both TOFC and double-stacked container operations. The current activity level is 15,000 lifts per month.



SP Brooklyn Intermodal Railyard