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...PARTMENT OF TRANSPORTATION AND COMMUNICATIONS
IN THE PHILIPPINES

FINAL REPORT

THE GREATER CAPITAL REGION INTEGRATED PORT DEVELOPMENT STUDY IN THE REPUBLIC OF THE PHILIPPINES

VOL.2 PORT MASTER PLAN

OCTOBER 1994

THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN (OCDI)
OCEAN CONSULTANT JAPAN CO.,LTD.(OCJ)

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ABBREVIATIONS

ADB	Asian Development Bank
AG&P	Atlantic Gulf and Pacific Corp. Manila
BAECON	Bureau of Agricultural Economics
BAEX	Bureau of Agricultural Extension
BBTI	Batangas Bay Terminal Incorporation
BCGS	Bureau of Coast Geodetic Survey
BEU	Bureau of Energy Utilization
BFAR	Bureau of Fishery Aquatic Resources
BFD	Bureau of Forest Development
BM	Bench Mark
BMG	Bureau of Mining Group
BOC	Bureau of Customs
BOD	Biochemical Oxygen Demand
CALABARZON	Cavite, Laguna, Batangas, Rizal and Quezon
CB	Central Bank
CFC	Conversion Factor for Consumption
CFS	Container Freight Station
CPA	Cebu Port Authority
DENR	Department of Environment and Natural Resources
DHS	Department of Human Settlements
DOA	Department of Agriculture
DOE	Department of Energy
DOTC	Department of Transportation and Communications
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
DWT	Dead Weight Tonnage
EDSA	Epifanio Delos Santos Ave Extension
EIRR	Economic Internal Rate of Return
EMB	Environmental Management Bureau
EPZ	Export Processing Zone
FPA	Fertilizer and Pesticide Authority
GCR	Greater Capital Region
GDP	Gross Domestic Product

GPS	Global Positioning System
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
GRT	Gross Tonnage
GT	Gross ton(s)
GVA	Gross Value Added
ICD	Inland Container Depot
ICTSI	International Container Terminal Service, Inc.
JETRO	Japan External Trade Recovery Organization
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standard
LOA	Length of Over All
LO/LO ship	Lift on Lift off ship
MARINA	Maritime Industry Authority
MICT	Manila International Container Terminal
MIRDP	Mindoro Integrated Rural Development Plan
MT	Metric Ton(s)
NEDA	National Economic and Development Authority
NCA	National Coal Authority
NCR	National Capital Region
NCSO	National Census and Statistics Office
NEPC	National Environmental Protection Council
NFA	National Food Authority
NHA	National Housing Authority
NIEP	Nationwide Industrial Estate Planning
NSC	National Steel Corporation
NSCB	National Statistic Cordination Board
NTPP	National Transportation Planning Project
O/D	Origin and Destination
OECF	Overseas Economic Cooperation Fund
PAGASA	Philippine Atmospheric Geographical and Astronomical Service Administration
PASTORA	Planning Assistance Service to Rural Areas
PCA	Philippine Coconut Authority
PCIA	Philippine Cement Industry Authority

PCU	Passenger Car Unit
PFDA	Philippine Fishery Development Authority
PFM	Pacific Flour Mills
PHILSUCOM	Philippine Sugar Commission
PMU	Port Management Unit
PNCC	Philippine National Construction Company
PNOC	Philippine National Oil Company
PPA	Philippine Ports Authority
REGION III	Central Luzon Region
REGION VI	Southern Tagalog Region
RO/RO ship	Roll on Roll off ship
SCF	Standard Conversion Factor
SME	Small & Medium scale Enterprises
SMB	Sverdrup, Munk and Bretschneider
SPT	Standard Penetration Test
TEU	Twenty-foot Equivalent Unit
UNICHEM	United Coconut Chemicals, Inc.

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PORT MASTER PLAN

CHAPTER 1 BASIC POLICY OF GCR PORT DEVELOPMENT

1.1 Basic Direction of Future Port Development

The goal of port development strategy is to realize the most efficient port development plan, harmonized with inland transportation system within GCR. In other words, to establish a port network system which can provide shipowners as well as cargo-owners and passengers with "fast", "economical" and "safe" sea transport service. Currently, economic growth is the most important target of the Philippines. The port sector as well, is expected to support the promotion of regional economic growth through providing better sea transport service.

At this moment, major GCR ports are facing the following five concerns which should be tackled as soon as possible in order for ports to contribute to national economy as well as to individual transport activities.

1) To assist smooth industrial development in GCR, especially the CALABARZON Regional Development Project.
2) To contribute to de-centralization of urban functions in Metro Manila by decreasing the role of the Port of Manila.
3) To cope with the growing trend of containerization in the Phillipines.
4) To promote privatization with regard to port management and operation.
5) To improve environment surrounding ports.

Some of the above concerns are incompatible, therefore prioritization is necessary. Priority may vary from port to port, in other words, some concerns should be treated as being supplementary to the other priority. However, each priority should be always situated on the "better port service" for any port users.

1.2 Growing Container Traffic and Its Future Prospect

1.2.1 Importance of Growing Container Traffic

Container traffic handled at port has been increasing year by year as shown in Table 1-1. The world total of container cargo handled at port exceeded 84 million TEU in 1990. Average annual growth rate between 1980 and 1990 was 8.5 %. Accordingly, it must be clearly understood that container traffic has become very important for

developing ports. It is not too much to say that the growth or decline of a port depends on how efficiently the port can handle increasing container cargo.

In particular, the growth rate of container traffic in East Asia is remarkably higher than the rest of the world as shown in Table 1-1. East Asia had more than 37% share of the world total in 1990. The rapid increase of container traffic in East Asia is attributed to the high growth of industrial production as well as increasing tendency of dependence on foreign trade.

Countries showing a significant increase in container traffic between 1980 and 1990 are Singapore, China, Thailand and Indonesia, with the annual growth rate being approximately 20% or more. The Philippines also shows a very sharp increase of container traffic as shown in the same table. What must be taken into account here is that this growing tendency of container traffic handled at East Asian ports is expected to remain unchanged even in the long term.

1.2.2 Features of Container Traffic

There is a wide difference between container and bulk cargo transport. Since bulk cargo such as petroleum and coal is transported by railway or pipeline which connects loading/unloading ports with production base or consuming center, because of its heavy weight and a large amount of volume. However, container cargo can be transported by various modes such as truck, barge, railway and airline as well as shipping. As a result, shippers/consignees and shipping companies can choose their favorite transport mode and port among possible alternatives in order to minimize transportation cost and time. Consequently, ports are confronted with severe completion with other ports even within the same hinterland. In other words, the growth and decline of container ports depends not only on economic growth of the hinterland, but also on the severe competition with other ports. It is quite important to develop constantly port facilities and equipment and then to establish efficient cargo handling system in response to the changing world as well as the cargo demand by shippers/consignees, in order to keep competitive power in growing container traffic.

1.3 Basic Policy for Development of GCR Major Ports

The major ports in GCR are the Port of Manila (South Harbor, MICT and North Harbor), the Port of Batangas, Sangley Point, and the Naic/Cavite New Port which has

been selected as an alternative port to Sangley Point. There are the six (6) basic policies to be considered when the Study Team determines the functional allotment of port activities among the major GCR ports, and formulates a port master plan. The following describes six basic polices.

(1) Existing port facilities, including on-going projects such as MICT's No.5 container berth, must be utilized up to the maximum capacity in order to meet growing cargo demand in future.
(2) The result of O/D survey for cargo and passenger movement, especially the port hinterland identified by the survey, must be taken into account when the role and function of each GCR port is determined.
(3) The port planning, including the constructing of new port facilities, must be based on the principle of minimization of total cost which consists of port facility and equipment investment, land acquisition cost, environment improvement coast, and shipper's transportation cost within the hinterland.
(4) A port master plan should give rise to no further aggravating impact on urban transport system.
(5) Environmental impact must be carefully taken into account.
(6) The advantage and disadvantage of a port development plan at Sangley Point should be clarified and compared with those at another alternative port, although the conversion plan of Sangley Point into an international commercial port has become the most expensive project due to the huge amount of cost for relocation of the Naval Base (4.2 billion peso).

Table 1-1 Increasing Container Cargo of World

(Unit: TEU)

No.	Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Growth Rate 1990/1980
A	East Asia												
1	Japan	3,417,118	3,740,864	3,753,667	4,113,749	5,083,897	5,517,009	5,614,703	6,210,011	6,909,050	7,539,316	7,851,608	8.7 %
2	Taiwan	1,644,322	1,787,753	1,902,260	2,429,304	3,026,839	3,075,151	4,104,953	4,772,339	4,889,091	5,278,227	5,430,039	12.7 %
3	Singapore	916,989	1,064,504	1,116,288	1,340,009	1,552,184	1,698,800	2,203,100	2,634,500	3,375,100	4,364,400	5,223,500	19.0 %
4	Hong Kong	1,464,961	1,559,819	1,659,943	1,837,047	2,108,583	2,288,753	2,779,025	3,457,182	4,033,427	4,463,709	5,100,569	13.3 %
5	South Korea			861,971	977,661	1,177,866	1,245,538	1,532,911	1,949,143	2,065,462	2,158,828	2,348,475	13.3 %
6	Philippines	437,220	552,473	684,575	735,159	657,792	638,471	754,168	913,909	1,096,743	1,286,208	1,383,252	12.2 %
7	China	54,038	90,528	142,877	191,651	273,154	446,473	487,416	406,906	793,706	968,860	1,143,898	35.7 %
8	Thailand	189,430	241,500	259,424	304,524	341,021	400,419	511,264	643,530	795,301	939,040	1,079,290	19.0 %
9	Indonesia	87,110	140,157	158,352	233,379	219,093	228,619	364,008	393,131	588,267	762,256	922,547	26.6 %
10	Malaysia	171,693	204,644	223,534	293,403	362,399	389,279	401,908	489,077	589,128	723,933	881,741	17.8 %
	Sub Total	8,382,881	9,382,242	10,762,891	12,455,886	14,752,828	15,928,512	18,753,456	21,869,728	25,135,275	28,484,777	31,364,192	14.1 %
B	North America												
1	USA	8,566,838	8,430,582	8,729,691	9,559,451	10,902,002	11,532,678	12,393,288	13,258,276	13,968,282	14,632,763	15,278,162	
2	Canada	757,267	785,752	767,495	838,377	1,001,490	1,068,395	1,155,307	1,288,233	1,402,673	1,432,062	1,524,771	
	Sub Total	9,324,105	9,216,334	9,497,186	10,397,828	11,903,492	12,601,073	13,548,595	14,546,509	15,370,955	16,064,825	16,082,933	6.1 %
C-1	North Europe												
1	Uk	2,263,546	2,194,227	2,574,710	2,724,272	2,918,756	2,886,196	3,011,273	3,337,037	3,670,196	3,786,704	4,016,59	
2	Netherlands	2,055,968	2,215,141	2,301,786	2,409,645	2,665,935	2,769,281	2,972,697	2,948,609	3,282,676	3,725,702	3,761,184	
3	Germany	1,493,097	1,725,193	1,689,686	1,759,002	2,055,782	2,151,646	2,254,128	2,561,689	2,816,650	3,092,829	3,265,747	
4	Belgiumm	915,207	1,033,627	1,027,939	1,239,558	1,456,538	1,470,478	1,534,504	1,670,983	1,724,267	1,768,157	1,901,172	
5	Spain	704,818	844,753	959,916	1,075,385	1,400,979	1,508,281	1,477,300	1,685,994	1,761,884	1,768,157	1,859,057	
6	France	1,071,025	1,280,797	1,214,990	1,164,726	1,290,246	1,484,786	1,350,370	1,341,232	1,435,045	1,605,792	1,567,511	
7	Sweden	314,331	346,418	422,315	393,872	453,121	471,372	467,051	500,667	499,202	453,789	471,929	
8	Portugal	176,178	181,510	194,105	208,375	238,707	265,531	291,652	344,895	376,500	377,054	411,184	
9	Eire	236,474	276,452	285,683	250,896	258,556	254,582	288,348	306,768	338,666	379,332	380,208	
10	Denmark	317,543	332,426	353,391	346,441	422,613	420,166	397,280	425,489	479,788	378,680	358,949	
11	Finland	105,069	108,949	126,156	142,212	157,430	164,629	180,905	217,956	261,798	305,868	306,125	
14	Poland	81,946	76,932	80,662	92,262	102,518	99,715	98,642	125,310	149,637	147,351	146,196	
12	Iceland					72,025	92,964	114,534	140,170	142,646	151,740	159,831	
13	Norway	66,388	71,206	65,937		70,034	76,885	114,647	119,982	135,908	141,883	157,390	
	Sub Total	9,801,590	10,687,631	11,297,276	11,806,646	13,563,240	14,116,512	14,553,331	15,726,781	17,174,863	18,083,038	18,763,053	6.7 %
C-2	Mediterranean												
1	Italy	1,228,713	1,230,827	1,240,608	1,368,899	1,614,201	1,524,894	1,476,320	1,557,534	1,632,196	1,670,541	1,807,183	
2	Greece	171,203	194,483	211,377	201,086	186,219	208,075	253,282	288,648	371,351	433,948	479,854	
3	Israel	274,145	299,858	304,442	336,244	331,006	307,725	344,741	376,139	392,198	514,060	462,000	
4	Cyprus	87,646	252,117	180,652	181,703	267,440	197,256	206,902	245,623	291,529	369,291	384,279	
5	Egypt	69,111	70,001	142,856	178,593	185,758	176,386	170,282	179,108	186,364	195,447	316,314	
6	Turkey					84,837	184,667	159,835	171,193	202,512	265,378	219,223	
7	Yugoslavia	55,591	71,741	72,075	79,548	84,184	81,196	87,568	119,084	145,044	144,685	150,181	
	Sub Total	1,886,409	2,119,027	2,152,010	2,346,073	2,753,645	2,680,199	2,698,930	2,937,329	3,221,194	3,593,350	3,819,034	7.3 %

Source: OCDI

No.	Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Growth Rate 1990/1980
D	Australia												
1	Australia	1,189,031	1,248,653	1,202,922	1,202,922	1,398,850	1,412,942	1,336,839	1,433,135	1,288,884	1,727,611	1,636,359	
2	New Zealand	247,085	242,382	327,540	321,429	347,440	405,337	390,209	411,585	406,979	463,459	466,097	
	Sub Total	1,436,116	1,491,035	1,530,462	21,524,351	1,746,290	1,818,279	1,727,048	1,844,720	1,695,863	2,191,070	2,102,456	3.9 %
E	Middle East												
1	UAE	339,753	439,630	411,380	502,661	598,036	711,652	925,703	957,558	1,042,637	1,366,741	1,563,277	
2	Saudi Arabia	818,816	913,622	1,048,981	1,186,539	1,175,543	946,916	823,706	827,752	822,663	758,526	788,567	
3	Oman			44,112	67,029	91,488	113,565	112,791	140,496	148,160	165,723	168,465	
	Sub Total	1,158,569	1,353,252	1,504,473	1,756,229	1,865,067	1,772,133	1,862,200	1,925,806	2,013,460	2,290,990	2,520,309	8.1 %
F	Central & South America												
1	Puerto Rico	851,927	841,933	934,857	910,851	918,457	881,629	990,635	1,033,609	1,283,620	1,289,031	1,381,403	
2	Brasil	158,395	201,079	267,783	358,524	531,013	611,644	594,609	666,007	810,858	743,840	569,186	
3	Mexico	35,790	40,900	121,294	87,507			136,501	148,863	177,779	185,929	228,182	
4	Chile	48,932	82,200	74,784	69,345	134,766	102,326	116,150	149,343	159,976	200,264	217,457	
5	Argentina						110,000	139,319	188,625	191,814	218,312	209,150	
6	Honduras	59,231	71,027	87,171	111,635	138,417	141,156	144,621	177,732	167,972	193,432	180,253	
7	Panama	130360	130,192	135,711	133,840	133,619	140,714	162,217	174,555	127,243	149,992	176,639	
8	Jamaica	179,009	183,680	147,751	158,206	142,675	232,386	274,206	254,757	182,069	152,935	139,626	
	Sub Total	1,463,644	1,551,011	1,769,351	1,829,908	1,998,947	2,219,855	2,558,258	2,793,491	3,101,331	3,133,735	3,101,896	7.8 %
G	Africa												
1	South Africa	585,527	712,443	661,443	652,444	747,804	632,759	617,489	657,574	756,252	770,466	774,106	
2	Nigeria	211,106	279,029	239,906	151,755	167,723	180,177	159,519	159,591	171,371	171,291	208,144	
3	Canary Islands	134,694	130,346	171,852	181,788	189,138	206,609	232,751	287,588	148,021	159,394	150,306	
4	Kenya	30,586	44,048	57,645	83,853	92,462	103,362	119.853	115,367	112,445	129,666	136,406	
	Sub Total	961,913	1,165,866	1,130,846	1,069,840	1,197,127	1,122,907	1,129612	1,220,120	1,188,089	1,229,817	1,268,962	2.8 %
H	India												
1	India	145,670	203,761	215,680	234,614	295,888	393,345	486,379	516,152	549,972	632,101	696,255	
2	Sri Lanka	41,834	59,496	103,233	128,456	181,484	215,877	341,496	479,298	620,940	544,197	583,811	
3	Pakistan	60,170	89,512	124,229	140,370	160,000	244,086	292,168	281,437	339,807	342,946	390,391	
	Sub Total	247,674	352,769	443,142	503,440	637,372	853,308	1,120,043	1,279,887	1,510,719	1,519,244	1,670,457	21.0 %
Others		610,038	714,487	2,803,148	1,879,489	2,902,963	2,790,349	2,925,653	3,115,210	3,398,734	3,226,316	2,810,486	16.5 %
World Total		37,163,242	40,220,073	42,824,848	45,569,690	53,320,971	55,903,127	60,877,126	67,256,581	73,810,483	79,816,162	84,223,778	8.5 %

Source: OCDI

CHAPTER 2 MICRO DEMAND FORECAST OF PORT TRAFFIC

2.1 Methodology

Method of cargo demand forecast is divided into three steps. First step is setting an initial cargo volume. Second step is setting growth rates of cargo volume and third step is calculating the cargo volume for 2010. Flow of method is shown in Figure 2-1.

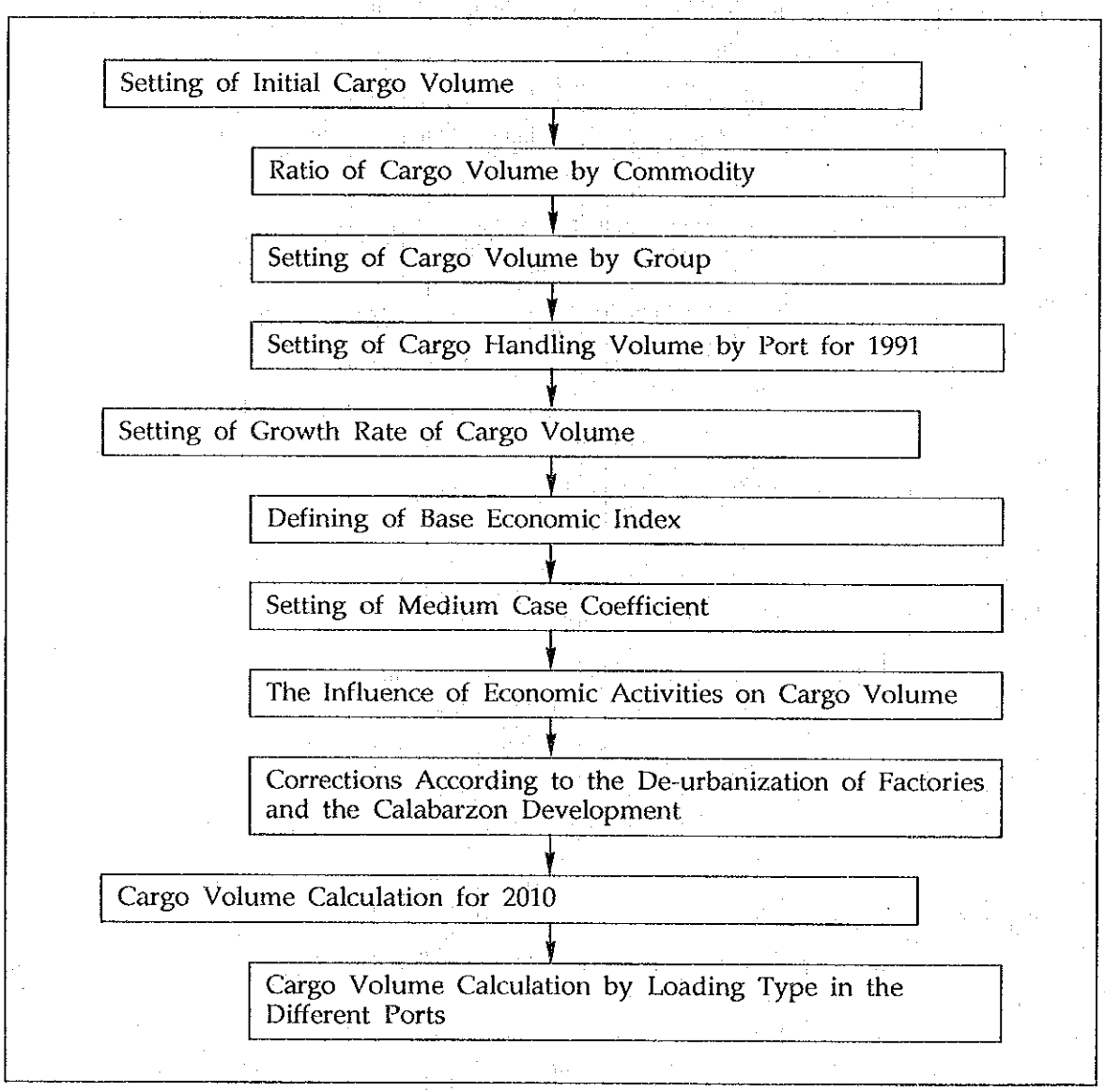


Figure 2-1 Flow Chart of Microscopic Forecast

2.2 Forecast of Port Cargo Traffic

(1) Setting of Initial Cargo Volume

1) Ratio of Cargo Volume by Commodity to Cargo Throughput

Statistics gathered by the PPA show that the total cargo volume by commodity in MICT and the North Harbor is smaller than the cargo throughput. This is shown in table 2-1. The discrepancy in this report can be adjusted by getting the corrective factor related to the already known statistics for type of cargo, for internal-external trade and for inwardoutward. This was set as the cargo volume by commodity for 1991. The corrective coefficient for type of cargo, for internal-external trade and for inwardoutward is shown in Table 2-2. and the resulting cargo volume by commodity after adjustments is shown in Table 2-3-A, 2-3-B and 2-3-C.

Table 2-1 RATIO OF CARGO VOLUME BY COMMODITY TO CARGO THROUGHPUT

(UNIT : TON)

NORTH HARBOR / DOMESTIC	BREAKBULK		BULK		CONTAINER	
	INWARD	OUTWARD	INWARD	OUTWARD	INWARD	OUTWARD
TOTAL CARGO THROUGHPUT (A)	2,545,893	907,127	55,048	250	3,258,861	3,692,266
TOTAL CARGO VOLUME BY COMMODITY (B)	2,350,353	737,472	50,860	250	1,030,957	1,008,056
(A)/(B)	1.08	1.23	1.08	1.00	3.16	3.66

NORTH HARBOR / DOMESTIC	BREAKBULK		BULK		CONTAINER	
	INWARD	OUTWARD	INWARD	OUTWARD	INWARD	OUTWARD
TOTAL CARGO THROUGHPUT (A)	5,984	0	0	0	2,357,866	1,524,674
TOTAL CARGO VOLUME BY COMMODITY (B)	4,469	0	0	0	1,717,471	1,121,886
(A)/(B)	1.34				1.37	1.36

SOURCE: ANNUAL STATISTICAL REPORT 1991 VOL(I), VOL(II) PPA

Table 2-2 CORRECTIVE COEFFICIENT OF CARGO VOLUME BY COMMODITY

	NORTH HARBOR		MICT	
	INWARD	OUTWARD	INWARD	OUTWARD
DOMESTIC				
BREAKBULK	1.08	1.23	1.00	1.00
BULK	1.08	1.00	1.00	1.00
CONTAINER	3.16	3.66	1.00	1.00
FOREIGN				
BREAKBULK	1.00	1.00	1.34	1.00
BULK	1.00	1.00	1.00	1.00
CONTAINER	1.00	1.00	1.37	1.36

Table 2-3-A CARGO STATISTICS BY COMMODITY CLASSIFICATION

BASE PORT AT BERTH

TOTAL CARGO VOLUME

(UNIT: TON)

COMMODITY	TOTAL				
	TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
Total	18,173,209	999,602	10,459,445	2,770,899	3,943,263
Abaca	67,942	87	21,730	8,477	37,649
Animal Feeds	278,245	15,905	234,962	10,435	16,943
Copra	109,447	32,936	76,438	37	36
Corn	667,090	70,970	596,100	0	21
Fertilizer	197,060	666,342	128,978	275	1,465
Fish & Fish Prep.	439,014	13,652	169,757	144,357	111,248
Fruits & Vegetables	891,887	76,386	519,347	50,456	245,694
Live Animal	325,748	24,956	200,034	100,758	0
Logs	427,372	2,761	338,960	85,356	295
Lumber	139,811	4,300	126,714	2,029	6,768
Palay & Rice	242,105	97,805	126,905	15,383	2,012
Sugar	494,615	7,258	473,834	0	13,523
Wheat	150,464	8,321	122,881	1,706	17,556
SUM (Small Vol. Cargos)	188,051	1,707	136,769	14,630	34,945
Bottled Cargo	741,630	41,990	676,657	13,956	9,026
Dairy Products	233,239	1,561	146,309	35,614	49,755
Other Gen. Cargo	4,693,494	888,398	3,785,100	355,686	464,310
Mach. & Elect. Equipt.	811,868	1,726	111,580	160,582	537,980
Cement	249,986	34,584	1118,524	96,011	867
Chemicals	1,249,458	1,161	392,784	190,595	664,918
Crude Minerals	427,880	14,817	96,128	259,094	57,841
Iron & Steel	1,336,791	2,613	644,519	604,618	85,042
Metaliferous Ores/Scrap	162,474	1,435	65,907	43,235	51,896
Mineral Fuel	158,625	2,570	50,162	105,401	493
Ref. Petroleum & Prod.	105,891	2,264	80,095	19,563	3,969
Furniture	369,255	1,083	79,758	16,988	271,426
Handicraft	266,774	0	0	0	266,774
Manufactured Metal	560,428	1,700	364,573	38,369	155,786
Paper & Pulp	414,084	75	134,657	150,009	129,342
Plywood & Veneer	231,869	1,145	195,725	1,625	33,374
Rattan	6,050	0	0	0	6,050
Textile Fiber	61,319	841	22,998	17,509	19,971
Textile & Garments Prod	761,038	255	30,938	104,683	625,162
Tobacco & Manufactures	140,016	5,536	108,049	11,936	14,496
Transport Equipment	572,189	372,462	81,573	111,526	6,627

Table 2-3-B CARGO STATISTICS BY COMMODITY CLASSIFICATION

BASE PORT AT BERTH

INWARD CARGO VOLUME

(UNIT: TON)

COMMODITY	INWARD				
	TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
Total	11,308,018	613,214	5,859,802	2,417,059	2,417,943
Abaca	37,478	85	21,142	406	15,844
Animal Feeds	182,424	6,421	152,510	6,653	16,840
Copra	107,981	32,893	75,052	0	36
Corn	653,860	70,634	583,205	0	21
Fertilizer	173,130	46,833	124,557	275	1,465
Fish & Fish Prep.	320,747	13,295	163,852	124,182	19,419
Fruits & Vegetables	677,085	73,920	474,492	32,703	95,969
Live Animal	320,455	24,191	195,508	100,756	0
Logs	417,064	2,616	332,752	81,696	0
Lumber	129,263	3,758	123,554	967	984
Palay & Rice	138,461	92,814	39,163	5,383	1,101
Sugar	469,076	23	455,551	0	13,502
Wheat	92,230	69	72,899	1,706	17,556
SUM (Small Vol. Cargos)	133,337	20,152	119,793	13,370	59
Bottled Cargo	154,439	74	143,348	7,125	3,892
Dairy Products	89,826	80	7,891	32,694	49,161
Other Gen. Cargo	1,972,730	38,534	1,408,450	221,301	304,445
Mach. & Elect. Equipt.	689,810	409	22,397	152,610	514,394
Cement	190,508	2,569	93,900	93,211	828
Chemicals	1,006,290	102	189,965	172,635	643,588
Crude Minerals	331,528	14,169	70,252	238,415	8,692
Iron & Steel	1,142,199	390	495,173	568,802	77,834
Metaliferous Ores/Scrap	121,870	1,020	39,641	39,130	42,080
Mineral Fuel	147,442	448	44,709	102,230	55
Ref. Petroleum & Prod.	23,348	58	1,607	17,852	3,830
Furniture	72,126	188	58,797	3,989	9,152
Handicraft	5,481	0	0	0	5,481
Manufactured Metal	239,118	129	75,444	32,927	130,618
Paper & Pulp	309,676	34	34,560	147,621	127,450
Plywood & Veneer	192,024	1	186,332	173	5,518
Rattan	4,078	0	0	0	4,078
Textile Fiber	47,220	796	10,957	15,992	19,475
Textile & Garments Prod	376,454	32	13,370	86,816	276,237
Tobacco & Manufactures	15,346	388	7,246	5,804	1,908
Transport Equipment	323,915	186,126	21,733	109,625	6,431

Table 2-3-C CARGO STATISTICS BY COMMODITY CLASSIFICATION

BASE PORT AT BERTH

OUTWARD CARGO VOLUME

(UNIT: TON)

COMMODITY	OUTWARD				
	TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
Total	6,865,191	386,388	4,599,643	353,840	1,525,320
Abaca	30,465	2	588	8,071	21,804
Animal Feeds	95,821	9,484	82,451	3,782	130
Copra	1,466	43	1,386	37	0
Corn	13,230	336	12,894	0	0
Fertilizer	23,930	19,509	4,421	0	0
Fish & Fish Prep.	118,267	357	5,905	20,175	91,829
Fruits & Vegetables	214,802	2,466	44,855	17,753	149,728
Live Animal	5,293	765	4,526	2	0
Logs	10,309	145	6,209	3,660	295
Lumber	10,548	542	3,160	1,062	5,784
Palay & Rice	103,644	4,991	87,743	10,000	911
Sugar	25,538	7,235	18,283	0	20
Wheat	58,234	8,252	49,982	0	0
SUM (Small Vol. Cargos)	54,714	1,592	16,976	1,260	34,886
Bottled Cargo	587,191	41,916	533,310	6,831	5,134
Dairy Products	143,413	1,481	138,418	2,920	594
Other Gen. Cargo	2,720,764	49,864	2,376,649	134,385	159,865
Mach. & Elect. Equipt.	122,058	1,317	89,183	7,972	23,586
Cement	59,479	32,015	24,624	2,800	39
Chemicals	243,168	1,059	202,819	17,960	21,330
Crude Minerals	96,353	648	25,877	20,679	49,149
Iron & Steel	194,592	2,223	149,345	35,816	7,208
Metaliferous Ores/Scrap	40,603	415	26,267	4,105	9,816
Mineral Fuel	11,183	2,122	5,453	3,170	438
Ref. Petroleum & Prod.	82,543	2,206	78,488	1,711	139
Furniture	297,129	895	20,961	12,999	262,275
Handicraft	261,293	0	0	0	261,293
Manufactured Metal	321,310	1,571	289,129	5,442	25,168
Paper & Pulp	104,408	41	100,097	2,378	1,892
Plywood & Veneer	39,845	1,144	9,393	1,452	27,856
Rattan	1,972	0	0	0	1,972
Textile Fiber	14,099	45	12,040	1,517	496
Textile & Garments Prod	384,584	223	17,569	17,867	348,925
Tobacco & Manufactures	124,670	5,148	100,803	6,132	12,587
Transport Equipment	248,273	186,336	59,841	1,901	196

2) Setting of Cargo Volume by Group

The commodities used as items of microscopic forecast were determined by obtaining the share composition by commodity. This is shown in Table 2-4. There are 35 items presented in this table, and their average share was calculated to be 2.9%. Other General Cargo garnered the top share at 25.8%, followed by Iron & Steel (7.4%) and Chemical products 86.9%). Fruits & Vegetables, machine & Electric equipment, Textile & Garments products, Bottled Cargo, and Corn closely followed each other at 4.9%, 4.5%, 4.2%, 4.1%, and 3.7%, respectively. Transport Equipment and Manufactured Metal each accounted for 3.1%, occupying the ninth an tenth position of the Top Ten List. These products individually exceed the computed average share, and their total share account for 67.7% of the whole volume. However, when the largest share holder, i.e., the unspecified Other General Cargo is deducted, the total share is at 41.0% and the average share is computed to be 4.7%.

This characterizes the Port of Manila, that is, no specific commodity accounts for the highest share-holder of total cargo volume. As shown in former chapter the Port of Manila is the leading port in the country, handling 55% of the total cargo. More than half of cargo are transported via the Port of Manila, making it easy to classify the Port of Manila as the distribution center of the Philippines. Thus, it can be said that the share composition by commodity changes in accordance to the consumption trends of the public. The fact that Other General Cargo accounts for the highest composition means that the commercial nature of the ports will continue in the future.

Taking this commercial nature of the Port of Manila into consideration, it is thought that it is more appropriate to base the forecast of future cargo volume on a new grouping of commodities rather than base this forecast on overlapping commodity classifications accounting for smaller shares. Namely these proposed five groups are Agriculture Related Goods, Consumer Goods, Industrial Capital Goods, Industrial Raw Material and Industrial Products.

Commodities whose cargo volumes are expected to vary according to the growth rate of agricultural production belong to the Agriculture Related Goods. These are mainly agricultural products, marine products, forestry products, fertilizers, animal feeds, etc. The unique characteristic of this group is that domestic cargo of Transport Equipment, as implied by the fact that most of the Transport Equipment is designated

for Agricultural Products on ferries, is apportioned to this group.

The cargo volume of Consumer Goods varies according to the increase rate of population and per capita GRDP (or GDP). Thus, the products belonging to this category are everyday necessities, food products, general goods, etc. With regards to general goods, most of the cargo belonging to Other General Cargo is assumed to be composed of Consumer Goods(40%).

Industrial Related Cargo is classified into three groups as it is expected that importation restrictions may be imposed in the future if the present trend of importation surplus continues. Moreover, these policies will vary according to whether the cargo is classified as Capital Goods, Raw materials, or Manufactured Products. These groups are denominated as Industrial Capital Goods, Industrial Raw Materials, and Industrial Products, respectively.

Table 2-5 presents the commodities belonging to each group, as well as the percentage distribution of those belonging to several groups.

3) Setting of Cargo Handling Volume by Port for 1991

Tables 2-6-A, 2-6-B and 2-6-C show the sum total of the 1991 cargo volume classified in conformity with Table 12-16. This value is set as the initial value for the forecast. According to this, the cargo volume of Base Ports at Berth in the Greater Capital Region is overwhelmingly pegged at 58% for the North Harbor, while the remaining proportion is reasonably allotted among the other ports with 22% at MICT, 15% at the South Harbor, and 6% at the Port of Batangas.

Table 2-4 COMPOSITION OF CARGO VOLUME BY COMMODITY

COMMODITY	SHARE (%)
Total	100.0
Abaca	0.4
Animal Feeds	1.5
Copra	0.6
Corn	3.7
Fertilizer	1.1
Fish & Fish Prep.	2.4
Fruits & Vegetables	4.9
Live Animal	1.8
Logs	2.4
Lumber	0.8
Palay & Rice	1.3
Sugar	2.7
Wheat	0.8
SUM (Small Vol. Cargos)	1.0
Bottled Cargo	4.1
Dairy Products	1.3
Other Gen. Cargo	25.8
Mach. & Elect. Equipt.	4.5
Cement	1.4
Chemicals	6.9
Crude Minerals	2.4
Iron & Steel	7.4
Metalliferous Ores/Scrap	0.9
Mineral Fuel	0.9
Ref. Petroleum & Prod.	0.6
Furniture	2.0
Handicraft	1.5
Manufactured Metal	3.1
Paper & Pulp	2.3
Plywood & Veneer	1.3
Rattan	0.0
Taxtile Fiber	0.3
Textile & Garments Prod	4.2
Tobacco & Manufactures	0.8
Transport Equipment	3.1

Table 2-5 CARGO BY GROWTH RATE

COMMODITY	DOMESTIC	FOREIGN
AGRICULTURE	Abaca Animal Feeds Copra Corn Fertilizer Fish & Fish Prep. Fruits & Vegetables Live Animal Logs Lumber Palay & Rice Sugar Transport Equipment Wheat SUM (Small Vol. Cargos)	
CONSUMER GOODS	Bottled Cargo Dairy Products Other General Cargo (40%)	Bottled Cargo Dairy Products Other General Cargo (40%)
INDUSTRY (CAPITAL)	Mach. & Elect. Equip. (50%) Other General Cargo (20%)	Mach. & Elect. Equip (50%) Other General Cargo (20%)
INDUSTRY (RAW. MAT)	Cement Chemicals Crude Minerals Iron & Steel Metalliferous Ores/Scrap Mineral Fuel Ref. Petroleum & Prod.	Cement Chemicals Crude Minerals Iron & Steel Metalliferous Ores/Scrap Mineral Fuel Ref. Petroleum & Prod.
INDUSTRY (PRODUCT)	Furniture Handicraft Mach. & Elect. Equip. (50%) Manufactured Metal Other General Cargo (40%) Paper & Pulp Plywood & Veneer Rattan Textile Fiber Textile & Garments Prod. Tobacco & Manufactures	Furniture Handicraft Mach. & Elect. Equip. (50%) Manufactured Metal Other General Cargo (40%) Paper & Pulp Plywood & Veneer Rattan Textile Fiber Textile & Garments Prod. Tobacco & Manufactures Transport Equipment

Table 2-6-A TOTAL CARGO VOLUME BY COMMODITY GROUPS

BASE PORT AT BERTH

(UNIT : THOUSAND TON)

TYPE	COMMODITY	TOTAL				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
DOMESTIC BREAKBULK	AGRICULTURE	2,232	745	1,487	0	0
	CONSUMER GOODS	461	79	382	0	0
	INDUSTRY-CAPITAL	154	19	135	0	0
	INDUSTRY-RAW. MAT	938	59	879	0	0
	INDUSTRY-PRODUCT	612	42	570	0	0
	TOTAL	4,397	944	3,453	0	0
DOMESTIC BULK	AGRICULTURE	12	0	12	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	43	0	43	0	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	55	0	55	0	0
DOMESTIC CONTAINER	AGRICULTURE	1,869	0	1,856	1	11
	CONSUMER GOODS	1,964	0	1,955	1	8
	INDUSTRY-CAPITAL	682	0	677	0	4
	INDUSTRY-RAW. MAT	530	0	526	1	3
	INDUSTRY-PRODUCT	1,967	0	1,936	2	29
	TOTAL	7,012	0	6,951	6	55
DOMESTIC TOTAL	AGRICULTURE	4,113	745	3,355	1	11
	CONSUMER GOODS	2,424	79	2,337	1	8
	INDUSTRY-CAPITAL	836	19	813	0	4
	INDUSTRY-RAW. MAT	1,511	59	1,448	1	3
	INDUSTRY-PRODUCT	2,579	42	2,507	2	29
	TOTAL	11,464	944	10,459	6	55
FOREIGN BREAKBULK	AGRICULTURE	376	51	0	325	0
	CONSUMER GOODS	16	0	0	15	1
	INDUSTRY-CAPITAL	43	0	0	41	1
	INDUSTRY-RAW. MAT	703	0	0	703	0
	INDUSTRY-PRODUCT	162	5	0	153	4
	TOTAL	1,300	56	0	1,238	6
FOREIGN BULK	AGRICULTURE	14	0	0	14	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	394	0	0	394	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	408	0	0	408	0
FOREIGN CONTAINER	AGRICULTURE	570	0	0	93	477
	CONSUMER GOODS	412	0	0	176	236
	INDUSTRY-CAPITAL	466	0	0	110	356
	INDUSTRY-RAW. MAT	1,084	0	0	221	862
	INDUSTRY-PRODUCT	2,471	0	0	520	1,951
	TOTAL	5,002	0	0	1,119	3,883
GRAND TOTAL	AGRICULTURE	960	51	0	432	477
	CONSUMER GOODS	428	0	0	191	237
	INDUSTRY-CAPITAL	509	0	0	151	358
	INDUSTRY-RAW. MAT	2,180	0	0	1,318	862
	INDUSTRY-PRODUCT	2,633	5	0	673	1,955
	TOTAL	6,710	56	0	2,765	3,889
GRAND TOTAL	AGRICULTURE	5,073	796	3,355	434	488
	CONSUMER GOODS	2,852	79	2,337	192	245
	INDUSTRY-CAPITAL	1,345	19	813	151	362
	INDUSTRY-RAW. MAT	3,691	59	1,448	1,319	865
	INDUSTRY-PRODUCT	5,212	47	2,507	679	1,984
	TOTAL	18,173	1,000	10,459	2,771	3,943

CONTAINERIZED RATIO OF FOREIGN CARGO

(IN) 3,204 / 4,372 * 100 = 73 (%)

(OUT) 1,797 / 1,874 * 100 = 76 (%)

Table 2-6-B INWARD CARGO VOLUME BY COMMODITY GROUPS BASE PORT AT BERTH

(UNIT : THOUSAND TON)

TYPE	COMMODITY	INWARD				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
DOMESTIC BREAKBULK	AGRICULTURE	1,820	503	1,317	0	0
	CONSUMER GOODS	158	16	142	0	0
	INDUSTRY-CAPITAL	66	8	58	0	0
	INDUSTRY-RAW. MAT	705	19	686	0	0
	INDUSTRY-PRODUCT	360	17	343	0	0
	TOTAL	3,108	562	2,546	0	0
DOMESTIC BULK	AGRICULTURE	12	0	12	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	43	0	43	0	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	55	0	55	0	0
DOMESTIC CONTAINER	AGRICULTURE	1,640	0	1,627	1	11
	CONSUMER GOODS	581	0	573	1	8
	INDUSTRY-CAPITAL	239	0	235	0	4
	INDUSTRY-RAW. MAT	210	0	206	1	3
	INDUSTRY-PRODUCT	649	0	619	2	28
	TOTAL	3,319	0	3,259	6	54
DOMESTIC TOTAL	AGRICULTURE	3,471	503	2,956	1	11
	CONSUMER GOODS	739	16	715	1	8
	INDUSTRY-CAPITAL	305	8	293	0	4
	INDUSTRY-RAW. MAT	957	19	935	1	3
	INDUSTRY-PRODUCT	1,009	17	961	2	28
	TOTAL	6,482	562	5,860	6	54
FOREIGN BREAKBULK	AGRICULTURE	365	51	0	314	0
	CONSUMER GOODS	7	0	0	6	1
	INDUSTRY-CAPITAL	39	0	0	37	1
	INDUSTRY-RAW. MAT	663	0	0	663	0
	INDUSTRY-PRODUCT	145	0	0	140	4
	TOTAL	1,218	51	0	1,161	6
FOREIGN BULK	AGRICULTURE	10	0	0	10	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	393	0	0	393	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	403	0	0	403	0
FOREIGN CONTAINER	AGRICULTURE	213	0	0	42	171
	CONSUMER GOODS	288	0	0	121	167
	INDUSTRY-CAPITAL	396	0	0	83	314
	INDUSTRY-RAW. MAT	950	0	0	175	774
	INDUSTRY-PRODUCT	1,358	0	0	425	937
	TOTAL	3,204	0	0	847	2,364
GRAND TOTAL	AGRICULTURE	589	51	0	367	171
	CONSUMER GOODS	295	0	0	128	167
	INDUSTRY-CAPITAL	434	0	0	120	314
	INDUSTRY-RAW. MAT	2,006	0	0	1,231	774
	INDUSTRY-PRODUCT	1,503	0	0	566	937
	TOTAL	4,826	51	0	2,411	2,364
GRAND TOTAL	AGRICULTURE	4,060	554	2,956	368	183
	CONSUMER GOODS	1,033	16	715	128	175
	INDUSTRY-CAPITAL	739	8	293	121	318
	INDUSTRY-RAW. MAT	2,963	19	935	1,232	777
	INDUSTRY-PRODUCT	2,512	17	961	568	965
	TOTAL	11,308	613	5,860	2,417	2,418

Table 2-6-C OUTWARD CARGO VOLUME BY COMMODITY GROUPS
BASE PORT AT BERTH

(UNIT : THOUSAND TON)

TYPE	COMMODITY	OUTWARD				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
DOMESTIC BREAKBULK	AGRICULTURE	412	242	170	0	0
	CONSUMER GOODS	303	63	240	0	0
	INDUSTRY-CAPITAL	88	11	77	0	0
	INDUSTRY-RAW. MAT	234	41	193	0	0
	INDUSTRY-PRODUCT	252	25	228	0	0
	TOTAL	1,289	381	907	0	0
DOMESTIC BULK	AGRICULTURE	0	0	0	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	0	0	0	0	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	0	0	0	0	0
DOMESTIC CONTAINER	AGRICULTURE	229	0	229	0	0
	CONSUMER GOODS	1,382	0	1,382	0	0
	INDUSTRY-CAPITAL	443	0	443	0	0
	INDUSTRY-RAW. MAT	320	0	3320	0	0
	INDUSTRY-PRODUCT	1,318	0	1,318	0	0
	TOTAL	3,693	0	3,692	0	1
DOMESTIC TOTAL	AGRICULTURE	641	242	399	0	0
	CONSUMER GOODS	1,686	63	1,622	0	0
	INDUSTRY-CAPITAL	531	11	520	0	0
	INDUSTRY-RAW. MAT	554	41	513	0	0
	INDUSTRY-PRODUCT	1,570	25	1,545	0	0
	TOTAL	4,982	381	4,600	0	1
FOREIGN BREAKBULK	AGRICULTURE	11	0	0	11	0
	CONSUMER GOODS	9	0	0	9	0
	INDUSTRY-CAPITAL	4	0	0	4	0
	INDUSTRY-RAW. MAT	40	0	0	40	0
	INDUSTRY-PRODUCT	18	5	0	13	0
	TOTAL	82	5	0	77	0
FOREIGN BULK	AGRICULTURE	4	0	0	4	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAPITAL	0	0	0	0	0
	INDUSTRY-RAW. MAT	1	0	0	1	0
	INDUSTRY-PRODUCT	0	0	0	0	0
	TOTAL	4	0	0	4	0
FOREIGN CONTAINER	AGRICULTURE	357	0	0	51	305
	CONSUMER GOODS	124	0	0	54	70
	INDUSTRY-CAPITAL	70	0	0	27	43
	INDUSTRY-RAW. MAT	134	0	0	46	88
	INDUSTRY-PRODUCT	1,113	0	0	95	1,018
	TOTAL	1,797	0	0	273	1,525
GRAND TOTAL	AGRICULTURE	371	0	0	66	305
	CONSUMER GOODS	133	0	0	64	70
	INDUSTRY-CAPITAL	74	0	0	31	43
	INDUSTRY-RAW. MAT	174	0	0	86	88
	INDUSTRY-PRODUCT	1,130	5	0	107	1,018
	TOTAL	1,883	5	0	354	1,525
GRAND TOTAL	AGRICULTURE	1,012	242	399	66	305
	CONSUMER GOODS	1,819	63	1,622	64	70
	INDUSTRY-CAPITAL	605	11	520	31	44
	INDUSTRY-RAW. MAT	728	41	513	86	88
	INDUSTRY-PRODUCT	2,701	30	1,545	107	1,018
	TOTAL	6,865	386	4,600	354	1,525

(2) Setting of Cargo Volume Growth Rate

1) Determining of the Base Economic Index

Table 2-7 presents the correlation between the cargo groups and the economic index which becomes the basis for the setting of the growth rate.

2) Setting of Medium Case Coefficient

Most of the economic index value for use in the computation of the growth rate is obtained from the National Medium-Term Philippine Development Plan 1993-1998 and the Medium-Term Southern Tagalog Region Development Plan 1993-1998. The values shown in Table 2-8 are values assumed to be high-case values of the forecast based on the aforementioned development plan values, and are the complementary values for the medium case.

3) The Influence of Economic Activities on Cargo Volume

The economic condition assumed in the medium case is the 7.5% growth presented in the Medium-Term Plan and the intermediate condition of 4% average growth rate of the past 5 years. Under this economic condition, importation restrictions resulting from the trade imbalance can be expected, and a declining forecast proportion for the period after year 2000 for each cargo group is set. These values are shown in Table 2-9. Twenty percent of the forecast cargo volume for year 2010 for the Agriculture Related products have been curtailed, likewise 20% from that of the Consumer Goods, 20% from the Industrial Capital Goods, and 10% from the Industrial Raw Materials.

If the manufacturing industry develops, and commodity prices increase as the years pass, the commodity price per weight will increase and the weight per price will decrease. At this point, the growth rate for the period between 1992 and 2000 is set at 2%, while that between 2000 and 2010 is set at 8%. These values are then adapted to foreign industrial cargo.

The present containerization rate of foreign cargo is 96% for export and 73% for import. It is though that there is no more increase to be expected from the containerization rate with regards to export, while there is still room for increase with

regards to import. Here, the containerization rate for the year 2010 is set to increase up to 90%, laying down the transition rate towards the containerization of general cargo. The values for each cargo group are shown in Table 2-9.

Table 2-10 presents the corrected 1991 values as the 2010 multiplying factors by products. The economic growth for 1992 is pegged at zero thus the forecast cargo volume growth is also set at zero.

4) Corrections According to the De-urbanization of Factories and the CALABARZON Development

The setting up of new factories in crowded Metro Manila by Metro Manila based companies which are expanding their business scale has become impossible. The trend is to build new factories along the stretch of the North-South Super Highways and their periphery. In case where the new factory requires massive transportation of goods, it is effective to plan a coastal factory in Batangas. Moreover, phenomenal industrial developments in this region are expected due to the Calabarzon development Plan.
Thus with this kind of development trends in Southern Tagalog, and the expected increase in volume to be transported to the Calabarzon via Port of Manila as recognized by OD Survey, the cargo volume of the Port of Manila will be diverted to the Port of Batangas. This volume is at 2% of the handling volume of the Port of Manila for year 2000 and 5% for 2010.
However, with regards to Agricultural Goods and Industrial Raw Materials whose ratios of transportation costs for these values are relatively high, 300 thousand tons of each category of the total importation to the Port of Manila will be unloaded in the Port of Batangas as a result of the demand for lower transportation costs.

5) Future Trend of Domestic Cargo

At the North Harbor, total handling volume has increased as a result of container cargo. The volume of break bulk cargo has remained constantly and it is estimated that the volume in the target year will be nearly the same as in 1991.

(3) Cargo Volume Calculation for 2010

The final results for each revision of the 2010 values are shown in Table 2-11. The total cargo volume reaches 56.4 million tons, an increase of 3.1 times of the 1991 cargo volume.

Table 2-7 SOCIOECONOMIC INDICATORS RELATED TO GROWTH RATE OF CARGO

HARBOR	COMMODITY-GROUP	ITEM	INWARD		OUTWARD	
			DOMESTIC	FOREIGN	DOMESTIC	FOREIGN
BATANGAS	AGRICULTURE	AREA INDICATOR	REGION IV GROWTH RATE / AGRO	REGION IV GRDP / CAPITA GROWTH RATE / POPULATION	REGION IV GROWTH RATE / AGRO	REGION IV GROWTH RATE / AGRO
	CONSUMER GOODS	AREA INDICATOR	REGION IV GRDP / CAPITA GROWTH RATE / POPULATION	REGION IV GRDP / CAPITA GROWTH RATE / POPULATION	REGION IV GRDP / CAPITA GROWTH RATE / POPULATION	REGION IV GROWTH RATE / INDUSTRY
	INDUSTRY (CAPITAL) (RAW MATERIAL) (PRODUCT)	AREA INDICATOR	REGION IV GROWTH RATE / INDUSTRY	REGION IV GROWTH RATE / INDUSTRY	REGION IV GROWTH RATE / INDUSTRY	REGION IV GROWTH RATE / INDUSTRY
MANILA NORTH	AGRICULTURE	AREA INDICATOR	PHILIPPINES GROWTH RATE / AGRO	NON	PHILIPPINES GROWTH RATE / AGRO	NON
	CONSUMER GOODS	AREA INDICATOR	PHILIPPINES GRDP / CAPITA GROWTH RATE / POPULATION	NON	PHILIPPINES GRDP / CAPITA GROWTH RATE / POPULATION	NON
	INDUSTRY (CAPITAL) (RAW MATERIAL) (PRODUCT)	AREA INDICATOR	PHILIPPINES GROWTH RATE / INDUSTRY	NON	PHILIPPINES GROWTH RATE / INDUSTRY	NON
MANILA SOUTH	AGRICULTURE	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT OF CONSUMER GOODS	NON	PHILIPPINES GROWTH RATE / EXPORT OF AGRO-PRODUCTS
	CONSUMER GOODS	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT	NON	PHILIPPINES GROWTH RATE / EXPORT
	INDUSTRY (CAPITAL) (RAW MATERIAL) (PRODUCT)	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT OF CONSUMER GOODS	NON	PHILIPPINES GROWTH RATE / EXPORT OF MANUFACTURED
MICT	AGRICULTURE	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT OF CONSUMER GOODS	NON	PHILIPPINES GROWTH RATE / EXPORT OF AGRO-PRODUCTS
	CONSUMER GOODS	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT OF CONSUMER GOODS	NON	PHILIPPINES GROWTH RATE / EXPORT
	INDUSTRY (CAPITAL) (RAW MATERIAL) (PRODUCT)	AREA INDICATOR	NON	PHILIPPINES GROWTH RATE / IMPORT	NON	PHILIPPINES GROWTH RATE / EXPORT OF MANUFACTURED

Table 2-8 LIST OF GROWTH RATE AS INDICATOR

(UNIT : PERCENT)

INDICATOR	PHILIPPINES		REGION IV	
	1992-2000	2000-2010	1992-2000	2000-2010
POPULATION	2.4	2.1	2.5	2.5
GRDP/CAPITA	3.74	3.96	4.03	4.03
AGRO	3	2.9	4.32	4.18
INDUSTRY	7	6.8	8.04	7.81
IMPORT	11.95	11.95	NON	NON
IMPORT/CONSUMER	12.47	12.47	NON	NON
EXPORT	13.79	13.79	NON	NON
EXPORT/AGRO	9.46	9.46	NON	NON
EXPORT/MANUFACTURED	15.47	15.47	NON	NON

Table 2-9 CHANGING OF CARGO VOLUME BY ANNUAL OR END OF TERM

(UNIT : PERCENTAGE)

HABOR	COMMODITY-GROUP	ITEM	INWARD				OUTWARD			
			DOMESTIC		FOREIGN		DOMESTIC		FORENGN	
			1992-2000	2000-2010	1992-2000	2000-2010	1992-2000	2000-2010	1992-2000	2000-2010
BATANGAS	AGRICULTURE	TRADE BALANCE FACT.	0	0	0	20	0	0	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	2	8	0	0	2	8
		@CONTAINERIZATION (BREAKBULK)	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
	CONSUMER GOODS	TRADE BALANCE FACT.	0	0	0	20	0	0	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	2	8	0	0	2	8
		@CONTAINERIZATION (BREAKBULK)	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
	INDUSTRY (CAPITAL)	TRADE BALANCE FACT.	0	0	0	20	0	0	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	2	8	0	0	2	8
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	1	0.5	0.5	0.5	1	1
	INDUSTRY (RAW MATERIAL)	TRADE BALANCE FACT.	0	0	0	0	0	0	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	2	8	0	0	2	8
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	1	1	0.5	0.5	1	1
	INDUSTRY (PRODUCT)	TRADE BALANCE FACT.	0	0	0	10	0	0	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	2	8	0	0	2	8
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	1	1	0.5	0.5	1	1
MANILA NORTH	AGRICULTURE	TRADE BALANCE FACT.	0	0	NON	NON	0	0	NON	NON
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	NON	NON	0	0	NON	NON
		@CONTAINERIZATION (BREAKBULK)	0.2	0.2	NON	NON	0.2	0.2	NON	NON
	CONSUMER GOODS	TRADE BALANCE FACT/	0	0	NON	NON	0	0	NON	NON
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	NON	NON	0	0	NON	NON
		@CONTAINERIZATION (BREAKBULK)	0.2	0.2	NON	NON	0.2	0.2	NON	NON
	INDUSTRY (CAPITAL)	TRADE BALANCE FACT/	0	0	NON	NON	0	0	NON	NON
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	NON	NON	0	0	NON	NON
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	NON	NON	0.5	0.5	NON	NON
	INDUSTRY (RAW MATERIAL)	TRADE BALANCE FACT/	0	0	NON	NON	0	0	NON	NON
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	NON	NON	0	0	NON	NON
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	NON	NON	0.5	0.5	NON	NON
	INDUSTRY (PRODUCT)	TRADE BALANCE FACT/	0	0	NON	NON	0	0	NON	NON
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	0	0	NON	NON	0	0	NON	NON
		@CONTAINERIZATION (BREAKBULK)	0.5	0.5	NON	NON	0.5	0.5	NON	NON
MANILA SOUTH	AGRICULTURE	TRADE BALANCE FACT/	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	0.5	0.5
	CONSUMER GOODS	TRADE BALANCE FACT/	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	0.5	0.5
	INDUSTRY (CAPITAL)	TRADE BALANCE FACT/	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1
	INDUSTRY (RAW MATERIAL)	TRADE BALANCE FACT/	NON	NON	0	0	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1
	INDUSTRY (PRODUCT)	TRADE BALANCE FACT/	NON	NON	0	10	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1
MICT	AGRICULTURE	TRADE BALANCE FACT/	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERIZATION (BREAKBULK)	NON	NON	6	6	NON	NON	0.5	0.5
	CONSUMER GOOS	TRADE BALANCE FACT.	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERZATION (BREAKBULK)	NON	NON	6	6	NON	NON	0.5	0.5
	INDUSTRY (CAPITAL)	TRADE BALANCE FACT.	NON	NON	0	20	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1
	INDUSTRY (RAW MATERIAL)	TRADE BALANCE FACT.	NON	NON	0	0	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1
	INDUSTRY (PRODUCT)	TRADE BALANCE FACT.	NON	NON	0	10	NON	NON	0	0
		@VOL/VAL CHANG (FOREIGN/INDUSTRY)	NON	NON	2	8	NON	NON	2	8
		@CONTAINERZATION (BREAKBULK)	NON	NON	6	6	NON	NON	1	1

NOTE: @ MEANS ANNUAL CHANGING RATE

Table 2-10 MULTPLYING FACTOR OF FUTURE CARGO IN 2010

TYPE	COMMODITY	INWARD				OUTWARD			
		BATANGAS	MANILA NORTH	MANILA SOUTH	MICT	BATANGAS	MANILA NORTH	MANILA SOUTH	MICT
DOMESTIC BREAKBULK	AGRICULTURE	2.11	1.69	1.00	1.00	2.11	1.69	1.00	1.00
	CONSUMER GOODS	3.18	2.94	1.00	1.00	3.18	2.94	1.00	1.00
	INDUSTRY-CAPITAL	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-RAW.MAT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-PRODUCT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
DOMESTIC BULK	AGRICULTURE	2.11	1.69	1.00	1.00	2.11	1.69	1.00	1.00
	CONSUMER GOODS	3.18	2.94	1.00	1.00	3.18	2.94	1.00	1.00
	INDUSTRY-CAPITAL	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-RAW.MAT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-PRODUCT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
DOMESTIC CONTAINER	AGRICULTURE	2.11	1.69	1.00	1.00	2.11	1.69	1.00	1.00
	CONSUMER GOODS	3.18	2.94	1.00	1.00	3.18	2.94	1.00	1.00
	INDUSTRY-CAPITAL	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-RAW.MAT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
	INDUSTRY-PRODUCT	3.94	3.32	1.00	1.00	3.94	3.32	1.00	1.00
FOREIGN BREAKBULK	AGRICULTURE	2.94	1.00	6.62	6.62	2.11	1.00	2.09	5.09
	CONSUMER GOODS	2.94	1.00	6.62	6.62	3.94	1.00	10.22	10.22
	INDUSTRY-CAPITAL	1.26	1.00	2.27	2.27	1.46	1.00	4.92	4.92
	INDUSTRY-RAW.MAT	1.46	1.00	2.82	2.82	1.46	1.00	4.92	4.92
	INDUSTRY-PRODUCT	1.35	1.00	2.53	2.53	1.46	1.00	4.92	4.92
FOREIGN BULK	AGRICULTURE	2.94	1.00	6.62	6.62	2.11	1.00	5.09	5.09
	CONSUMER GOODS	2.94	1.00	6.62	6.62	3.94	1.00	10.22	10.22
	INDUSTRY-CAPITAL	1.26	1.00	2.27	2.27	1.46	1.00	4.92	4.92
	INDUSTRY-RAW.MAT	1.46	1.00	2.82	2.82	1.46	1.00	4.92	4.92
	INDUSTRY-PRODUCT	1.35	1.00	2.53	2.53	1.46	1.00	4.92	4.92
FOREIGN CONTAINER	AGRICULTURE	2.94	1.00	6.62	6.62	2.11	1.00	5.09	5.09
	CONSUMER GOODS	2.94	1.00	6.62	6.62	3.94	1.00	10.22	10.22
	INDUSTRY-CAPITAL	1.26	1.00	2.27	2.27	1.46	1.00	4.92	4.92
	INDUSTRY-RAW.MAT	1.46	1.00	2.82	2.82	1.46	1.00	4.92	4.92
	INDUSTRY-PRODUCT	1.35	1.00	2.53	2.53	1.46	1.00	4.92	4.92

Table 2-11-A ESTIMATED TOTAL CARGO VOLUME IN 2010

(UNIT : THOUSAND TON)

TYPE	COMMODITY	TOTAL				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SUUTH	MICT
DOMESTIC BREAKBULD	AGRICULTURE	3,084	1,281	1,803	0	0
	CONSUMER GOODS	461	79	382	0	0
	INDUSTRY-CAP	315	53	263	0	0
	INDUSTRY-RAW.M	938	59	879	0	0
	INDUSTRY-PRDCT	612	42	570	0	0
	TOTAL	5,410	1,514	3,896	0	0
DOMESTIC BULK	AGRICULTURE	20	0	20	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	144	7	137	0	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	164	7	157	0	0
DOMESTIC CONTAINER	AGRICULTURE	4,139	592	3,534	1	11
	CONSUMER GOODS	6,678	172	6,497	1	8
	INDUSTRY-CAP	2,458	155	2,299	0	4
	INDUSTRY-RAW.M	3,960	708	3,248	1	2
	INDUSTRY-PRDCT	7,898	540	7,329	2	27
	TOTAL	25,133	2,167	22,907	6	53
DOMESTIC TOTAL	AGRICULTURE	7,242	1,873	5,356	1	11
	CONSUMER GOODS	7,139	251	6,879	1	8
	INDUSTRY-CAP	2,774	208	2,562	0	4
	INDUSTRY-RAW.M	5,041	775	4,264	1	2
	INDUSTRY-PRDCT	8,511	582	7,899	2	27
	TOTAL	30,707	3,688	26,960	6	53
FOREIGN BREAKBULK	AGRICULTURE	870	137	0	733	0
	CONSUMER GOODS	101	0	0	99	1
	INDUSTRY-CAP	46	2	0	43	1
	INDUSTRY-RAW.M	667	33	0	633	0
	INDUSTRY-PRDCT	179	15	0	161	3
	TOTAL	1,863	187	0	1,670	5
FOREIGN BULK	AGRICULTURE	88	0	0	88	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	1,112	56	0	1,056	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	1,200	56	0	1,144	0
FOREIGN CONTAINER	AGRICULTURE	4,644	13	0	1,942	2,688
	CONSUMER GOODS	3,212	0	0	1,395	1,818
	INDUSTRY-CAP	1,307	65	0	361	881
	INDUSTRY-RAW.M	4,605	230	0	1,887	2,487
	INDUSTRY-PRDCT	9,178	460	0	1,703	7,015
	TOTAL	22,945	769	0	7,288	14,889
FOREIGN TOTAL	AGRICULTURE	5,602	150	0	2,763	2,688
	CONSUMER GOODS	3,313	0	0	1,494	1,819
	INDUSTRY-CAP	1,353	68	0	404	882
	INDUSTRY-RAW.M	6,384	319	0	3,577	2,487
	INDUSTRY-PRDCT	9,356	475	0	1,864	7,018
	TOTAL	26,008	1,012	0	10,102	14,894
GRAND TOTAL	AGRICULTURE	12,844	2,023	5,356	2,765	2,700
	CONSUMER GOODS	10,451	251	6,879	1,495	1,827
	INDUSTRY-CAP	4,127	276	2,562	404	886
	INDUSTRY-RAW.M	11,425	1,094	4,264	3,578	2,490
	INDUSTRY-PRDCT	17,867	1,057	7,899	1,866	7,045
	TOTAL	56,715	4,700	26,960	10,108	14,947

CONTAINERIZED RATIO OF FOREIGN CARGO

(IN) 12,898 / 14,321 * 100 = 90 (%)

(OUT) 9,279 / 9,531 * 100 = 97 (%)

Table 2-11-B ESTIMATED INWARD CARGO VOLUME IN 2010

(UNIT : THOUSAND TON)

TYPE	COMMODITY	INWARD				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SUUTH	MICT
DOMESTIC BREAKBULD	AGRICULTURE	2,493	913	1,580	0	0
	CONSUMER GOODS	158	16	142	0	0
	INDUSTRY-CAP	136	23	113	0	0
	INDUSTRY-RAW.M	705	19	686	0	0
	INDUSTRY-PRDCT	360	17	343	0	0
	TOTAL	3,851	988	2,863	0	0
DOMESTIC BULK	AGRICULTURE	20	0	20	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	144	7	137	0	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	164	7	156	0	0
DOMESTIC CONTAINER	AGRICULTURE	3,545	448	3,084	1	11
	CONSUMER GOODS	2,004	34	1,962	1	8
	INDUSTRY-CAP	871	57	810	0	4
	INDUSTRY-RAW.M	2,331	503	1,825	1	2
	INDUSTRY-PRDCT	2,927	211	2,687	2	27
	TOTAL	11,679	1,254	10,367	6	52
DOMESTIC TOTAL	AGRICULTURE	6,058	1,362	4,683	1	11
	CONSUMER GOODS	2,162	49	2,104	1	8
	INDUSTRY-CAP	1,007	80	923	0	4
	INDUSTRY-RAW.M	3,180	529	2,647	1	2
	INDUSTRY-PRDCT	3,287	229	3,029	2	27
	TOTAL	15,694	2,249	13,387	6	52
FOREIGN BREAKBULK	AGRICULTURE	820	137	0	683	0
	CONSUMER GOODS	15	0	0	14	1
	INDUSTRY-CAP	29	1	0	26	1
	INDUSTRY-RAW.M	614	31	0	583	0
	INDUSTRY-PRDCT	120	6	0	111	3
	TOTAL	1,599	175	0	1,418	5
FOREIGN BULK	AGRICULTURE	69	0	0	69	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	1,108	55	0	1,053	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	1,177	55	0	1,122	0
FOREIGN CONTAINER	AGRICULTURE	2,823	13	0	1,676	1,135
	CONSUMER GOODS	1,936	0	0	831	1,105
	INDUSTRY-CAP	958	48	0	233	677
	INDUSTRY-RAW.M	3,935	197	0	1,664	2,075
	INDUSTRY-PRDCT	3,687	184	0	1,250	2,252
	TOTAL	13,340	442	0	5,654	7,244
FOREIGN TOTAL	AGRICULTURE	3,713	150	0	2,428	1,135
	CONSUMER GOODS	1,951	0	0	845	1,106
	INDUSTRY-CAP	987	49	0	259	678
	INDUSTRY-RAW.M	5,658	283	0	3,300	2,075
	INDUSTRY-PRDCT	3,807	190	0	1,361	2,255
	TOTAL	16,116	673	0	8,193	7,250
GRAND TOTAL	AGRICULTURE	9,771	1,512	4,683	2,430	1,146
	CONSUMER GOODS	4,113	49	2,104	845	1,114
	INDUSTRY-CAP	1,994	129	923	260	682
	INDUSTRY-RAW.M	8,837	812	2,647	3,301	2,077
	INDUSTRY-PRDCT	7,094	419	3,029	1,363	2,282
	TOTAL	31,809	2,921	13,387	8,199	7,302

Table 2-11-C ESTIMATED OUTWARD CARGO VOLUME IN 2010

(UNIT : THOUSAND TON)

TYPE	COMMODITY	OUTWARD				
		TOTAL 4 HARBORS	BATANGAS	MANILA NORTH	MANILA SUUTH	MICT
DOMESTIC BREAKBULD	AGRICULTURE	590	368	223	0	0
	CONSUMER GOODS	303	63	240	0	0
	INDUSTRY-CAP	180	30	149	0	0
	INDUSTRY-RAW.M	234	41	193	0	0
	INDUSTRY-PRDCT	252	25	228	0	0
	TOTAL	1,559	527	1,033	0	0
DOMESTIC BULK	AGRICULTURE	0	0	0	0	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	0	0	0	0	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	1	0	1	0	0
DOMESTIC CONTAINER	AGRICULTURE	594	144	450	0	0
	CONSUMER GOODS	4,674	138	4,536	0	0
	INDUSTRY-CAP	1,587	98	1,489	0	0
	INDUSTRY-RAW.M	1,628	205	1,616	0	0
	INDUSTRY-PRDCT	4,971	329	4,870	0	0
	TOTAL	13,453	913	12,540	0	1
DOMESTIC TOTAL	AGRICULTURE	1,184	511	673	0	0
	CONSUMER GOODS	4,977	201	4,776	0	0
	INDUSTRY-CAP	1,767	128	1,638	0	0
	INDUSTRY-RAW.M	1,862	245	1,616	0	0
	INDUSTRY-PRDCT	5,224	354	4,870	0	0
	TOTAL	15,013	1,440	13,573	0	1
FOREIGN BREAKBULK	AGRICULTURE	50	0	0	50	0
	CONSUMER GOODS	86	0	0	86	0
	INDUSTRY-CAP	18	1	0	17	0
	INDUSTRY-RAW.M	53	3	0	50	0
	INDUSTRY-PRDCT	59	9	0	50	0
	TOTAL	265	12	0	252	0
FOREIGN BULK	AGRICULTURE	19	0	0	19	0
	CONSUMER GOODS	0	0	0	0	0
	INDUSTRY-CAP	0	0	0	0	0
	INDUSTRY-RAW.M	4	0	0	4	0
	INDUSTRY-PRDCT	0	0	0	0	0
	TOTAL	22	0	0	22	0
FOREIGN CONTAINER	AGRICULTURE	1,820	0	0	266	1,554
	CONSUMER GOODS	1,276	0	0	564	712
	INDUSTRY-CAP	348	17	0	128	203
	INDUSTRY-RAW.M	670	33	0	224	412
	INDUSTRY-PRDCT	5,491	276	0	453	4,763
	TOTAL	9,605	327	0	1,634	7,645
FOREIGN TOTAL	AGRICULTURE	1,889	0	0	335	1,554
	CONSUMER GOODS	1,362	0	0	649	712
	INDUSTRY-CAP	366	18	0	144	203
	INDUSTRY-RAW.M	726	36	0	277	412
	INDUSTRY-PRDCT	5,550	284	0	503	4,763
	TOTAL	9,892	339	0	1,908	7,645
GRAND TOTAL	AGRICULTURE	3,073	511	673	335	1,554
	CONSUMER GOODS	6,339	201	4,776	649	712
	INDUSTRY-CAP	2,133	146	1,638	144	204
	INDUSTRY-RAW.M	2,588	282	1,161	277	412
	INDUSTRY-PRDCT	10,773	638	4,870	503	4,763
	TOTAL	24,905	1,779	13,573	1,908	7,645

2.3 Container Cargo Volumes by Region

Container cargo volumes of the port of Manila generated in NCR, Region III and Regions IV respectively are estimated based on the O/D survey. Computed cargo volumes in 1991 and 2010 are 8.8 and 31.7 million tons respectively in NCR, 1.3 and 6.4 million tons in Region III and 2.0 and 7.1 million tons in Region IV. Of the total container volume in 2010, domestic cargoes account for 3.1 million tons while foreign cargoes account for 4.0 million tons.

Table 2-12 Container Cargo in GCR (Unit: Thousand Tons)

PORT AND GENERATED AREA	YEAR 1991 TOTAL	YEAR 2010 TOTAL	DOMESTIC	FOREIGN
PORT OF MANILA	12,100	45,200	23,000	22,200
REGION III	1,300	6,400	3,400	3,000
NCR	8,800	31,700	16,500	15,200
REGION IV	2,000	7,100	3,100	4,000
PORT OF BATANGAS	0	2,900	2,100	800

Chapter 3 FUNCTIONAL ALLOTMENT OF PORT ACTIVITIES

3.1 Functional Allotment of Port Activities at Port of Manila

The latest port master plan at the Port of Manila was formulated in 1978 by the Philippine Ports Authority (PPA) under the Department of Public Works, Transportation and Communications (DPWTC). The objectives of that master plan are the same as those of today, namely, urgent port extension for coping with growing container cargo. Fig. 3-1 shows the port master plan at the Port of Manila for the target year 1991. As shown in Fig. 3-1, port extension need is stressed especially at MICT and the North Harbor.

Large water space within MICT's port area along the north breakwater, was planned to be reclaimed for an international container terminal. A domestic container terminal was also planned, facing back to back with a new MICT's international container terminal along the north breakwater. In addition, there is a large general cargo terminal to be reclaimed in the offshore of the North Harbor. Above all, port extension at the North Harbor has been very urgent since 1978.

On the other hand, there is no international container terminal planned at the South Harbor. An international general cargo terminal was planned at the root of the south breakwater, but the scale of the plan was small. The concept for increasing port capacity at the South Harbor was to rehabilitate the existing port facilities, not to expand the port on a large scale. However, on the basis of both the newly predicted cargo demand forecast (High case scenario) and the natural conditions survey conducted by the Study Team this time, port extension at the South Harbor will be given the priority as described below from the economic point of view.

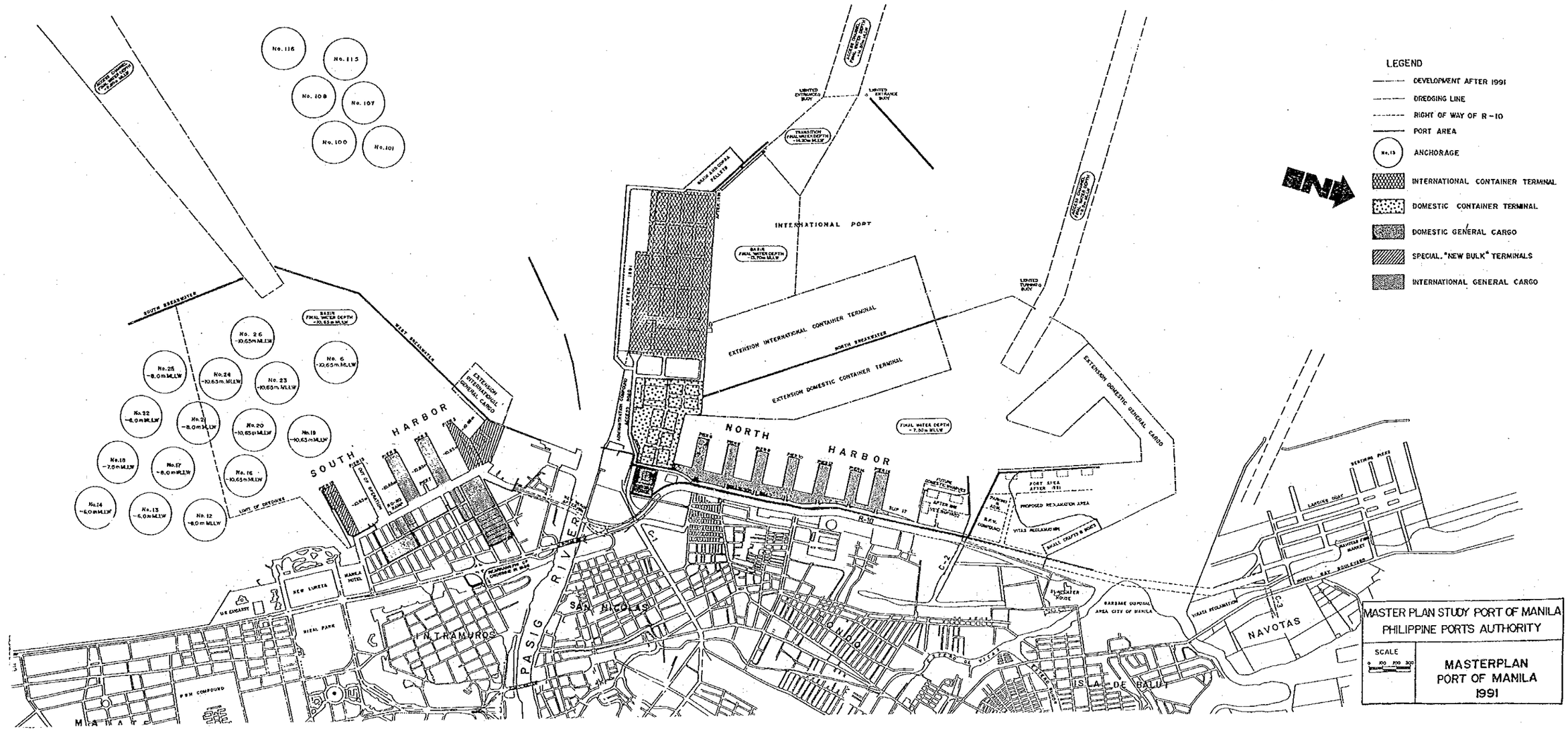


Figure 3-1 Conclusion of Master Plan Study by DPWTC in 1978

3.2 Selection and Determination of Development Site at Port of Manila

3.2.1 Alternatives for International Container Terminal at Port of Manila

There are five construction site alternatives for an international container terminal at the Port of Manila. Obviously, the existing port areas are close to the central business district, accordingly there will be no more enough space near the port. Five alternatives are as follows.

1. Site A : Reclamation at existing finger piers at the South Harbor
2. Site B : Reclamation along the existing south breakwater of the South Harbor
3. Site C : Extension of the existing MICT's terminal straightforward to offshore from the farthest terminal of MICT.
4. Site D : Extension of the existing MICT's terminal along the existing breakwater extended from the MICT's terminal
5. Site E : Reclamation along the north breakwater of the North Harbor Location map of alternatives is shown in Fig.3-2.

3.2.2 Evaluation and selection of alternatives for the Siting of International Container Terminal

(1) Site A

This alternative is realized by demolishing the existing finger piers at the South Harbor. Accordingly, the present international conventional berths must be rebuilt in another place. The idea of this alternative comes from a recognition that there will be no other place to construct an international container terminal within the South Harbor except for demolishing the existing port function.

Soil condition is relatively good, thus this results in redu or four the cost of wharf construction. But, due to strict space limitation, only three or four international container terminals can be constructed. Accessibility to the port hinterland is fairly good because of its own location.

The water depth in front of present berths is -10 m, thus in order to provide sufficient water depth for the new international container terminal, a considerable amount of dredging volume is required, but construction cost can be largely reduced by keeping good balance between excavation and reclamation.

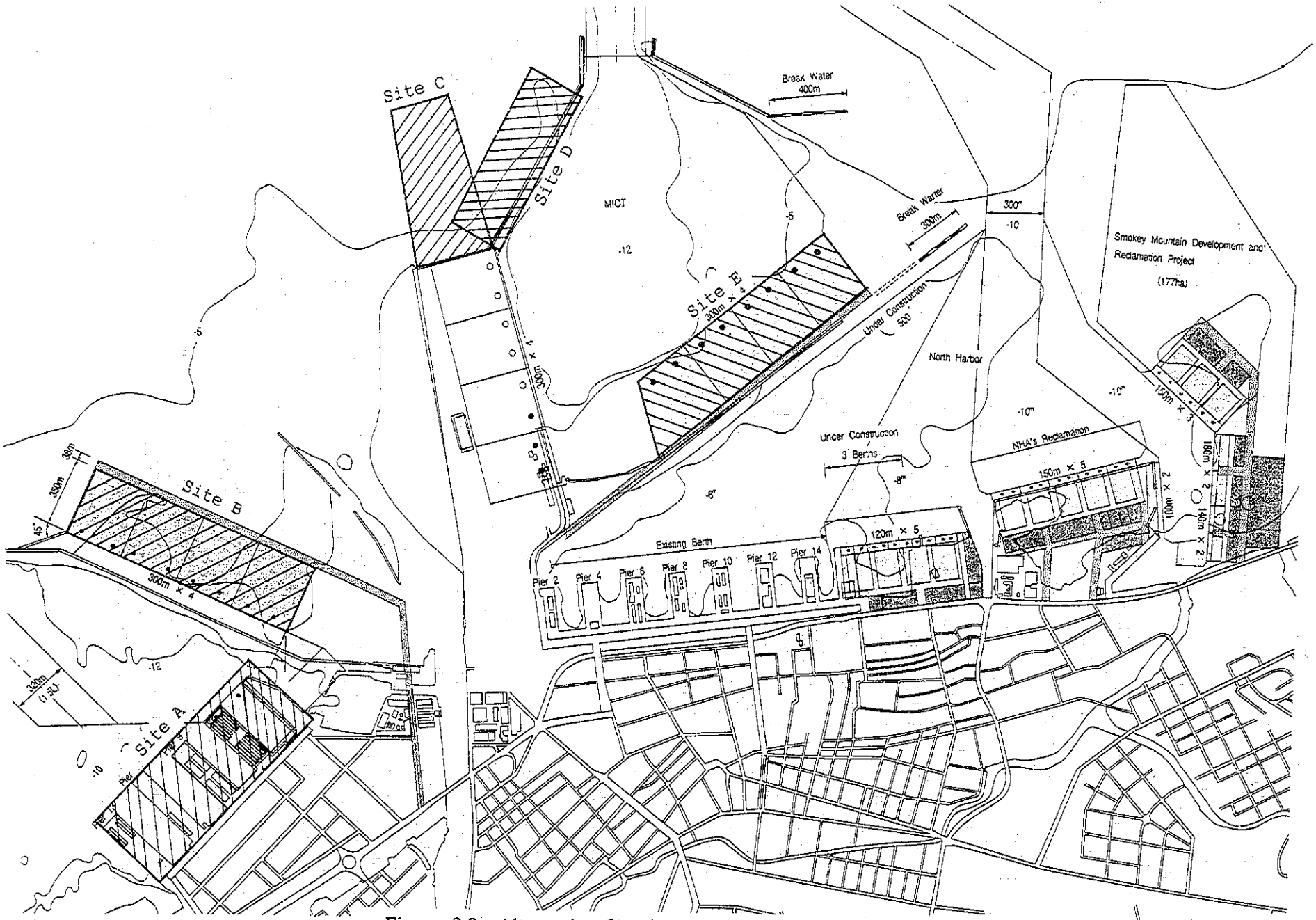


Figure 3-2 Alternative Site for International Container Terminal

(2) Site B

This alternative was originally proposed by the Master Plan Study of the Port of Manila prepared by the Philippine Ports Authority (PPA) and the Department of Public Works, Transportation and Communications (DPWTC) in 1978. Actually, reclamation of these areas have been carried out for a long time by using a considerable amount of sea sand provided by maintenance dredging of main channels, and are still being reclaimed, aiming at creation of future international container terminals.
The existing long breakwater will be also transformed into a new container berth and there still exists vast and deep water area which is suitable for waterways and turning basins for panamax type container vessels.

But, according to the latest result of natural conditions survey, it has been found out that soil condition of seabed around this area is very soft. Design study on wharf for -13 m container berth recommends that the improvement of soil foundation and removal of the existing long breakwater are strictly necessary, due to the high possibility of slip circle failure. These two factors result in pushing up the construction cost of this alternative.

The location of the Site B is relatively far from the port hinterland, thus high-grade port highways must be constructed.

(3) Site C

This alternative makes it possible to construct a long, straight and deep-sea container terminal by being connected with the existing MICT's international container terminal. Further extension of this terminal is also feasible toward offshore direction. But, this alternative requires removal of the existing offshore breakwater and construction of a new substitutive breakwater beyond the present one. Due to being located at the port of the Pasig River's shallow mouth, the cost of reclamation and construction of substitutive breakwater will not be costly. In addition, soil condition is estimated rather good, this results in reducing wharf construction cost. Access road to the port hinterland is needless, because the terminal is just next to the existing MICT's terminal.

(4) Site D

This alternative is similar to Site C alternative. One of the advantages of this alternative is that construction of a new container terminal does not need removing the

existing breakwater, because that breakwater will be able to be transformed into new container berths in the course of reclamation. There also exists vast and deep water area which is suitable for waterways and turning basins for panamax type container vessels. Accordingly, dredging cost is expected to be negligible, and reclamation cost will not amount to much, due to being located at part of Pasig River's shallow mouth. In addition, access road to the port hinterland is needless, because the terminal is next to the present MICT's terminal. However, the most significant disadvantage is that at most three container terminals can be planned at this place, and no further extension is expected without change of alignment of the existing breakwaters on a large scale.

(5) Site E

This alternative was also proposed by the Master Plan Study of the Port of Manila prepared by PPA/DPWTC in 1978. According to the natural conditions survey conducted by the Study Team, soil condition at this site is relatively good, comparing with that of the South Harbor. As a result, technical design of new wharves will be able to economize construction cost, but soil condition becomes worse as a new container berth goes toward offshore direction. This point must be carefully taken into account when estimating the construction cost.

Space limitation is not so strict for future extension of container terminals in this alternative, but the simulation analysis of calmness shows that the farthest terminal from the present MICT's terminal requires the further extension of the existing offshore breakwater in order to keep the occurrence frequency above wave height 0.5 m within range of less than 5 %. This factor will also push up the construction cost of this alternative.

With respect to access road to the port hinterland, a causeway must be planned between the MICT's terminal and a new container terminal, because those areas around this planned bridge should be strictly forbidden of reclamation work in order to preserve a turning basin for MICT as well as the North Harbor.

(6) Comparison and Evaluation of Alternatives

(1) Reliability

Container cargo handling is said to be sensitive to the movement of container vessels. Berth utility largely depends on the wind and waves. It is necessary to keep

the wave height in front of quay wall less than 0.5 m.

Generally speaking, the Manila port's area is well protected from the wind and waves of the Luzon Sea by long breakwaters as well as the Sangley Point Peninsular. The waves which invade through the entrance of the breakwaters, will easily dissipate into minor one by deflection at the waterfront. What should be taken into account is the wind wave which will be induced by the west wind from the Bataan Peninsular. According to the Study's simulation analysis of the calmness described in Chapter 2 of Part I, the occurrence frequency above wave height 0.5 m in front of Site A, B and D is well kept within range of less than 5 %, but the calmness of water areas in front of Site C and E will not be sufficiently preserved without extension of the existing breakwaters.

(2) Rough Estimation of Construction Cost

The construction cost of each alternative is roughly estimated in Chapter 9. The result of rough estimation of construction cost is as follows :

1) Site A is most inexpensive (Not including construction cost of substitutive general cargo berths)
2) Site B is very expensive.
3) Site C is most expensive.
4) Site D is most expensive than Site A, but less expensive than Site B.
5) Site E is almost the same as Site D.

(3) Space Utilization and Future Expansion

1) Site A : Many buildings and city facilities remain behind the terminal. Conventional cargo berths will be demolished and a wide range of water area will be also extinguished.
2) Site B : Abundant with undeveloped wide area on the back side as well as towards offshore direction, but at most four container terminals can be constructed without extension of the existing breakwater.
3) Site C : Abundant with undeveloped wide area towards offshore direction. Development can be also well organized with the existing MICT's terminal.
4) Site D : Abundant with undeveloped wide area towards off shore direction, but at most three container berths can be constructed without

extension of the existing breakwater. Development can be well organized with the existing MICT's terminal.

5) Site E : Abundant with undeveloped wide area towards the north direction, but at most three container terminals can be constructed without extension of the existing offshore breakwater.

(4) Water Area Utilization

1) Site A : The depth of water area in front of the proposed container terminal is not enough for panamax type vessels. Dredging work from -10 m up to -13 is necessary. This alternative will also extinguish a wide range of water area within the port.

2) Site B : The depth of water area near the existing finger piers is not enough for panamax type vessels. Dredging work from -10 m up to -13 m is necessary.

3) Site C : The depth of water area in front of the proposed container terminal is not enough for panamax type vessels. Dredging work from -10 m up to -13 m is necessary.

4) Site D : The depth of water area in front of the proposed container terminal is enough for panamax type vessels, but the turning basin is close to the main entrance channel.

5) Site E : The depth of water area in front of the proposed container terminal is not enough for panamax type vessels, but dredging volume is not too much. This alternative will extinguish a wide range of calm water area within the port, but there still exists enough space for turning basins.

(5) Accessibility to Land side Area

1) Site A : The proposed terminal is easy to access the main roads, at the same time needless to construct a new access road.

2) Site B : An access road must be constructed on reclamation area. The existing road must be also widened to access the terminal. A port bridge crossing over the Pasig River is recommended to be constructed to increase the easy access to the main highway.

3) Site C : The existing port road can be used, but countermeasure to

alleviate congestion around the root of MICT will be necessary.

4) Site D : The same as Site C.

5) Site E : The proposed terminal is easy to access the main road, but a port bridge must be constructed between the existing MICT and the new terminal.

(6) Effect on Existing port Facilities

1) Site A : All existing port berthing facilities must be relocated and reconstructed in another place, due to reclamation for creating a new international container terminal.

2) Site B : This alternative is independent of all existing port facilities.

3) Site C : The same as above.

4) Site D : The same as above.

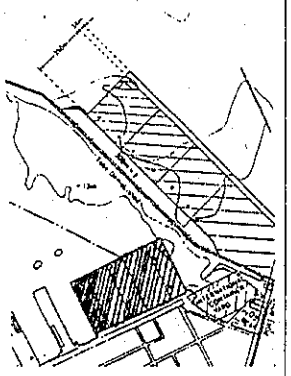
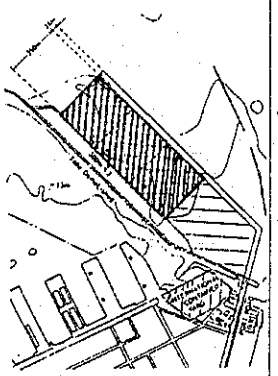
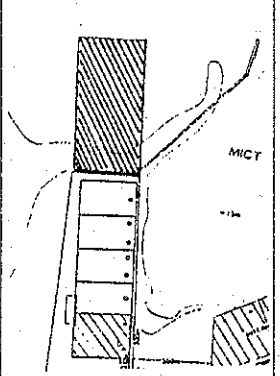
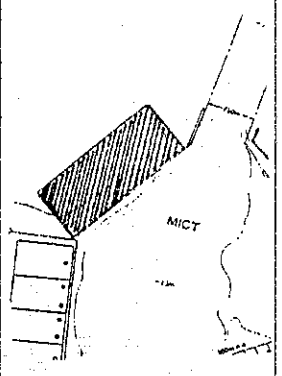
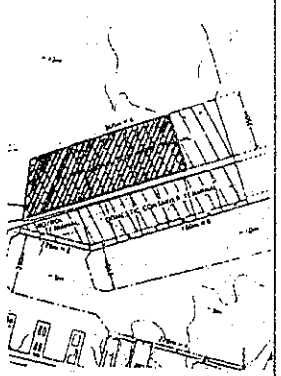
5) Site E : The same as above.

(7) Overall Evaluation

Overall evaluation of five alternatives is summarized in Table 3-1.

As shown in Table 3-1, Site E has been selected as the best alternative for an international container terminal in case of the medium case scenario, and Site B and Site E as the best in case of the high case (I) scenario for the target year 2010.

Table 3-1 Evaluation of Alternative Sites for International Container Terminal at the Port of Manila

		ALTERNATIVES				
		Site A	Site B	Site C	Site D	Site E
Locataion						
EVALUATION	Reliability	5	5	3	4	5
	Construction Cost	5 (2)	3	2	4	4
	Space Utilization	3	5	5	3	5
	Water Area Utilization	3	4	5	4	4
	Accessibility	5	4	5	5	4
	Effect on Existing Function	3	5	5	5	5
Overall		24 (21)	26	25	25	27
Priority		5	2	3	3	1

Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)
2) Construction cost of Site A goes up further, if relocation cost of general cargo berths is taken into account. In case of that, lower evaluation is realized, namely, only 2 point.
3) The above evaluation is valid only in case of construction of at most four (4) international container terminals. Overall evaluation always depends on how large a project is.

3.3 Selection and Determination of Development Site at North Harbor

3.3.1 Alternatives for Domestic Container Terminal at North Harbor

There are four construction site alternatives for a domestic container terminal at the North Harbor. Alternative construction site will be created by reclamation or land acquisition. Four alternatives are as follows. (from Pier NO.2 to NO.6)

(1) Site A : Reclamation at the existing finger piers (from Pier NO.2. to NO.6) at the bottom of the North Harbor.
(2) Site B : Reclamation along the north breakwater, facing back to back with an international container terminal, projected at MICT.
(3) Site C : Land acquisition at the National Housing Authority's Reclamation Area.
(4) Site D : Land acquisition at the Smokey Mountain Development and Reclamation Project area.

Location map of each alternative is shown in Fig. 3-3.

3.3.2 Evaluation and Selection of Alternatives for the Siting of Domestic Container Terminal

(1) Site A

This alternative is realized by reclamation of water-front from Pier NO.2 to NO.6 of the North Harbor. Accordingly, those de-commissioned berths must be reconstructed in another place. The water depth in front of the present finger piers is -6 m to -7 m, thus dredging work from -6 m up to -10 m is necessary in order to construct a turning basin with sufficient depth for domestic container vessels. Port access road is shortest among four alternatives. And the calmness of water area in front of berths will be kept in good condition, due to the existing long breakwater. This means that total construction cost is expected to be most inexpensive. On the other hand, broad and calm water area at the bottom of the port must disappear, because of being replaced by reclaimed land. It is predicted that the size of domestic container vessels will scale up in future. Larger container vessels will need more calm water area, therefore, reducing the calm water area, especially at the bottom of the port, will cut down the efficiency of port activities in future.

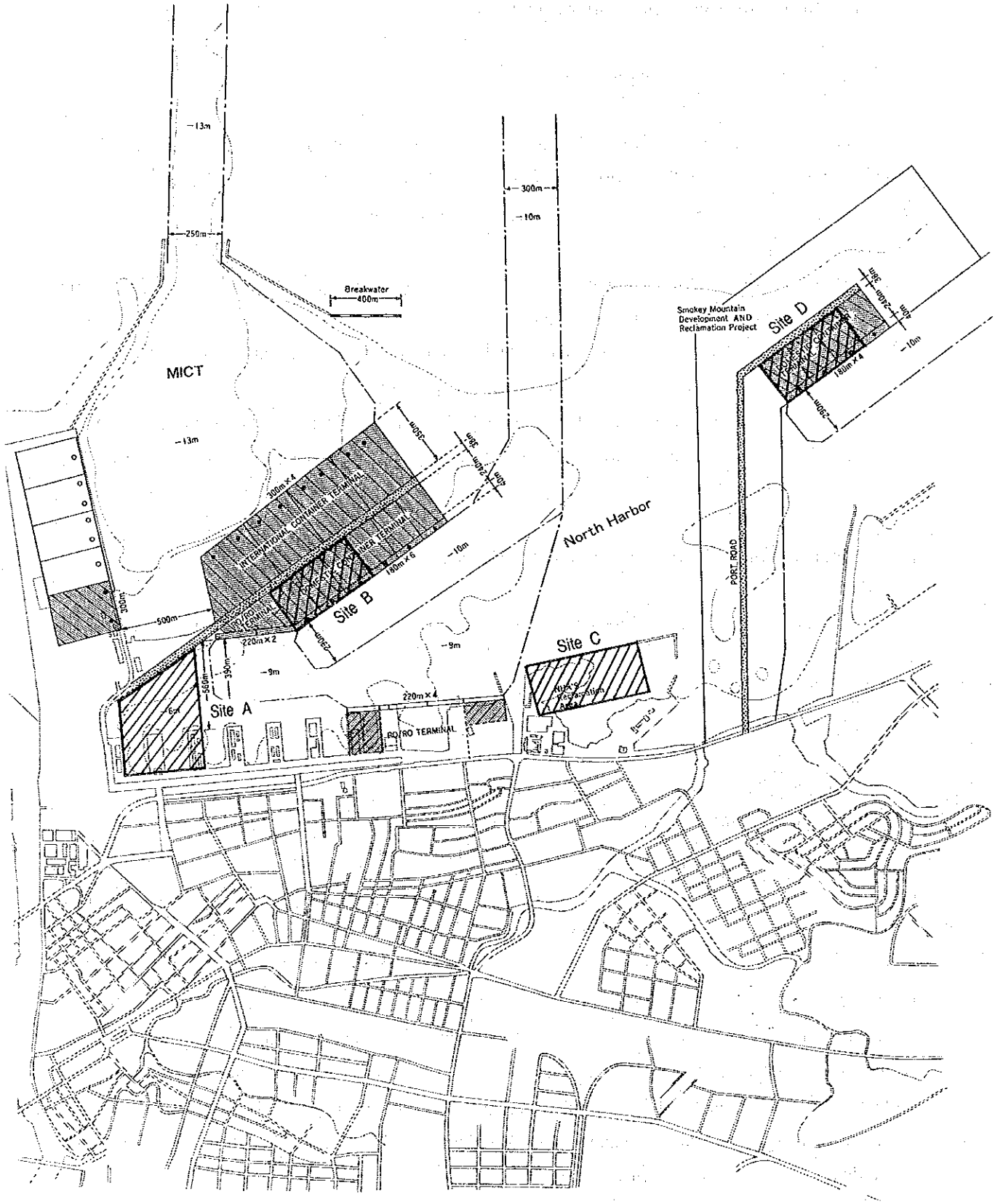


Figure 3-3 Alternative Site for Domestic Container Terminal

(2) Site B

This alternative was proposed by the Master Plan Study for Port of Manila conducted by PPA/DPWTC in 1978. The reclamation area of this alternative is comparatively far from the existing finger piers, however such a new domestic container terminal will be able to reserve a broad, calm water area for a turning basin. According to natural conditions survey by the Study Team, soil condition of the seabed at the root of the north breakwater is relatively good, but soil becomes softer at the tip of the same breakwater. This results in pushing up construction cost of wharves. In short, construction cost of berthing facilities depends on the exact location of a new domestic container terminal, that is, the farther from the bottom of the breakwater a new terminal is planned, the more expensive the construction cost will be.

However, space limitation is not so strict for future extension of container terminals, and the calmness of water area in front of berths can be kept in good condition, as far as a new terminal is planned in the inner side of the north breakwater. With respect to port access road, a causeway must be built in order to connect a new domestic container terminal with the existing MICT's terminal. The port bridge must be also designed to reserve a broad and calm water area for a turning basin at the bottom of the port.

(3) Site C

This alternative was also proposed by PPA/DPWTC in 1978, as a long-term future plan for domestic general cargo berths. The land at this site has been almost reclaimed by the National Housing Authority, thus land acquisition is necessary, instead of creation of a new land. There is no definitive land use plan at this moment, but the basic policy for future land use here is mixed use, not for port activity only. This means that land acquisition may not be possible, no matter how useful the proposed site is for port.

Another disadvantage of this alternative is that the existing north breakwater, including its 500 m extension project, will not secure the complete calmness of water area in front of berths. According to the Study Team's simulation analysis, 300 m extension of the north breakwater is required in order to keep the occurrence frequency above wave height 0.5 m within range of less than 5 %. This will push up the construction cost. As for port access road, it can be easily connected with main urban highways behind the new terminal.

(4) Site D

This alternative is grounded on the Smokey Mountain Development and Reclamation Project (SMDR Project), which has been recently publicized by the government concerned. That project has not been finalized, being still under technical examination. Accordingly, the final configuration of planned reclamation area might be changed more or less. Due to the same reason as the case of Site C, land acquisition procedure should be initiated by PPA as early as possible.

There is no space limitation for future port extension on condition that land acquisition is possible and feasible. The calmness of the water area in front of berths will be also fairly secured, because the water front line is facing to the Navotas Fish Port Complex, not to offshore. However, major disadvantage of this alternative is that the entrance of the harbor must be separated from the existing North Harbor. Accordingly, a considerable length of a new water channel must be constructed. This results in pushing up construction cost of Site C project.

(5) Comparison and Evaluation of the Alternatives

1) Reliability

Generally speaking, berthing facilities at the Port of Manila is effectively protected from the wind and waves of the Luzon Sea by long breakwaters as well as the Sangley Point Peninsular. The waves which invade through the entrance of breakwaters will drastically dissipate into minor one by deflection at the waterfront. What is most important with respect to sheltering the port is the impact of the wind wave which is induced by the west wind from the Bataan Peninsular. According to the Study Team's simulation analysis, the occurrence frequency above wave height 0.5 m in front of Site A and Site B, is well kept within range of less than 5 %, but the calmness of water area in front of site C is not preserved without extension of the existing breakwaters. The Study Team's analysis recommends that the north breakwater should be extended straightly to the offshore by 300 m in order to secure the required calmness of the objective water area.

2) Rough Estimation of Construction Cost

The construction cost of each alternative is roughly estimated in Chapter 9. The

result of rough estimation of construction cost is as follows.

① Site A is most inexpensive (without construction cost of substitutive domestic general cargo berths).
② Site B is more expensive than Site A and Site C.
③ Site C is more expensive than Site A, but less expensive than Site B. (It should be taken into account that the land acquisition may not be possible.)
④ Site D is most expensive, due to a huge amount of dredging to construct a new water channel.

3) Space Utilization and Future Expansion

① Site A : MICT's container handling facilities remain behind a new domestic container terminal. The existing domestic general cargo berths will be de-commissioned and a wide range of water area will be also extinguished.
② Site B : Abundant with undeveloped wide area toward the north direction along the north breakwater.
③ Site C : Abundant with undeveloped wide area on the back side, but the water front line is limited. At most five (5) domestic container berths can be provided. The scale of undeveloped area on the back side also depends on the land acquisition process.
④ Site D : Abundant with undeveloped wide area on the back side (total area is 177 ha). The water front line is also sufficiently long. However, the scale of undeveloped area and usable water front depend on the land acquisition process.

4) Water Area Utilization

① Site A : The depth of water area in front of the proposed container terminal is not enough for future container vessels. Dredging work from -6 m up to -10 m is necessary. This alternative will also extinguish a wide range of water area at this portion of the port.
② Site B : The depth of water area in front of the proposed container

terminal is not enough for future container vessels, but dredging volume will not be too much. This alternative occupies a wide range of calm water area within the North Harbor, but enough calm water space for a turning basin can be still reserved.

③ Site C : The depth of water area in front of the proposed terminal is not enough, but dredging volume will not be too much. Enough water space for a turning basin can be reserved, but this water area must be protected by a newly extended breakwater.

④ Site D : The depth of water area in front of the proposed terminal is not enough. This alternative also needs a considerable length of a new water channel. This results in a huge amount of dredging.

5) Accessibility

① Site A : The proposed terminal has easy access to the main urban highways. Accordingly, it is needless to construct a port access road.

② Site B : The proposed terminal has easy access to the main urban highways, but a causeway must be built between the existing MICT and a new terminal.

③ Site C : The proposed terminal has easy access to the main urban highways. Accordingly, it is needless to construct a port access road.

④ Site D : The proposed terminal is a little bit far from the main urban highways, therefore, port road construction is one of the major components of investment.

6) Effect of Existing Port Facilities

① Site A : The existing berths of Pier NO.2 to NO.6 must be relocated and reconstructed in another place, due to reclamation for creating a new domestic container terminal.

② Site B : This alternative is independent of all existing port facilities.

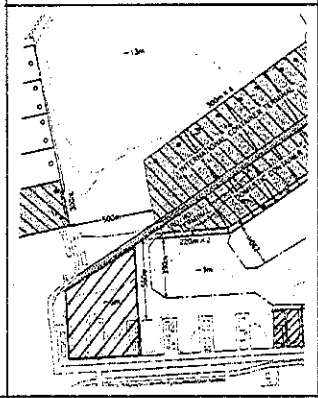
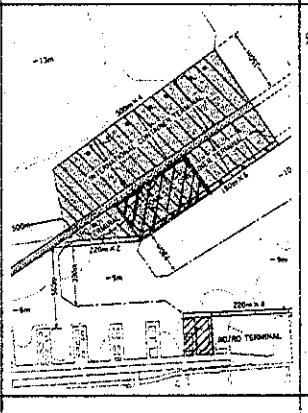
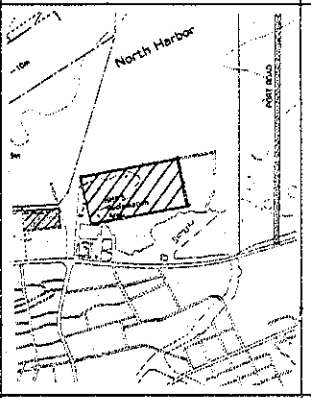
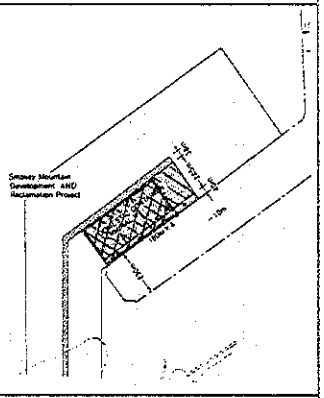
③ Site C : The same as above.

④ Site D : The same as above.

7) Overall Evaluation

Overall evaluation of four alternatives is summarized in Table 3-2. As shown in Table 3-2, Site B has been selected as the best alternative for a domestic container terminal in case of the medium case scenario, and Site B and Site D as the best in case of the high case scenario for the target year 2010.

Table 3-2 Evaluation of Alternative for Domestic Container Terminal at the Port of Manila

		ALTERNATIVES			
Locataion		Site A	Site B	Site C	Site D
					
EVALRATION	Reliability	5	5	3	4
	Construction Cost	5	3	4	4
	Space Utilization	3	5	4	5
	Water Area Utilization	3	4	5	4
	Accessibility	5	3	5	3
	Effect on Existing Function	2	5	4	5
	Land Acquisition	5	5	3	4
Overall		28	30	28	29
Priority		3	1	3	2

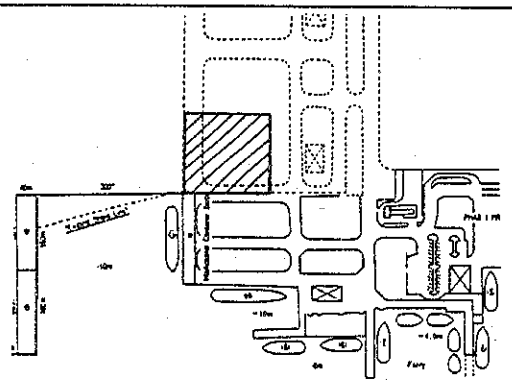
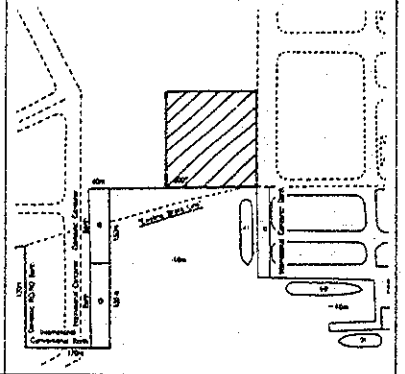
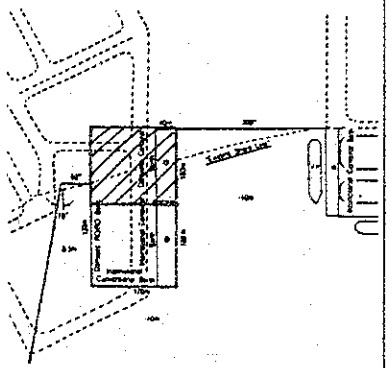
Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)

2) The above evaluation is valid only in case of construction of 5 at 6 domestic container terminals. Overall evaluation always depends on how large a project is.

3.4 Selection and Determination of Development Site at Port of Batangas

There are three (3) alternative port development sites for a domestic container terminal at the Port of Batangas. Table 3-3 shows each development site at Batangas. Each alternative has been appraised from the following six (6) evaluation points, namely 1) Reliability, 2) Construction cost, 3) Space utilization, 4) Water area utilization, 5) Accessibility, and 6) Effect on existing port function. As a result of overall evaluation, the proposed reclamation area located 300 meters away from the west end of the Phase-I project site (Site C), has been selected as the best development site for a domestic container terminal in case of the medium and high economic growth scenario. The result of overall evaluation is summarized in Table 3-3.

Table 3-3 Evaluation of Alternative for Domestic Container Terminal at the Port of Batangas

		ALTERNATIVES		
		Site A	Site B	Site C
Locataion Map				
EVALUATION	Reliability	5	4	4
	Construction Cost	3	4	5
	Space Utilization	4	3	5
	Water Area Utilization	4	5	5
	Accessibility	5	5	4
	Effect on Existing Function	5	5	5
Overall Evaluation		26	26	28
Priority		2	2	1

Note: 1) Evaluation Point; 5 (Very Good), 4 (Good), 3 (Average), 2 (Less than Average) and 1 (Poor)

2) The above evaluation is valid only in case of construction of 5 at 6 domestic container terminals. Overall evaluation always depends on how large a project is.

CHAPTER 4 DEVELOPMENT PLAN OF CONTAINER TERMINAL

4.1 Evaluation of Existing Berth Capacity at Each Port

In this section, present capacity of foreign container port terminals at the South Harbor, MICT, the North Harbor and the Port of Batangas is evaluated. Capacities of a port terminal are determined by several factors such as facilities, equipment and handling operations which can be represented by productivity of cargo handling equipment, berth occupancy ratio and so on.

Scope of evaluation of current port capacities covers pier only and excludes anchorage and Pasig River at each port.

4.1.1 Conditions for Evaluating Port Capacity

In evaluating the present port capacities, the following conditions of port facilities should be considered:

① on-going projects (rehabilitation at South and the North Harbor, phase one project at Port of Batangas)
② prevalence of large size vessels in future (mentioned in Part I of Chapter 11.6)
③ renewal of actual port facilities (for example, the increased capacity of cargo handling equipment, additional number of gantry cranes at MICT and the South Harbor etc.)

(1) Berth Conditions

1) South Harbor

Figure 4-1 shows plan view of South Harbor.

In the medium and high case scenario, there are four(4) existing container berths of ten(10) meters in depth with four(4) gantry cranes, but two(2) old gantry cranes at Pier 3 will be replaced by new gantry cranes in future.

2) MICT

Figure 4-2 shows plan view of MICT.

There are four(4) existing container berths of twelve(-12) meters in depth, 900

meters in berth length and six(6) gantry cranes. But in near future, this container terminal shall be completed as a standard-size container terminal with 1,200 meters in total length, twelve(-12) meters in depth and eight(8) gantry cranes which shall be able to accommodate four(4) large container vessels (30,000 DWT, LOA 237m) simultaneously.

3) North Harbor

Figure 4-3 shows plan view of North Harbor.

To cope with the increasing domestic container cargo, between Pier 16 and VETERAN SHIPYARD, a new domestic RO/RO berth with 375 meters in length and eight(-8) meters in depth is now under construction using ADB loan. As the back up area, container yards of 57,600 sq.m and 48,000sq.m are respectively planned behind the new domestic RO/RO berth and Slip 0.

This new berth shall be able to accommodate two(2) RO/RO vessels simultaneously with the passenger terminal.

A part of existing berths with six(-6) meters in depth shall be also used as a container cargo handling berth by container and RO/RO type vessel.

4) Port of Batangas

Figure 4-4 shows plan view of the Port of Batangas.

After Phase I Project, which already commenced in 1993, is completed, Port of Batangas will have eight(8) domestic and two(2) foreign berths excluding small craft and ferry berth. One of the foreign berths shall be used as a multi-purpose berth, the other shall be used as a general cargo berth.

In future, the multi-purpose berth shall also accommodate foreign container vessel with an additional one(1) gantry crane. Domestic container cargo by RO/RO type vessel shall be also handled at parts of these domestic berths.

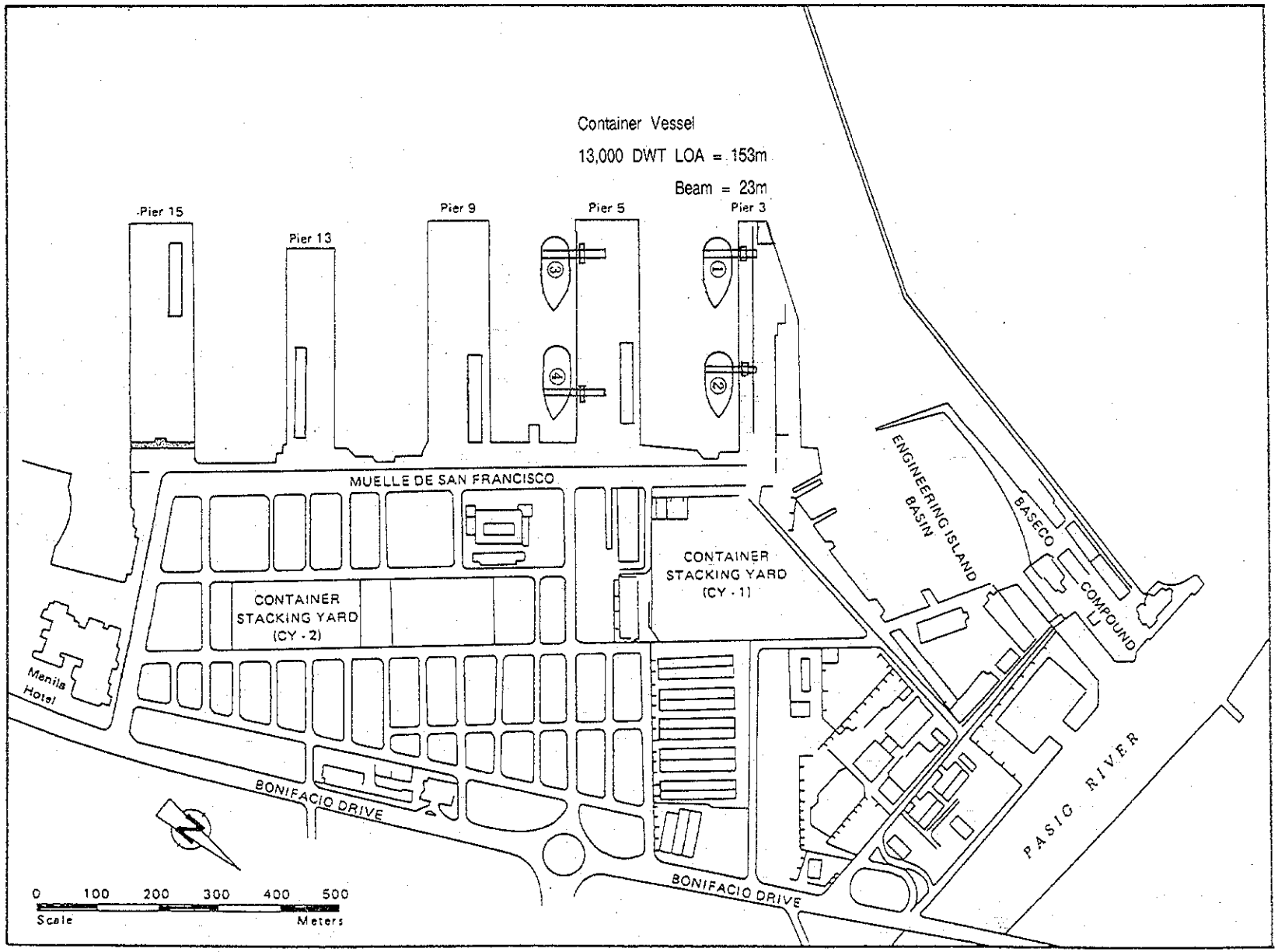


Figure 4-1 Plan View of South Harbor

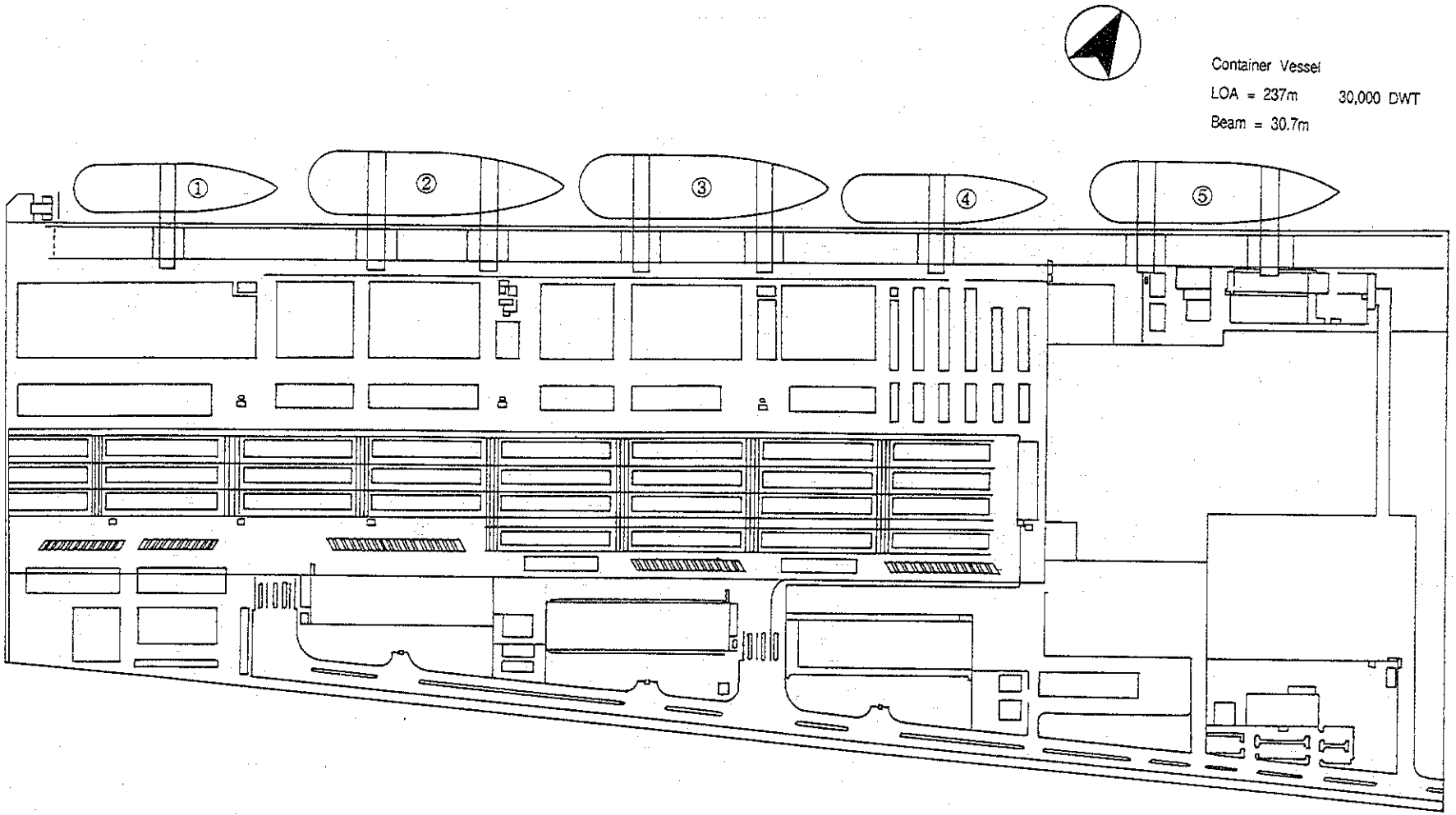


Figure 4-2 Plan View of MICT

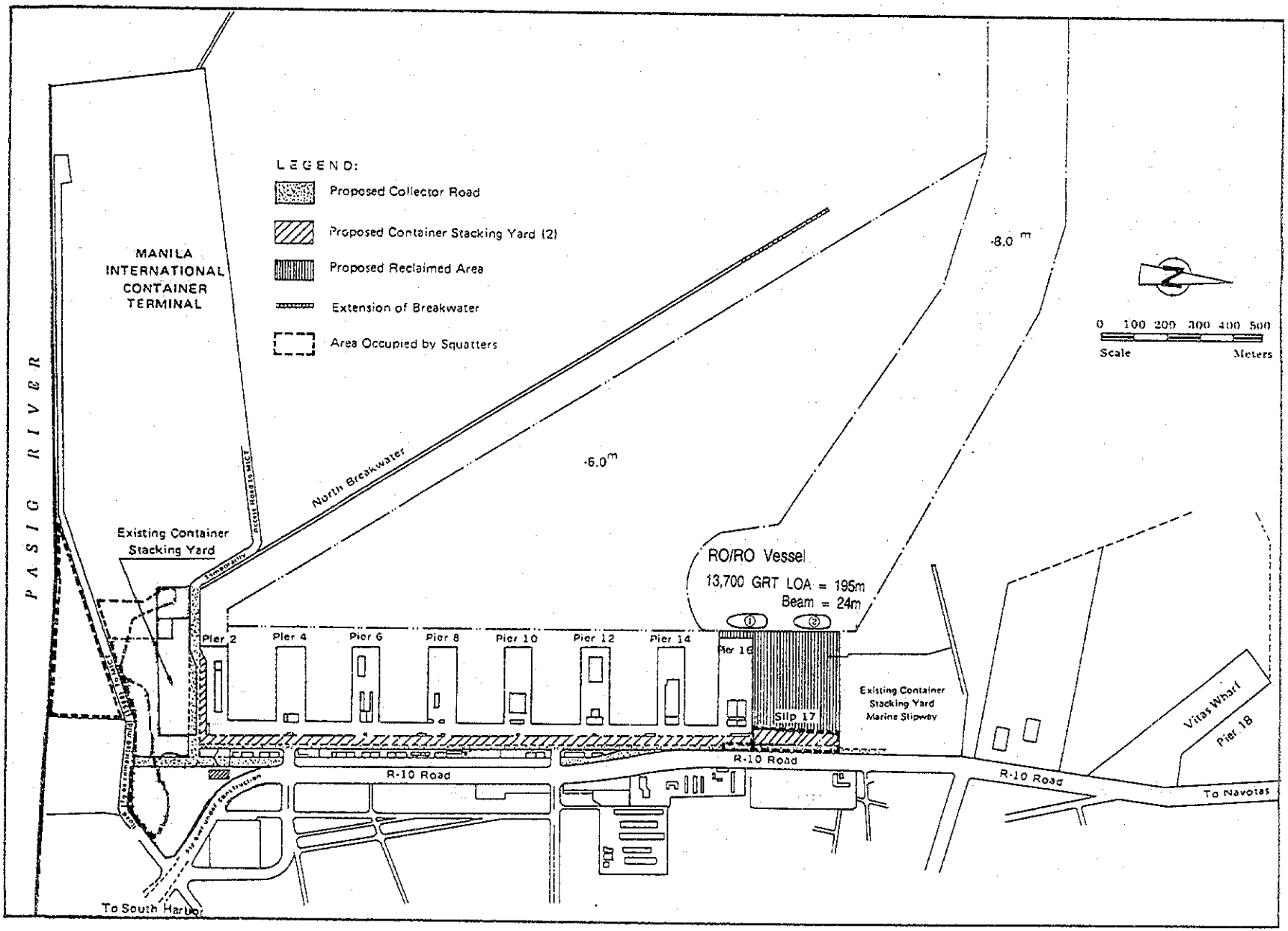


Figure 4-3 Plan View of North Harbor

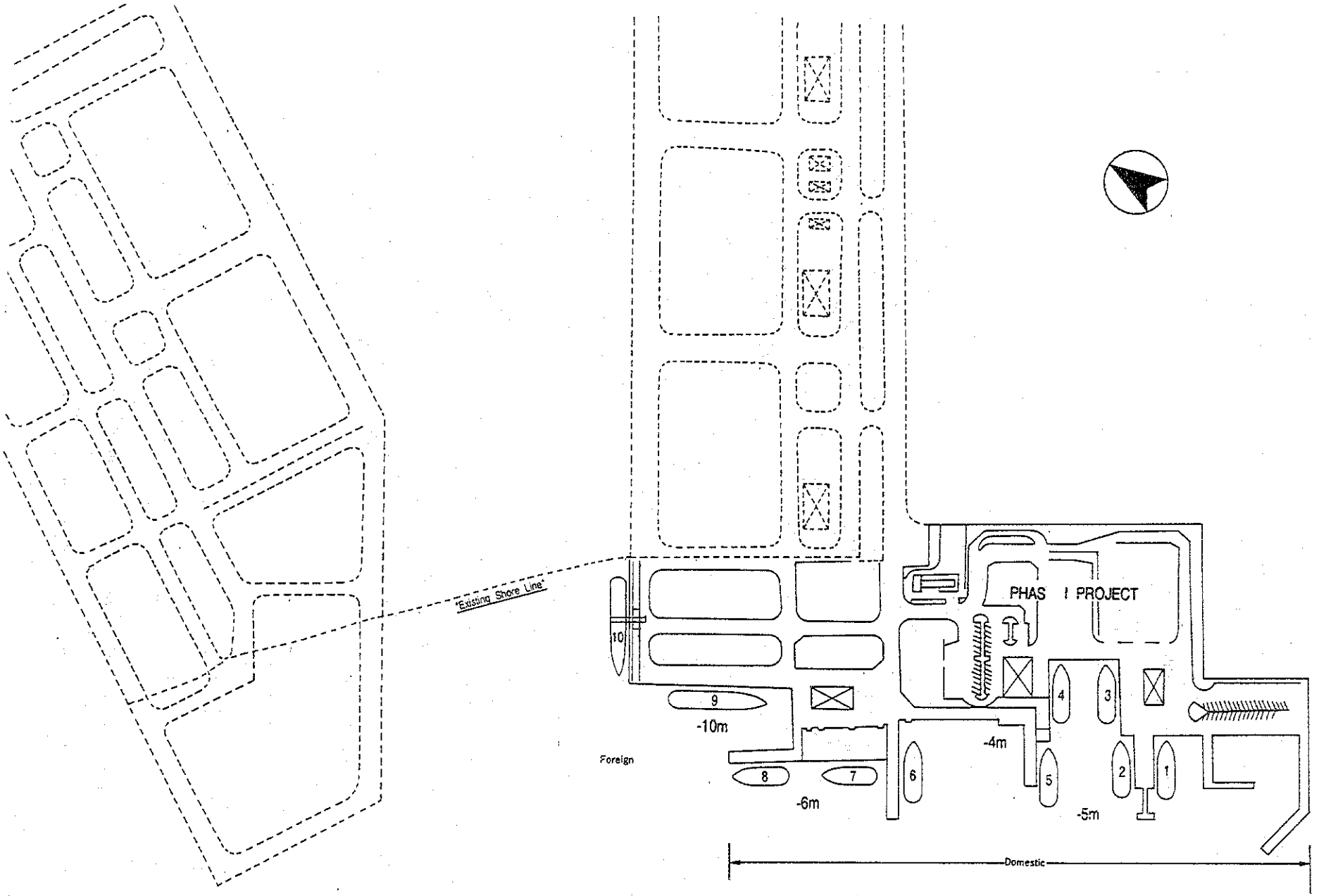


Figure 4-4 Plan View of Port of Batangas, Phase I

(2) Productivity and Idle Time

Figure 4-5 shows the average service time based on the statistics of PPA, and as that data includes every kind of vessel at each harbor, we have general information indicating that productivity at South and North harbor is less than MICT. But we cannot grasp the correct average service time by ship type. So, in order to grasp the average service time / staying time by ship type(container and non-container vessel type), the Study Team used other data from Marina Port Services, Ine.(MSPI) and ICTSI (see Appendix D-1).

According to Appendix D-1, the average coefficient of equivalent staying time per vessel(=service time / staying time) at MICT and the South Harbor is presently 0.82 and 0.91 respectively. But, the average idle time in container terminal is assumed to be two(2) hours before and after the service time.

The present number of container handled by a gantry crane is about twenty(20) boxes per hour. So, considering the productivity in future shall be greater than the present productivity, the number of container handled by a gantry crane is assumed to be 25 boxes per hour.

On the other hand, the productivity handled by forklift or ship's gear crane is assumed to be ten(10) boxes per hour according to the contract between terminal operator and stevedore. And the idle time is assumed to be two(2) hours before and after the service time.

(3) Berth Occupancy Rate

Figure 4-6 shows the berth occupancy ratio (BOR) at each harbor. Table 4-1 lists the recommended maximum berth occupancy rate calculated by UNCTAD (Port Development, A Handbook for Planners in Developing Countries; United Nations Conference on Trade and Development).

From these tables, it is noted that occupancy rate for the port of North Harbor is over 70%. This implies that the port is operating at its full capacity. In addition, the field survey confirmed that the port is rather congested. MICT and the South Harbor are judged to have little more spare capacity.

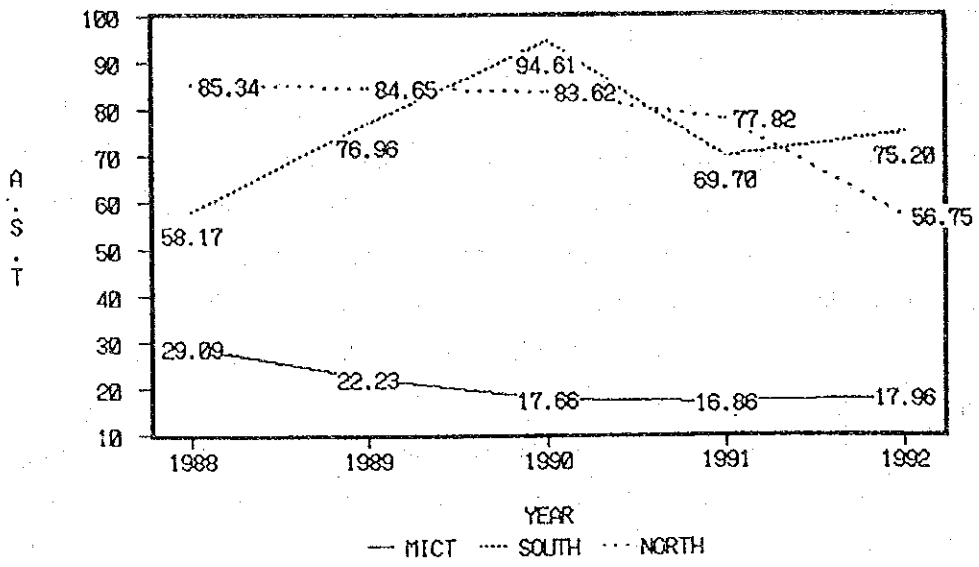


Figure 4-5 Average Service Time

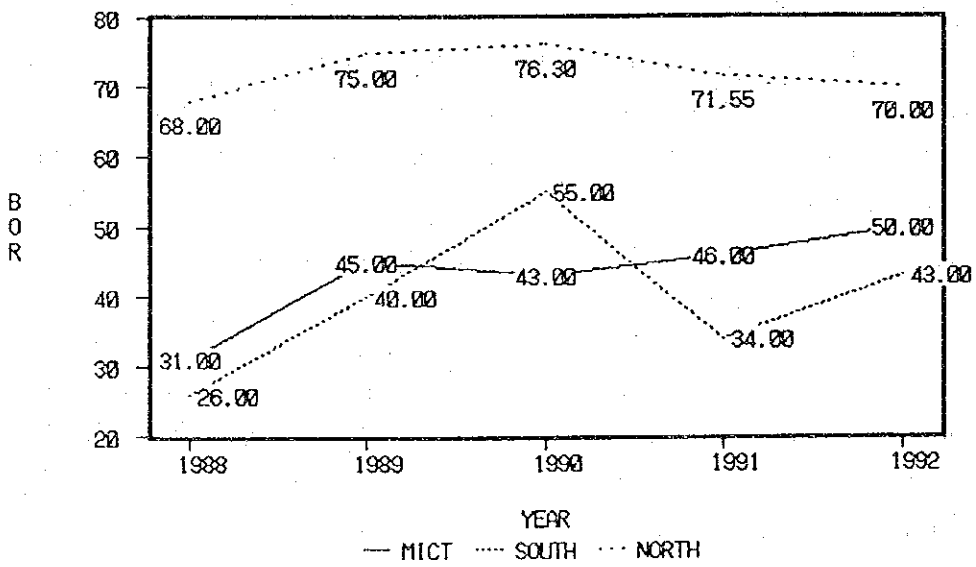


Figure 4-6 BOR (%)

The berth occupancy rate used for calculation at MICT and South Harbor is assumed to be 50% respectively, according to the relation to the number of berths and recommended maximum berth occupancy (Table 4-1). In addition, the berth occupancy rate for calculation at North Harbor is assumed to be 50% because the Pier of North Harbor could accommodate two(2) standard vessels at the same time.

(4) Ratio of Loaded, 40 Foot Container and Weight of Loaded Container in TEU

Figures 4-7 to 4-9 show weight of loaded container in TEU, ratio of loaded containers in TEU, and ratio of 40 foot containers in TEU respectively. The Study Team adopted the present data for the weight and ratio of loaded container in TEU. On the other hand, the figure for South Harbor and MICT is assumed to be 70%, considering that the ratio of 40 foot containers shall increase in future in accordance with increasing container cargo.

On the other hand, the present ratio of 40 and 20 foot containers at North Harbor is about 10% and 70% respectively (see Appendix D-2). But the ratio of 40 foot containers in the year 2010 at North Harbor is assumed to be 40% for the same reason as above.

(5) Operation Time and Days

In the container terminal, the operation time by gantry crane is assumed to be 24 hours and 365 days because the full time service is always required for the liner vessel.

On the other hand, at the Port of Batangas, considering the natural conditions based on JICA Report of the Development Project on the Port of Batangas studied in December 1985 and the fact that there is no break water, the operation time is assumed to be reduced to 320 days and 16 hours.

(6) Relation of Vessel Size and Container Cargo Volume in TEU per Vessel

Table 4-2 shows the relation of the forecasted vessel size, mentioned in Part I of Chapter 11.6 and container cargo volume in TEU per vessel. The container cargo volume in TEU per vessel is calculated as to be in proportion to the present average loaded cargo volume of container in TEU per vessel at South Harbor and MICT. On the other hand, the container cargo volume in TEU at North Harbor by container or

RO/RO vessel is assumed to be almost full capacity which is in accordance with the ship list from CONFERENCE OF INTERRISLAND SHIPOWNERS AND OPERATORS (CISO)'s member.

The figure for calculation at Port of Batangas depends on the same data of South Harbor or North Harbor. And the other basic figures for calculation can be seen in Appendix D-3.

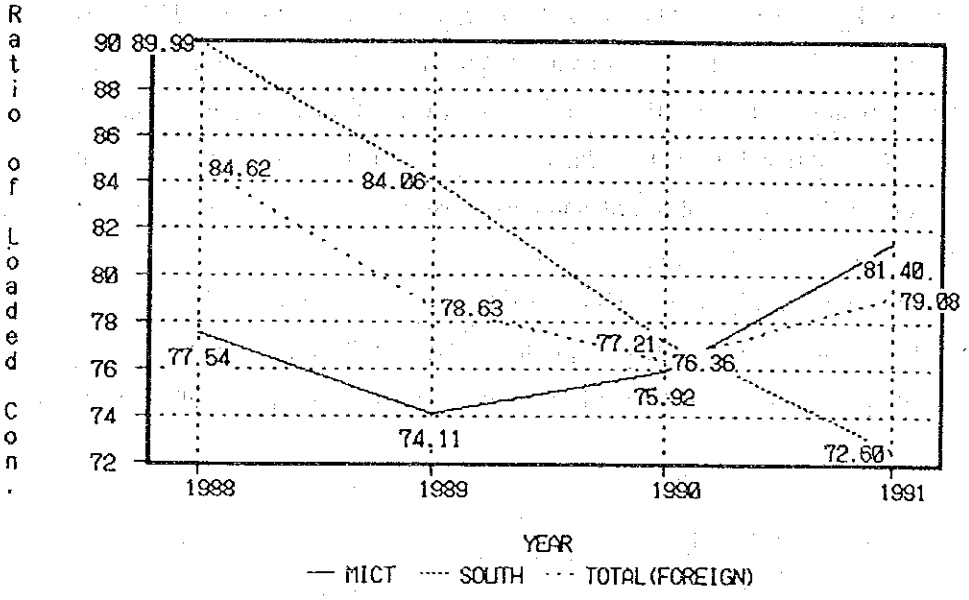


Figure 4-7 Ratio of Loaded Containers in TEU

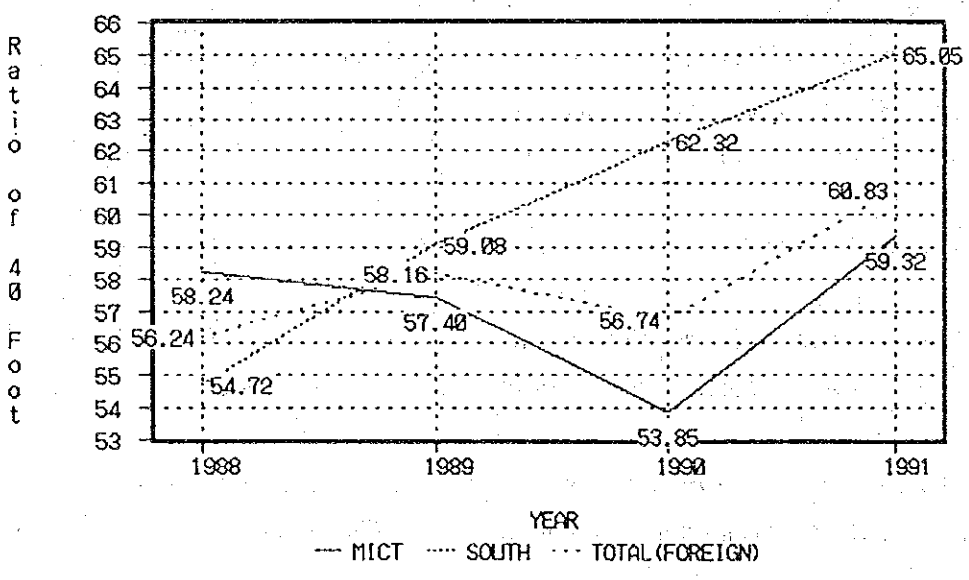


Figure 4-8 Ratio of 40 Foot Containers (TEU)

Table 4-1 Recommended Maximum Berth Occupancy

Number of Berths in the Group	Recommended Maximum Berth Occupancy (%)
1	40
2	50
3	55
4	60
5	65
6	70

note: Costs for ship and port are assumed to be 4 to 1.

Source: UNCTAD

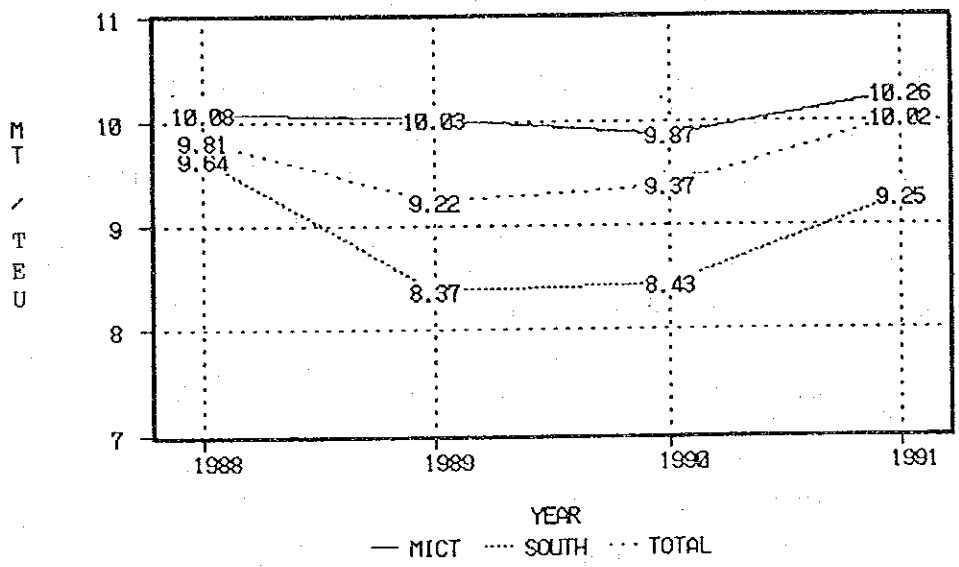


Figure 4-9 Weight of Loaded Container per TEU

Table 4-2 Relation of Vessel Size and Container Cargo Volume per Vessel per Vessel

	Vessel Type and Dimensions					Cargo Volume in TEU
			LOA	Draft	Beam	
South Harbor	Container	13,000 DWT	153m	-8.4m	23.0 m	470
MICT	Container	30,000 DWT	237m	-11.6m	30.0 m	810
North Harbor	Container	12,500 DWT	145m	-8.3m	21.6 m	413
	Container	3,300 DWT	107m	-5.3m	16.0 m	148
	RO/RO	13,700 GRT	195m	-7.5m	24.0 m	200
	RO/RO	3,000 GRT	113m	-4.9m	18.9 m	100
Port of Batangas	Container	13,000 DWT	153m	-8.4m	23.0 m	470
	Container	8,500 DWT	113m	-9.0m	19.0 m	275
	RO/RO	2,000 GRT	96m	-4.4m	17.1 m	45

Remarks : The TEU's in RO/RO type (13,700 GRT and 2,000 GRT) means number of trucks.

4.1.2 Evaluation of Existing Berth Capacity at Each Port

The capacity of berth at each port is calculated by using formula 4.1 and 4.2.

Maximum Capacities
= Number of Vessels x Number of Containers(TEU) per Vessel
x Ratio of Loaded Container x Cargo Volume per container----(4.1)

(The number of vessels is determined by relevant factors such as service time, staying time and berth occupancy ratio etc. The service time is closely related to the productivity of cargo handling equipment.)

The number of vessels (V) is ascertained by using formula 4.2.

$$BOR=\frac{V\times M}{n\times m\times(H\times D-2V)} \qquad \text{----(4.2)}$$

BOR : Berth Occupancy Rate (50%)
V : Number of Vessels per year
M : Average Handling Cargo Volume per vessel
n : Number of Gantry Crane or Gang
m : Productivity
H : Operation hours per day
D : Operation days per year
2V : Idle Time (2 hours per vessel)

(1) South Harbor

The existing berth capacity (4 berths) at South Harbor is estimated as 4,200,000 MT (622,000 TEU) per annum.

Berth's dimensions and figure for calculation are assumed to be as follows:

Average vessel size	:13,000 DWT, L=153m, Draught 8.4m
Length per berth	:-10.0m
Number of gantry crane	:1 unit / berth
Productivity	:25 units / hour
Cargo volume per vessel	:470 TEU (294 Boxes)
Ratio of 40 foot in TEU	:70%

Service time per vessel	:11.8 hour / vessel
BOR	:50%
Idle time	:2 hours
Operation time	:24 hours / day
Operation days	:365 days / year
Weight of loaded container per unit	:9.3 MT / TEU
Ratio of loaded container in TEU	:72.6%

* Number of vessels
  = 344 Vessels per year
* Number of handling boxes
  = 101,136 Boxes/berth
* Cargo Volume
  1,050,500 MT/berth
* Number of Container in TEU
  155,500 TEU/berth

(2) MICT

The existing berth capacity (4 berths) at MICT is estimated as 10,290,000 MT (1,230,000 TEU) per annum.

Berth's dimensions are assumed to be:

Average vessel size	:30,000 DWT, L=237m, Draught 11.6m
Length per berth	:300m, -12.0m
Number of gantry crane	:2 units / berth
Productivity	:25 units / hour
Cargo volume per vessel	:810 TEU (506 Boxes)
Ratio of 40 foot in TEU	:70%
Service time per vessel	:10.1 hour / vessel
BOR	:50%
Idle time	:2 hours
Operation time	:24 hours / day
Operation days	:365 days / year

Weight of loaded container per unit
:10.3 MT / TEU
Ratio of loaded container in TEU
:81.4%

* Number of Vessel
  = 394 Vessels per year
* Number of handling boxes
  = 199,364 boxes/berth
* Cargo Volume
  = 2,571,500 MT/berth
* Number of Container in TEU
  = 306,700 TEU/berth

(3) North Harbor

1) New berth for domestic container terminal

The capacity of new berth (1 berth) for domestic container terminal is estimated as 2,170,000 MT (127,000 TEU) per annum.

Berth's dimensions and figure for calculation are assumed to be as follows:

Average vessel size	:12,500 DWT, L=145m, Draught 8.3m
Length per berth	:180m, -10.0m
Number of gantry crane	:1 unit / berth
Productivity	:25 units / hour
Cargo volume per vessel	:413 TEU (330 Boxes)
Ratio of 40 foot in TEU	:40%
Service time per vessel	:13.2 hour / vessel
BOR	:50%
Idle time	:2 hours
Operation time	:24 hours / day
Operation days	:365 days / year

Weight of loaded container per unit
:20.7 MT / TEU
Ratio of loaded container in TEU
:82.5%

* Number of Vessel
  =308 Vessels per year
* Number of handling boxes
  =101,640 Boxes/berth
* Cargo Volume
  =2,170,000 MT/berth
* Number of container in TEU
  =127,000 TEU/berth

2) New berth for domestic RO/RO terminal

The method of calculation of the berth capacity for the RO/RO vessel depends on the Standard of Ferry in Japan. According to this standard, the formula is as follows:

* $N=P/(T \times 365 \times a \times \gamma \times n)$----------(4.3)

  here; N:Frequency a day
  P:Cargo volume (using the large cargo volume of inward or outward)
  T:Capacity of loaded cargo per truck
  (usually, 6ton/truck)
  a:Ratio of sailing possibility a year (determined by natural conditions)
  γ:Ratio of using RO/RO vessel(usually, 0.6)
  n:Loaded number of truck per vessel
* Limitation of frequency a day per berth:
  Long distance ; 3 sailings / berth
  Short and middle distance ; 6 sailings / berth

According to above formula, the capacity of berth (1 berth) for container cargo by RO/RO vessel type is estimated as 1,440,000 MT (83,100 TEU) per annum.

Berth's dimensions and figure for calculation are assumed to be as follows:

Average vessel size :13,700 GRT, L=195m, Draught 7.5m
Length per berth :220m, -9.0m
Ratio of sailing possibility a year
:assumed to be 0.9
Loaded number of truck per vessel
:200 trucks / vessel (200 TEU)

Limitation of frequency :3 (long haul)

* Cargo Volume

=1,440,000 MT/berth

* Number of Container in TEU

=83,100 TEU/berth

Remarks; Loaded number of truck per vessel is according to CISO member's Vessels list

3) Existing berth

The capacity of existing berth for container cargo by small RO/RO or container vessel is as follows:

	Small Container	Small RO/RO
Average vessel size	3,300 DWT LOA 107m Draft 5.3 m	3,000 GRT LOA 113m Draft 4.9m
Cargo Volume/vessel	150 TEU (120 Box)	100 TEU (80 Box)
Productivity/hour	10 Box	10 Box
Number of Gang	3	4
Operation hours	13	13
Operation days	360	360
Number of Vessel/year	468	1,080
Capacity/berth (Box)	56,160	62,400
(TEU)	70,200	78,000
(MT)	1,199,000	1,332,000

(4) Port of Batangas

1) Multi-Purpose Berth (Foreign)

The berth capacity (1 berth) at Port of Batangas for foreign container cargo is estimated as 613,000 MT (90,910 TEU) per annum.

2) Domestic new Container berth

The capacity of new container berth (1 berth) is estimated as 1,230,000 MT (72,050 TEU) per annum. Berth's dimensions and figure for calculation are assumed to be as follows:

Average vessel size	:	8,500 DWT
		LOA 113m
		Draft 9.0m
Cargo Volume/vessel	:	275 TEU (220 Boxes)
Productivity	:	25 Box/hour
Gantry crane	:	1 unit
Operating hour	:	16 hours
Operating days	:	320 days
Number of Vessel/year	:	262
Capacity/berth (BOX)	:	57,640
(TEU)	:	72,050
(MT)	:	1,230,000

3) Existing RO/RO berth

The capacity of existing berth (1 berth) for container cargo by RO/RO vessel type is estimated as 320,000 MT (18,700 TEU) per annum.

Berth's dimensions and figure for calculation are assumed to be as follows:

Average vessel size	:	2,000 GRT, L=96m, Draught 4.4m
Length per berth	:	120m, -5.5m
Ration of sailing possibility a year	:	assumed to be 0.9
Loaded number of truck per vessel	:	45 trucks / vessel
Limitation of frequency		3 (long haul)

* Cargo Volume 320,000 MT/year

4.2 Required Number of Container Berths

4.2.1 International Container Berths

Table 4-3 shows the container cargo assignment to each port based on forecasts in 2010. In accordance with this table and the existing berth capacity mentioned in Chapter 4.1, the necessary number of container berths for forecasted cargo volume could be calculated.

Table 4-4 shows the projection of the number of foreign container based on forecasts in the medium and high case scenario.

Table 4-3 Foreign Container Cargo Assignment to Each Port in 2010

Low Case Unit: 1000(MT)

	Present Cargo Vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
South Harbor	1,119 (22%)	16,300	4,210 (26%)	4.0	4.0	0.0
MICT	3,883 (78%)		12,090 (74%)	4.7	4.0	1.0
Batangas	0	460		0.7	1.0	0.0

Medium Case Unit: 1000(MT)

	Present Cargo Vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
South Harbor	1,119 (22%)	22,240	4,440 (20%)	4.2	4.0	0.0
MICT	3,883 (78%)		17,800 (80%)	6.9	4.0	3.0
Batangas	0	770		1.3	1.0	0.0

High Case Unit: 1000(MT)

	Present Cargo vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
South Harbor	1,119 (22%)	31,000	4,210 (14%)	4.0	4.0	0.0
			6,220 (20%)	2.4	0.0	3.0
MICT	3,883 (78%)		20,570 (66%)	8.0	4.0	4.0
Batangas	0	1,200		1.7	1.0	1.0

Table 4-4 Number of Foreign Container in TEU based on Cargo Assignment in 2010

Unit: TEU

	Present 1991	Target Year in 2010		
		Low Case	Medium Case	High Case
South Harbor(a)	166,566	622,000	658,000	918,000
MICT (b)	464,583	1,443,000	2,123,000	2,958,000
Port of Manila (a+b)	631,149	2,065,000	2,781,000	3,876,000
Port of Batangas	0	62,000	113,000	178,000
Total	631,149	2,127,000	2,894,000	4,054,000

Remarks: Include Empty Container

(1) Medium Case

The medium case requires three(3) new international container berths at MICT, Port of Manila. The required three(3) new container berths of 900 meters in length should be planned along the West Breakwater at the MICT considering efficient land use and intensive operation of international container terminal. The pier 3 at South Harbor with two(2) gantry cranes should be also improved to meet the container cargo handling demand as necessary.

The multi purpose berth at Port of Batangas should be also used as an international container berth with an additional one(1) gantry crane.

(2) High Case

Seven(7) new container berths totaling 2,100 meters in length are required at the Port of Manila. The high case I scenario assumes that there is enough space to cope with the increasing container cargo volume at the Port of Manila. But high case II, III scenario assumes that there is no room for expansion because of several problems such as traffic congestion and concentration of port facilities at Port of Manila and so on. In the latter case, a new port (Naic/Cavite or Sangrey Point) shall accommodate three new container terminals totaling 900 meters in length.

At the same time, Pier 3 at South Harbor with two (2) gantry cranes should be also improved to meet the container cargo handling demand as necessary.

The multi purpose berth at Port of Batangas should be also used as an international container berth with additional one (1) gantry crane. Furthermore, one (1)

additional foreign container berth is required with 180 meter berth length. This berths should be also used as other vessel considering efficient berth use.

4.2.2 Domestic Container Berths

Table 4-5 shows domestic container cargo assignment to North Harbor and Port of Batangas based on forecasts in 2010. The additional number of domestic container berths to meet the forecasted cargo volume is also shown in the same table.

Table 4-6 shows the projection of the number of domestic container based on forecasts in the medium and high case scenario.

And also, in the medium case scenario, the ratio of these container cargo volumes transported by container and RO/RO type vessel shall be assumed to be 60% and 40% respectively in the target year because the present ratio of container cargo transported by container to RO/RO vessel type (52% to 48%: see Appendix D-4) shall change in accordance with containerization in domestic trade to cope with increasing container cargo.

In addition, in the high case scenario, the above ratio will be raised more than the medium case scenario. Therefore, the ratio is assumed to be two to one (67% to 33%).

The share of large container vessel over 3,000 DWT (draft -5.7 m) in all container vessels for container cargo is presently 81 % (see Appendix D-4).

The share of large RO/RO vessel over 5,000 GRT (draft -5.7 m) in all RO/RO vessels for container cargo is presently 61 % (see Appendix D-4).

Therefore, it is assumed that the above shares of both types of large vessel will rise in accordance with increasing containerized cargo, and that the share of large container and RO/RO vessel will be 100 % and 80 % respectively.

Table 4-5 Domestic Container Cargo Assignment to Each Port in 2010

Low Case

Unit: 1000(MT)

	Vessel Type	Present Cargo Vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
		6,950	16,900				
Port of Manila	Container	(52%)	10,140 (60%)				
		Large (81%)		10,140 (100%)	4.7	0.0	5.0
		Small (19%)		0 (0%)	0.0	---	0.0
	RO/RO	(48%)	6,760 (40%)				
		Large (61%)		5,410 (80%)	3.8	3.0 (planned)	1.0
		Small (39%)		1,350 (20%)	1.0	— (Existing)	0.0
		0	1,300				
Port of Batangas	Container	Large		780 (60%)	0.6	0.0	1.0
	RO/RO	Small		520 (40%)	1.6	3.0	0.0

Medium Case

Unit: 1000(MT)

	Vessel Type	Present Cargo Vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
		6,950	22,910				
Port of Manila	Container	(52%)	13,750 (60%)				
		Large (81%)		13,750 (100%)	6.3	0.0	6.0
		Small (19%)		0 (0%)	0.0	0.0	0.0
	RO/RO	(48%)	9,160 (40%)				
		Large (61%)		7,330 (80%)	5.2	3.0 (planned)	2.0
		Small (39%)		1,830 (20%)	1.4	--- (Existing)	0.0
		0	2,170				
Port of Batangas	Container	Large		1,300 (60%)	1.1	0.0	1.0
	RO/RO	Small		870 (40%)	2.7	3.0	0.0

High Case

Unit: 1000(MT)

	Vessel Type	Present Cargo Vol.	Cargo Demand in 2010		Required Nos. Berth	Existing Nos. Berth	Additional Nos. Berth
		6,950	32,000				
Port of Manila	Container	(52%)	21,440 (67%)				
		Large (81%)		21,440 (100%)	9.9	0.0	10.0
		Small (19%)		0 (0%)	0.0	---	0.0
	RO/RO	(48%)	10,560 (33%)				
		Large (61%)		8,450 (80%)	6.0	3.0 (planned)	3.0
		Small (39%)		2,110 (20%)	1.6	--- (Existing)	0.0
		0	3,300				
Port of Batangas	Container	Large		2,210 (67%)	1.6	0.0	1.0
	RO/RO	Small		1,090 (33%)	3.4	3.0	0.0

Table 4-6 Number of Domestic Container in TEU based on Cargo Assignment

Unit: TEU

		Present 1991	Target Year in 2010		
			Low Case	Medium Case	High Case
North Hanbor		407,362	987,000	1,342,000	1,874,000
	Comtainer Vessel	407,362	591,000	805,000	1,255,000
	Ro/Ro vessel		396,000	537,000	619,000
Port of Batangas		0	76,000	127,000	193,000
	Comtainer Vessel	0	46,000	63,500	129,000
	Ro/Ro vessel		30,000	63,500	64,000
Total		407,362	1,063,000	1,469,000	2,067,000

Remarks: Include Empty Container

(1) Container berth

1) Medium Case

In order to cope with increasing domestic container cargo, six(6) new domestic container berths totaling 1,080 meters in length are required at North Harbor, Port of Manila. The six(6) berths will be ten(10) meters in depth and 180 meters in berth length respectively. These berths should be planned along the existing breakwater at the North Harbor.

Further more, at Port of Batangas, one(1) additional domestic container berth of 150 meters in length is required in a later stage of Phase one.

2) High Case

As well as the medium case scenario, to cope with increasing domestic container cargo, ten(10) new domestic container berths totaling 1,800 meters in length are required at North Harbor, Port of Manila.

Four(4) of the ten(10) required berths shall be planned at the Smokey Mountain Development and Reclamation Project area, because of efficient land use.

(2) RO/RO Berth

1) Medium Case

In order to cope with container cargo assignment, two(2) RO/RO berths are required at North Harbor, Port of Manila. These berths will be 9.0 meters in depth and 220 meters in berth length and should be able to accommodate new large RO/RO vessels. One of the two(2) required berths will be planned next to the under construction RO/RO berths from pier 14 to 16. The other berth will be planned next to new domestic container berths along the existing breakwater.

In addition, at Port of Batangas, it is sufficient to handle the cargo assignment at the stage of Phase one.

2) High Case

In order to cope with container cargo assignment, Three(3) new RO/RO berths are required at North Harbor, Port of Manila. Three(3) required berths will be 9.0 meters in depth and 220 meters in berth length respectively.

Further more, at Port of Batangas, one additional RO/RO berth of 120 meters in length is required in a later stage of Phase one.

Table 4-7 shows the result of the additional container berths.

The present number of berths is different from actual data of PPA due to the suitable vessel size for the berth's depth

Table 4-8 shows cargo assignment to each port in the target year by scenario which includes container and general cargo.

Table 4-9 shows the result of the additional berths by scenario which includes container and general cargo.

Table 4-7 Additional Container Berth at Each Port in 2010

	Classified Berth	Present Num. of Berth	Low Case		Medium case		High case I	
			Num. of Berth	Length Depth	Num. of Berth	Length, Depth	Num. of Berth	Length, Depth
South Harbor	For. Cont.	4(180m, -10)	0	0	0	0	3	300m, -13m
	Sub Total	4	0	0	0	0	3	900m
MICT	For. Cont.	4(300m, -12)	1	300m, -13m	3	300m, -13m	4	300m, -13m
	Sub Total	4	1	300m	3	900m	4	1,200m
North Harbor	Dom. Conv.	41	0	0	0	0	0	0
	Dom. RO/RO	3(220m, -9)	1	220m, -9.0m	2	220m, -9.0m	3	220m, -9.0m
	Dom. Cont.	0	5	180m, -10.0m	6	180m, -10.0m	10	180m, -10.0m
	Sub Total	44	6	1,120m	8	1,520m	13	2,460
Port of Batangas	For. Cont.	1(185m, -10m)	0	0	0	0	1	180m, -10.0m
	Dom. Cont.	0	1	150m, -10.0m	1	150m, -10.0m	1	150m, -10.0m
	Sub Total	11	1	150m	1	150m	2	330m
Ground Total			8	1,570m	12	2,570m	22	4,890m

Remarks: 1) For. Cont. means Foreign Container berth.

2) For. Conv. means Foreign Conventional berth.

3) Dom. Conv. means Domestic Conventional berth.

4) The present number of berth is calculated by the Study Team, cosidering the average ship size will become large in future.

5) The present number of berth of the Port of Btangas is based on the plan of Phase I.

Table 4-8 Cargo Assignment to Each Port in 2010

Unit: Thousand (MT)

		Low Case		Medium Case		High Case I		High Case II, III	
		Total Volume	Container	Total Volume	Container	Total Volume	Container	Total Volume	Container
Manila	Sub Total	38,300	33,200	52,000	45,150	72,600	63,000	66,370	56,770
Suoth Harbor	Total	6,300	4,200	7,020	4,200	14,430	10,430	8,200	4,200
	Domestic	0	0	0	0	0	0	0	0
	Foreign	6,300	4,200	7,020	4,200	14,430	10,430	8,200	4,200
MICT	Total	12,100	12,100	18,040	18,040	20,570	20,570	20,570	20,570
	Domestic	0	0	0	0	0	0	0	0
	Foreign	12,100	12,100	18,040	18,040	20,570	20,570	20,570	20,570
North Harbor	Total	19,900	16,900	26,960	22,910	37,600	32,000	37,600	32,000
	Domestic	19,900	16,900	26,960	22,910	37,600	32,000	37,600	32,000
	Foreign	0	0	0	0	0	0	0	0
Port of Batangas	Sub Total	2,810	1,760	4,700	2,940	7,300	4,500	7,300	4,500
	Domestic	2,200	1,300	3,690	2,170	5,700	3,300	5,700	3,300
	Foreign	610	460	1,010	770	1,600	1,200	1,600	1,200
New Port	Sub Total	0	0	0	0	0	0	6,230	6,230
	Domestic	0	0	0	0	0	0	0	0
	Foreign	0	0	0	0	0	0	6,230	6,230
Ground Total		41,110	34,960	56,720	48,090	79,900	67,500	79,900	67,500

Table 4-9 Additional Berth at Each Port in 2010

	Classified Berth	Present Num. of Berth	Low Case		Medium case		High case I		High Case II, III
			Num. of Berth	Length, Depth	Num. of Berth	Length, Depth	Num. of Berth	Length, Depth	Num. of Berth
South Harbor	For. Cont.	4(180m, -10)	0	0	0	0	3	300m, -13m	0
	For. Conv.	14(170m, -10)	0	0	0	0	0	0	0
	Sub Total	18	0	0	0	0	3	900m	0
MICT	For. Cont.	4(300m, -12)	1	300m, -13m	3	300m, -13m	4	300m, -12m	4
	Sub Total	4	1	300m	3	900m	4	1,200m	4
North Harbor	Dom. Ferry	Depth							
	Dom. Conv.	-6.0m							
	Dom. RO/RO	41	0	0	0	0	0	0	0
	Dom. RO/RO	3(220m, -9)	1	200m, -9.0m	2	220m, -9.0m	3	220m, -9.0m	3
	Dom. Cont.	0	5	180m, -10.0m	6	180m, -10.0m	10	180m, -10.0m	10
	Sub Total	44	6	1,120m	8	1,520m	13	2,460m	13
New Port	For. Cont.	0	0	0	0	0	0	0	3
	Sub Total	0	0	0	0	0	0	0	3
Port of Batangas	For. Cont.	1(185m, -10m)	0	0	0	0	1	180m, -10m	1
	For. Conv.	-(230m, -10m)	0	0	0	0	1	170m, -10m	1
	Dom. Ferry	4(-4.0m)							
	Dom. Conv.	2(-5.5m)							
	Dom. RO/RO	7(-5.0m)	0	0	0	0	1	120m, -5.5m	1
	Dom. Cont.	0	1	150m, -10,0m	1	150m, -10.0m	1	150m, -10.0m	1
	Sub Total	15	1	150m	1	150m	4	620m	4
Ground Total			8	1,570m	12	2,570	24	5,180	24

Remarks: 1) For. Cont. means Foreign Container berth.

2) For. Cont. means Foreign Conventional berth.

3) Dom. Conv. means Domestic Conventional berth.

4) The present number of berth is calculated by the Study Team, considering the average ship size will become large in future.

5) The present number of berth of the Port of Btangas is based on the plan of Phase I.