

## Chapter 33 Port management / Operation Plans

### 33.1 Required Port Management / Operation System

In order to administrate and manage the Cai Mep-Thi Vai International Port, a new port management body must be established before the new port is operational in 2010. The organizational form of the new port management body should be a form which consists of the same port management system as described in Chapter 16, from the viewpoint of cargo handling efficiency and unification of port management system. The Study Team proposes the organization of the new port management body, which is shown in Figure 33.1.1.

In order to accelerate private sector participation in the field of cargo handling operation, the Study Team also proposes the leasing system at a container and general cargo terminal. After port infrastructure with quay side container crane is constructed by a new port management body, a container and general cargo terminal is leased to a private operator. This private operator will play a role to stevedore and to store cargo at the terminal. Therefore, the new port management body does not hold stevedoring departments which are responsible for cargo handling operation and storage at terminal within its own organization.

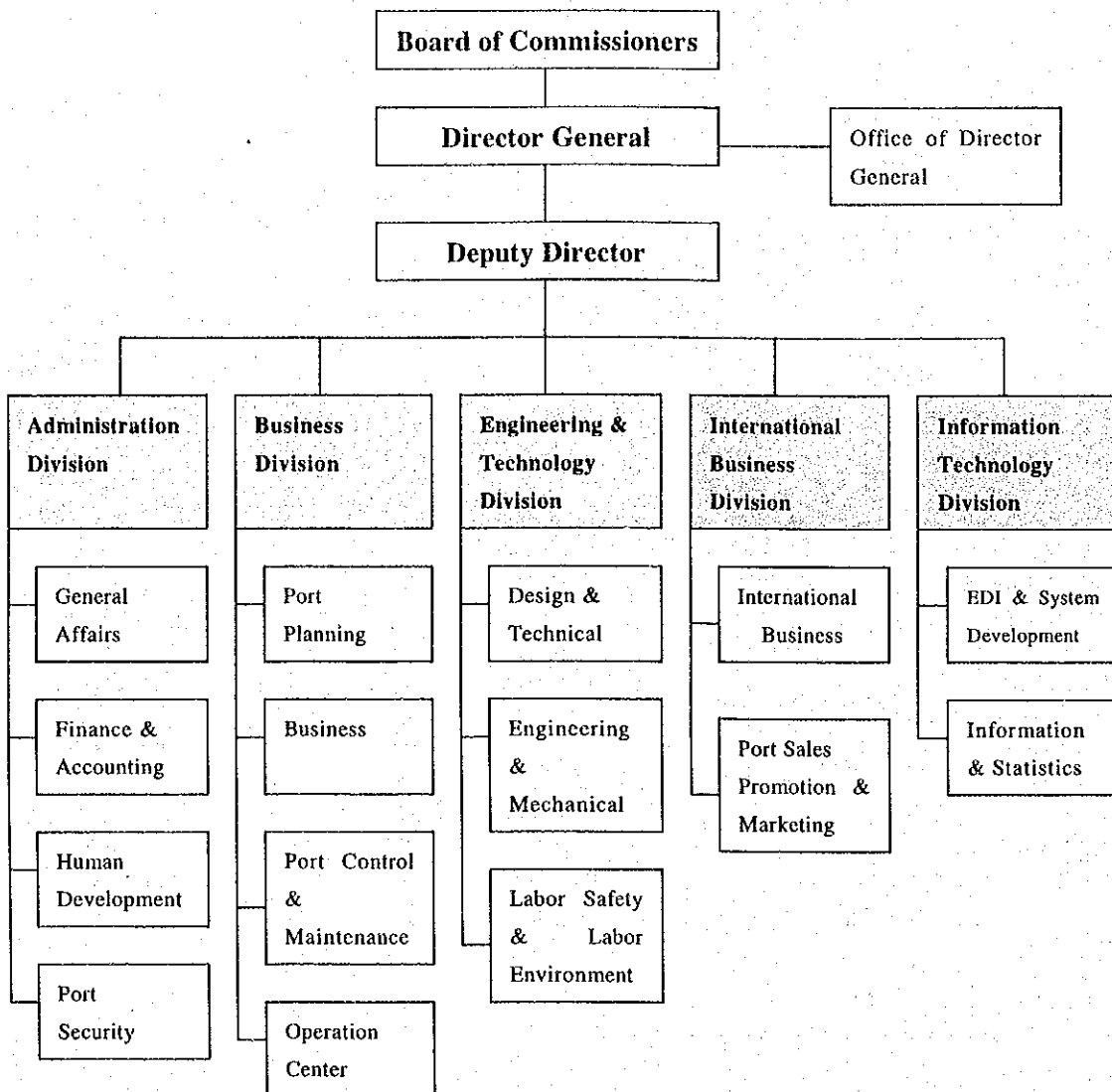
It is also pointed out that pilot service, tugboat service and other marine service are exempted from the responsibility of the new port management body, because those services should be carried out by the existing maritime organizations and enterprises.

#### (2) Board of Commissioners

Top management of a port is executed by a board of commissioners. Under the leadership of the board of commissioners, a director general is responsible for port management and operation as a whole, which are normally taken care of on "day by day" basis. A deputy director general assists a director general in managing and operation a port. And there are an appropriate number of departments which are responsible for the specific field within the tasks of port management and operation at the port. Therefore, a board of commissioners is the most important section of a port. In other words, a board of commissioners is the supreme decision making body at a port management body.

Take the Port of Laem Chabang, Thailand, for an example. The board consists of 15 commissioners, whose professions are central government leader, and custom services. ( Table 33.1.1 ). The board of commissioners at the Laem Chabang Port is thought to be one of the model organizational structures in the South East Asia. The Study Team recommends that the board of commissioners at a new port management body should consists of men of central government career, men of VINAMARINE career, men of municipal government career, maritime business leaders, city planners and developers in SFEA. The central government should also play a key role to establish the board of commissioners at the Cai Mep-Thi Vai International Port.

Under the strong leadership of the board of commissioners, a director general, deputy director general, and each manager of a department can play their own role to carry on day by day port



**Figure 33.1.1 Organization Chart of PMB at the New Port**

management and operation. Therefore, the selection of board members is one of the most important tasks when a new port management body is organized. The Study Team recommends that MOT and VINAMARINE should take a strong initiative to establish an efficient port management body in Vietnam for the purpose of port management, operation and development at the Cai Mep-Thi Vai International Port.

Table 33.1.1 Board of Commissioners of Laem Chabang, Thailand

<b>Responsibility of Board</b>	<b>Personal Background</b>
Chairman	Director General, Harbor Department, Ministry of Communications and Transport
Commissioner	Permanent Secretary, Ministry of Commerce
Commissioner	Deputy Director General, Custom Department, Ministry of Finance
Commissioner	Director General, Port Authority of Thailand
Other Commissioners(Up to 11 commissioners )	Relevant Central Government Organizations

### (3) Organizational Scale of New Port Management Body

The Study Team proposes the necessary and sufficient number of staffs of a new port management body, based on the correlation analysis between the number of staffs and container cargo throughput at typical container ports in the world. Taking account of the predicted amount of container cargo at the new port in the year 2010, approximately 300 staffs can be proposed as the appropriate organizational scale of the new port management body. The new port management body manages not only a container terminal at Cai Mep, but also a general cargo terminal at Thi Vai. Therefore, the organizational scale of the new port must be larger than that of a container terminal only. All these being taken into account, the Study Team proposes the organizational structure and the number of staffs in 2010 as shown in Table 33.1.2.

### (4) Organizational Scale of Cargo Handling Operator

The Study Team proposes the necessary and sufficient number of employees of a terminal operator, based on the estimation described in Chapter 26. At Cai Mep Container Terminal, it is assumed that the terminal is operated by 6 units and 3 shifts for quayside container crane, 15 units and 3 shifts for transfer crane, 36 units and 3 shifts for tractor. At Thi Vai General Cargo Terminal, it is assumed that the terminal is operated by 6 units and 3 shifts for crane, 10 units and 3 shifts for tractor, 5 units and 3 shifts for forklift. All these being taken into account, the Study Team proposes the organizational structure and the number of employees in 2010 should be approximately 500 at the Cai Mep International Container Terminal, and approximately 900 at the Thi Vai International General Cargo Terminal, as shown in Table 31.3.3 and Table 31.3.4.

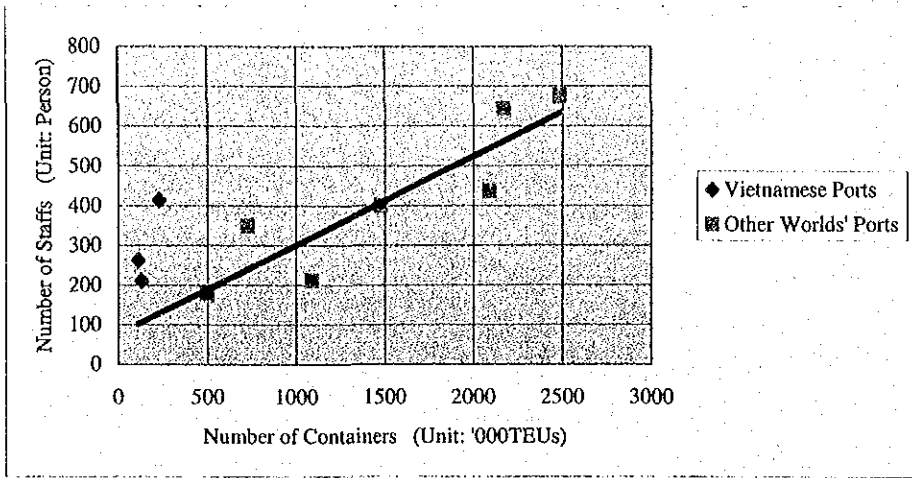


Figure 33.1.2 Correlation between Number of Staffs and Number of Containers

Table 33.1.2 Organizational Structure and Number of Staffs at New Port Management Body in 2010

Board of Commissioners ( 7 )				
Director General ( 1 )			Office of Director General ( 3 )	
Deputy Director General ( 4 )				
Manager in charge of Port Administration ( 1 )	Manager in charge of Port Business ( 1 )	Manager in charge of Engineering and Technology ( 1 )	Manager in charge of International Business ( 1 )	Manager in charge of Information and Technology ( 1 )
+General Affairs Section	+Port Planning Section	+Design and Technical Section	+International Business Section	+EDI and System Development Section
+Finance and Accounting Section	+Business Section	+Engineering and Mechanical Section	+Port Sales and Marketing Section	+Information and Statistics section
+Human Development Section	+Port Control and Maintenance Section	+Labor Safety and Labor Environment Section		
+Port Security Section	+Operation Center for Container Terminal			
	+Operation Center for General Cargo Terminal			
Section Total : 90	Section Total : 90	Section Total : 40	Section Total : 30	Section Total : 30

Table 33.1.3 Organizational Structure and Number of Employees at Container Terminal Operator in 2010

Kind of Responsibility	Details	Number of Employees
Administartion Section		15
Yard Operation Section	Quayside Container Crane	27
	Transfer Crane	68
	Tractor / Chassis	110
Yard Control Section		15
Ship Operation Section		216
CFS Operation		16
Documentation Section		20
Maintenance Section		17
Gate Operation		30
Total		534

Table 33.1.4 Organizational Structure and Number of Employees at General Cargo Terminal Operator in 2010

Kind of Responsibility	Details	Number of Employees
Administration Section		15
Yard operation Section	Crane	27
	Tractor / Low Bed Shassis	45
	Forklift	150
	Ship Operation Gang	600
Yard Control Section		12
Documentation Section		24
Maintenance Section		12
Gate Operation Section		27
Total		912

(5) Organization of Construction Management Team

To initiate port construction works at the project site, construction management organization must be identified and set up at first. Without this organization at the site, port construction will not make any progress. Therefore, a supervisory team for these duties must be organized before the initiation of the construction.

The major duties of the construction management team is consisting of the following three tasks. The first duty is to verify the quality of materials and works. Construction materials must be inspected before being shipped from their place of origin. The method of transporting materials and their storage at the site, must be carefully watched. Methods of construction operations must be also supervised.

The second duty is to provide guidance and direction to contractors and to help them to solve difficulties generated during the construction period. The supervisory team must also coordinate the discrepancy between the client and the contractor when the interpretation of the contract itself is sometimes diversified. The third duty is to play a very important role to decide on matters in dispute under the contract.

The above supervisory team should be organized by a variety of engineers and staffs. Civil engineers, mechanical and electric technicians, surveyors, accountants and office staff are needed to form the team for a large scale port project, in addition to an experienced engineers as a chief of this team. All these procedures must be carried out by the central government concerned and VINAMARINE headquarter. When necessary, the supervisory team may call on the specialized technical assistance from the appropriate engineering agency from time to time.

The supervisory team consists of several tens of engineers and staffs at the early stage of the construction. But, the number of the team members will increase and reach to some hundreds, as the construction works proceed. It is self-evident and desirable that the supervisory team will be developed and transferred to an administrative division, and engineering and technology division within the future port authority at Cai Mep-Thi Vai International Port, when the planned port is newly operational in 2010.

### 33.2 Scheme of Private Sector Participation ( PSP )

#### (1) Introduction of Private Sector Participation ( PSP ) to New Port

The leasing system in which infrastructure is constructed by the public sector has been already recommended in Chapter 24. Public sector's investment should include not only wharves, yard, navigation channel and access road, but also quay side crane, because a large amount of investment may make private sector bear greater risk for the project. On the other hand, a new port management body can take advantage of foreign soft loan with lower interest rate to finance the initial investment. Superstructure and facilities, such as cargo handling equipment and buildings, should be invested by private sector. Private sector aims at high productivity based on its long cargo handling experience and know-how. Private sector also has flexibility in responding to the changing economic situation in the international container cargo market.

The leasing system of general cargo berths must be also carefully considered. The Study Team recommends that general cargo berths should be leased to the same private sector as a container terminal operator. The reason is described below.

##### 1) Reducing the private sector's financial risk

Since cargo handling volume is not likely to be large at multi-purpose general cargo berths, port revenues generated from those berths also tends to become insufficient. When general cargo berths alone are leased to a private sector, the lessee's financial risk will become larger. In order to get rid of this kind of risk, both general cargo and container berths should be leased to the same private sector.

##### 2) Public usage of general cargo berths

Major customers at multi-purpose general cargo berths are usually a large number of small shipping companies. General cargo berths should not be exclusively used for specific shipping companies, but should be always open to those small port customers. Otherwise, those small shipping companies will completely lose the business chance at this new port. When a new port authority enters a contract with the private sector to lease the general cargo terminal, a provision to ensure the public usage at the terminal should be contained in the contract.

##### 3) Common usage of berths between container and general cargo terminal.

Vessel calls to a port can sometimes be irregular. When a large number of vessels call at the same time, appropriate berth allocation must be made in order to achieve efficient cargo handling at the port. In this sense, when container berths at Cai Mep are occupied by plenty of vessels, those calling vessels should be allowed to call at the Thi Vai International General Cargo Port to load / unload container cargo. However, general cargo vessels should not be allowed to call at the Cai Mep International Container Terminal because container terminals cannot accept slow general cargo handling operation all the time. The Study Team proposes that the common usage of general cargo berths between container and general cargo terminal should be introduced to the port to provide port users with maximum cargo handling capacity.

(2) Type of New International Terminal Utilization

In general, there are three types of terminal utilization, which are "Public Use", "Commercial Use", and "Private Use". Features of these three types are described in Table 33.2.1.

Table 33.2.1 Features of Terminal Utilization

	Public Use	Commercial Use	Private Use
Ownership	Public	Public / Private	Private
Operation	Public / Private	Private	Private
Advantages	<ul style="list-style-type: none"> <li>• First come, first served policy can be preserved.</li> <li>• Risk is small for private sector.</li> </ul>	<ul style="list-style-type: none"> <li>• Cargo handling efficiency is high, due to unified terminal operation.</li> <li>• Many small shipping company possibly make use of terminal.</li> <li>• Under public sector's control of private sector, port development is possibly progressed.</li> </ul>	<ul style="list-style-type: none"> <li>• Private sector takes advantage of the most efficient cargo handling operation for the specific cargo.</li> <li>• Base cargo can be acquired.</li> <li>• Under public sector's control of private sector, port development is possibly progressed</li> </ul>
Disadvantage	<ul style="list-style-type: none"> <li>• Operational efficiency tends to become low, due to inconsistency cargo handling operation.</li> </ul>	<ul style="list-style-type: none"> <li>• There may be a chance of monopolization at port</li> <li>• There exists no unprofitable cargo handling operation at terminal.</li> </ul>	<ul style="list-style-type: none"> <li>• A large amount of cargo needs to be handled at port to take advantage of scale economy.</li> <li>• Terminal management is drastically aggravated in case of private sector's evacuation.</li> </ul>

Since the New International Port is constructed by public sector, even in case of PSP, it is strictly secured that public sector be always supervising the development and management of the new port in order to gain the maximum transport benefit from this port facilities. From the viewpoint of the most efficient berth utilization, commercial use among the above three types of terminal utilization, should be introduced to the port as a basic PSP scheme. In conclusion, public sector provides infrastructure and quay side container crane, while private sector provides superstructure and necessary facilities. Terminal management and operation is conducted by private sector. The public sector supervises port management and operation. Basic terminal utilization is "commercial use system".



## **PART 5 CONCLUSIONS AND RECOMMENDATION**

### **Chapter 34 Conclusions and Recommendations**

#### **34.1 General**

##### **34.1.1 Objectives of the Proposed Development Plan**

The major objectives of the Port Development Plan in the South of Vietnam proposed herewith are:

- (1) to provide MOT/VINAMARINE with a well analyzed long-term direction of port development in the region together with short-term/priority development schemes for making official decisions of Vietnam,
- (2) to assist MOT/VINAMRINE in presenting to the regional society the official intention of the Government on port development in this region,
- (3) to promote cooperation among the parties concerned for successful development of the port,
- (4) to guide and attract the potential private investment to the regional industries and marine businesses,
- (5) to be a base of financing arrangements necessary for the target port development,
- (6) to upgrade the capability of VINAMARINE staff in port planning, management and operation.

##### **34.1.2 Effective Utilization of the Report**

On the basis of the above understanding on the objectives of the proposed port development, the Report needs to be utilized accordingly keeping the following points in mind.

- (1) After being scrutinized by MOT/VINAMARINE, the port development plan needs to be authorized as an official VINAMARINE plan to be endorsed by the higher authorities of the government.
- (2) It is important to present the plan in an appropriate manner to the public for getting their positive acceptance and cooperation.
- (3) Constant review of the proposed plans is indispensable for flexible modification of the original plan to fit the updated situations of various development backgrounds.
- (4) With a view to inviting private sector investment (from the maritime business circles in particular), intensive sales initiatives should be made by utilizing the Report.
- (5) Then the Report can be used as a text for VINAMARINE staff as part of their training.

(6) On the basis of the Study proposals, more detailed port development schemes focusing on the first stage construction should be prepared to fit the requirements of possible financing agencies and/or private sector investors.

## **34.2 Basic Policy of Port Development**

### **34.2.1 Final Targets of Port Development**

The final targets of the port development in the south of Vietnam are:

- (1) to promote national/regional socio-economic development,
- (2) to strengthen international and domestic shipping network,
- (3) to create an attractive business environment in and around the port hinterland,
- (4) to alleviate excess concentration of economic/transport activities in HCMC area,
- (5) to provide the citizens of HCMC with a beautiful and comfortable waterfront,
- (6) to save the valuable riverside from irregular development/activities.

### **34.2.2 General Key Factors for Successful Port Development**

In order to achieve the above targets, the following points need to be considered as the base of successful port development.

- (1) Firm belief and strong will of MOT/VINAMARINE to contribute to the promotion of social welfare and economic development of the nation or region through the port development and operation
- (2) Positive incentives and motives of the PMB to be established for the proposed new port in developing their port
- (3) Timely formation of a well-conceived port policy and development plans authorized by the responsible agencies
- (4) Firm foundation of institutional and legal setup for effective port administration and management
- (5) Positive cooperation with the port related agencies and parties concerned
- (6) *Appropriate financial arrangements and sound status of PMB for the target port development*
- (7) Sufficient capability of PMB for effective port administration, management and operation supported by reliable port engineering and technological knowledge and skills

### **34.2.3 Proposed Port Development Policies**

#### **(1) Regional Development Policy**

In general, a port has three roles, one is a role as the logistic node, the second is a role as the core facility for the regional and industrial development and the third is a role as a waterfront amenity.

##### **1) Sustainable Regional Development by Decentralization Policy**

Ports move away from the central city area to suburban areas for the smooth urban activities and for the improvement of urban environments. Port's activities in the city center should limit the freight handling necessary only for city activity and the waterfront re-development. Through these, the charm of Ho Chi Minh City will be raised more as an international city.

##### **2) Gateway Port with Integrated Transport Network in the Region**

In the outside of a residential area, the light industries such as the clean high-tech industrial complex will be arranged. Heavy and chemical industries and logistics bases and ports will be developed in the downstream rivers where the land and maritime transportation will harmonize.

#### **(2) Fundamental Views of Long Term Port Development**

The importance will increase as a new base of an international transportation that connects not only the Asian countries but also American and European countries. Moreover, the importance will also increase as a base of transportation for coastal service, which connects the southern part and northern part of Vietnam. In addition, the development of the amenity in waterfronts and the preservation of natural environment will also become dispensable.

### **34.3 Demand Forecast of Cargo Traffic**

Presently, more than 40 small container ships ranging 246 TEU to 1,181 TEU call the ports along the Saigon River weekly. There is a growing need to construct a deep container port. The demand forecast indicates that the SFEA economy will badly need such a port by the year 2010 to maintain its international competitiveness and further by 2020 it will enable to be one of representative container ports in Asia.

On the other hand, appropriate non-container port facilities should also be developed at a Thi Vai – Vung Tau new port since those facilities should be adequately distributed within SFEA, taking account of shippers' sites and port access transport.

### **34.4 Master Plan for Development of the Ports in the Region With the Target Year 2020**

#### **34.4.1 Port Development Plan**

##### **(1) Basic Direction of Port Development**

In 2020, total cargo volume is forecasted to reach 78 million tons, of which, containerized 4.7 million TEUs. This figures is 3.5 times during the forecast period while containerized cargo will show 5.4 times in the same period.

According to calculations, the Long Tau River channel has sufficient capacity to accept twice the

current number of vessels using the channel. In addition, ports along the Sai Gon River have the capacity to handle twice the current cargo volume. However, due to the severe traffic congestion in the center of the city, it is not recommendable that ports along Sai Gon River handle twice the current volume.

Moreover, vessels are expected to become larger. Therefore new ports should be developed in the lower course of the river or the river mouth where a sufficient depth can be acquired.

### (2) Target Vessel Size

In Thi-Vai-Vung Tau area, maximum container vessel size will be set at 80,000 DWT in 2020, and 50,000 DWT in 2010. Cargo vessels up to 50,000 DWT will be able to be accommodated in ports in Thi Vai River area in 2020. In Saigon-Soai Rap River area maximum vessel size will be set at 20,000 DWT. The largest passenger ship which will come into the HCMC ports in 2020 is 50,000 GRT.

### (3) Port Development Plan

Based on the results of cargo demand forecast and the calculated maximum vessel sizes, number of tentative berths in 2020 and 2010 is calculated as below:

Table 34.4.1 Number of Container Berths

Container Berths	Vessel Size	2010	2020	Total
Tan Cang Cat Lai	20,000 DWT	2	0	2
Cat Lai Container	20,000 DWT	2	0	2
Hiep Phuoc Container	20,000 DWT	1	2	3
Upper Cai Mep	50,000 DWT	0	2	2
Lower Cai Mep	50,000 DWT	4	0	4
Lower Cai Mep	80,000 DWT	0	2	2
Total		9	6	15

Table 34.4.2 Number of General Cargo Berths

General Cargo Berths	Vessel Size	2010	2020	Total
Cat Lai	20,000 DWT	1	0	1
Hiep Phuoc Container	20,000 DWT	1	1	2
Hiep Phuoc General	20,000 DWT	0	10	10
Thi Vai General	50,000 DWT	2	4	6
Dong Xuyen IP	20,000 DWT	1	0	1
Total		5	15	20

Table 34.4.3 Number of Passenger Berths

Passenger Berths	Vessel Size	2010	2020	Total
Sai Gon	50,000 GRT	0	1	1

#### **34.4.2 Channel Development Plan**

##### **(1) Long Tau River Channel**

The traffic volume in the Long Tau river channel in 2020 is forecasted at 16,900 vessels / year. This is twice the present traffic volume. Therefore the sections that have sharp bends should be improved and the VTS should be introduced for the safe navigation.

##### **(2) Soai Rap River Channel**

At the first stage, this channel will be used from the Long Tau River channel and will operate as the two-way traffic channel depending on the tidal height. The navigational channel in the upper Soai Rap River will be developed for container vessels of up to 20,000 DWT in the new general port of Hiep Phuoc. At the same time, the height of the high-tension cable should also increase not lower than 55m above the highest water level.

The large-scale route development of the down stream from the river mouth of Soai Rap cannot immediately reach the conclusion on the development possibility. On this account, vessels up to 5,000 DWT will navigate by utilizing the existing water depth and high tidal term combined with new navigation aids.

##### **(3) Thi Vai River Channel**

The main navigation channel from the entrance of Ganh Rai Bay to the Cai Mep site passing the offshore Ben Dinh site will be planned for the container vessel up to 80,000 DWT. This channel will be designed for the 24-hour operation, which does not depend on the tidal fluctuation, and for the two-way traffic.

The channel from the Cai Mep site to the Thi Vai site will be planned for vessels up to 50,000 DWT. This channel will also be designed for tidal operation and for two-way traffic. There is a sharp S-shape bend between the Cai Mep site and the Thi Vai site. In this section, the vessel traffic should be restricted one-way for vessels more than 30,000 DWT for safety navigation.

##### **(4) Other Issues**

The under clearance of the bridges and the cables over the main channels should be kept more than 55m. In the case of the gas pile liens under the channel, the future depth of channels should be taken into account.

#### **34.4.3 Transportation Network Plan**

(1) In order to ease the notorious HCMC traffic congestion, especially heavy congestion adjacent to HCMC ports group, it is highlighted that railways will fulfill an important role in the field of cargo transportation, especially container cargoes.

(2) When the railway network is established in this region, a big public Inland Container Depot (ICD) will be also needed as a supporting facility and to promote the new container port. The ICD has following functions as a logistics center in the south of Vietnam:

- 1) Container transport to/from HCMC by rail in order to reduce traffic congestion inside HCMC,
- 2) Gateway terminal to north and central Vietnam, and Cambodia for international container

cargoes.

### **34.5 Short term Development Plans for the Ports in the Regions with the Target Year of 2010**

#### **34.5.1 Port Development Plan in HCMC Area**

(1) In accordance with the urban development master plan of HCMC, all the major ports in HCMC are planned to be relocated to the Cat Lai and/or Hiep Phuoc Area by the year 2020 in order to relieve traffic congestion in the city. On the way to the above planning, Cat Lai IZ Port should be developed with three 20,000DWT container berths and two 20,000DWT general cargo berths and Nha Rong Port, which is a part of the Sai Gon Port, should be reformed as a water front park by the year 2010.

#### **34.5.2 Port Development Plan in Thi Vai Area**

(1) Ports in Thi Vai area basically support the industrial activity of the immediate port hinterland. In order to meet the demand for loading/unloading facilities caused by the above activity, General Cargo Terminal with 2 berths to accommodate a 50,000 DWT vessel should be developed by the year 2010.

(2) The size of the container vessel has been increasing throughout the world. This necessitate the development of a deep port as quickly as possible in Vietnam. Therefore, Container Terminal with 2 berths to accommodate a 50,000DWT vessel should be developed at the Lower Cai Mep site, which is close to the site of the Phu My IZ, by the year 2010.

### **34.6 Priority Port Development Schemes for the Urgent Requirements**

#### **34.6.1 Alternatives of Priority Port Development Project Packages**

The new container port project by the Vietnamese Government targeted for 2010 as an Intra-Asian maritime gateway in the south of Vietnam should be started in Cai Mep site.

Particularly quick service is very important for container vessels. Therefore, the channel section up to Cai Mep should be determined as two-way traffic with the sufficient depth for the full draft of container vessel. On the other hand, the Thi Vai site should be developed as the general cargo port with the channel by taking account of tidal advantage.

For the second stage of the project, there are two alternative project packages. The first one is to construct the new deeper depth of berths in Cai Mep and the second one is to construct new deeper berths in Ben Dinh-Sao Mai. It is necessary to determine the future project site for vessels of Post-Panamax size after checking the following conditions.

- a) Overall economic growth of Vietnam
- b) Datum of natural condition (current, wave, siltation, etc)
- c) Increase of container traffic in the hinterland of ports

- d) Existence of constant container consignor / consignee
- e) Detail estimation on environmental and social impact

### 34.6.2 Project Package for the Urgent Requirements

The development of a deep container terminal (CDL -14m) is vital to the independent growth of the Vietnamese economy. From this viewpoint, the construction of 2 berths in the lower Cai Mep site should be given priority. In tandem with this, another general terminal with berth depth of -14m in Thi Vai area where industrialization is rapidly advancing is also planned.

Among those above projects, there are 3 works items, which should be undertaken by the public sector. They are: (1) initial dredging of the navigational channel which makes the project benefit estimate difficult, (2) construction of access roads to ports and (3) construction of deep terminals (CDL -14m) which requires massive investment.

The use of ODA funds to finance the construction and development of all infrastructures required up to year 2010 is, on the one hand, not in conformity with the target of ODA, which is to support and stimulate the self-development of recipient countries, and on the other hand, it raises issues involving budget limitations. Consequently, it is desirable to allocate the limited funds for priority projects, which will act as a catalyst for further investment into the projects by either the target country or the private sector.

### 34.7 Feasibility Analysis on Master Plan in Thi Vai Area

Eight (8) container berths capable to accommodate maximum 80,000 DWT in Cai Mep and six (6) general cargo berths capable to accommodate maximum 50,000 DWT in Thi Vai are planned for the master plan 2020 in Thi Vai area. The investment amount of these ports facilities including the navigation channel are US\$ 200 million for Cai Mep and US\$ 80 million for Thi Vai, respectively. The economic analysis on master plan was carried out for each project port configuration in Thi Vai area and Vung Tau area as the project combination of Cai Mep Container Terminal, Thi Vai General Cargo Terminal and Ben Dinh Sao Mai Container Terminal, respectively on the same development framework.

The configuration of Cai Mep Container Terminal with Thi Vai General Cargo Terminal is superior to the configuration of Ben Dinh Sao Mai Container Terminal with Thi Vai General Cargo Terminal from the benefit of national economy as appeared in Table 34.7.1 below.

Table 34.7.1 Result of Economic Analysis on Master Plan

Indicator	Cai Mep + Thi Vai	BDSM + Thi Vai
EIRR	22.5%	19.6%
ENPV at 10 % D.R.	1,100.5	888.2
BCR at 10 % D.R.	2.71	2.23

Source: JICA Study Team

## 34.8 Feasibility Analysis on the Proposed Priority Port Development

### 34.8.1 Structural Design

- (1) Cai Mep site is covered by very soft subsoil of 30 m thickness. Therefore, soil improvement is necessary for the construction of terminal yard. Even after execution of the soil improvement work, some settlement in future will occur. Therefore, attention should be paid to the design of pavement and other land facilities.
- (2) The very soft subsoil layer in Thi Vai site is about 15 m thick, thinner than Cai Mep site. However, soil improvement work is also necessary and the same attention with Cai Mep port should be paid for the detailed design.
- (3) Quays of both terminals are situated in the river and if the quay structure will disturb the flow of river, configuration of riverbed and riverbank in upstream and downstream will be changed. To avoid such phenomena, attention should be paid during the detailed design of quay and revetment structures.
- (4) Hard subsoil layer is situated at about CDL -45 m in Both terminal sites. Therefore, quay structure and other heavy facilities should be supported by pile foundation.
- (5) For the facility design of both terminals, no difficulties are anticipated except attention to soft subsoil and river hydraulics mentioned above. Compared with the seaports, there are no wave problems and even advantage from the view points of structural design and construction works.

### 34.8.2 Construction Plan and Cost Estimate

#### (1) Construction Plan

As the preconditions for construction planning, number and capability of local construction companies, equipment available and materials supply for the Project have been investigated. As the result, the capabilities and experiences of the local contractors have been deemed to be sufficient subject to their good preparation of necessary large equipment or work vessels and jointed with foreign contractors. As for the construction material supply, steel pipe piles or sheet piles and large-scale rubber fenders should be imported from foreign countries. It becomes clear that a large volume of soil for navigation channels should be dredged. Then large trailing (drag) suction hopper dredgers should be procured when they will be needed.

After reviewing workable days or considering speed of each work, a construction schedule for the feasibility project is proposed. It takes five years after commencement of construction works. However, the schedule is to be rather tight so that, in order to complete the works until the end of 2009, various procedures including extraordinary selection of contractors should be done smoothly and quickly, and then critical works such as soil improvement or sand filling works for reclamation should be carried out.

#### (2) Cost Estimate

Rough cost for the Feasibility Study of the Project up to the year 2010 have been carried out. The



results are as follows.

- Lower Cai Mep: Container Wharf (LCC3&LCC4) including Access Channel and Road
  - 50,000DWT 2 Berth——159.3 Million USD (19.1Billion Yen)
  - Container Wharf——102.9 Million USD (12.3Billion Yen)
  - Access Road——— 5.8Million USD (0.7Billion Yen)
  - Channel———23.4 Million USD (2.8Billion Yen)
  - Others———27.1 Million USD (3.3Billion Yen)
- Thi Vai: General Cargo Wharf (TVG1&TVG2) including Access Channel and Road
  - 50,000DWT 2 Berth ——81 Million USD (9.7 Billion Yen)
  - General Cargo Wharf——61.8 Million USD (7.4Billion Yen)
  - Access Road——— 2.8Million USD (0.3Billion Yen)
  - Channel &Basin——— 2.4MillionUSD (0.3Billion Yen)
  - Others———14.0Million USD(1.7Billion Yen)

The portion of equipment cost is rather high to occupy 47% and 31% of the total direct cost of LCC3&LCC4 and TVG1&TVG2 respectively. Therefore, procuring cargo handling machines or equipments such as container crane, jib crane, RTG (Rubber Tired Gantry Crane) or tractor should be carefully decided in number and price.

As for maintenance dredging the volume is not so large so that it is recommendable that once 3 or 4 years 2.8million and 0.6million cubic meters should be dredged for LCC3 & LCC4 and TVG1 & TVG2 respectively.As a reference, the cost for Ben Dinh Sao Mai Container Wharf (50,000DWT 2 Container Berth) is also calculated. It becomes 182 Million USD (21.8 Billion Yen) 14% higher than that of LCC3&4.

### 34.8.3 Economic Analyses on the Priority Project

#### (1) Result of Economic Analysis on the Priority Project

The economic viability evaluation of the priority project was carried out for each project port, namely Lower Cai Mep International Container Terminal (LCC) and Thi Vai International General Cargo Terminal (TVG). Table 34.8.1 shows the result of economic analysis by EIRR, ENPV and BCR.

Table 34.8.1 Result of Economic Analysis on Priority Project

Indicator	LCC+TVG	LCC Alone	TVG Alone
EIRR	16.1 %	17.1 %	12.4 %
ENPV at 10 % D.R. (US\$ Million)	155.7	123.1	19.9
BCR at 10 % D.R.	1.48	1.48	1.25

Source: JICA Study Team

As shown in the above table, both cases of a combination with LCC and TVG or independent developments of respective terminal clearly exceeds 10% and 1.0 set out as a cut off rate of EIRR and BCR, respectively. Therefore, the project of the Lower Cai Mep International Container Terminal combined with the Thi Vai International General Cargo Terminal, as well as an independent implementation of respective port is considered competitive among other similar

projects and feasible for the implementation from the national economic viewpoint.

### (3) Sensitivity Analysis

The result of sensitivity analysis on the project combined with LCC and TVG as a base case were shown in Table 34.8.2. As shown in this table, the project is verified as feasible even the cost of initial capital investment and maintenance were increased at 10 % and the benefit decreased at 10 %.

Table 34.8.2 Result of Sensitivity Analysis

Indicator	Base Case	Case-I	Case-II	Case-III
Capital Cost Increased		10%	10%	10%
Maintenance Cost Increased				10%
Benefit Decreased			10%	10%
EIRR	16.1%	15.3%	13.7%	12.9%
ENPV at 10 % D.R.	155.7	142.2	94.3	76.8
BCR at 10 % D.R.	1.48	1.42	1.28	1.22

### 34.8.4 Financial Analysis on the Priority Project

The financial viability evaluation of the priority project was carried out based on the result of calculated financial internal rate of return (FIRR). It was assumed that the leasing system in which port infrastructure and quayside container cranes were provided for a terminal operator by the port management body (PMB), should be adopted at the New International Container and General Cargo Terminal. FIRR for the New PMB in case of 5 year construction project, is 5.7 % which exceeds the weighted average interest rate (3.78 %) of assumed fund raising plans. FIRR for the terminal operator in case of 5 year construction project is 23.8 %, which exceeds the assumed private bank's interest rate (15.0%). The project is also verified as feasible even if the initial and maintenance cost is increased by 10 %, and the port revenue is decreased by 10 %. On the other hand, FIRR for the New PMB in case of 4 year construction project, is 5.8% which also exceeds the weighted average interest rate (3.78%) of the assumed fund raising plan. FIRR for the terminal operator in case of 4 year construction project, is 22.5% which exceeds the assumed private bank's interest rate (15.0%). The project is also verified as feasible even if the initial and maintenance cost is increased by 10%, and the port revenue is decreased by 10%.

Hence, the priority project of the Lower Cai Mep International Container Terminal combined with the Thi Vai International General Cargo Terminal, is considered financially feasible, except for the case that the financial environment is expected to drastically change.

## 34.9 Port administration, Management and Operation

### 34.9.1 Port administration System of the Country

While it is natural that an administration system of a certain sector of a country is established for its own benefit and convenience under the political and social system of the country, international requirements are an important factor as well for the port sector administration concerned in particular.

This is because the port facilities and its service activities should be designed and provided for the port users who have their own requirements for the benefit of their international business and global shipping economy. The port users, whether they are shippers, shipping lines and other port-related entities, tend to use a port which is managed and operated well under a simple and transparent administration system, so that they can coordinate their business activities easily with the direction of port sector development and management policy of the government. In this context, the current system of port administration of this country may need to be further improved as follows.

#### (1) Classification of Ports

Vietnam has many ports, many of which differ in terms of roles and characteristics. In such a situation, it is not realistic or effective for all ports to be administrated in the same manner.

In order to identify the importance of Vietnamese ports, to clarify the investment priority for those ports and to distribute effectively limited budgets on the national level, ports in Vietnam should be classified functionally with clear criteria, for instance, 1) function of ports, 2) contents and quality of handling cargoes, and 3) size of hinterland territory. And the responsibility and the degree of commitment of the central government concerning the port administration need to be identified in each port category.

#### (2) Unification of Port Administration

Taking account of the importance of port infrastructure as public assets, the role of a central government for port administration is very important. However, the lack of only one function for port administration in Vietnam may disturb the appropriate execution of nation-wide port administration. Moreover, these functions should not be shared among several ministries in order to avoid duplication and inconsistent policy making. To improve the present administrative system in Vietnam, all roles concerning the central government should be played by one administrative line, that is, *one main ministry or a combination of one ministry and one government agency*.

#### (3) Improvement of Institutional Framework for Port Administration.

It is necessary to institutionalize the formulation and authorization of a port master plan of each major port in Vietnam. It is a basic principle that a port management body (PMB) formulates a draft master plan and then the central government authorizes it.

#### (4) Establishment of Appropriate Port Management System

A port management entity can either be a public body or a private body. In the case of Vietnam which desires to accelerate national growth through the promotion of maritime international transportation, it is considered that port management by a public entity is more suitable. However, the Vietnamese port management bodies are a mixture of semi-public and private entities. Accordingly, how to install a public at enterprises is an important question. The appropriate port management system including the following three countermeasures for major ports has to be examined and established as soon as possible.

- 1) Establishment of supervising organization for port management body
- 2) Addition of specific public responsibilities to port management body.
- 3) Establishment of an independent organization installed specific public characteristics.

### 34.9.2 Port Management and Operation System of the Proposed New Ports

While there is increasing awareness of the need to adjust a port system to the changing sea transport market, the immediate measure to make port services more responsive to port user demand has become common. In order to realize an optimal cost-effective utilization of port facilities, it is essential for Vietnam to introduce a more advanced port management and operation system as follows.

#### (1) Establishment of New Port Management Body for the New Port

In order to carry out efficiently and effectively the port management and operation of the New Port, a new port management body should be established as soon as possible. Fundamentally, the organization from this new port management body needs to be a form which consists of a board of commissioners, a director general, deputy director generals, and directors of necessary divisions. The management and operation of the New Port should be conducted under organizational framework suitable for the typical new large container port in Vietnam. Regarding the existing port management bodies such as Ho Chi Minh Port Group, the restructuring toward the new framework proposed in this Study may need a long time to be realized. However, continuous efforts towards realizing this goal are necessary.

#### (2) Establishment of Construction Management Team

To initiate port construction works at the project sites, the organization of construction management must be identified and set up at first. A supervisory team for these duties must be organized before the initiation of the construction.

The supervisory team consists of several tens of engineers and staffs at early stage of the construction. But, the number of the team will increase and reach to some hundreds, as the construction works proceed. And the supervisory team should be developed and transferred to an administrative division, and engineering and technology division within the future port management body for the New Port, when the planned port is newly operational.

#### (3) Promotion of Private Sector Participation (PSP)

Promotion of Private Sector Participation (PSP) is a main stream of port management business throughout the world. In Vietnam, PSP for developing public infrastructure has been conducted through the preparation of relevant regulations.

When a new port management body introduces PSP to the New port, the lease system is recommended. Public sector's investment should include not only wharves, yard, navigation channel and access road, but also quay side cranes, because a large amount of investment may make private sector bear greater risk for the project. Superstructure and facilities, such as cargo handling equipment and buildings should be provided by the private sector. Private sector aims at high productivity based on its long cargo handling experience and know-how. Private sector also has flexibility in responding to the changing economic situation in the international container cargo market.

The leasing system of a general cargo terminal must be also carefully considered. It is recommended that a general cargo terminal should be leased to the same private sector as a

container terminal operator in order to reduce the private entity's financial risk.

(4) Introduction of Electric Data Interchange (EDI) System

It is essential for Vietnam to introduce a more advanced information system for port/terminal management and operation. The relevant government agencies and port management bodies should make an effort to utilize "one-stop service system" and a full-scale EDI system at major ports in Vietnam. Particularly, the Ministry of Transport and VINAMARINE are expected to show strong leadership towards the port information technology promotion.

**34.9.3 Management and Operation Policies for the Terminals and Navigation Channels**

(1) Terminal Management and Operation

1) General ports in HCM City including Cat Lai and Hiep Phuoc Sites shall be basically separated with containers and general cargoes up to 2010. On the other hand, Cai Mep-Thi Vai International Port for large size vessels shall establish basically specialized cargo handling system by kind of cargoes, which means container, general cargo and bulk cargo (clean and dirty) up to 2020. And for such terminals, one (1) operator should manage at least two (2) berths together in order to use personnel, equipment, facilities and yard space efficiently and effectively.

2) Since cargo volume will increase year by year, one (1) container berth and one (1) general cargo berth in the feasibility study on the priority project might be planned to be provisionally constructed latest in 2006 during the transitional period to the proposed construction schedule as well as approach channels. In this regard, provisional cargo stockyards will be proposed in the appropriate places between the planned terminal and National Road Route 51, because the terminal yard cannot be used for the time being due to long duration of the pavement.

3) Vessel and yard operation planning, equipment control and maintenance management, terminal management and EDI shall be controlled by batch processing using a software on the market.

(2) Channel Management and Operation

1) The number of calling vessels to SFEA ports is expected to be more than 8 thousand in 2010 (an increase of 1.3 times over 2000) and more than 12 thousand in 2020 (a twofold increase). Therefore, for vessel traffic safety, efficiency and protection of environment, VTS in SFEA shall be established and a navigation regulation applying to VTS in SFEA be stipulated.

The Port Authority of HCM City has introduced VTS covering waters between HCM City Port Area and Vung Tau Pilot Station. Therefore the system shall be spread over SFEA waters including the Thi Vai River from 2010. And the responsible organization will be preferable to be the authority because the system shall be managed by one organization in SFEA water.

2) Special navigation regulation for VTS in SFEA water shall be stipulated for navigation restrictions, priority by kind of vessels and so on, especially in the water of the junction of the Long Tau Approach, Thi Vai Approach and Dinh River Approach Channels, and 'S' shape bent Channel in the Thi Vai River.

3) Countermeasures against the illegal movement of small boats, especially fishing boats in the SFEA water shall be required by means of VTS operation.

4) A system to train and foster VTS operators shall be established, and VTS be started from the information service. After VTS operators will improve their operation with security, navigational assistance and traffic organization services shall be introduced.

5) Kinds of nautical charts to cover Vung Tau Approach, the Long Tau River to HCM City Ports, the Thi Vai River and Dinh River Channels shall be produced and published to the public by a competent authority in Vietnam, because such charts are currently not available.

6) Aids to navigation for deep draft vessel traffic shall be provided in addition to the existing ones as the channels will develop, especially for the entrance of Ganh Rai Bay.

7) Pilot exemption system shall be established. The captain of vessel, who calls the same port area frequently can be exempted to take pilot for the purpose of reduction of traffic congestion at pilot station and pilotage.

#### **34.9.4 Port Environment Management**

Taking the social conditions and sustainability of Vietnamese society into account, the realistic ideas on the port environmental management, which allow to avoid and to mitigate possible environmental impacts arising possibly from the new port operation are recommended. The recommendations, however, are not only protective ideas, but also positive ones as described in following sections.

##### **(1) Strict application of environmental quality standards**

The results of the site survey conducted by the Study Team imply that the industrial and human waste discharge might be the cause of the current contamination of water and sediment in the survey areas. The Study Team would like to recommend the proper application of the environmental regulations on the discharge, especially industrial, from the land area and *improvement of the treatment system of the discharges.*

##### **(2) Preservation of mangrove swamps**

The areas, in and around the project sites, are designated as industrial zones by the Vietnamese Government. A power station and various sorts of industrial plants have already been constructed.

On the other hand, there are valuable environmental resources represented by mangroves, mud-lands, etc. The basic policy of the Study Team is that port and related development in the sites should be in harmony with the local environment.

Considering the current environmental conditions in the survey areas, a zoning map consisting of three zones defined below is proposed as shown in Figure 34.9.4.1.

##### **1) Core Zone:**

Nature reserve zone to strictly control human interference.

##### **2) Buffer Zone:**

Coexisting type development zone that becomes a buffer between the development of the ports and urban functions, and at the same time conservation of natural resources.

3) Multi-purpose Use Zone:

Zone allowing development.

Even in the Multi-purpose Use Zone, since the mangrove swamps constitute not only a visual landscape, but also are sensitive detector of environmental pollutions for long term, the Study Team would like to recommend to avoid unnecessary distraction and forestation of the mangrove forests for new port construction as much as possible.

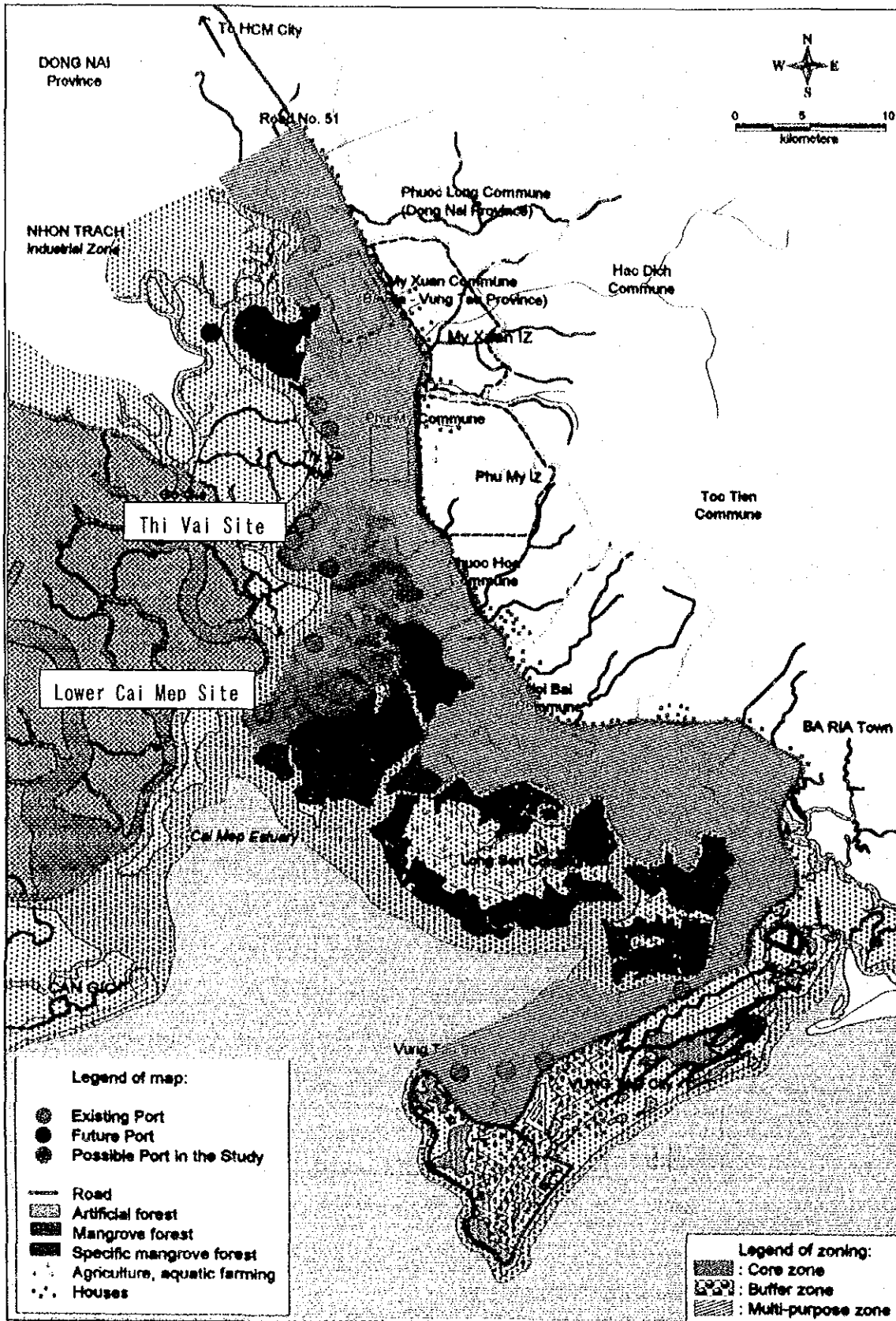


Figure 34.9.4.1 Zoning Map



### (3) Preparation of funds required for urgent rehabilitation of unexpected damage on environment

Recently many reports have been brought forward with respect to oil spillage from stranded vessels that caused considerable damages on the neighboring environment. Reports on the similar incidents have also been rendered concerning the Study Area. A speedy counter-measure is mandatory for such unexpected accidents that in many cases can affect the eventual magnitude of damage on the environment.

For this reason, it is recommendable to institute a funding system to utilize a part of port duties received from port users as the aid fund to cope with such emergent disasters in harmony with the principle of account for the lose incurred by the causers.

#### **34.9.5 Port Statistics System**

Accurate and reliable port statistics including cargo handling volume, number of ship calls, port operation performances and other data/information are essential as a base of port planning, administration, management and operation. Although some port-related data and statistics in Vietnam are well collected and compiled, following suggestions may be useful for further improvement of the port statistics system of the country.

(1) Since port statistics are recognized as one of the most basic data sources, not only for port sector development but for the drafting of national economic development policy, under the responsible government agencies. While establishing a complete port statistics system may be expensive, it is recommended to make further efforts for upgrading and clarifying the trend of cargo handling volume by lot, and the origin/destination of each kind of commodity/cargo type, as well as number of calling ships, and the present situation of dominant port facilities.

(2) With a view to achieve the above mentioned goal, port statistics should be edited, having close relation 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 also become very important to define the classification of individual cargo and to unify the survey period.

### **34.10 Follow up Action for the Successful Implementation of the Proposed Port Development**

#### **34.10.1 Periodical Review of Port Plans**

Periodical review of port plans is always required for proper promotion of port development, particularly under highly sensitive or unstable economic or social conditions. As already pointed out, cargo traffic demand in the region is expected to increase depending on economic development not only of the region but of the inland neighboring countries, and also on industrial location expected at the hinterland of the target ports. On the other hand, recent economic trend of the major Asian countries including Vietnam implies unstable/uncertain position of the total cargo flow demand to be generated by such sensitive situation of the regional economy. It should be clearly understood, therefore, that a certain level of uncertainty may creep into cargo traffic forecasts, and that there may be a certain gap between estimated potential cargo traffic demand and actual future cargo traffic to be served by the projects port facilities.

Considering the above point, it is important to understand that the original plan might lead the development policy of the ports in an undesirable direction. In this sense, constant review and adjustment of the plans are essential to meet any contingency in the surrounding situation. The recommended master plans should be carefully reviewed and adjusted, say, at least every five years.

#### **34.10.2 Authorization of the Project Schemes in Vietnam**

How to realize the recommended development plan of the ports is another important point for effective implementation of the projects. There are many cases observed in developing countries where the project development as recommended in the studies fails to be successfully realized. The major reasons (apart from apparent failure in planning) for this type of failure can be summarized as follows:

- a) Lack of practicability, applicability or flexibility in proposed schemes
- b) Basic change in the government's policy for the target port development
- c) Shortage of funds for the development
- d) Failure in developing other port related infrastructure and facilities
- e) Lack of proper control by the government of related private sector activities

In order to avoid the above-mentioned failures, the plans should officially be authorized through proper procedure by laws, regulations or any other form applicable to the country concerned. This is particularly effective in securing public expenditure on a long-term basis for the projects themselves as well for other public works necessary for the projects. The plan also needs to be open projects. The plan also needs to be open to the public so that business activities concerned could be properly coordinated.

#### **34.10.3 Procurement Policy of Financial Resources**

The appropriate procurement policy of financial resources is one of the most vital factors for successful realization of the project. If the government would like to avail itself of an ODA based soft loan, the following points need to be considered carefully.

- (1) High priority of the project is essential among all other competitive projects of the country.
- (2) The realistic financial size of the project should be designed and selected for successful mobilization of the project finance, considering, for instance, the total amount of foreign loan/outstanding debts of the country, possible size of the required local currency funds, appropriate allocation of the total required funds in the co-financing scheme if possible and necessary, and so on.

#### **34.10.4 Engineering Requirements for Further Improvement of the Proposed Port Development Schemes**

- (1) Technical Aspect in General

The Project can be featured technically by the following characteristics:

1) The scale and size of port facilities are the largest having been planned in Vietnam

The design ship is a so-called Post-Panamax ship, and has a size of 50,000 DWT, accompanied by a deep planned depth of channels and basins of CDL –14 m.

The scale of project is large, including development of new deep channels, large-size berths and related facilities and introduction of large-capacity equipment.

2) The natural conditions at the project site are not always easy to deal technically

For example, the foundation of berths, yards, and roads consists of a very soft clayey layer with a depth of about 30 m from the surface. Hence, foundation improvement work is prerequisite, which takes a considerable time and needs a large capital.

3) The Project requires high technology

For example, Ganh Rai Bay and the Thi Vai River are favorable area in terms of the hydraulic conditions related to sedimentation, which implies that the location is suitable to exploit channels. Planning of the channels and assessment of sedimentation, however, involve the latest comprehensive technology to analyze the phenomena and to find out optimum methodology of dredging and maintenance.

4) The Project requires large investment cost and rapid execution

As a result of the above technical characteristics of the Project, the investment cost roughly estimated amounts to USD 187 million. Compared with the workload of the Project, the construction period is limited until 2010. Rapid execution is necessary.

5) General recommendations

Taking into consideration the above features of the Project and the peculiarities of the site, the following recommendations are presented:

- a. In executing the Project, procedures related to planning, design, tendering, and execution should be rational and short, allowing the actual progress of the Project as fast as possible.
- b. Cooperation between the Executing Agency and the Consultant should be well and close enough to carry out the Project smoothly.
- c. The Consultant who shall play an important role of supporting the Executing Agency technically should be well qualified in terms of technology and experience in the related fields.

(2) Detailed Design Stage

1) Survey for Detailed Design of Port Facilities

a) Soil Investigation

For the feasibility study purpose, 2 borings in quay area, 1 boring in terminal yard and 3 borings in access road were conducted for Lower Cai Mep site and Thi Vai site. However, these are

insufficient for detailed design of quays, foundation piles of quay structure, and soil improvement works and foundations of facilities of terminal yard and access road. Therefore, the following number of additional borings with suitable field and laboratory tests should be conducted.

- Quay Site (on water): 50m intervals, 2 lines,
- Trestle (on water): 50m intervals, 1 line,
- Terminal Yard (on land): 100m intervals grid, and
- Access Road (on land): 100m intervals, 1 line.

#### b) Topographic Survey

The topographic surveys executed for feasibility study at the two sites were 100m intervals, which are not enough for the detailed design purpose. To calculate exact soil volume for reclamation and to determine drainage and bridge spans, detailed topographic survey for terminal yard and access road should be conducted with the following accuracy.

- Terminal Yard: Survey lines = 20m intervals, Contour = 0.5m pitch, Scale = 1: 500
- Access Road: Cross sections = 50m intervals, Contour = 0.5m pitch, Scale = 1: 500

#### c) Sounding Survey

The sounding surveys conducted for feasibility study purpose were also not sufficient for the detailed design of quay structure and dredging plan in front of quay. Therefore, detailed sounding survey around quay structure should be carried out with following accuracy.

- Quay Site: Survey Lines = 20m intervals, Contour = 1.0m pitch, Scale = 1: 500.

### 2) Review of Channel Alignment

The planned and analyzed channel in this Study constitutes a basis of the execution of the Project. However, the planned alignment of the Thi Vai River Approach Channel had better be reviewed to optimize the route and curvature, and to minimize the sedimentation volume and eventual maintenance dredging.

It is desirable to add alternatives of channel alignment and to deepen the assessment of the sedimentation, in which the latest bathymetric charts should be taken into account based on new sounding and sampling surveys. Numerical simulations and monitoring surveys are to be carried out. Such surveys and analyses may include detailed measurements of current and SS, monitoring of degree and locality of sedimentation, analysis of sedimentation rate, etc.

### 3) Investigation for Procurement of Construction Materials

Steel pipe piles or sheet piles and large-scale rubber fenders should be imported from foreign countries. These materials are rather expensive and dominate the cost of piers. It is recommendable to survey more precise prices from suppliers in foreign countries.

As for local materials, sand for reclamation and other works amount to over 6.7 million cubic meters, and they are needed in a short period. Therefore, it is better to investigate sources, transportation method and facilities as well as prevailing market price beforehand.

### (3) Construction Stage

#### 1) Quay, Terminal Yard, and Access Road

- For the quality control of materials and workmanship, basic laboratory test equipment and survey equipment should be prepared at a Project Site.
- Analysis for soil improvement should be conducted in detailed design stage based on the additional boring and laboratory test data. In case of soil improvement works, however, the results of analysis will not always coincide with actual phenomena. Therefore, during the soil improvement work, progress of settlement should be surveyed continuously, and check borings should be conducted if required.

#### 2) Channels and Basins

Capital and maintenance dredging is discussed and analyzed for the planned channels. The capital dredging volume is assessed to be 9.9 million m<sup>3</sup>, and the maintenance dredging volume is estimated to amount about 2 million m<sup>3</sup> at intervals of 3 to 4 years.

The most suitable dredging method and equipment are ordinary dredging operations by Drag Suction Dredgers. The dumping site is proposed at 5km offshore of Vung Tau Cape where serious impact is not anticipated.

In planning and executing the capital and maintenance dredging, the following surveys and analyses are recommended:

- 1) *Monitoring bathymetric surveys throughout the channel should be conducted at least twice a year to review and manage the dredging plan properly.*
- 2) *When dredging has performed by a Drag Suction Hopper Dredger, leveling of the undulation of the seabed should be carried out every time after dredging by means of a blade. This is to increase the average depth and allowance for sedimentation, and to avoid rapid sedimentation in the troughs formed on the surface of the channel bottom.*
- 3) *When high sedimentation is observed locally, an appropriate measure should be taken such as introduction of an easier agitation dredging and/or leveling by a blade. This is because the above-described dredging plan is based on gross treatment of sedimentation under average conditions.*
- 4) *When unusual sedimentation is found such as formation of a submerged dam and upstream siltation, an appropriate measure should be taken such as introduction of a suitable dredger to remove it as soon as possible.*
- 5) *If siltation is found, the navigable depth and keel clearance should be discussed, by measuring the distribution of bulk density of fluid mud, to evaluate necessity and suitable methods of dredging.*
- 6) *In relation to dumping of dredged soils, regular monitoring surveys should be carried out on the distribution of SS and on the formation of banks due to accumulation of dumped soils on*

the seabed. If excessive SS or accretion of dumped soils were observed, the site should be moved taking account of current speed and direction, effective diffusion distance, depth of water, etc.

7) For inspection and takeover of the channel, pre- and post-sounding surveys should be carried out by means of a dual-frequency echo-sounder, so that the existence of fluid mud can be detected.

### 3) Surveys and Analyses for Control of Schedule and Supervision of Construction Works

It is important to carry out the construction works smoothly and to avoid any backlog of the facilities already built, which is apt to happen in marine construction.

In this context, it is essential to introduce a forecast system of weather and marine conditions throughout the construction period. Among other items such as wind and rain, forecast of waves due to monsoons and typhoons is very necessary for the above objectives. A real-time wave observation device should be introduced at an appropriate site in Vung Tau area.

### (4) Environmental Management and Monitoring

#### 1) Environmental Monitoring around Construction Site

General items to be monitored around the port construction site throughout their construction and operation periods are as follows:

- Water quality, sediment quality, air quality, noise, vibration, fauna, flora, etc.

In addition, the Study Team would like to note that warnings on the local environment expressed by the neighboring inhabitants in and around the sites could be one of the important sources of information that should be reflected on the planning and implementation of environmental management and monitoring.

#### 2) Monitoring of Turbidity and Sedimentation at the Dredging Site

In order to evaluate the effect of dredging, current and SS should be monitored at the site of dredging by the similar way at the dumping site.

The survey should be carried out by measuring current and sampling water vertically, at least 3 depths at the surface, the middle depth and the bottom.

#### 3) Monitoring at Dumping Site of Dredged Soils

The following monitoring surveys should be considered along with the monitoring at the dredging site as far as the dumping operations are carried out:

- Current, water quality, sediment quality, benthos, bathymetry, etc.

## 34.11 Policies for Overall Port Sector Promotion of the Country

### 34.11.1 Promotion of Supporting Activities for Port Sector development

It is generally observed that the Vietnamese port sector is rather weak compared with other sectors of the country. Considering the heavy requirements on port development under the severe economic and financial conditions, the Vietnamese port sector needs to become more powerful as a whole in promoting overall port sector development. The following policies may be effective in strengthening the Vietnamese port sector in its economic, administrative, and even political position.

(1) To promote national or regional consensus and international understanding on the importance of the ports for Vietnam and its 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 of this country.

(4) To secure reasonable allocation of public funds (national and local government budgets) to the port sector development.

(5) To create more attractive business environment for private participation in the port sector development.

#### **34.11.2 Strengthening of Port Engineering Administration**

##### *(1) Capacity and Resource Development of Project Executing Agency*

The enough number and high quality of the staff of the Executing Agency are essential factors for the smooth and successful implementation of the Project.

It is recommended to arrange enough staff and to secure their high technical capabilities in this project. Training programs should be provided in the Project for them, including both studying in classes and On-the-Job Training.

##### *(2) Revision of Technical Standards*

The technical standards on marine facilities and works in Vietnam are diverse. Planning and design standards for some important marine facilities have not been formulated yet, including, for example, container terminals and breakwaters. On the other hand, some of the present standards are very detailed. Some are out of date.

It is recommended to revise and unify the technical standards in each field of Survey, Planning, Design, and Construction. The last one can be a form of Construction Management Standard.

It is also imperative to have a system for periodic review of the standards.

##### *(3) Review of Contract Guidelines*

In the past, competition among the bidders was commonly very severe in Vietnam, sometimes resulting in bidding with a much cheaper price than orthodoxly estimated, which caused, in some of other projects, various adverse effects on execution and quality of construction.

In this context, procurement guidelines could be rationalized and revised so as to secure the quality of the construction.

#### **(4) Capacity and Resource Development of Local Contractors**

In marine construction, it is recommended to take measures to develop the capacity and resources of the local contractors specifically in the fields of scheduling and arrangement of preparatory works, number and capacity of construction equipment, orderly control of construction schedule by the Critical Path Method (CPM), etc.

#### **34.11.3 Enhancing Human Resources**

The total power of a group is substantially controlled by the individual capability of each member of that group. It is necessary for the Vietnamese port sector to upgrade their staff in terms of number and quality. Establishment of a comprehensive human resources upgrading is the first step to this end.

#### **34.11.4 Enhancement of 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 container ship calls in particular. While the most effective way of port sales should be designed to fit the actual requirements and the sales policy of each individual port, it may be helpful at least for new PMB for the project port to study the activities conducted by the world major container ports.

### **34.12 Future Study Targets for Promotion of Comprehensive Development of the South of Vietnam**

#### **34.12.1 Re-development of HCMC Riverfront Complex**

In recent years, the urban traffic congestion has severe in the center of HCMC, exacerbating the friction between urban and harbor activities. On this account, neither the expansion of existing ports nor constructing a new terminal on the Saigon River side in a city center is recommended. Port facilities have to, therefore, be markedly relocated to suburban areas. To put it concretely, port should move to the Cat Lai area and the Hiep Phuoc area step-by-step, while some parts of the cargo handling function can be maintained in harmonization with the urban activities.

Ports located in the upstream of Sai Gon River and neighboring area from Tan Thuan bridge, where severe traffic congestion usually occurs, should be redeveloped as a passenger ship terminal and a waterfront park to increase the charm and fame of HCMC as a worldwide city.

It is necessary to do a port redevelopment study in this area in conjunction with the urban and transportation development study.

#### **34.12.2 Technical Study and Survey Program for Soai Rap River Development**



### (1) Local Conditions and Survey Objectives

The development of the Soai Rap River depends technically on possibility of exploiting and maintaining the deep entrance channel at the mouth of the River against the anticipated heavy sedimentation.

The supply of sediments to the mouth of the Soai Rap River is not only from the main stream of the Dong Nai River and the Sai Gon River, but also from the Vam Co River that connects through numerous canals to the Mekong River. In the sea, the mouth of the Soai Rap River is in the range of coastal process that covers the mouths of the tributaries of the Mekong River. Consideration on the effect of the mouths of the Tieu River and the Dai River is imperative. In other words, the study area must be wider and larger than that of the Thi Vai River.

The objective is to pursue the possibility and to examine appropriate methods of developing and maintaining the channel at the mouth of the Soai Rap River for large ships of about 10,000 DWT in a technically and economically viable way in consideration of the above conditions.

### (2) Study and Survey Methodology

In order to take account the above conditions and objectives, an extensive and comprehensive surveys and analyses are required. The following is a proposal of the study:

#### 1) Site Surveys

The following site surveys are necessary, which takes one cycle of the related phenomena, or one year. The survey area is 50 km long coastline with 30 km width, and 50 km long Dong Nai river.

- a. Bathymetric Surveys: Twice in the rainy and dry seasons, covering the coastline of 50 km long and the Dong Nai River of 50km long.
- b. Tidal Level and Current Measurements: Twice in the rainy and dry seasons at about 10 places in the sea and 3 places, one each at 3 river mouths.
- c. River Discharge Surveys: Measurement of water and sediment discharges at 3 river mouths. Twice in the rainy and dry seasons, 5 each at the cross sections of the 3 river mouths.
- d. Seabed Material Sampling: Sampling and grain size analysis. Twice in the rainy and dry seasons at about 100 places in the sea and 30 places, 10 each at 3 river mouths.
- e. Suspended Solid and Bedload Measurement: Sampling and grain size analysis. Twice in the rainy and dry seasons at about 100 places in the sea and 30 places, 10 each at 3 river mouths.
- f. Wave Measurement: Continuous measurement of waves at one place off the River mouth for one year.

#### 2) Analysis of Historical Change in River and Coastline

Analysis of available navigation charts and photographs taken by airplanes and satellites in the past.

#### 3) Planning of Channel Alignment and size with/without Anti-sedimentation Facilities

Preparation of alternatives of channel alignment and size. Anti-sedimentation facilities are also planned along the channel, such as submerged training walls, and at coastlines, such as groins.

#### 4) Numerical Simulations

Applying the above 3) and utilizing the results of 1) and 2), the following numerical simulations are carried out to assess the degree of sedimentation in the channel, and evaluate the appropriateness of the plans and facilities:

- a. Sedimentation/Erosion Analysis: By means of 3-dimensional model in the sea and the River.
- b. Coastline Stability Analysis: By means of one-line theory along the coastlines.

#### 5) Overall Evaluation, Conclusions and Recommendations

Conclusions will be drawn based on the above surveys and analyses as well as past experience of other similar projects.

### **34.12.3 Water Transport System in Mekong Delta Area**

The inland waterway transport, which is a basic means of promoting economic linkage and of facilitating cross-border movement of goods and people, and thus contributes in expanding trade and investments, enhancing labor and social mobility and facilitating access to new markets and economic opportunities, plays an important role in the Mekong Delta Area, especially for transport of bulk cargoes such as rice, construction materials and so on. The improvement of the inland waterway transport system is also expected to greatly contribute to dissolution of regional gaps, poverty reduction programs and the regional activation in the Mekong Delta Area through the domestic and international cargo movement.

Therefore, in order to make use of the system more efficiently, the development study for the inland water transportation system in the Mekong River is recommended. The objectives of the study are:

- (1) To formulate a program for the improvement of inland waterway and associated facilities including river ports, especially core ports, and inter-modal connection with road along the subject international river system;
- (2) To identify priority projects consisting of inland waterway improvement program taking into account of increasing cargo trends through inland waterway system;
- (3) To formulate a program for deepening, widening and maintenance of the navigation channel, and prepare the installation program of inland waterway navigation aids;
- (4) To formulate plans to facilitate cargo and passengers movement using inland waterway system;

#### 34.12.4 Overall Port Sector System

The roles of port sub-sector can be perceived as the major contributor to the economic development. In addition, small and medium size ports are included from the point of view of narrowing the regional gap. The study on overall port sector system should focus on regional economic development.

##### (1) Port development plan

The study will reexamine the roles of major ports and their capacities as well as division of labor described in VITRANSS by reviewing the economic development of three regional economic centers, i.e. north, central and south economic centers. The result of this review will be fed back into the mid-term port development plan.

The study will discuss the division of labor between Hai Phong Port and Cai Lan Port in the North, the timing for expansion of Da Nang Port and need for development of Lien Chieu Port in the Central Area. The study also investigates the appropriate timing for development of a deep-water port in the South Area. In addition, the commercial utilization of Cam Ranh port should be studied.

##### (2) Issues in port administration organization for efficient port operation

The study will clarify the issues below and recommend appropriate solutions.

a) Make analysis of the jurisdiction of Ministry of Transport (in charge of planning, design and construction of ports) and that of VINALINE (in charge of maintenance and port administration) to check whether duplication exists, and whether the prerequisites for efficient port administration are systematically developed between them.

b) Current division of labor between VINALINE and Ministry of Transport (VINAMARINE) and its further improvement

c) Examine the policy and program of the private sector participation (PSP) in the port operation

d) Current situations and issues of small- and medium-sized ports (including current situations of port facilities and access to hinterland)

e) Analyze allocation, distribution and execution of the budget for small- and medium-sized ports. (Clarify the problems on the budget workflow in related ministries and their agencies, budget execution rates and others.)

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