

7. Evaluation of Master Plans

7.1 Economic Analysis for Long-term Plans

7.1.1 Framework of the Economic Analysis

(1) Subjects of the Analysis

This section covers economic analysis on the following projects:

- * The New Cebu Port project,
- * Cebu Baseport project,
- * Toledo Port project, and
- * The New San Remigio Port project.

The long-term investment plans intend to meet potential traffic demands of the ports concerned until the year 2020. The plans are divided in two(2) phases: the first phase starts in 2004/2005 and finishes in 2010 at latest, and the second phase starts in around 2010 and ends in 2015 at latest. The investment plans in the first phase are called "Short-term plans".

(2) Evaluation Method

The economic analysis are performed from the standpoint of the Philippine economy and society. Aim of the analyses is to judge feasibility of the projects from the standpoint, based on investment efficiency of the projects. Accordingly, project cost of the projects concerned are estimated to realize and operate the planned facilities of the projects, while benefits of the projects concerned are devised and both the project costs and benefits are evaluated from the standpoint.

Economic Internal Rate of Return (EIRR), Cost Benefit ratio (B/C) and Net Benefit (B-C) are used as indices of the investment efficiency.

The social discount rate or opportunity cost of capital of 15 %/annum in the Philippines is adopted as an evaluation criterion of the investment efficiency.

(3) Evaluation Period

In the analysis, the year 2004 is the counting base year of the costs and benefits because the year is the commencing year of civil works of the New Cebu port project, and the year 2038 is adopted as the ending year of the evaluation period. About 30 years are taken into account as the operation period of the facilities of the projects within the evaluation period.

(4) Expression Methods of Project Cost and Amounts of Benefits

a) The project cost and amount of the benefits are measured on the economic price basis, resulting in that sub-item costs such as financial and transfer-costs which are included in the project cost expressed on the financial price basis are excluded. The economic price is almost same as "Resource value" or "Opportunity cost" of unit of materials and services which is measured in a complete competition market.

b) The project cost and amount of the benefits satisfy the following principles:

- * Avoidance Principle of double counting benefit items,
- * Principle on counting indirect effects,
- * Principle of the "With" and "Without" project cases, and
- * Principle of attribution of the benefits.

c) Numeraire and base year of the value expression adopted in the analysis are as follows:

The Philippine domestic economic price basis is adopted as the numeraire for expressing the values of the costs and benefits. It is because main beneficiaries of the projects are the Philippine economy and society. Standard Conversion Factor (SCF) of 0.967 is applied for converting values of foreign portion of the project cost onto the numeraire.

The year 2001 is adopted as the base year. An exchange rate of the Pesos to US Dollar of 52.5 pesos/US\$ is used for converting values expressed at US\$ into the ones expressed at Pesos.

(5) Project Cost

The project cost consists of the following sub-costs:

- * Construction cost,
- * Replacement cost,
- * Maintenance cost, and
- * Operation cost.

Only in the case of Cebu Baseport project, the replacement cost does not generate.

(6) Benefits

The benefit items are deferent among the four port projects. The items are devised, based on final functions of the ports concerned which are entailed after the construction, expansion and/or rehabilitation of the port facilities, and taking into consideration the above-mentioned principles, measurability of the items and reliability of basic data for estimating amount of the

benefits. As a result, some kinds of benefits which can be clearly recognized but do not satisfy the above conditions are not evaluated in the analysis.

Amounts of the benefit items are estimated on the principle of the "With" and "Without" project cases, and the principle of attribution of the benefits.

7.1.2 Economic Analysis on the New Cebu Port Long-term Project

(1) Conclusion on the Analysis

EIRR of the base case of the long-term project is estimated to be 27 %/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippines (15 %/annum). Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 30 % and at same time the benefits were decreased by 30 % from the base case (14 %/annum), the project continues to be almost economically feasible.

(2) Functions of the New Cebu port

Expansion of the existing Cebu Baseport is limited, resulting in that it will surely not be able to cope with the very near future demand on the cargo and passenger transportation at Baseport. Accordingly, the New Cebu port should be constructed as earlier as possible to supplement the shortage of the capacity of the existing Cebu Baseport.

The New Cebu Port is planned to be unique government port which can handle the foreign trade cargoes in the Cebu Island.

(3) Construction Cost

The construction costs of the project by the investment phases is as follows:

(unit : million pesos at 2001 economic prices)

Short-term investment period	:	8,679
Second phase investment	:	8,041
(total) Long-term investment period	:	16,720

The economic costs by the construction works are larger than the financial costs due to conversion of the foreign portions which are parts of the financial cost by the construction works onto the Numeraire (the Philippine domestic economic prices). However, as the VAT is not an economic cost, the total economic cost of is smaller by 6.7 % than the total financial cost.

(4) Benefits

The following four(4) benefit items can be enumerated:

Benefit 1: Benefit brought about by treatment of demand of foreign trade cargoes which will exceed the treatment capacity of the existing Cebu Baseport,

Benefit 2: Reduction benefit of transportation cost of foreign trade containerized cargoes,

Benefit 3: Reduction benefit of navigation cost and handling cost of containerized cargoes which would be brought about by avoidance of transportation of the cargoes by transship vessels, and

Benefit 4: Reduction benefit of handling cost of cargoes.

Among the above benefits, amount of the Benefit 1 is largest which is 44.6 % and the Benefit 3, is 42.8 % of the total amount of the Benefits in 2020.

(5) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 7.1.1 EIRR for the New Cebu Port Long-term Plan (unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	27	24	22	19
	10% up	25	22	20	17
	20% up	23	20	18	15
	30% up	21	19	16	14

7.1.3 Economic Analysis on the Cebu Baseport Long-term Project

(1) Conclusion on the Analysis

EIRR of base case of the Long-term project is estimated to be 20 % / annum. The rate exceeds the social discount rate or opportunity cost of capital of the Philippine, but is fairly below of the New Cebu Port project(27 %/annum). Accordingly, it can be concluded that the project is economically feasible. However, the EIRRs are more sensitively affected by changes in the project cost or amount of the benefits, compared with the stability of the efficiency in the New Cebu Port case.

This implies that attention should be paid for unexpected changes in the values of the two items from the planned or estimated ones.

(2) Functions of Cebu Baseport

Functions of the Cebu Baseport of handling all volume of the foreign trade cargoes and 10 % of domestic containerized cargoes, which have to be performed in the "Without" project case of the New Cebu Port, are planned to be transferred to the New Cebu Port in 2009. After the year 2009, Baseport will work as a main seaport in the Region 7 which will handle domestic trade cargoes and passengers.

(3) Construction Cost

The construction costs of the project by the investment phases is as follows:

(unit : million pesos at 2001 economic prices)

Short-term investment period	:	756
Second phase investment	:	503
(total) Long-term investment period	:	1,259

The construction cost corresponds to 7.2 % of the New Cebu Port project. Total economic cost of the construction is smaller by 6.9 % than the total financial cost by the same reason pointed out in the case of the construction cost of the New Cebu Port project.

(4) Benefits

The following three (3) benefit items can be enumerated:

Benefit 1: Recovery benefit of treatment capacity of domestic trade cargoes,

Benefit 2: Improvement benefit of treatment efficiency of domestic trade cargoes, and

Benefit 3: Reduction benefit of embarkation and disembarkation time cost of passengers.

Among the three Benefit items, amount of the Benefit 1 is largest which is 50.8 % of the total amount of the Benefits in 2020.

(5) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 7.1.2 EIRR for Cebu Baseport Long-term Plan (unit: %/annum)

		Benefits			
		20% down	10% down	Base case	10% up
Project cost	20% up	n.a	n.a	8	15
	10% up	n.a	5	15	20
	Base case	n.a	14	20	25
	10% down	13	20	26	30

7.1.4 Economic Analysis on the Toledo Port Project

(1) Conclusion on the Analysis

EIRR of the base case of the long-term project is estimated to be 25 %/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippines. Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 20 % and at same time, the benefits were decreased by 20 % from the base case (15 %/annum), the project continues to be economically feasible.

(2) Functions of the Port

The functions of the port are as follows:

1. Handling of domestic trade cargoes, and
2. Handling of passengers.

There would basically no any change in the functions between now and in future. However, the port is planned to be positioned as a main intermediate government port located at the west side of the Cebu Island. It would be able to handle cargoes and passengers whose OD pairs of not only the Toledo area and the Negros Island but also the Cebu urban area and the Negros Island. As a result, volume of the cargoes and number of the passengers to be accommodated at the port are expected to increase at a high pace in future.

(3) Construction Cost

The construction cost of the project (the long-term investment plan) is as follows: 901 million pesos at 2001 economic prices. Total economic cost of the construction is smaller by 6.9 % than the financial cost by the same reason pointed out in the case of the construction cost of the New Cebu Port project.

(4) Benefits

The following three(3) benefit items can be enumerated:

Benefit 1: Treatment benefit of domestic trade cargoes exceeding the existing cargo handling capacity,

Benefit 2: Reduction benefit of transportation cost the cargoes and navigation cost of RORO ferries, and

Benefit 3: Reduction benefit of embarkation and disembarkation time cost of passengers.

Among the three Benefits, amount of the Benefit 2 is largest which is 50.1 % and the Benefit 1, is 48.5 % of the total amount of the Benefits in 2020.

(5) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 7.1.3 EIRR for Toledo Port Long-term Plan (unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	25	22	19	16
	10% up	22	20	17	14
	20% up	20	18	15	12
	30% up	18	16	13	11

7.1.5 Economic Analysis on the New San Remigio Port Project

(1) Conclusion on the Analysis

EIRR of the base case of the long-term project is estimated to be 27 %/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippine. Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 30 % and at the same time the benefits were decreased by 30 % from the base case (15 %/annum), the project continues to be economically feasible.

(2) Functions of the Port

Functions of the new port as follows:

1. Handling of domestic trade cargoes, and
2. Handling of passengers.

At present, the existing Hagnaya port performs the above-mentioned functions. However, the port will surely not be able to cope with the future traffic demand, because it is financially inefficient for the port to be expanded from the topographical viewpoint of the port. Accordingly, it is more feasible to transfer the functions of the port to a newly-planned port to cope with the future traffic demand on the existing Hagnaya port.

As a result, the newly planned port would function as a main intermediate government port located at the north end of the Cebu Island. It would be able to handle cargoes and passengers whose OD pairs of not only the Hagnaya area and Bantayan Island, but also the Cebu urban area and the Bantayan Island.

(3) Construction Cost

The construction cost of the project (the long-term investment plan) is as follows:

466 million pesos at 2001 economic prices.

The construction cost is almost a half of the cost the Toledo port project. Total economic cost of the construction is smaller by 7.0 % than the financial cost by the same reason pointed out in the case of the construction cost of the New Cebu Port project.

(4) Benefits

The following four(4) benefit items can be enumerated:

Benefit 1: Reduction benefit of cargo damage cost which would be brought about by reception of RORO ferry,

Benefit 2: Reduction benefit of cargo handling cost,

Benefit 3: Treatment benefit of passengers who will not be accommodated due to limit of the handling capacity of the existing Hagnaya port, and

Benefit 4: Reduction benefit of embarkation and disembarkation time cost of passengers.

Among the four Benefits , amount of the Benefit 1 is largest which is 67.9 % of the total amount of the Benefits in 2020.

(5) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 7.1.4 EIRR for San Remigio Port Long-term Plan (unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	27	25	23	20
	10% up	25	23	21	18
	20% up	23	21	19	17
	30% up	22	20	18	15

7.2 Preliminary Financial Analysis

(1) Methodology and Assumption

Financial feasibility of the proposed project has been evaluated in terms of the Financial Internal Rate of Return (FIRR). The tariffs which are scheduled to be revised by January 2001 are employed.

(2) Operation Scheme

It is assumed that CPA shall be the owner of the infrastructure and superstructure shall be leased to Private Sectors at the New Cebu Port, and cargo handling is operated by private sector at Cebu Baseport. The cost (investment) shouldered and the revenue obtained by the CPA are assumed to be as listed in Table 7.2.1.

Table 7.2.1 The Revenues and the Costs in the Calculation of FIRR

	Revenues	Costs
CPA	1) Port Tariff 2) Cargo Handling Fee (Foreign 20%, Domestic 10%) 3) Lease Charge	1) Infrastructure and superstructure 2) Operating expenses by the project such as maintenance, personnel and administration costs

It is assumed that CPA charges Private Sectors fixed P250 million/years from 2009(2 Berth), P500million/year from 2015(4Berth) at the New Cebu Port. (Private sector also pays a part of handling charge to CPA.)

(3) FIRR and evaluation

1) Calculation of FIRR

The results of FIRR calculation are shown in Table 7.2-2

Table 7.2.2 Result of FIRR Calculation

	Cebu Baseport	The New Cebu Port of CPA	Cebu Baseport and the New Cebu Port of CPA
FIRR	5.4%	8.4%	8.2%

If 75 % of initial investment by CPA is covered by soft loan (interest rate of 2%/year) and the rest of the initial cost shouldered by CPA is covered by a loan with an interest rate of 15 % (the real interest rate excluding inflation rate), the weighed average interest rate for the total investment becomes 5.25 %. Since the FIRR calculated above exceeds the weighed average interest rate, the project is assessed to be financially viable. Enhancing capacity of Cebu

Baseport decreases a burden on the New Cebu Port. Therefore, CPA should set up a package of the New Cebu Port and Cebu Baseport.

In cases of Toledo Port and the New San Remigio Port, CPA can cover operating costs using its own revenues, but investment costs. Therefore, construction cost must also be subsidized by the government or municipality, or CPA's assets.

7.3 Initial Environmental Examination (IEE)

7.3.1 IEE for Natural Environment

- (1) The Initial Environment Impact Examination of the Natural Environment of the location of 1) the New Port area Consolacion, the rehabilitation of 2) Cebu Baseport in Cebu City, 3) Toledo Port, 4) San Remigio proposed area has successfully gathered needed information to draw appropriate mitigation for identified impacts as required by the Department of Environment and Natural Resources (DAO 96-37) and the Japan International Cooperation Agency's environmental guidelines for infrastructure study.
- (2) Regarding current situation of natural environmental aspects from the results of our sampling survey in the 4 study sites, it is polluted in the order as follow : 1) existing Cebu Baseport - 2) New Cebu Port (Consolacion) - 3) Toledo Port - 4) San Remigio site especially in the parameter of coliform. That is a cause of population pressure from the populated area such as Cebu city and Lapu-lapu city.
- (3) Regarding current situation of natural environmental aspects from the results of our sampling survey of sea water and seabed (bottom sediment) in the 4 study sites, it is found polluted in the order as follow:

Table 7.3.1 Pollution Level of Each Port

	Copper	Arsenic	Lead	Mercury
Cebu Baseport	High Level	Lower	Lower	Low
New Cebu Port	Lower	Lower	Lower	Low
San Remigio	Very low	Lower	Lower	Low
Toledo	Very low	Lower	Lower	Low

Lower: less than specified range of DENR

Low and Very low means the lower side of the specified range of DENR

High level: higher side of the specified range

- (4) Regarding the mangrove community in the New Cebu Port proposed area Consolacion. The mangrove community concerned will be transplanted at the specified mangrove mitigation area, then the area can be developed for a new port. As a mitigation measure of mangrove area development, mangrove planting plan should be formulated at the tidal flat in north of proposed area in this study project.

- (5) Regarding fauna and flora in 4 study sites, no threatened, extinct and rare species of mangroves, seaweeds, algae, macrobenthic organisms or coral were found in the areas.

7.3.2 IEE for Social Environment

- (1) The Initial Environment Impact Examination of the Social Environment of the location of the New Port- Barangay Tayud, Consolacion and the rehabilitation of the Cebu Baseport in Cebu City has successfully gathered needed information to draw appropriate mitigation measures for identified impacts as required by the Department of Environment and Natural Resources (DAO 96-37) and the Japan International Cooperation Agency's environmental guidelines for infrastructure study.
- (2) Cebu Baseport respondents who are generally poor, migrants and squatters have accepted the reality that they are to be ejected from the area because it is CPA that owns the land. Regarding this case, CPA and the LGU of the Cebu City recognizes the needs of these squatters and hope to resolve this with a Social Development Plan. This Plan will encourage the residents of the area to actively participate in the process of decision making during the Environmental Impact Assessment Phase.
- (3) The socio-cultural and economic survey and focus interviews has generated a profile of the present status of the respondent's environment revealing their perceived negative and positive impacts as well as their suggested mitigation.
- (4) On the other hand, Tayud residents and particularly the shipyard owners feel their responsibility as citizens to respond to the call of local, national and international need for a New International Port. The survey and the focus group interviews further revealed the needs, issues and concerns of the affected residents of which the consultant considered in the section of environmental impacts and mitigation.
- (5) With this project profile, the results of the survey and the focus interviews, this initial examination of the social environment of Cebu Baseport and the New Cebu Port becomes the basis for the Environment Impact Assessment that follows this study.
- (6) The impact assessment shows that the local government units (LGU) will directly earn from Cebu Baseport project through taxes and business permit. The project may prompt the increase in land values around the port area. This becomes a long-term positive impact. Direct and indirect employment opportunities will create labor demand both in port operation and commercial enterprises. Women will benefit from employment opportunities particularly in commercial enterprises. Although Cebu is rich in archeological possibility, it is unlikely that the proposed site will yield finds due to intense use of the area.

In Tayud, Consolacion impact assessment showed that the project will prompt the closure of the shipyards operating in the area resulting in unemployment. On the other hand, the conversion of the use of the shore and off-shore areas will have an impact on food production capacity of the local population. Although the productivity of the fishing ground is relatively low and diminishing, many poor households still depend on it for food.

8. Short-term Development Plan for Cebu Baseport and the New Cebu Port

8.1 Traffic Demand Forecast for the Short-term Development Plan

8.1.1 Demand Forecast of Cebu Baseport

(1) Forecast of Cargo for Short Term Plan

The traffic forecast of tCebu Base port is carried out in the following three cases.

Case 1: The cargo forecast of inbound/outbound of domestic and import/export of foreign cargoes basis is carried out by correlative analysis between GRDP of the hinterland and cargo handling volume at Cebu Baseport in low growth rate of GRDP, medium and high cases. The result is found that the medium case is reasonable.

Case 2: The total cargo demand as forecasted in case 1 is classified by conventional and containerized cargo volume of inbound/outbound of domestic and import/export of foreign trades by setting up the future containerized ratio of respective type of cargo trade and the following impacts “with project” are considered to generate cargo traffic.

- Bulk cargo volume has been small quantity, tentatively it is included as parts of the conventional cargo
- Diversion of Manila transit cargo
- Diversion of traffic from Visayas Region
- Influence of development of the new San Remigio port and Toledo port

Case 3: As commodity basis 18 commodities for domestic trade and 12 commodities for foreign trade out of 35 classified commodity items are selected to forecast the total cargo throughput in Cebu Baseport. The total forecast cargo volume is made similar to case 2 by adjusting the volume of cargo listed in the other commodities.

The summary of the above forecast is shown below.

Table 8.1.1 Cargo Volume for Short-term Plan (Cebu Baseport and the New Cebu Port)

Cargo	Macro Forecast (tons/year)		Micro Basis (tons/year)		
	Case 1	Case 2	Commodity Basis	Rest Items	Total
Domestic Cargo Volume					
Year 2010	11,194,000	10,976,650	9,901,778	1,074,872	10,976,650
Foreign Cargo Volume					
Year 2010	2,726,247	3,140,099	2,698,617	441,482	3,140,099

8.1.2 Demand Forecast of Containerized Cargo Volume

(1) Forecast of Containerized Cargo Volume

The forecast is carried out for inbound/outbound of domestic trade and import/export of foreign trade based on the estimated containerized ratio of respective mode of transport thereof. Table 8.1.2 shows the results of forecast conventional and containerized cargo volume of inbound/outbound of domestic and import/export of foreign cargo.

Table 8.1.2 Forecast of Containerized and Conventional Cargo, Cebu Baseport for Short-term Plan

Unit: Metric Tons

Year and Cases		Domestic Cargo			Foreign Cargo		
		Inbound	Outbound	Total	Import	Export	Total
2005	Conventional	1,764,058	2,531,455	4,295,513	488,780	22,907	511,687
	Containerized	1,760,518	2,212,019	3,972,537	910,887	313,961	1,224,848
2010	Conventional	2,217,807	3,379,424	5,597,231	441,877	35,147	477,024
	Containerized	2,131,503	3,247,916	5,379,419	2,092,727	570,348	2,663,075

(2) Forecast of Number of Container

The number of estimated container in TEU is worked out by the following factors:

- 1) Containerization Ratio of inbound/outbound of domestic trade and import/export of foreign trade,
- 2) Cargo Volume per TEU,
- 3) Estimated ratio of "full" and "empty" containers in future based on the actual trends of Cebu Baseport during 1998 to 2000

The Table 8.1.3 show the results of number of full and empty containers, inbound/outbound of domestic and import /export of foreign cargo.

Table 8.1.3 Number of Inbound/outbound of Domestic and Import/Export of Foreign Containers at Cebu Baseport

Unit: TEU

Domestic Cargo						
Year	Inbound			Outbound		
	Full	Empties	% of Full	Full	Empties	% of Full
2000	127,660	23,751	84%	83,231	65,676	56%
2005	157,189	43,175	78.5%	160,291	40,073	80%
2010	190,313	92,115	67.4%	235,356	47,071	83.3%
Foreign Cargo						
Year	Import			Export		
	Full	Empties	% of Full	Full	Empties	% of Full
2000	39,095	11,922	77%	42,759	10,167	81%
2005	79,902	18,439	81.2%	56,064	42,277	57%
2010	183,573	38,940	82.5%	101,848	120,664	45.8%

Source: CPA Data

Note: Total for year 2000 are summed up of 1-12 months of original data.

8.1.3 Demand Forecast of Cargo Volume by Commodity Basis

(1) Correlation Coefficient for Commodity Projection:

The commodity wise forecast is worked out by the regression formula established from the correlation coefficient of the economic index like sector GRDP, manufacturing, construction and industry sectors of each commodity.

(2) Demand Forecast of Cargo Volume by Commodity Basis

The cargo forecast by commodity basis at the Cebu Baseport project is summarized in Table 8.1.4.

Table 8.1.4 Summary of Domestic and Foreign Cargo Forecast by Commodity Basis at Cebu Base port

Unit: Metric. ton

Year	Domestic			Foreign		
	Inbound	Outbound	Total	Import	Export	Total
2005	3,524,576	4,743,474	8,268,050	1,399,668	336,868	1,736,536
2010	4,349,310	6,627,340	10,976,650	2,534,604	605,495	3,140,099

(3) Demand Forecast of Cargo Traffic for the Short-term Plan

It is anticipated that foreign container cargo will be directly delivered /collected from the New Cebu Port which at present are treated as domestic cargo through the Manila (North harbor) port for transshipment. Such transshipment of domestic containerized cargo is converted into the foreign containerized cargo and subtracted from the domestic cargo.

The cargo demand forecast derived from the commodities basis will be more accurate and projected trends of cargo and economic activities, which volume thus are taken for planning the project as shown below.

Table 8.1.5 Demand Forecast of Cargo Volume for the Short-term Development Plan

Domestic Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Inbound	Outbound	Total	Inbound	Outbound	Total	
2000	1,435	1,506	2,941	1,426	1,148	2,574	5,515
2010	2,218	3,379	5,597	2,132	3,248	5,380	10,977
Foreign Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Import	Export	Total	Import	Export	Total	
2000	442	17	459	446	239	685	1,144
2010	442	35	477	2,093	570	2,663	3,140

8.1.4 Demand Forecast of Passenger Traffic

(1) Macro Forecast of Passenger Traffic

The forecast of passenger traffic was carried out based on the correlation of population in the direct hinterland, region 7 and passenger traffic through the port as in Case 1 and based also on the correlation of population in the 10 indirect hinterlands as in Case 2. Table 8.1.6 shows the estimation result thereby.

Table 8.1.6 Forecast of Passenger Traffic at Cebu Baseport

Unit: No. of Passenger

Year	Case 1 (Direct Hinterland)		Case 2 (Indirect Hinterland)	
	Population Region 7	Passenger (Actual)	Population Share of Indirect Hinterland	Passenger (Actual)
2000	5,701,064	10,059,048	100.0%	10,059,048
Projected population				
2005	6,245,222	14,513,871		13,053,783
2010	6,757,759	18,463,944		17,220,944

(2) Forecast of Passenger Traffic by Vessel Types through the Cebu Baseport

The passenger traffic forecast is estimated based on the traffic trends by type of vessels calling to Cebu Baseport.

Considering the passenger traffic to be sensitive to characteristics of vessel types and to quality of service, the conservative passenger traffic forecast as estimated in the micro projection above is suggested for the short-term plan.

Table 8.1.7 Summary of Passenger Traffic Forecast by Types of Vessel, Cebu Baseport

Unit: No. of Passenger

Year	Large RORO	Fast Craft	Conventional	Metro Bus	Small Craft	Total
2000	668,575	1,799,617	5,217,768	2,288,979	84,109	10,059,048
2005	905,803	2,438,169	6,827,077	2,288,979	76,028	12,536,057
2010	1,227,207	3,303,298	8,932,743	2,288,979	68,723	15,820,949

8.2 Short-term Development Plans

8.2.1 Required Facilities for Short-term Plans

The required facilities for short-term plans are obtained using the same formula in section 6.4.1.

(1) The New Cebu Port

Table 8.2.1 Required Facilities for the New Cebu Port

	Berth length (m) (No. of berths)	Berth depth (m)	Others
Foreign Container Terminal	600 (2)	13	Area: 30ha 5 gantry cranes
Foreign Multi-Purpose Terminal	190 (1)	10	Area: 2ha Shed
Service Boat Mooring Area	pontoon	3	
	Length (km)	Width (m)	
Access Road	1.8	19	Two (2) lanes

(2) Cebu Baseport

Table 8.2.2 Required Facilities for Cebu Baseport in 2005, 2008, and 2010

	Berth length (m) (No. of berths)			Others
	2005	2008	2010	
Foreign Container Terminal	220 (1)	440 (2)	-----	
Foreign Multi-Purpose Cargo Terminal	180 (1)	180 (1)	-----	
Large RORO Ferry Terminal	450 (1)	450 (2)	450 (2)	Passenger Terminal (3,500m ²)
Middle RORO Ferry Terminal	600 (10)	660 (11)	660 (11)	RORO ramps Passenger Terminals (2,800m ² x 2)
Domestic Container Terminal	350 (2)	350 (2)	175 (1)	
Domestic Conventional Cargo Terminal	600 (6)	800 (8.0)	900 (9)	
Passenger/Cargo Terminal	840 (14)	780 (13)	780 (13)	
Fast Craft Terminal	110 (4)	165 (5)	165 (5)	
Metro Bus Ferry	Pontoons (2)	Pontoons (2)	Pontoons (2)	

8.2.2 Required Equipment for Short-term Plan (2010)

The equipment to transport containers between the vessel and quay-side apron is the most important element in the container terminals, because the berth occupancy time of the vessel depends on the container discharging/loading capacity of the equipment.

Container vessels are designed as Lift on/Lift off system in order to accommodate as many containers as possible within the limits of the vessel's dimensions. All major container terminals in the world are equipped with quay-side gantry cranes at their berths. Each quay-side gantry crane may handle 25~35 boxes or more per hour.

The following methods are considered as the operation system between the quay-side apron and CY. Rubber Tier Mounted Gantry Crane (RTGs) system is recommended for the New Cebu Port container terminal.

- Rubber Tier Mounted Gantry Crane (RTGs) system
- Straddle Carrier System
- Top-Lift / Reach Stacker System
- On Trailer (Chassis) System

(1) Summary of the New Cebu Port Container Handling Equipment

Table 8.2.3 Required Container Handling Equipment in 2010

Kind of Container Handling Equipment		Number of Units
Quay-Side Gantry Crane (QSGC)		5 Units
Rubber Tire Mounted Gantry Crane (RTGs)		14 Units
Prime Mover	Tractor Head	33 Units
	Trailer(20/40/45'Combine Type)	40 Units

(2) CFS Cargo Handling Equipment

The New Cebu Port is assumed to require a warehouse (CFS) with 3,200m² (80m length and 40m width). The following number of fork lift trucks should be prepared for LCL cargo handling.

Table 8.2.4 Required LCL Cargo Handling Equipment on 2010

Capacity of Forklift	Container Side	Truck Side
2.5 tons Low Mast Type	2 Units	2 Units
3.0 tons Low Mast Type	1 Unit	1 Unit
5.0 tons Normal Type	1 Unit	
10.0 tons Normal Type	1 Unit	

(3) Multipurpose Berth Conventional Cargo Handling Equipment.

Table 8.2.5 Required of Multipurpose Berth Cargo Handling Equipment

Capacity of Forklift	Number of Unit
3.5 tons Normal Forklift	4 Units
5.0 tons Normal Forklift	2 Units
10.0 tons Normal Forklift	1 Unit

8.2.3 Layout and Phasing Plans

(1) The New Cebu Port

Considering the present foreign container capacity of CIP (300 thousand TEUs/year at quay side and 220 thousand TEUs/year at land side) and future demand of container cargoes, the New Cebu Port should be developed at the earliest schedule. The New Cebu Port is assumed to start its operation with all required facilities in the short-term plan, including two (2) container berths, one (1) multi-purpose berth, and access road, in 2009.

Layout plan of the short-term is shown in Fig. 8.2.1-8.2.4.

(2) Cebu Baseport

1) Layout Plan in 2010

After the inauguration of the New Cebu Port, only domestic cargoes and passengers will be handled at Cebu Baseport. Layout plan in 2010, based on the master plan and required facilities, is shown in Fig.8.2.5.

2) Development Plans in Short-term

Considering required facilities in short-term, urgency of each project, and on going rehabilitation works at pier 2 and berths of B28-30, the following development plans are proposed for the short-term. (See section 6.4.2)

- a) Expansion (30m off-shore) of backyard of conventional cargo berth (B21, 22, 24, 25)
- b) Renovation of pier1 and 3, including expansion of width of pier1 for large cargo vessels
- c) Construction of passenger terminal buildings with boarding bridge and elevated catwalk for RORO ferries
(one (1) passenger terminal building with boarding bridge for large RORO ferries and two (2) passenger terminal buildings with elevated cat walk for middle RORO ferries.)
- d) Expansion of back-up area for RORO ferries
(In particular, expansion of back-up area for RORO ferries and foreign container handling area is required until the foreign cargo vessels will be shifted to the New Cebu Port)

3) Phasing Plan

The development plan is basically separated into two (2) phases. Main work of phase 1 is extension of back up area of the berths in PMO 2, up to 2005. The period of phase 2 is 2006-2010 and main work is renovation of piers and berths in PMO 3 & 4. (See Table 8.2.6)

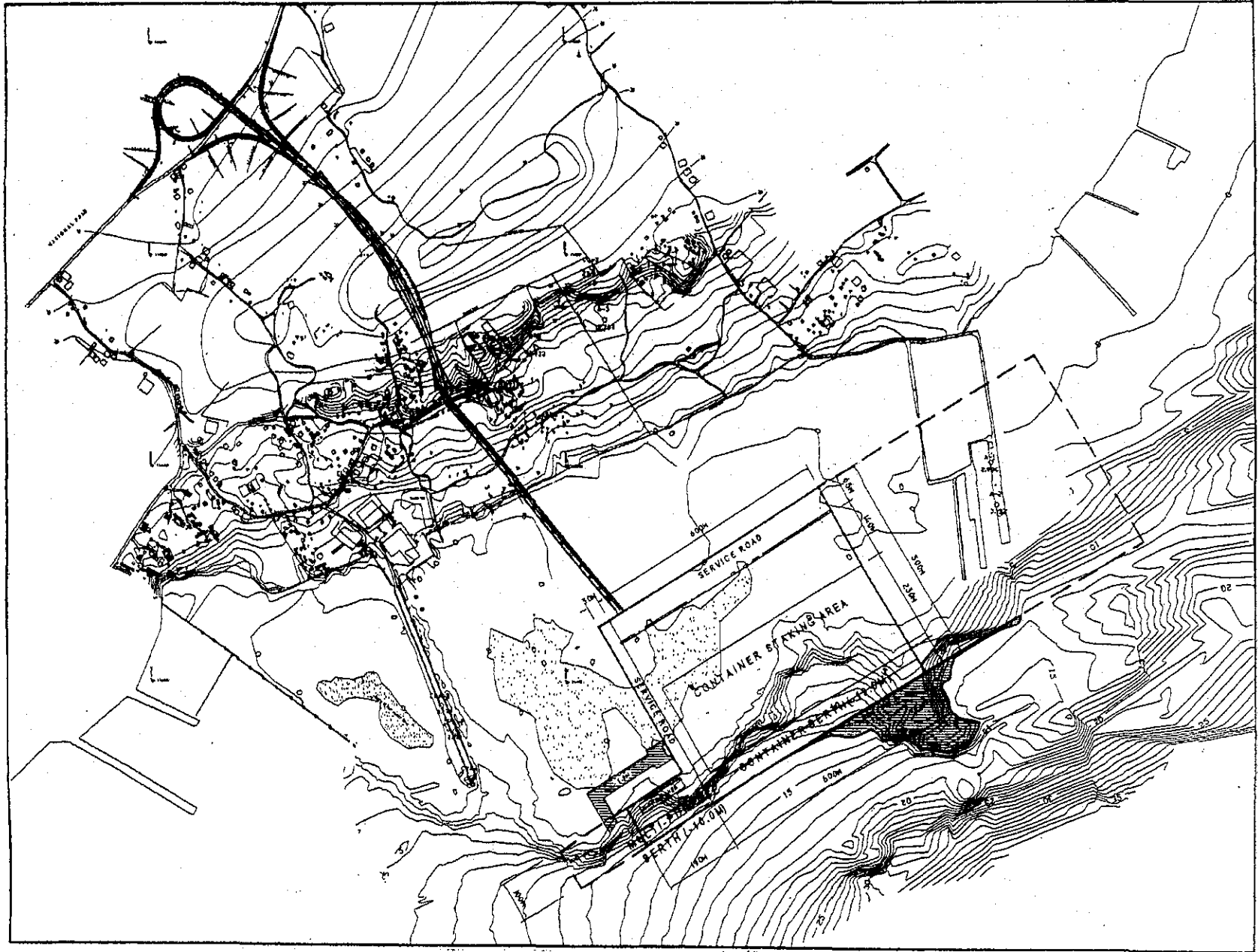


Fig.8.2.1 Short-term Development Plan of New Cebu Port(1)



Fig. 8.2.2 Sort-term Development Plan of New Cebu Port(2)

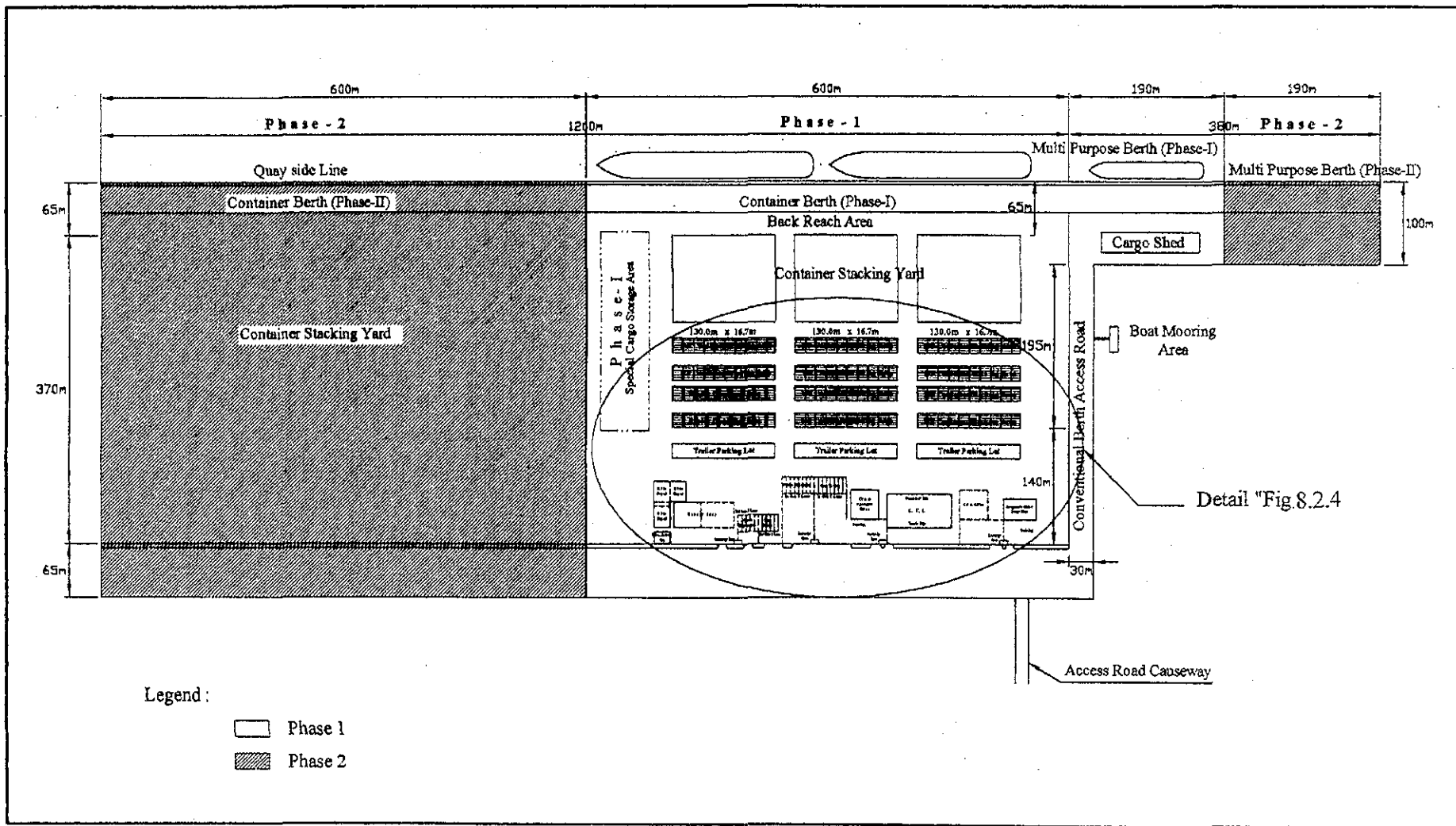


Fig. 8.2.3 Container Terminal Layout Plan

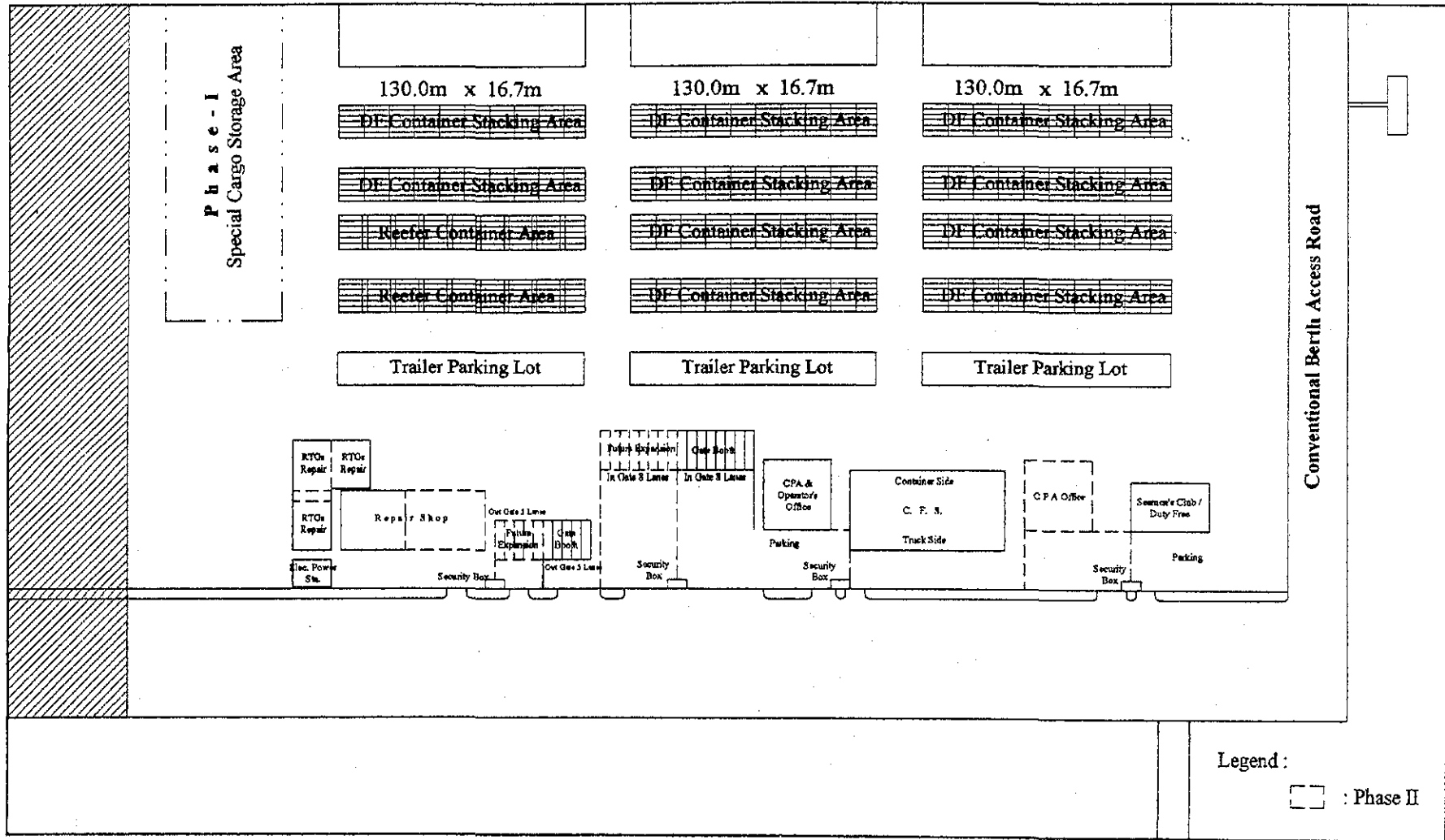


Fig.8.2.4 Container and Office Allocation Plan

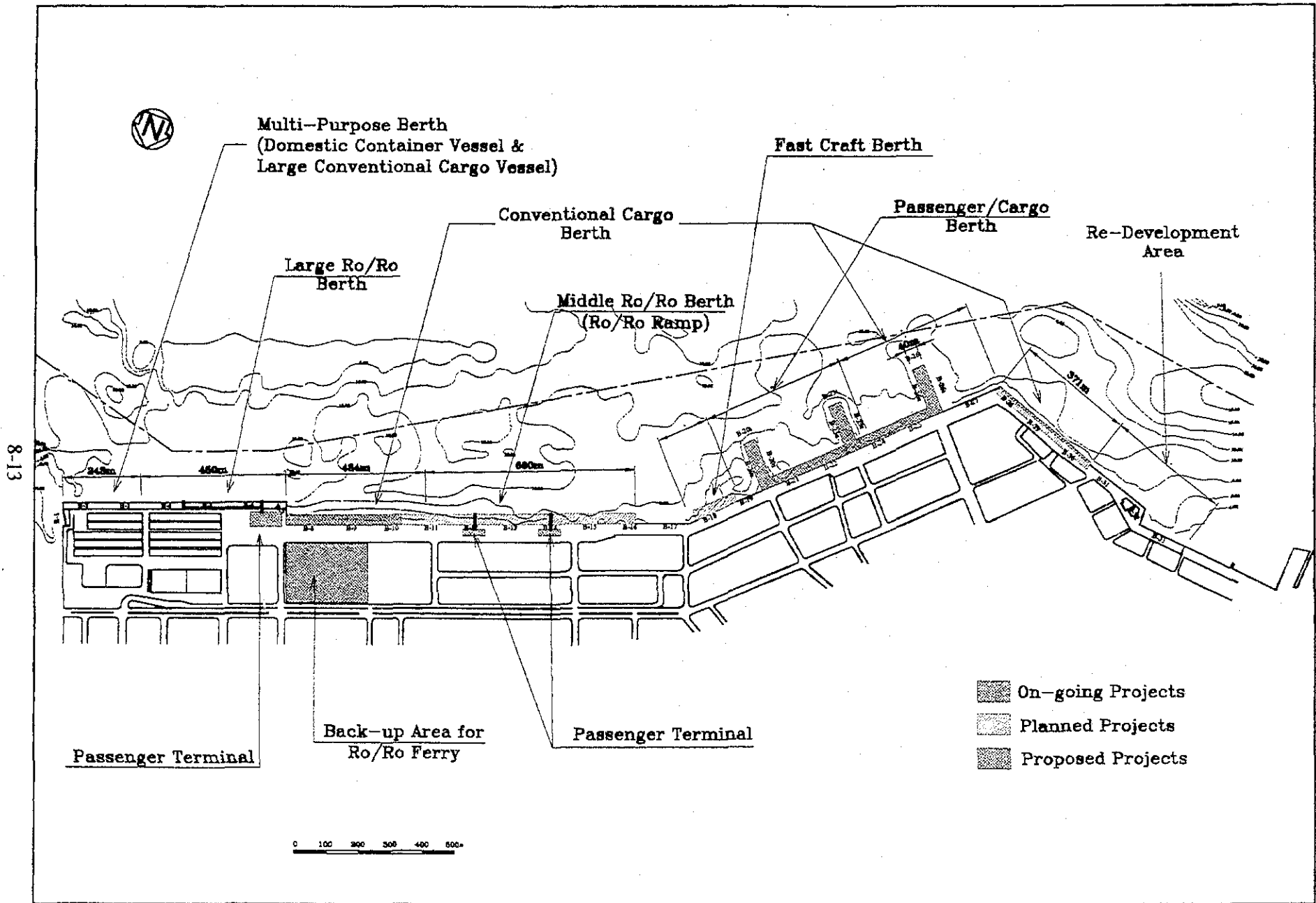


Fig. 8.2.5 Cebu Baseport Development Plan (2010)

Table 8.2.3 Development Schedule of Cebu Baseport

PROJECT DESCRIPTION	QUANTITY	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(PMO 1) Passenger Terminal Building (Large RO/RO)	7,000 m ²										■	■					■	■				
(PMO 2) Rehabilitation of Quaywall & Extension of Back-up Area (Berth 8-10)	354 m	■	■																			
Convert Existing Marginal Wharf for RO/RO ramp & Extension of Back-up Area (Berth 10-12)	301 m (RO/RO ramp 221m)			■	■																	
Convert Existing Marginal Wharf for RO/RO ramp & Extension of Back-up Area (Berth 13-14)	240 m					■	■															
Convert Existing Marginal Wharf for RO/RO ramp & Extension of Back-up Area (Berth 15-16)	199 m						■	■														
Convert Existing Marginal Wharf for RO/RO ramp & Extension of Back-up Area (Berth 17)	60 m																	■	■			
Passenger Terminal Building (Middle RO/RO)	2,800 m ² x 3			■	■		■	■														
Back-up Area Expansion for RO/RO Ferry	6 ha					■	■															
(PMO 3-4) Rehabilitation & Expansion of Pier 1	320 m							■	■													
Rehabilitation of Pier 2	343 m	■	■																			
Expansion of Pier 2	290 m																	■	■			
Rehabilitation of Pier 3	313 m										■	■										
Passenger Terminal Building & Berthing Facility for Fast Craft (Berth 18-19)				■	■																	
Extension of R.C. Deck & Back-up Area (Berth 21-22)	260 m											■	■									
Extension of R.C. Deck & Back-up Area (Berth 24-25)	250 m								■	■												
(PMO 5) Rehabilitation of Fender System (Berth 28-30)	371 m	■	■																			
Rehabilitation of Working Apron & R.C. Deck (Berth 28-30)	371 m			■	■																	
Expansion of R.C. Deck and Back-up Area (Berth 28-30)	371 m																	■	■			

8.2.4 Evaluation of the Water Calmness at the New Cebu Port

The probability of the water calmness within the limit wave height (0.5m) for cargo handling operation at the proposed berthing areas are calculated and shown in Table 8.2.7.

Table 8.2.7 Water Calmness at New Cebu Port

Area	Probability of water calmness within the limit wave height
Short-Term Plan	97.6 %- 98.5 %
Long-Term Plan	97.5%
Future Development Plan	90.5% - 93.6 %

Short-term plan consists of the development of berthing facilities by the year 2010 and comprises 600 m container berth and 190 m multi-purpose berth. Long-term plan is the area for 600m expansion planned for the year 2020 and Future Plan is an area in the north-east of the long-term plan.

The port should be operational for more than 97.5 % of the time throughout the year. The berth area for the short-term and long-term plan is generally calm with the probability of workable days between 97.6 and 98.5 % as it is protected from outside waves mainly by Mactan Island. However, in the future plan, when the berths are extended to North East, the probability of workable conditions is as low as 90 % to 94%. Therefore the wave calmness will become a critical issue in expanding the port to North East in the future. Thus, further studies will be needed.

In this study, wave is estimated from observed wind data, however, to make the future wave assessment more accurate with use of actual recorded data, it is useful and proposed to install a wave gauge as soon as possible to continuously monitor and make a wave record for a long period.

8.2.5 Evaluation of Berthing Capacity

A numerical simulation model "Witness", was employed to evaluate whether the port capacity would be sufficient to deal with the increasing cargo and vessel traffic throughout the planning period.

Berth occupancy rate and average waiting time are shown in Table 8.2.8, Table 8.2.9, Table 8.2.10 and Table 8.2.11.

Table 8.2.8 Berth Occupancy Rate of the New Cebu Port

Berth	Berth occupancy rate
Container	0.72
Conventional	0.60

Table 8.2.9 Berth Occupancy Rate of Cebu Baseport

Berth	Berth occupancy rate	
	Two way	One way
Large RoRo	0.66	0.66
Middle RoRo	0.67	0.67
Container	0.30	0.30
Conventional	0.58	0.58
Passenger Cargo	0.42	0.42
Fast Craft	0.41	0.41
Metro Bus	0.50	0.50

Table 8.2.10 Waiting Time of the New Cebu Port

Berth	Average waiting time(minutes)
Container	18
Conventional	0

Table 8.2.11 Waiting Time of Cebu Baseport

Berth	Average waiting time(minutes)	
	Two way	One way
Large RoRo	0	0
Middle RoRo	0	0
Container	0	0
Conventional	0	1
Passenger Cargo	0	0
Fast Craft	0	0
Metro Bus	0	0

In the case of the New Cebu Port, short waiting time occurs. But it does not adversely affect the schedule of a container ship. In the case of Cebu Baseport under two-way, there is no-waiting time. In the case under one-way, there is a little waiting time. Therefore, CPA should set up one-way by VTMS (Vessel Traffic Management System).

8.3 Engineering Design

8.3.1 Design Concept of Quay Wall Structure

The type of berth structures is determined considering the environmental considerations, topographic, hydrographic and soil conditions of site. The design concept of the berthing facilities of the New Cebu Port and Base port is described as follows:

(1) Design of Quay Wall Structure of the New Cebu Port

The same type of berth structure for Container Berth and Multipurpose Cargo Berth is adopted, considering the soil conditions and future possibility of utilization by container vessels.

From the detailed review of the soil data at site, the soil layers are found to be coral mixed fragment soil conditions. The berth structure using SPSP is found suitable in terms of the cost, construction period and environmental considerations. The typical section is shown in Fig. 8.3.1.

The berthing facility at the small boats basin for servicing boats like tug boats and pilot boats is planned on the landside of the multipurpose cargo berth. The access channel and basin in front of the berth will be dredged to the depth of - 3.0 m. The berthing structure is designed with reinforced concrete pontoon (25 m x 10 m x 2.6 m) anchored by steel pipe pile.

(2) Design of Pier 1 and 3 at Cebu Baseport

1) Reconstruction of Pier No.1 for large cargo vessel

Due to heavily damaged conditions of existing pier structure, the berthing facilities as a whole will be reconstructed for use of cargo vessel of 2,000 DWT.

The quay wall structure using SSP is considered advantageous in terms of cost, construction period and environmental aspects due to simple construction method and minimum environmental impacts.

2) Rehabilitation of Pier No.3 for passenger vessels

The pier No.3 is used for small passenger vessels of 500 GRT class. The existing concrete piles at the central parts of the pier is used for supporting upper structure, but some of the heavily damaged piles along the periphery of the pier will be replaced with new concrete piles to be driven adjacent to the damaged pile.

The existing upper structures of pier No 3 shall be demolished and new upper structures of reinforced concrete beams and slab will be reconstructed on the top of the existing concrete piles.

(3) Design Concept of Access Road Way Structure

1) Planning of Access Road Route

Design traffic volumes inside the New Cebu Port area and access road for the short -term plan of year 2010 are estimated at 351 car /hr.

According to the traffic volume, for the short-term plan, 2 lanes (15.5 m width) will be enough but the area of 4 lanes (18.9m width) will be reserved for the long-term plan.

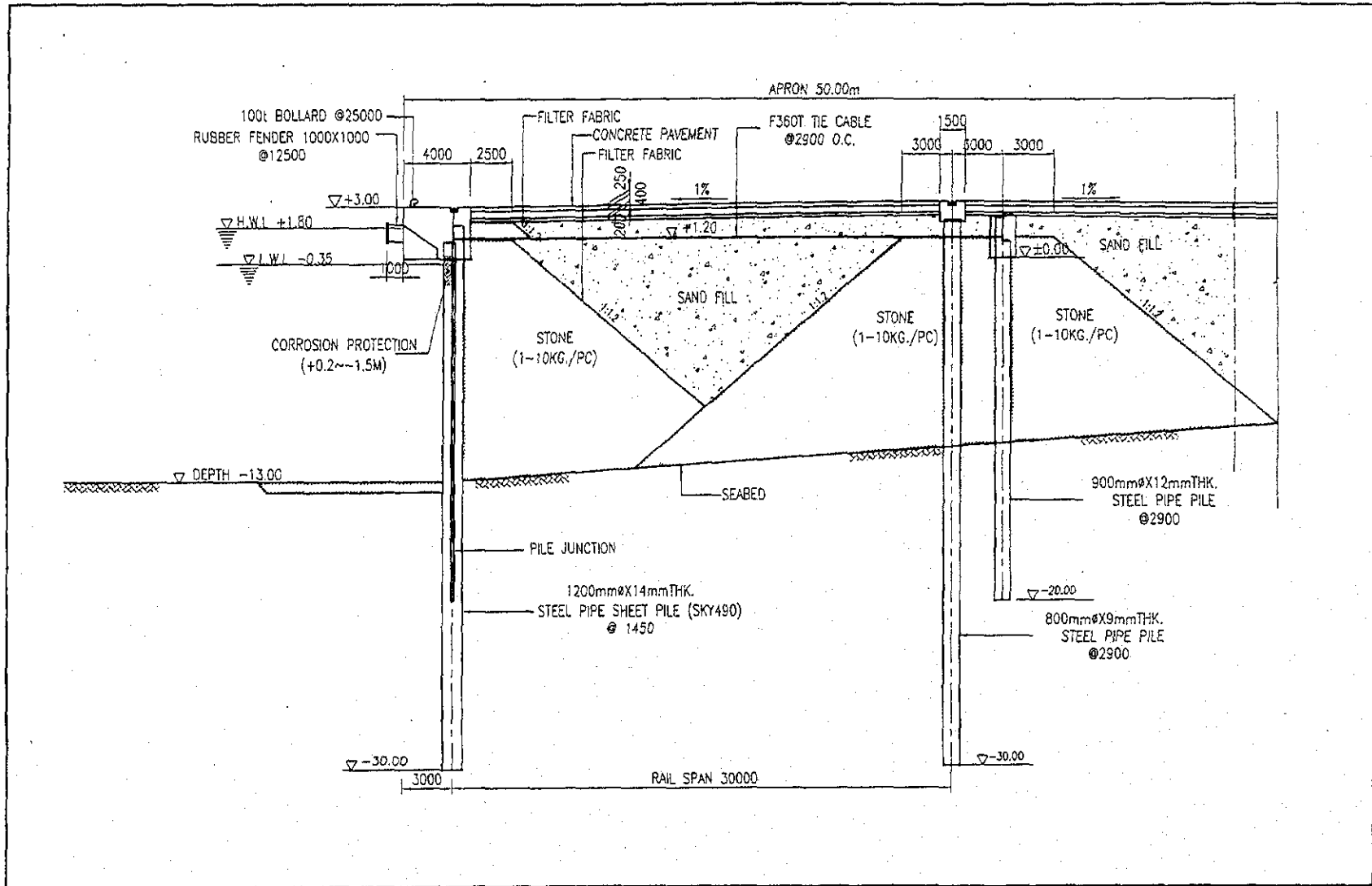


Fig 8.3.1 Typical Cross Section of Container Berth

From the environmental point of view, the access road on the offshore area till the port area is planned by combination of flyover and the causeway to connect the reclamation area so as to make water flow around the reclaimed port island by the tidal current.

2) Design Concept of Bridge Pier, Beams and Foundation

On the short-term plan, the foundation and pier to support the beams of the flyover structure should be designed to sustain the loads on the 4 lanes width required for the long-term plan. Thus the land acquisition of the access road parts should be 4 lanes portion (18.9 m width). But for the short-term plan, the beams shall be placed on the pier for 2 lanes portion (15.5 m width).

The cutting width on the hilly parts should be reserved for 4 lanes portion, but for the short-term 2 lanes with shoulder on both sides will be paved with concrete. The remaining parts will be reserved for future development.

3) Design Concept of Foundation and Upper Structure of Flyover

The PC concrete piles will be used for foundation of pier column of the flyover. The length of piles is estimated based on the site reconnaissance survey of the land area and soil investigation data. The footing foundation will be constructed around every 30 m interval starting from the reclaimed area of the New Cebu Port island.

The superstructure of 15.5 m width of the road area for short-term plan will be constructed with 8 pieces of PCI-girder (span = 30 m) for one span and concrete pavement on the slab made on the PC I-girder beam.

(4) Concept of Container Handling Equipment

1) Container Quay Crane

Outline specification of quay cranes for Panamax size container vessels is planned with the following dimension. The outline of the planned quay crane is shown in Fig. 8.3.2.

Span	30.0 m
Outreach from sea-side rail center	Min. 37.5 m
Back reach from land-side rail center	Min. 11.0 m
Lift: Total:	Min. 37.0 m
Above rail level	Min. 26.0m
Below rail level	Min. 11.0 m
Max. boom height above rail	48.90 m
Overall width	Max. 27.0 m (Bumper free)
Power supply by electricity:	A.C. 6,000 V, 50 Hz, 3 Phase
Hoisting Capacity	40.0 ton

2) RTG Crane

The RTG is planned to have the space of 4 stack plus 1 over pass, 6 rows plus 1 trailer lane, with the following specification:

- Auto-steering system
- Anti-sway control system
- Spreader skew adjusting device
- 90-degree steering for changing traveling lane
- Monitoring system

Rated load (under the spreader):	40.6 Metric Tons
Type of spreader	20 ft / 40 ft telescopic spreader
Span:	23.5 m
Lift - Lowest:	GL + 0 m
- Highest:	GL+ Min. 15.2 m
Wheel base:	Min. 6.4 m
Overall width:	Max. 12.2 m
Number of gantry wheels:	4 tires / corner (total 16 wheels)
Power supply	Diesel engine electric power generator on the crane

8.4 Cost Estimation for Short Term Plan

8.4.1 Financial Source and Executing Body

In preparing a implementation program and cost estimation, it is assumed that majority of construction of the New Cebu Port and a part of the rehabilitation works in Cebu Baseport will be undertaken with ODA fund while the rest of the works may be executed either by CPA or private operators with their own financial sources or local funds. The financial sources and the executing bodies are assumed as shown in Table 8.4.1.

Table 8.4.1 Financial Sources and Executing Bodies

Description	Financial Source	Executing Body
The New Cebu Port		
Civil Works, Buildings , Quay Gantries	ODA	CPA
Cargo Handling Equipment except for Quay Gantry	Private Operator(s)	Private Operator(s)
Cebu Baseport		
Rehabilitation/Expansion of Berth 8 - 16, 21 - 25, 28 - 30 Pier 1, 2, 3	CPA/ Local Fund/ ODA	CPA
Passenger Terminal, Open Yard	Private Company(s)	Private Company(s)

8.4.2 Estimate of Project Cost

Cost estimates are based on the current market prices in June 2001, of materials, fuel, labor rates and equipment rates prevailing in Cebu and other regions inside the country.

US\$ 1.00 = 52.5 Pesos = 125 Yen, 1 Peso = 2.38 Yen

The estimated capital cost for the development of the New Cebu Port is approximately 9.3 billion pesos (or equivalent to 22.2 billion yen) and the rehabilitation work of Cebu Baseport is approximately 2.7 billion pesos (6.3 billion yen), within which approximately 30 % is proposed to be developed by CPA. The local currency component for each port development will be 31 % and 37 %. Such estimated costs include construction of civil and buildings facilities such as dredging, reclamation, berth and pavement, procurement of equipment, land acquisition, engineering service, contingency and VAT. The summary of capital cost for the proposed plans are shown in Table 8.4.2.

Table 8.4.2 Estimated Cost for the Short-term Plan

Description	New Cebu Port (Million Pesos)	Cebu Baseport (Million Pesos)
CPA's Original Plan	—	732.5
Proposed Plan for CPA	5,974.1	626.7
Construction	4,389.0	—
Equipment	1,500.0	—
Other (land, compensation, etc)	85.1	—
Proposed Plan for Private Companies	1,220.5	693.3
Total	7,194.6	2,052.5
Engineering Cost	497.7	143.7
Contingency (10%)	769.2	219.6
VAT (10%)	846.1	241.6
Grand Total	9,307.6	2,657.3

8.5 Implementation Planning

Major concerns in construction works and construction schedule are described hereunder.

8.5.1 Marine Works

(1) Pile Driving

Approximately 1,300 steel pipe piles with the diameter between 800 mm and 1200 mm and the length between 20 m and 32 m are to be driven. 2 barge mounted piling rigs will be employed, one for driving sea-side sheet piles and the other for landside piles.

(2) Dredging

The dredging volume is estimated at approximately 170,000 m³. In the implementation plan, 6 m³ capacity Grab Dredger is considered for the scheduling and cost estimation purpose with the average dredging volume of 1,500 m³/day.

(3) Reclamation

Total volume of 1,300,000 m³ of soil is required to fill the area of 331,000 m². The filling material can be obtained from the quarries near the project site. The material may be transported by barge or by trucks with approximate volume of 5,000 m³/day.

According to the soil investigation, a normally-consolidated soft clay layer with a thickness of 3 - 5 m is found at a depth around -6 to -12 m. Thus, reclamation and other loads such as container stacking will result in consolidation settlement. The settlement is estimated at around 20 cm at the shallow area and 80 cm at the deep area. The required time for 80 % consolidation is estimated at 4 to 8 months.

(4) Rock Works

Approximately 480,000 m³ rocks are required. Good quality material may be obtained in Cebu Island.

8.5.2 Environmental Considerations

Some construction activities may cause negative impact on the environment. Those activities and possible impact are:

- Piling work - noise and vibration

- Waste material dumping - industrial waste

- Dredging and Reclamation- water pollution

- Traffic of construction equipment such as dump truck - noise, vibration, dust, accident

8.5.3 Overall Construction Schedule

A total estimated construction period will be 36 months. According to the master schedule, construction will start in the beginning of 2006 and finish in the end of 2008

8.5.4 Renovation Works of Cebu Baseport

The renovation works of Cebu Baseport are basically concrete deck type quay construction, sheet pile type quay construction and building works, which are mainly continuation of the on-going works. The work types and locations are shown below.

Table 8.5.3 Work Types of Cebu Baseport Renovation

Work Type	Description	Location
Quay Construction (concrete deck type)	Concrete piling, concrete decks, paving, fender installation	Berths 8 - 16, 18 - 19, 21 - 22, 24 - 25, 28 - 30, Pier 3
Quay Construction (sheet pile type)	Sheet piling, paving	Pier 1 and 2
Building Works		Passenger Terminal Building (Large RORO, Middle RORO and Fast Craft)

8.6 Investment Plans

8.6.1 Private Sector Participation for Container terminal Development

(1) Port Operation of Container Berth

1) The actual situation of CIP

- ① CPA contracts with OPASCO for 10 years.
- ② CPA provides the cargo handling service.
- ③ Public berth
- ④ CPA imposes 20 % of handling charge.

2) Manila International Terminal Company

- ① PPA contracts with MITC for 25 years.
- ② PPA leases quay and landside.
- ③ Commercial berth
- ④ PPA imposes 10 % of handling charge.

3) Asian Terminals Incorporated

- ① PPA contracts with ATI for 25 years.
- ② PPA leases quay and landside.
- ③ Commercial berth
- ④ PPA imposes 20 % of handling charge and P300 million fixed charge every year.

(2) Basic scheme of privatization at the New Cebu Port

Infrastructure is constructed by the public sector which leases it to the private operator. Infrastructure should include quay side gantry crane, because a large investment is required for infrastructure and involves greater risks. Moreover, CPA can use funds with lower interest to finance the initial investment. Cargo handling equipment and buildings will be the responsibilities of the private sector (lessee). Private sector aims at high productivity with efficient investment based on its experience and know-how.

In selecting a leasing system, CPA should give priority to maintaining public use and increasing efficiency. CPA should lease berth and landside, because high efficiency can be secured by unified operating. However, the New Cebu Port is not used by only one shipping company, it is used by plural shipping companies. When CPA enters a contracts with private sector, it should contain a provision to ensure that at least one berth is for public use. Moreover, CPA should lease facilities to two private operators. Since competition is generated, efficiency

is increased. However, both private operators should introduce computer systems to maximize efficiency, and they should cooperate with each other.

(3) Scheme of Leasing Fee

For preparation of the lease, it is important to analyze and decide how to recover the investment and related cost. CPA should adopt combinations of the variable fee and fixed fee. Moreover, CPA should set up a minimum volume and offer incentives to exceed that fee.

8.6.2 Investment Plans

The investment plans for the New Cebu Port and Cebu Baseport are as follows.

(1) The New Cebu Port

1) Container Terminal

A lease system is recommended and CPA will invest in infrastructure and quay gantry cranes. The private sector should invest in superstructure.

2) Multi purpose Terminal

Multi purpose berth is public infrastructure for various users and should be constructed by CPA.

3) Access Road

Access Road is essential infrastructure for port activities and should be constructed by CPA.

(2) Cebu Baseport

All planned projects, except relocation of the fast craft terminal, are to be conducted by CPA. The proposed renovation and improvement of the existing port facilities should be conducted by CPA, while the development of passenger terminal buildings basically should be promoted on private sector project bases. The expansion of back-up area for RORO ferries at private land in Port Zone also should be promoted on private sector project bases.

Table 8.6.1 Investment Plan (New Cebu Port)

unit: million pesos

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Public Sector				113	113	2,517	2,199	1,989	105	105
Private Sector				24	24	556	556	412	26	26
Total				137	137	2,755	2,755	2,401	131	131

Table 8.6.2 Investment Plan (Cebu Baseport)

unit: million pesos

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Public Sector	335	220	11	166	138	132	228	141	133	96
Private Sector	8	128	199	240	187	54	0	0	0	0
Total	342	349	210	407	325	186	228	141	133	96

8.7 Improvement Program on Port Management and Operation

8.7.1 Port Management

(1) Framework of CPA

Since CPA was established, the See section has been strengthened. CPA should strengthen Port Planning Section in the future. CPA should introduce a system that promotes information exchange among related parties.

(2) Strengthening the organization

Employees at CPA are essentially specialists and rarely move from one department to another. As a result, there are few employees who have comprehensive knowledge of operations.

For CPA to operate efficiently, ①Employees should inform others of their activities and duties. ②Employees should discuss ways to improve their work or solve problems. ③Information should be exchanged at regular meetings. ④An environment where employees can discuss problems should be fostered. ⑤Employees should take an interest in world trends, especially those related to their work. Newspapers, magazines, the internet etc., are important sources of information in this regard. ⑥Both specialist and generalists should systematically be promoted. ⑦The liaison conference should be established with PPA, DOTC, etc. As a result, CPA will be able to acquire high quality information, and cooperation among organizations will be enhanced.

(3) Staff Training System for CPA

Staff training system for CPA should be designed and developed with comprehensive training program structure covering various training demands. In other words, staff training for CPA needs to be conducted under well- coordinated programs with constant exchange of relevant information, for instance, on new technologies for port operation or development, and recent trends of administrative or legal requirements. It is recommended that DOTC should incorporate basic training concept when designing or conducting its own staff training program and advising the matter to port sector. ①Strengthening exact knowledge and deepening understanding on other organization's business is particularly important in making better coordination with relevant agencies or entities. ②Promotion of on-the-job-training

(OJT) becomes more effective by developing OJT methods and manuals applicable to actual training stage. ③Strengthening evaluation of effects of training is another requirement for improving the staff training system. And retraining system is necessary to make the staff training system more effective. Moreover CPA should utilize PPA's training system.

(4) Institutionalization for Authorizing Port Master Plan

1) Scope of Port Master Plan

Provision of port master plan should contain planning of wharves, terminal, navigational channel and other related facilities which would fall under the same port, administrative area. As described above, the port master plan should be so comprehensive that planning procedure needs to be institutionalized in close cooperation with other related organs parties concerned.

2) Authorization of Port Master Plan

Before a port master plan is officially authorized, the draft plan must be understood and agreed upon by the various parties concerned. Opinions from government agencies, local people, users and people of academic fields should be invited and reflected in the master plan accordingly.

(5) Improving Port Statistics System

Port statistics should cover all ports including private ports. It should clarify at least the trend of cargo handling volume by lot and the origin/distribution of each kind of commodity and cargo type. CPA should form appropriate questionnaire for port statistical survey. And, if possible, port statistics should be integrated with statistics system of land transportation, which is closely related to port activities, and also be compatible with international standards. In that case, it will become very important to define the classification of individual cargo by categorizing into a couple of strata and to unify the survey period. These are indispensable matters also for adequately revising the subject items according to the change of times.

(6) The Port Promotion Association

CPA should establish a port promotion association with relevant companies and associations. The port promotion association promotes Cebu port to consignor of Cebu area cooperating with CPA. And it carries out presentation to invite shipping company and consignor. Moreover, it should produce promotional materials such as port brochure, promotional video, handbook, etc.

8.7.2 Port Operation and Cargo Handling

1) Safety Operation for RORO Ferries

At Cebu Baseport, the cargo handling area for containers and palletized cargoes to be loaded to/discharged from RORO ferries is very small. Moreover it often happens that passenger embarkation/disembarkation and cargo handling are carried out at the same area and time.

To avoid this dangerous situation, following measures should be taken:

- To demarcate the cargo handling area for in bound and out bound cargoes with paint
- To control cargo receiving/delivering vehicles
- To control vehicles on ramp-way between vessel and pier
- To make and use sequence work sheets for systematic operation
- To build a passenger boarding bridge for safety operation
- To install a lighting system for night operation

2) Avoiding Direct Loading and Discharging to/from Trucks

It is recommended that this cargo handling method should be adopted only for specific cargoes, such as hazardous cargoes, frozen cargoes, perishable cargoes and special heavy cargoes.

8.7.3 Information System

Exchange of information among CPA headquarters and each PMO (port management office) is basically conducted by telephone and hard copy delivery. Mistake often happens. Therefore CPA should establish advanced communication system through computerization.

The adequate communication system should be prepared for efficient operation of the New Cebu Port and Cebu Baseport. It is envisaged that the following systems are required.

- 1) *On-line communication systems covering each PMO, warehouse, open cargo storage yard, and port entrance gate booth etc, for management, administration and operation with real time information (voice and data links).*
- 2) *Connection to Philippine telephone network system (voice and data links).*
- 3) *Telephone control system (equipment control).*
- 4) *Between vessels and shore side communication link.*
- 5) *Security system link.*
- 6) *Other government official offices communication system link.*
- 7) *Backup system for emergencies.*

8.7.4 Marketing and Port Promotion Strategy

The New Cebu Port is expected to play an important role as the regional hub port for the development of Visayas area. The New Cebu Port should have the container transport network with large hub-ports mentioned above in order to offer efficient transport service to port users. Port marketing and promotion is a key factor to introduce a new sea transport route. However, there are no particular port marketing and promotion activities at present. CPA should positive action of port promotion for shipping lines and their agents. Port marketing and promotion activities are most important to the future development of CPA. CPA must play the main role in these activities in cooperation with other related organizations including private sector.

CPA should endeavor to increase port cargoes and to attract shipping lines. To offer good performance and competitive charges is an essential factor to attract shipping companies. Good reputation encourages port promotion.

9. Evaluation of Short-term Plans

9.1 Economic Analysis on Short-term Investment Plans

9.1.1 Framework of the Economic Analysis

(1) Subjects of the Analysis

The four (4) port projects are the subjects of the analysis in the case of the long-term evaluation, while the following two(2) port projects are the subjects in the case of the short-term evaluation:

- * The New Cebu Port project, and
- * Cebu Baseport project.

(2) Investment Plans

The long-term investment plans on the two ports intend to meet the potential traffic demands of the port concerned until the year 2020, while the short-term investment plans are to cope with the demands until the year 2010.

(3) Common Points with the Framework for Long-term Project Evaluation

The following points are common in the two frameworks:

- a) Premises on the evaluation works,
- b) Evaluation method,
- c) Yearly investment during the period of the short-term plans,
- d) Benefit items,
- e) Estimation formulas of the benefits, and
- f) Values of the variables in the estimation formulas.

The yearly investment is same as the one of the long-term plans for the period of the short-term evaluation. It is because the short-term investment plans are the first half of the long-term investment plans.

(4) Traffic Demands, Project costs and Amounts of Benefits after the Year 2010

They are as follows:

- a) Traffic demands. There will be changes until the year 2010, but no change afterwards.

- b) Construction cost. The cost generates for the period 2004/2005-2008/2010, and no generation afterwards.
- c) Replacement cost, Maintenance cost and Operation cost. The costs are generated for the whole period, i.e. until the year 2038. However, the costs are estimated, based on the short-term investment plans.
- d) Amounts of benefits. The amount is generated for the whole period. However, such benefits will depend on the handling capacities of facilities planned in the short-term investment plans.

9.1.2 Economic Analysis on the New Cebu Port Short-term Project

(1) Conclusion on the Analysis

EIRR of the base case of the short-term project is estimated to be 23 % / annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippine (15 %/annum). Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 20 % and at the same time, the total amount of the benefits were decreased by 20 % from the base case (14 %/annum), this project continues to be economically feasible.

(2) Construction Cost

The construction cost of the project is as follows:

8,679 million pesos at 2001 economic prices.

Total economic cost of the construction is smaller by 6.8 % than the financial cost by the same reason pointed out in the case of the construction cost of the New Cebu Port project.

(3) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 9.1.1 EIRR for New Cebu Port Short-term Plan

(unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	23	20	18	15
	10% up	21	18	16	13
	20% up	19	16	14	11
	30% up	17	15	12	10

9.1.3 Economic Analysis on the Cebu Baseport Short-term Project

(1) Conclusion on the Analysis

EIRR of the base case of the short-term project is estimated to be 28 % / annum. The rate exceeds the social discount rate or opportunity cost capital of the Philippine (15 %/annum). Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 20 % and at the same time, the amount of the benefits were decreased by 20 % from the base case (16 %/annum), the project continues to be economically feasible.

The rate is higher than the one of the Cebu Baseport long-term project (20 %/annum)..It implies that the short-term project will better be realized at first and then realization of the Phase 2 project(the latter half of the long-term investment plan) will be decided, taking into consideration the situation of the traffic demand at that time.

(2) Construction Cost

The construction cost of the project is as follows:

756 million pesos at 2001 economic prices.

Total economic cost of the construction is smaller by 6.9 % than the financial cost by the same reason pointed out in the case of the construction cost of the New Cebu Port project.

(3) Benefit

Two thirds of the amount of the Benefit 3 “Reduction Benefit of embarkation and disembarkation time cost of passengers” expected in the long-term project evaluation are counted.

(4) Sensitivity

The result of sensitivity analysis (EIRR) is shown below.

Table 9.1.2 EIRR for Cebu Baseport Short-term Plan

(unit: %/annum)

		Benefits			
		20% down	10% down	Base case	10% up
Project cost	20% up	16	19	22	25
	10% up	19	22	25	28
	Base case	21	25	28	31
	10% down	24	28	31	34

9.2 Financial Analysis

(1) Methodology and assumption

Financial feasibility of the proposed project has been evaluated in terms of the Financial Internal Rate of Return (FIRR). The tariffs which are scheduled to be revised by January 2001 are employed.

(2) Operation Scheme

It is assumed at the New Cebu Port that CPA shall be the owner of the infrastructure and superstructure shall be leased to Private Sectors at the New Cebu Port, and cargo handling is operated by private sector at Cebu Baseport. The cost (investment) shouldered and the revenue obtained by the CPA and Private Sectors are assumed to be as listed in Table 9.2.1

Table 9.2.1 The Revenues and the Costs in the Calculation of FIRR

	Revenues	Costs
CPA	1) Port Tariff 2) Cargo Handling Fee (Foreign 20%, Domestic 10%) 3) Lease	1) Infrastructure and superstructure 2) Operating expenses by the project such as maintenance, personnel and administration costs
Private Sector	1) Cargo Handling Fee (Foreign 80%, Domestic 90%)	1) Cargo Handling Equipment 2) Lease Charge 3) Operating expenses by the project such as maintenance, personnel and administration costs

(3) FIRR and Evaluation

1) Calculation of FIRR

The results of FIRR calculation are shown in Table 9.2.2

Table 9.2.2 Result of FIRR Calculation

	Cebu Baseport	The New Cebu Port of CPA	Cebu Baseport and the New Cebu Port of CPA	The New Cebu Port of Private Sector
FIRR	7.1%	7.4%	7.4%	20.1%

2) Sensitivity Analysis

Sensitivity analysis is calculated to examine the impact of unexpected future changes such as cargo volume, construction cost, inflation or exchange rate. The following cases are envisioned.

- Case 1: The investment costs increase by 10 %
- Case 2: The revenue decreases by 10 %

- Case 3: The investment costs increase by 10 % and the revenue decrease by 10 %
 The result of FIRR by the fluctuation of cost and revenue is shown in Table 9.2.3.

Table 9.2.3 Result of FIRR Calculation

	The New Cebu Port		Cebu Baseport
	FIRR of CPA	FIRR of Private Sector	FIRR of CPA
Base Case	7.4%	20.1%	7.4%
Case 1	6.5%	18.5%	6.5%
Case 2	6.2%	16.0%	6.2%
Case 3	5.4%	14.7%	5.6%

3) Evaluation

If 75 % of initial investment by CPA is covered by soft loan (interest rate of 2 %/year) and the rest of the initial cost shouldered by CPA is covered by a loan with an interest rate of 15 % (the real interest rate excluding inflation rate), the weighed average interest rate for the total investment becomes 5.25%. Since the FIRR calculated above exceeds the weighed average interest rate, the project is assessed to be financially viable. Enhancing capacity of Cebu Baseport decreases the burden on the New Cebu Port. Therefore, CPA should set up a package of the New Cebu Port and Cebu Baseport.

9.3 Environmental Impact Assessment (EIA)

9.3.1 Natural Environment

- (1) For the Cebu Baseport and the New Cebu Port Development Projects, full-scale Environmental Impact Assessment including preparation of Environmental Management Plan and Environmental Monitoring Plan was carried out as required by the Department of Environment and Natural Resources (DAO 96-37) and the Japan International Cooperation Agency's environmental guidelines for infrastructure study.
- (2) The seawater is polluted in the order of 1) Cebu Baseport - 2) New Cebu Port (Consolacion) especially in the parameter of coliform. That is due to population pressure from the populated area of Cebu city. As mitigation measures to the seawater pollutions, the following environmental treatment facilities should be provided at Cebu Baseport and the New Cebu Port:
 - 1) The complete drainage system,
 - 2) water treatment facility and
 - 3) sewage facility should be equipped in the project in order to prevent discharging pollutants from the port areas.
- (3) Regarding the mangrove community in the New Cebu Port development area at Consolacion, some mangrove trees are found at the littoral zone and along the coastal area

of the New Cebu Port development area. Most of them are already in mature stage with average diameter of 15 cm to 30 cm. As mitigations of such mangrove trees and ecosystem of tidal area., the following measures are proposed:

- 1) The reclamation area and access road foundations should be planned to minimize the interference of existing mangrove trees.
 - 2) The mitigation area should be specified for relocations of affected mangrove trees and equivalent amount of affected mangrove trees should be replanted by seedlings 10 times of existing number as part of the project.
 - 3) The access road foundation between the coastal area to the reclaimed part area should have open space to make sea water flow by the tidal current, so as to maintain the mangrove trees and ecosystem of tidal area alive.
- (4) Regarding the air quality and noise impacts to the planned Access Road Area, at moment there are no land uses among the preset area for construction of the planned access road.

There is only agricultural land use near the construction site of the New Cebu Port.

Some private houses are scattered around the planned road area. It is observed that the present concentration of TPS, SO₂, NO₂, Co caused from the vehicles of construction works and container tracks during the operation stage would be less than 1/100 of the DENR specified level.

The noise level would be reduced 3db at every 2 times of distance from the source of noise. At present the access road is planned along the agricultural land and nearest residents are located around 300 - 500 m away from the planned access road area.

Therefore there will not be the serious environmental impacts by air pollution and noise level.

9.3.2 Social Environment

- (1) The perception interview and the focus group discussions of the residents of Barangay Tayud, for the New Cebu Port development, revealed the needs, issues and concerns of the affected residents of which the consultant considered in the identifying impacts and carrying out mitigation measures. Regarding the awareness and perception of the project by the residents of Barangay Tayud, 83 % of the respondents of the survey were already aware of the project, 90 % of them are favor of and 10 % are against the project. The reasons for their being against the project are:
 - 1) possible adverse impacts on the existing income sources
 - 2) possible displacement of fisher folks
 - 3) increase of crime against property

- 4) pollution, generation of garbage, reduction of farmland, drying-up of water resources and increase in land value.

As mitigations, the followings are proposed:

- 1) relocation of the affected families and compensations thereof
- 2) within Consolacion area is preferred as their relocation site
- 3) A community based gender responsive social development plan as prepared by the concerned government line agencies shall be worked out and provided to the affected in coordination with CPA and local government units.
- 4) The employment of local residents shall be provided for livelihood opportunities for the construction staff and operation staff of the new port.

This is exemplified by the Barangay Tayud residents particularly the shipyard owners' acceptance of their responsibility as citizens to respond to the call of local, national and international need for a New International Port.

- (2) On the other hand, Cebu Baseport residents' perception survey has showed a relatively high level of awareness and acceptance of the proposed project. They have raised relevant issues, concerns and problems that were considered in the impact assessment and mitigating measures.

Regarding the awareness and perception of the project at the Cebu Baseport, 66 % of respondents of the survey were already aware of the project. 67 % of the respondents are in favor of the project due to the following reasons:

- 1) port improvement
- 2) more and better employment and income
- 3) improvement of the city and its high potential revenue
- 4) generation of business opportunities

31 % are not favor of the project due to the following reasons:

- 1) adverse impacts on their housing and income sources
- 2) environmental destructions
- 3) occurrence of demolitions
- 4) deterioration of business

As mitigation, the followings are proposed

- 1) provision of relocation site near Cebu Baseport area
- 2) elimination of criminality in the port area
- 3) provision of livelihood and compensation
- 4) A base port - based gender responsive social development plan as prepared by the officers of the recognized vendors association in coordination with the concerned government line agencies should be undertaken to assure the sustainability of the

residents economic activities.

CPA and the LGU of the Cebu City recognizes the needs of these residents and hope to mitigate this with a Social Development Plan. This Plan will encourage the residents of the area to actively participate in the process of decision making during the negotiation or conflict resolution process.

- (3) It is further recommended that an amicable settlement could be rendered and concrete social development projects could be extended to the affected residents to encourage harmonious relationship between the proponent and stakeholders during the project implementation.
- (4) The results of the perception survey, focus interviews and scoping workshop revealed a high level of social acceptability of the project. At the end, to sustain the tripartite partnership of the CPA, the Local Government Unit and the government agencies, the Social Development Plans workshop of Barangay Tayud and the residents of the Base Port were done. This participatory mechanism where the proponent, the government, and affected families generated a need-based social development action plan that are beneficial and acceptable to all parties.
- (5) To mitigate the negative impacts at Cebu Baseport and the New Cebu Port, a full information, education and communication strategy shall be employed to make the directly affected populace and other stakeholders to actively participate in the process of the Environment Impact Assessment for an assured Social Acceptability. A Social Development Plan shall be evolved by the stakeholders to assure the sustainability in the implementation of the plan as well as the monitoring of the conditions set forth by DENR.

10. Conclusions and Recommendations

10.1. Basic Policy on Port Development

10.1.1 The Final Targets of Port Development

The final targets of the Cebu Integrated Port Development are:

- (1) to promote national/regional socio-economic development
- (2) to strengthen global/domestic shipping network
- (3) to create an attractive business environment in and around the port hinterland
- (4) to provide the users and citizens with a beautiful and comfortable waterfront
- (5) to provide the local citizens with access to/from remote islands

10.1.2. Proposed Port Development Policies

(1) The existing port facilities at Cebu Baseport and outports have the following shortcomings.

1) Cebu Baseport

- a) Limitation of maximum permissible draft of calling vessels
- b) Lack of available land space for expansion
- c) Limited space for waterfront expansion
- d) Narrow water area for offshore expansion
- e) Deteriorated port facilities
- f) Low productivity of cargo handling due to lack of appropriate facilities
- g) Capacity shortage of passenger facilities

2) Outports

- a) Overall substandard level of port facilities
- b) Poor economic return of port investment
- c) Lack of suitable coastal space for economical port development

(2) Development Policies

Considering the actual situations of the ports, the development policies of the New Cebu Port, Cebu Baseport and outports are as follows.

1) New Cebu Port

- a) Cebu Baseport should play the role of the regional hub port to cater for the cargo and passenger traffic in Visayas and adjacent areas for the effective transportation network.
- b) To accommodate future traffic volume and enlargement of vessel size, in particular foreign container vessels and general cargo vessels, a new port with deep berths and

sufficient cargo handling area should be developed out of the Cebu Baseport area.

- c) The primary function of the New Cebu Port is as an international container terminal to cater for future container vessels operated in inter-Asia route and general cargo vessels.
- d) The new container terminal should offer high cargo handling productivity to successfully compete with other ports.

2) Cebu Baseport

- a) The existing facilities should be used effectively through the proper rehabilitation and renovation.
- b) The location of Cebu Baseport is advantageous for passengers. The primary function of the port is the transportation of passengers. RORO ferries and passenger/cargo vessels carry both passengers and cargoes. Therefore, this port handles both passengers and cargoes. For the effective use of this port, domestic cargo vessels are also handled here.
- c) Expansion of back yard area is required for efficient cargo handling and safety of passengers
- d) To accommodate a large number of vessels, required quays and upgraded capacity will be necessary after the renovation.
- e) Improvement of the passenger safety and convenience and cargo handling system is required.

3) Outports

- a) Proper rehabilitation and renovation should be conducted for the efficient use of existing facilities.
- b) The major role of outports is to serve as the gate to the neighboring islands with short sea transport distance. Therefore, the improvement of the sea route between Cebu island and the neighboring islands should be promoted through improving service and introducing RORO ferries and fast crafts. Required port facilities should be developed.
- c) The development of Toledo port, which is the western gateway of Cebu island, is the priority project to improve the RORO and fast craft route between Cebu and Negros. The development of the new San Remigio port, in place of Hagnaya port, is also a priority project to establish a new RORO route between Cebu and Bantayan island which can be connected with planned RORO route between Bantayan island and Negros. Therefore these ports were selected for the master plan study.

(3) Site for the New Cebu Port Development

Consolacion-Liloan was selected as the site for the New Cebu Port, based on the detailed survey and evaluation among five (5) candidate sites. Cebu North Coastal Road Project should proceed on schedule for the development of a new port at this site.

10.2 Physical Development Plans

10.2.1 The Physical Development Plans of the New Cebu Port and Cebu Baseport

(1) Demand Forecast of Cebu Baseport

The demand forecast of Cebu Baseport is shown in Table 10.2.1-1

Table 10.2.1-1 Demand Forecast of Cebu Baseport

	Foreign Container* (1,000TEU)	Foreign Conventional (1000ton)	Domestic Container (1,000TEU)	Domestic Conventional (1,000ton)	Passengers (1,000 person)
2000	104	459	300	2,941	10,059
2010	445	477	565	5,597	15,820
2020	1,198	756	1,203	6,905	20,462

(2) Allocation of Future Demand between Cebu Baseport and the New Cebu Port

The demand forecast of Cebu Baseport and the New Cebu Port are shown in Table 10.2.1-2.

Table 10.2.1-2 Demand Forecast of Cebu Baseport and the New Cebu Port

		Foreign Container (1,000TEU)	Foreign Conventional (1000ton)	Domestic Container (1,000TEU)	Domestic Conventional (1,000ton)	Passengers (1,000 person)
New Cebu Port	2010	445	477	57	--	--
	2020	1,198	756	120	--	--
Cebu Baseport	2010	--	--	508	5,597	15,820
	2020	--	--	1,083	6,905	20,462

Note: 10% of total domestic container cargoes, carried by domestic container vessel

(3) New Cebu Port

The development plan of the New Cebu Port is as follows.

1) Master Plan (2020)

a) Foreign container terminal

Quay length 1200m and berth depth 13m (four (4) berths)

Land area 60ha

Gantry cranes 10

b) Foreign multi-purpose terminal (756 thousand metric ton)

Quay length 380m and berth depth 10m (two (2) berths)

Land area 4ha

Cargo shed 2

c) Service boat mooring facility

d) Access road from the new port to the Cebu North Coastal Road

- e) Cargo handling equipment
- f) Navigation aids facilities

2) Short-term Development Plan (2010)

a) Foreign container terminal

Quay length 600m and berth depth 13m (two (2) berths)

Land area 30ha

Gantry cranes 5

b) Foreign multi-purpose terminal (one (1) berth)

Quay length 190m and berth depth 10m

Area 2ha

Cargo shed 1

c) Service boat mooring facility

d) Access road from the new port to the Cebu North Coastal Road

e) Cargo handling equipment

f) Navigation aids facilities

3) Stage Development Plan

It is recommended that the New Cebu Port be constructed in the following phases.

1st Phase: 2006-2008 Tow (2) container berths and one (1) multi-purpose berth

2nd Phase: 2011-2014 Tow (2) container berths and one (1) multi-purpose berth (One (1) container berth will be operational in 2013)

(4) Cebu Baseport

The development plan of Cebu Baseport is as follows.

1) Master Plan (2020)

a) Ongoing/ planned projects

Expansion (30m off-shore) of the backyards and deepening of berths B8-B17 with construction of RORO ramps (proposed length is 720m)

Rehabilitation of pier 2 and demolition of the shed

Rehabilitation of fender system and working apron of the berths of B28-30

Close of the berths of B31-33 due to the Cebu South Coastal Road Project

Relocation of the fast craft terminal (proposed site is B18-19)

b) Proposed Projects

Expansion (30m off-shore) of backyard of conventional cargo berth (B21-22, 24-25, 28-30)

Renovation of pier 1-3, including expansion of width of pier 1 and 2 for large vessels

Construction of passenger terminal buildings with boarding bridge and elevated catwalks for RORO ferries

Expansion of back-up area for RORO ferries

2) Short-term Plan (2010)

a) Ongoing/ planned projects

Expansion (30m off-shore) of backyards and deepening of berths B8-B17 with construction of RORO ramps (proposed length is 660m) and other ongoing/planned projects are assumed to be conducted by 2010.

b) Proposed Projects

Expansion (30m off-shore) of backyard of conventional cargo berth (B21, 22, 24, 25)

Renovation of pier1 and 3, including expansion of width of pier1 for large vessels.

Construction of passenger terminal buildings and boarding bridge for RORO ferries

Expansion of back-up area for RORO ferries

3) Stage Development Plan

(Stage Development Plan of Cebu Baseport)

The renovation work should be conducted part by part in order to maintain required quay length and overall capacity. It is recommended that the renovation works basically be conducted in the following stages.

2000-2005 Renovation work at PMO 2

2006-2010 Renovation work at PMO 3 & 4

2011-2020 Renovation work at PMO 5 and Pier 2

10.2.2 The physical development plans of Toledo Port and the new San Remigio port

(1) Demand Forecast of Toledo Port and the New San Remigio Port

The demand forecast of Toledo Port and the New San Remigio Port are shown in Table 10.2.2-1.

Table 10.2.2-1 Demand Forecast of Toledo Port and the New San Remigio Port

		Cargo(1000 tons)	Passenger (1000 persons)
Toledo Port	1999	141	286
	2010	1,224	1,089
	2020	2,332	1,283
New San Remigio Port	1999*	5	277
	2010	382	670
	2020	789	901

Note: * handled at Hagnaya Port

(2) Toledo Port

1) Master Plan (2020)

The southward development of the present jetty is recommended. Main facilities are as follows. (See Fig.4.3.2-1)

- Two (2) unit of RORO berth (4 - 6m deep)
- Fast craft berths
- General cargo berth (320m long and 6m deep)
- Back yard area, Passenger terminal building, warehouse

2) Stage Plan

The long-term development project is planned to be carried out separately in two phases. At the first stage, two (2) units of RO berth and a fast craft berth will be constructed, and cargo vessels will use one RORO berth temporarily.

(3) New San Remigio Port

1) Master Plan(2020)

The site of the New San Remigio Port is recommended near the mouth of Hagnaya Bay, where the private causeway exists. Main facilities are as follows. (See Fig.4.3.2-2)

- Two (2) jetties for RORO berths (4m deep) and fast craft berths
- Back yard area, Passenger terminal building, warehouse

2) Stage Plan

The long-term development project is planned to be carried out separately in two phases. At the first stage, one (1) jetty will be constructed.

10.3 Preliminary Evaluation of the Feasibility of the Master Plans

10.3.1 Cost Estimation for the Master Plans

The project cost for master plans of each port are as follows.

Table 10.3.1-1 Cost Estimation for the Master Plans

(unit: million pesos)

Description	Cebu Baseport	New Cebu Port	Toledo Port	New San Remigio Port
Construction	2,762	8,376	632	329
Equipment	-	5,565	115	49
Other (land, compensation, etc)	-	95	-	9
Subtotal	2,762	14,302	747	387
Engineering Cost	193	963	52	26
Contingency (10%)	296	1,481	80	41
VAT (10%)	325	1,664	88	45
Total	3,576	17,922	967	501

10.3.2 Development Sectors

(1) The New Cebu Port

Infrastructure and gantry cranes are developed by the public sector, while cargo handling equipment and buildings are the responsibility of the private sector.

(2) Cebu Baseport

Renovation of port facilities will be done by the public sector, while passenger terminal buildings and the expansion of back-up area for RORO ferries at the private land will be the responsibility of the private sector.

(3) Toledo Port and the New San Remigio Port

All port facilities, except cargo handling equipment, are developed by the public sector.

10.3.3 Preliminary Economic Analysis of the Master Plans

Regarding the master plan of Cebu Baseport, the renovation of three (3) piers and conventional berths at PMO 3, 4, and 5, which will be conducted by CPA, has been evaluated. The result of EIR calculation is as follows.

The New Cebu Port	EIR 27%
Cebu Baseport	EIR 20%
Toledo Port	EIR 25%
The New San Remigio Port	EIR 27%

The social discount rate or opportunity cost of capital of 15 %/annum in the Philippines is adopted as an evaluation criterion of the investment efficiency. Since all EIIRs exceed this rate, all projects are assumed to be economically feasible.

10.3.4 Preliminary Financial Analysis of the Master Plans

The result of FIRR calculation is as follows.

The New Cebu Port (CPA)	FIR 8.4%
Cebu Baseport (CPA)	FIR 5.4%

The average interest rate under a soft loan is assumed to be 5.25%. Since the FIRRs exceed this rate, the projects are assumed to be feasible.

In the case of Toledo port and the new San Remigio port, CPA can cover only operating costs by its revenues.

10.3.5 Initial Environment Examination (IEE)

(1) IEE for Natural Environment

Regarding current situation of natural environmental aspects from the results of our sampling survey in the 4 study sites, it is polluted in order as follow : 1) Cebu Baseport - 2) New Cebu Port site (Consolacion) - 3) Toledo Port - 4) New San Remigio Port site, especially in the parameter of coliform. That is a cause of population pressure from the populated area such as Cebu city and Lapu-lapu city.

Regarding fauna and flora in 4 study sites, no threatened, extinct and rare species of mangroves, seaweeds, algae, macrobenthic organisms or coral were found in the areas.

Regarding the mangrove community in the New Cebu Port proposed area (Consolacion), the mangrove areas is not specified as a protected mangrove area now. So the area shall be specified as development area for industry of land use program by the local government of Consolacion, Madaue city. The mangrove community concerned will be transplanted at the specified mangrove mitigation area, then the area can be developed for the new port.

(2) IEE for Social Environment

The socio-cultural and economic survey and focus interviews has generated a profile of the present status of the respondent's environment revealing their perceived negative and positive impacts as well as their suggested mitigation.

Cebu Baseport respondents who are generally poor, migrants and squatters have accepted the reality that they are to be ejected from the area because CPA owns the land. Although, they expect CPA and the LGU of the Cebu City to recognizes the situation of these squatters and to mitigate this with a Social Development Plan. This Plan will encourage the residents of the area to actively participate in the process of decision making during the Environmental Impact Assessment Phase.

On the other hand, residents in Consolacion, particularly the shipyard owners, feel their responsibilities as citizens to respond to the call of local, national and international need for a new international port. The survey and the focus group interviews further revealed the needs, issues and concerns of the affected residents to be considered in the section of impacts and mitigation.

10.4 Short-term Development Plan

10.4.1 Development Scheme of Short-term Development

The following development scheme is recommended in general.

(1) New Cebu Port

1) Development

CPA: Infrastructure of container terminal with quay gantry cranes

Multi-purpose terminal with a shed

Access road and Navigation aids facility

Private: Cargo handling equipment for container terminal and multi-purpose terminal

2) Operation

Container terminal: Private
(lease system and double operator system is recommended)

Multi-purpose terminal: CPA or Private
(Considering lease system together with container terminal)

(2) Cebu Baseport

1) Ongoing/ planned projects

CPA: Expansion of backyards and deepening the berths with RORO ramps in PMO2 are

Rehabilitation of pier2

Rehabilitation of the berths in PMO5 area

Private: Relocation of the fast craft terminal

2) Proposed Projects

CPA: Expansion of backyards of the berths in PMO3, 4 area

Renovation of pier1 and 3

Private: Passenger terminal buildings with boarding bridge

Expansion of back-up area for RORO ferries

10.4.2 Evaluation of the Feasibility of the Short-term Development Plan

(1) Project Cost

The project cost for short-term plans is as follows

Table 10.4.2-1 Estimated Cost for the Short-term Plan

Description	New Cebu Port (Million Pesos)	Cebu Baseport (Million Pesos)
CPA's Original Plan	-	732.5
Proposed Plan for CPA	5,974.1	626.7
Construction	4,389.0	-
Equipment	1,500.0	-
Other (land, compensation, etc)	85.1	-
Proposed Plan for Private Companies	1,220.5	693.3
Total	7,194.6	2,052.5
Engineering Cost	497.7	143.7
Contingency (10%)	769.2	219.6
VAT (10%)	846.1	241.6
Grand Total	9,307.6	2,657.3

(2) Economic Evaluation (EIRR)

Regarding Cebu Baseport Development, objective projects for the feasibility study are off-shore expansion of the back yards of the berths in PMO 3 & 4 and renovation of pier 1 and 3 to be conducted by CPA. The results of the calculation of EIRR are as follows.

New Cebu Port	23%
Cebu Baseport	28%

Both EIRRs exceed the social discount rate or opportunity cost of capital (12-15 % per annum) in the Philippines and both projects are economically feasible.

Moreover, even though the project cost was increased by 10 % and the benefits were decreased 10 % both projects are still economically feasible (EIRR of New Cebu Port : 18 %, EIRR of Cebu Baseport : 22 %)

(3) Financial Evaluation (FIRR)

The result of the calculations of FIRR of CPA and private container terminal operator is as follows.

CPA	
New Cebu Port	7.4%
Cebu Baseport	7.1%
New Cebu Port and Cebu Baseport	7.4%
Container Terminal Operator	
New Cebu Port	20.1%

FIRRs of CPA exceed the average rate of 5.25 % under a soft loan and the projects are thus

financially feasible. Moreover, even though the project cost was increased by 10 % and the revenues were decreased 10 % both projects are still financially feasible (FIRR of New Cebu Port : 5.4 %, FIRR of Cebu Baseport : 5.5 %)

Development of Cebu Baseport, which will increase the capacity of the port, contributes to decrease the required facilities of the New Cebu Port. To improve the FIRR of Cebu Baseport project, development Cebu Baseport is recommended to be conducted together with the New Cebu Port development as one package.

(3) Environmental Impact Assessment (EIA)

1) Natural Environment

According to the chemical analysis of samples, it is found that the registered concentrated value of phosphates, nitrogen, and sulfates of all water samples collected in Cebu Baseport, Consolacion area, Toledo Port area and San Remigio area were well within the specified concentration range of the sea water.

Generally the water is polluted in the order of 1) Cebu Baseport - 2) New Cebu Port (Consolacion), especially in the parameter of coliform. That is due to population pressure from the populated area of the Cebu city. As mitigation measures to such pollutions, the following environmental treatment facilities should be provided at Cebu Baseport and the New Cebu Port:

- 1) The complete drainage system,
- 2) water treatment facility and
- 3) sewage facility should be equipped in the project in order to prevent discharging pollutants from the port areas.

Regarding fauna and flora in 4 study sites, no threatened, extinct and rare species of mangroves, seaweeds, algae, macrobenthic organisms or coral were found in the areas.

Regarding the mangrove community in the New Cebu Port development area at Consolacion, the mangrove community concerned will be transplanted at the specified mangrove mitigation area, then the area can be developed for new port. As mitigations of such mangrove trees and ecosystem of tidal area, the following measures are proposed:

- 1) The reclamation area and access road foundations should be planned to minimize the interference of existing mangrove trees.
- 2) The mitigation area should be specified for relocations of affected mangrove trees and equivalent amount of affected mangrove trees should be replanted by seedling 10 times of existing number as part of the project.
- 3) The access road foundation between the coastal area to the reclaimed part area should have open space to make sea water flow by the tidal current, so as to maintain the

mangrove trees and ecosystem of tidal area alive.

2) Social Environment

The perception interview and the focus group discussions of the residents of Barangay Tayud, for the New Cebu Port development, revealed the needs, issues and concerns of the affected residents of which the consultant considered in the identifying impacts and carrying out mitigation measures. Moreover, the perception survey revealed a positive scenario as reflected by the high level of awareness and acceptance of the project. Regarding the awareness and perception of the project by the residents of Barangay Tayud, 83 % of the respondents of the survey were already aware of the project. 90 % of them are favor of and 10 % are against the project

On the other hand, Cebu Baseport residents' perception survey has showed a relatively high level of awareness and acceptance of the proposed project. They have raised relevant issues, concerns and problems that were considered in the impact assessment and mitigating measures.

Regarding the awareness and perception of the project at the Cebu Baseport, 66 % of respondents of the survey were already aware of the project. 67 % of the respondents are in favor of the project resolution process.

It is further recommended that an amicable settlement could be rendered and concrete social development projects could be extended to the affected residents to encourage harmonious relationship between the proponent and stakeholders during the project implementation.

The results of the perception survey focus interviews and scoping workshop revealed a high level of social acceptability of the project. At the end, to sustain the tripartite partnership of the CPA, the Local Government Unit and the government agencies, the Social Development Plans workshop of Barangay Tayud and the residents of the Base Port were done. This participatory mechanism where the proponent, the government, and affected families generated a need-based social development action plan that are beneficial and acceptable to all parties.

10.5 Port Administration, Management, and Operation

10.5.1 Port Administration System of CPA

(1) Restructuring of CPA Organization and Management

CPA was established as the regional port authority, whose base organization was a regional port management office of PPA. However, the duties and responsibilities of both organizations are completely different. Sections of the organization can be separated into three categories; "Plan", "Do", and "See". In the era of PPA, main section of the regional office was "Do"

section, because "Plan" and "See" works were mainly carried out by the head office. CPA is required to enhance its organization of "Plan" and "See" as an independent port authority. The following actions are recommended.

- 1) Enhancement of planning section in order to formulate individual and regional port development plans for efficient management and investment
- 2) Fostering of generalists through the personnel exchange for upgrading capability of policy making and planning
- 3) Establishment of the regular meeting with each central and local government and port users to exchange of views and opinions for port development

(2) Financial Management and Tariff System

For the economic progress of the region, the development of outports is required. However, it is difficult to develop outports from their own revenues. Therefore, public financial support by central and local government is necessary for the outports development.

Port charges are main revenues of CPA. To enhance the financial foundation of CPA, tariff system and levels should be timely revised based on the situation of shipping market.

(3) Staff Training

To upgrade the capability of each employee, CPA should improve its training system in cooperation with DOTC and PPA, because they have advanced training systems and facilities.

(4) Upgrading of Port Statistics System

The following measures are recommended to upgrade CPA's port statistic system.

- 1) Enhancement of the statistic section
- 2) Improvement of the collecting data items and quality
- 3) Greater computerization
- 4) Publication of a statistic book

10.5.2 Management and Operation of Each Port

(1) New Cebu Port

A private company, with sufficient experience and knowledge of container terminal, is recommended as the container terminal operator for efficient management and operation. In order to promote sound competition, double terminal operator system is recommended in general.

To attract various shipping companies, fair treatment by the port operator should be guaranteed in the lease contract. The introduction of incentive system for the operators, such as reduction of cargo charges from the operators for excess cargo volume above standard level, may need to be included in the contract. The fixed and variable depends on the cargo volume mixed lease fee system (can be employed to reduce the risk).

In order to promote sound competition, double terminal operator system is recommended in general. In this case, cooperation between the operators is necessary for the efficient use of the entire container terminal

(2) Cebu Baseport

The main points for the improvement of management and operation are as follows.

- 1) Separation of passenger movement and cargo handling is urgently required and will contribute both passenger safety and improvement of cargo handling productivity.
- 2) Improvement of cargo handling method, such as RORO system, should be encouraged.
- 3) CPA should monitor the performance of cargo handling to improve its productivity.
- 4) Effective utilization of private land in port zone should be encouraged under close coordination between landowners and CPA

10.5.3 Policies and Actions for Navigation Safety

Considering the narrow channel (about 150m at its narrowest point) limited water area, and the increasing number of calling vessels, the introduction of Vessel Traffic Management System (VTMS) and one way traffic system at the channel for large vessels is recommended. CPA should coordinate with the Coast Guard to ensure that these measures are introduced.

10.5.4 Design of the Facilities

For further improvement of the port facilities, including gantry cranes and type of berth structure, the most proper design of port facilities should be carefully considered in the stage of the detail design.

10.5.5 Port Environmental Management

Regarding the natural environmental aspect, the overlapping area with mangrove area in the New Cebu Port development, which is site of reclamation area and access road area, shall be minimized. The mangroves substitute mangrove planting area shall be provided as part of the mitigation measures.

Regarding the social environmental aspects, the Social Development Program (SDP) proposed

in the scoping workshops to the affected residents should be implemented in coordination with the various government agencies and representatives.

10.6 Follow up Actions for Successful Implementation of the Proposed Port Development

10.6.1 Authorization of the Project in the Philippines

CPA needs to obtain authorization of the project as a national project for implementation of the project through the required procedures with relevant organizations, such as DOTC, NEDA, RDC, and must also seek the understanding of residents will be affected by the project.

In particular, CPA shall prepare the integrated Environmental Impact Statement (EIS) System and submit it to DENR regional office for the development of Cebu Baseport and Head office in Manila for development of the New Cebu Port based on the Environmental Impact Assessment (EIA) study conducted by the JICA Study. Then the project proponent can implement proposed project when the Environmental Compliance Certificate (ECC) is approved and issued by DENR.

10.6.2 Preparation of Financial Resources

A soft loan is an essential factor for the implementation of the proposed projects. CPA should promote both required processors in the Philippines and the condition with related organizations for providing soft loan.

10.7 Policies on Overall Port Sector Promotion

10.7.1 Promotion of Supporting Activities for Port Sector Development

Under the severe economic and financial conditions in promoting overall port development in the Philippines, it is essential that the Philippines port sector should become more powerful as a whole in its economic, administrative, and even political position. The following policies may be vital to this end.

- (1) to promote national or regional consensus and international understanding on the Philippines port policy
- (2) to improve legal, institutional arrangements
- (3) to strengthen theoretical base for better understanding of the parties concerned regarding the importance of the port sector development
- (4) to secure adequate allocation of public fund (national and local government budget) to the port sector development
- (5) to create more attractive business environment for private participation in the port sector development

10.7.2 Port-related Human Capacity Building

The total power of a group is substantially controlled by the individual capability of each member of the group. In this context, it is vital to upgrade the individual human capability of all port-related personnel in each position or level of their assignment both in the public and private sector entities concerned. Since total human capability of the Philippines port sector seems not fully developed, a comprehensive port-related personnel capacity building program should be established through positive cooperation among the parties concerned.

10.7.3 Port Sales Activities

Under the recent severe competition among the world major container ports, port sales activities have become one of the vital measures in attracting calls of container vessels in particular. While the most effective way of port sales should be designed to fit the actual requirements of each individual port, it may be helpful at least for CPA to learn the various cases conducted by the world major container ports. The port sales activities, which major ports conduct, are port sales missions for domestic and foreign market, port seminars, port tours for users and so on.

10.7.4 Diversification of the Business Field of CPA

As commonly understood among the port sector parties, any port authority can neither sustain itself nor contribute to the regional economic promotion, if it remains in making its business only within the limited port management and operation. The above fact can be easily confirmed when you see the past histories of actual operations of the world major port authorities such as the New York Authority, The Port of Kobe, The Port of Hamburg and so on.

While the size of CPA operation is not large enough to be diversified as the above examples, it may be worthwhile in long time range to consider other types of business such as port-oriented industrial park, port business office building, a kind of maritime museum or tropical aquarium, Seamen's Club, Duty Free Shop and so on.

10.7.5 Establishment of Cooperation System with Neighboring Communities

Port activities always feed various port-related businesses in and around the port. And many affiliated business and families live off such economic activities generated by the port. For successful port sector development, it is extremely important to keep strong cooperative relations with these groups of business entities and human communities. It is often observed that a port authority organizes a sort of association composed of such groups as a supporting system for the port promotion. This strategy may be necessary for CPA as well in promoting

the development of New Cebu Port.

10.8 Surveys and Researches for Future Development

The workability of cargo handling operation along the berth for the long term development plan on the planned area and alignment are checked by using wind data collected at the Mactan Airport. The planned area and alignment of berthing facilities is found reasonable workable ratio of more than 97.5 % of annual working days. However in the future plan, when the berthing alignment is extended to north direction, the probability of workable conditions is considered to be lower than this level due to the impacts of frequent high waves. The wave calmness will become an issue in future development of the New Cebu Port. The wave assessment in this study was made based on the observed wind data. It is proposed to make the future wave assessment more accurate by using actual recorded wave data to be collected by wave record equipment installing offshore near the Bagapay point (mouth of Magellan Bay).

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