PART 1 PRESENT CONDITIONS

Chapter 1 *Socio-economic Conditions of the Study Area*

The Southern Focal Economic Area (SFEA) connoting the Study area is composed of HCMC and three provinces of Binh Duong, Dong Nai and Ba Ria-Vung Tau, and the center of economic activities in the South Vietnam, especially in commerce and industry. Its hinterlands include Mekong Delta and southern part of the Central Vietnam.

- Population: In 2000, the SFEA's population was 8.5 million, sharing 11% of the national total. HCMC is the largest city in Vietnam, having population over 5.2 million. This shares about 7% of the national total, 59% of the SFEA total. While the highest proportion of urban population was shown in HCMC (84%), other provinces show lower between 30% and 40%. Therefore, population density in HCMC is very high, 10 times of the national average.
- Employment: The labor force in the SFEA was 3.9 million of people in 2000, holding 55% of the national total. While 40%-60% of employees in three provinces were engaging in agricultural sector, most of the employees in HCMC was engaging in service sector (52%) and industrial sector (39%).
- GDP: The SFEA's GDP reached at VND 274 trillion. The proportions by sector were 57% of industry, 38% of service and 5% of agriculture. This also accounted for 31% of national total and 50% of industry total, 29% of service total and 7% of agricultural total. Per capita GDP in the SFEA was VND 10.1 million in 2000, about 3 times higher than national average of VND 3.6 million (at 1994 constant price). Per capita GDP in Va Ria-Vung Tau was extremely high because of the extraction of crude oil.

Table 1.1 Socio-economic Conditions of the SFEA, 2000

Area	Population			GDP 1/				
	Total ('000)	Density (pers/km^2)	% of Urban Pop.	Total (tri VND)	Share by Sector (%)			Per capita GDP (mil. VND)
					Agri-culture	Industry	Service	
HCMC	5,222	2,487	83.5	52.3	1.9	46.0	52.1	10.0
Binh Duong	738	273	33.3	3.8	14.8	60.0	23.2	5.1
Dong Nai	2,039	346	30.8	10.4	18.7	56.5	24.8	5.1
Ba Ria-Vung Tau	823	416	42.0	19.3	3.4	85.5	11.1	23.5
SFEA Total	8,822	696	63.2	85.9	4.9	56.7	38.4	9.7
Vietnam Total	77,686	236	24.0	273.6	23.2	35.4	41.4	3.5
% to Vietnam Total	11.4	-	-	31.4	6.6	50.3	29.1	-

Note: 1/ 1994 constant price

- Foreign Trade: The value of Vietnam's foreign trade reached at US$ 30 billion in 2000. Proportions of export and import are 48% and 52%, respectively. The SFEA's foreign trade value shared 58% of the national total, 81% of export total and 38% of import total. Major products for export were crude oil, garment and textile, footwear, seafood, rice, coffee and rubber. Particularly, the export value of crude oil accounted for 30% of export total in the SFEA. Major imported products were machinery and spar-parts, refined oil, garment and textile, steel, electronic appliances and fertilizers. Main partners in foreign trade were Japan, China and Australia for export and Singapore, Japan and Taiwan for import. Those top-three countries shared 40% and 47% of the respective total value in export and import.

- Capital Investment: During 1995-1999, the total amount of capital investments in the SFEA accounted for 57% of its national total. The proportions between state, non-state and foreign were 43%, 18% and 39%, respectively.
- Foreign Direct Investment (FDI): The amount of foreign direct investment has been increasing since 1988. By 2000, the total number projects reached 3,170 with total investment amount of US$ 39 billion. Most of the FDI projects are located in the SFEA. In 2000, the proportions of the project numbers and registered capital in the SFEA to the country were 77% and 85%, respectively.

Chapter 2 National and Regional Development Plan

(1) National and Regional Development plan

After having shifted to a market economy in 1989, Vietnam has accomplished smooth economic development even under the influence of the Asian economic crisis.
GDP has doubled in the past decade (1991-2000 years), and this can be in part attributed to the great progress made toward industrialization.

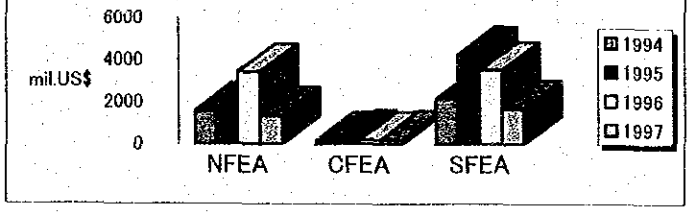
The major targets of the National Development Strategy (2001-2010) for the next decade are as follows:

-Double GDP
-Promote industrialization
-Consolidate the infrastructure for economic development

Focal Economic Areas (FEA) located in three regions (North, Central, and South) play vital roles for the regional development.
In the Southern Focal Economic Area (SFEA) they plan to develop the region by expanding IZs to the outer city areas, by developing industries linked with the oil and gas exploitation, by promoting service industries and by consolidating infrastructures such as national roads and ports.

SFEA has been playing an important role in developing the national economy by attracting foreign direct investment.

Figure 2-1 Foreign Direct Investment (FDI) in three Focal Economic Areas



FDI in SFEA plummeted in the mid of 1990s due to the local economic slowdown and the Asian financial crisis, but with the favorable back-ground of US bi-lateral trade agreement and AFTA, FDI has been recovering recently.

(2) Transport Infrastructure Development Plan

The road network and the inland waterway network are main transport infrastructures in southern Vietnam.
National Road No. 1 (NR 1) linking to NR 51, NR 13, NR 22 and other major roads in the HCMC suburbs form the road network in this area.

Mekong River and Dong Nai River play vital roles as the inland waterway network; the waterway

network in Mekong Delta is quite developed.
The railway network in this area is still underdeveloped (only the Hanoi-HCMC line is currently operating).

The development of the road network is being carried out at a quick pace with the support of foreign assistance.
The rehabilitation project of NR 22 which is a section of the Asian Highway, the rehabilitation project of NR 1 including Can Tho Bridge construction and the construction project of HCMC East-West highway are on-going main road development projects in this region.
The rehabilitation project of the inland waterway network in Mekong Delta containing the Can Tho port rehabilitation work is now being undertaken.

There are several major road development projects with the target year of 2010 or 2020: expressway construction projects of HCMC-Vung Tau, HCMC-Can Tho, HCMC-Na Trang and a construction project of the Phu My bridge connected with the HCMC south expressway.

In the inland waterway development projects, the rehabilitation projects for HCMC-Kien Luong, HCMC-Ca Mau, and HCMC-Ben Tre etc. are planned.

The construction projects of new lines for Bien Hoa -Vung Tau, HCMC-Can Tho, and HCMC-Loc are major long-term development projects in the railway sector.
A terminal extension project of HCMC International Airport is now on-going. And in the future, a new international airport is to be constructed in Long Than, Dong Nai province adjoining to HCMC.

Chapter 3 Natural Conditions

Available information and data on natural conditions are collected for the Study Area. Statistical analyses are conducted for meteorological and hydrological data. Aero-photographs are compared to analyze historical change in coastlines and riverbanks in the past three eras in 1954, 1977 and 1990-1992. Site surveys are performed in Ganh Rai Bay and the Tri Vai River to measure currents, water quality (suspended solids, etc.), seabed materials (particle size, etc.), and river discharge (water and SS) in the rainy and dry seasons. Bathymetric, topographic and geotechnical surveys are carried out at the relevant sites of Thi Vai, Cai Mep and Ben Dinh-Sao Mai for new port planning.

The Study Area belongs to "the Tropical Monsoon Zone." There are basically two prevailing seasons, i.e. "Rainy Season" from May to October and "Dry Season" from November to April. HCM City has an average rainfall of 1,896mm annually, and 1,568mm at Ba Ria. The Thi Vai River, the basin of which has an area of 520 km^2, belongs to the Don Nai River Basin in the Eastern Nam Bo Plains. There is substantially no flood in Thi Vai -Vung Tau area.

The seabed and riverbed materials consist of silt at shallow areas less than about 10m, and sand in deeper portions. The bottom of the beach in front of Can Gio has fine sand. The shallow mud bank in front of Long Son is made of clayey silt.

Ocean currents off Vung Tau change the direction by season. The current speed is less than 1 knot. The tidal pattern is predominantly "Semi-diurnal." At Vung Tau the Mean Sea Level (MSL) is CDL +2.67m and the Highest High Water Level (HHWL) is CDL +4.43m. The High Water Level (HWL, defined by average of the highest and second highest monthly water level to be used by design of port facilities) is calculated for the records of six years from 1995 to 2000, i.e. CDL +3.97m at Vung Tau and +3.92m at Phu An. Water level higher than 4.0m occurs less than 10 times, or 0.2% of time, in a year. "The tidal windows", which affect the operation of channels, are 4.1% and 23.5% of time with average impassable time of 2.72 hours and 5.00 hours every time for the water levels less than +1m and +2m above CDL, respectively.

Tidal current in Ganh Rai Bay is, generally speaking, strong, exceeding 1m/sec at spring tides. Flow directions in Ganh Rai Bay parallel the channels. Suspension of sediments due to the current is significant in the channels for both the ebb and flood tides. In the Thi Vai River the current is also strong. Some portions of meandering, confluence and exit of the river have very deep water depth. But, large-scale change in plane configurations is not found in the Thi Vai River. Considerable changes by erosion are found at the concave portions of Phu My and Cai Mep. The northern half of Can Gio Coast has advanced by sand drift.

Typhoons attack south Vietnam from the east to the west mainly in October and November. They generate high waves. The most influential typhoon in the past was Typhoon No. 9726 ("*Linda*") with the lowest atmospheric pressure of 985 hPa on 2 November 1997.

Geological investigations at the Thi Vai River area show that the surface soil is very soft and deep. The bearing stratum lies below CDL -15 to -45m. In Ben Dinh-Sao Mai area the strength of soils is relatively stronger. Earthquakes in the Study Area are expected not to be strong and frequent. The seismic intensity level is designated to be 7 along the coastline of the Study Area.

Chapter 4 Environmental Conditions

As far as environmental considerations are concerned, two survey areas including two capitals of district and city, and three communes, which may be affected by the possible new port construction and its operation, have been designated as shown in Figure 4.1.

The overview of the environmental conditions in and around the survey areas can be described as follows:

Industrial development along the Thi Vai River has started since 1975 with a few numbers of enterprises, which were specialized in processing of agricultural products. Then, the number and type of industries have increased.

Since early 1990, the survey areas have been industrialized rapidly by installation of power plants, LPG distribution bases, food processing plants and other industries accompanied by their respective loading and unloading facilities. Especially, some Industrial Zones (IZs) and river ports were established, which have contributed to improve living conditions of local residents, including provision of infrastructure, electricity, water as well as new jobs.

On the other hand, in and around the existing IZs, a large extent of mangrove swamp and mud-land eco-system has still remained especially in Phuoc Hoa Commune and Vung Tau City, respectively.

In the southern part of Can Gio district belonging to Ho Chi Minh City, about 20 km apart from the survey areas, there is an environmentally protected area (75,740 ha) which was designated in January 2000 as the Can Gio Mangrove Biosphere Reserve by the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Mainly along the National Road No. 51 in the survey areas, there are about 28 historical relics including pagodas, temples, churches, statues, etc. All of these, however, have been built since 1975 or later, and none of them has not been conserved by the government.

As a result of the evaluation on the previously surveyed data collected by the study team, primary features of the natural environmental conditions are summarized below:

- Comparing with the permissible range in the Vietnamese Environmental Standards and assuming possible range of contents that normally exist in the nature, no significant values of pollutants both in water and sediment were detected in the survey areas.

- Fauna and Flora, which are protected by the government, were not found in the survey areas.

- Bio-diversity in Ben Dinh-Sao Mai site is lower than that of Cai Mep site.

- The project activities hardly affect the natural environment in Can Gio Mangrove Biosphere Reserve.

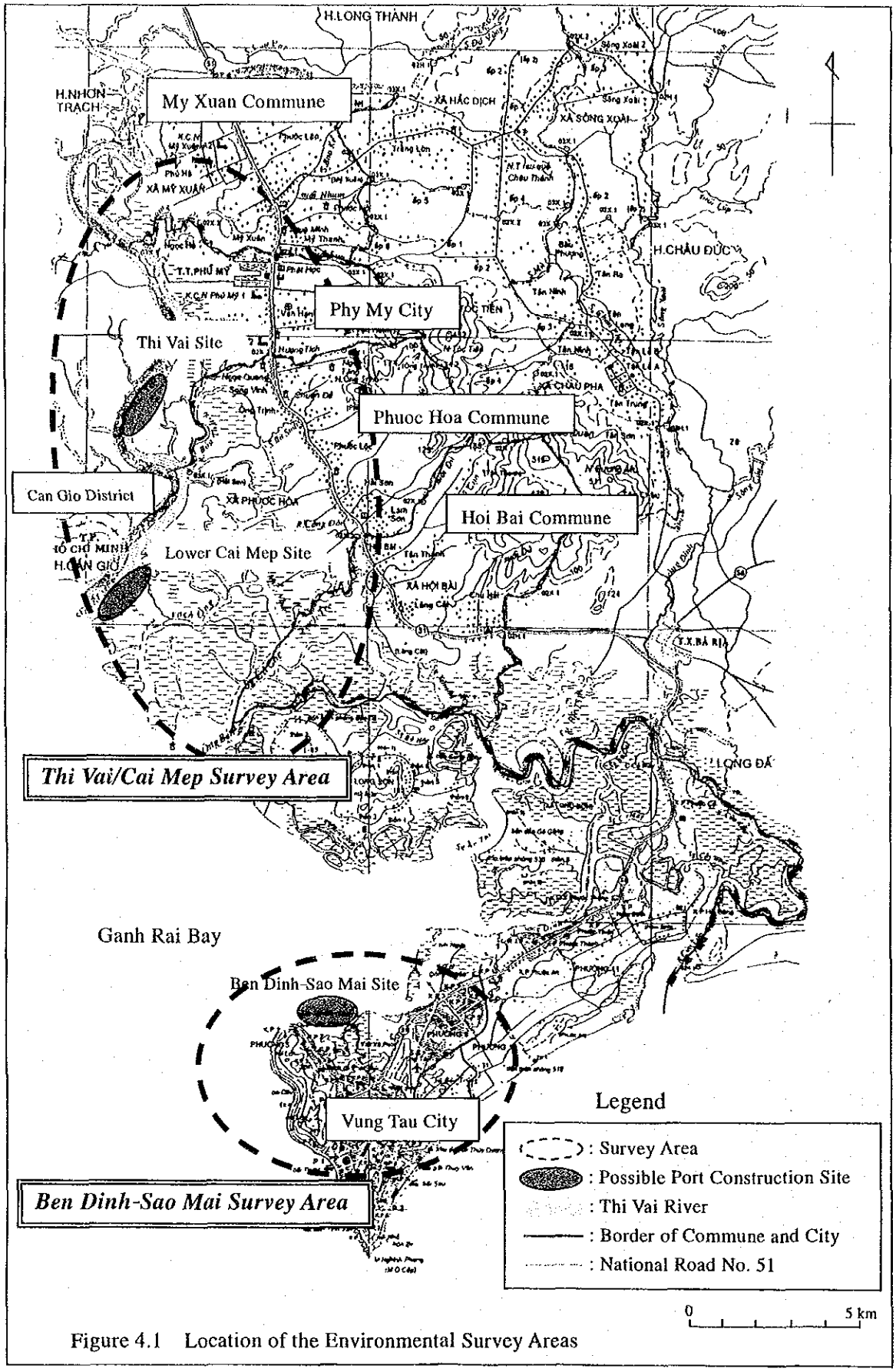


Figure 4.1 Location of the Environmental Survey Areas

Chapter 5 Regional Maritime Trends

(1) Maritime Trends at Ports in the Asian Region

Malaysia is located along the east-west trunk shipping route. Consequently, 95% of Malaysia's trade relies on maritime transportation. Primary products and industrial products account for the rapid increase of container throughput in Malaysian ports. Responding to the demand growth, large-scale port development is underway in some ports, such as Port Klang, Port Penang, Port of Tanjung Pelapas (PTP) as a new container hub port and so on. PTP is a one-hour drive from Singapore with an excellent highway access linking PTP with various destinations in Malaysia and Thailand. Recently Maersk-Sealand and Evergreen shifted their container cargo handling bases from Singapore to PTP. This means that PTP has become a threat to Singapore as an alternative container hub in Southeast Asia.
In addition, Thailand and Indonesia also plan to develop deep sea ports with a depth of 15-16m. These countries are seeking to become regional hub ports in Asia by developing sufficient port and port-related facilities. This will increase competition among ports in the region.

These countries have the advantage of possessing solid base cargo volumes which allow them to maintain stable cargo throughput without relying on transshipment cargoes. On the other hand, a port with a high transshipment rate like Port of Singapore may suffer from unstable cargo throughput in future.

(2) Port Management System

PAT in Thailand currently manages two ports, Bangkok Port and Laem Chabang Port. This enable cargo movement at ports to be controlled unitarily. Consequently, cargo volume in the Bangkok Port has been reduced and traffic congestion in the city has been dramatically curbed, while Laem Chabang Port has been rapidly developed as a regional hub port to supplement the constrained capacity of Bangkok Port.
The two major ports in Cambodia, Phnom Penh Port and Sihanoukville Port, are financially independent from the central government. They have proceeded with their own development plans in order to improve their own port-related activities. This may make it difficult to conduct port management in a comprehensive manner.

Considering the above, it is desirable to establish one single port management body under the Port Authority system in order to manage ports efficiently. In addition, a port management body should manage activities of each port carefully after due consideration of its role as an inland port or an outer port for a city.

(3) Establishment of Transportation Network

In Thailand, a big public ICD was planned as supporting facility for Laem Chabang Port. The eastern seaboard at Laem Chabang Port has been linked to the ICD by rail and road. Forty percent of the total container cargo has been handled by railway.
In Cambodia, there are Free Trade Zones linked by road to ICD in the suburbs of Phnom Penh.

Traffic congestion is still a big obstacle that hampers efficient transport between Free Trade Zones/ICD and the Sihanoukville Port.

Strong cooperation among the gateway port, ICD, the industrial zones and railways is indispensable in order to establish a well-conditioned transportation network especially for container cargo transportation.

(4) Practical use of International Inland Water Transportation

The Cambodian Government and the Vietnam Government signed an agreement on the transit of goods in September 2000 in order to develop the economies of the two countries. This will enable practical use of infrastructure connecting the two countries, especially international road and inland waterways in the Mekong Delta.

It is expected that development of physical distribution between Cambodia and Vietnam will contribute greatly to the economic growth in this region. Simplified procedures of custom clearance and pilotage are also necessary to promote regional development.

Chapter 6 Present Conditions of Ports

6.1 Present Port Traffic Demand

Total port throughput in Vietnam reached 73.3 million tons in 2000, an increase of 2.2 times from 34.0 million tons in 1995. Volume of foreign cargoes accounts for 71% of the total. However, the volume of domestic cargoes increased 2.9 times from 1995 to 2000. The proportions by commodity type were 45% of dry cargo, 39% of liquid cargo and 16% of containerized cargo. Particularly, the volume of containerized cargoes increased 4.4 times in the last five years.

The total throughput of the ports in the SFEA in 2000 was 45.6 million tons, which is 62% of the national total. The proportions of the SFEA's port throughputs to the national total by commodity type were 42% in dry cargo, 80% in liquid cargo and 75% in containerized cargo. The total volume of exported and imported cargoes recorded a dominant share of 85% to the SFEA's total. The volume of cargoes handled by the ports belonging to the Sai Gon Port Authority shared about 60% of the SFEA's total, with 88% in dry cargo and 100% of containerized cargo.

The general ports in the SFEA handled 21 million tons in total of which 81% was handled by five major general ports such as Sai Gon, Tan Cang, Ben Nghe, VICT, and Phu My. These general ports, with the exception of Phu My Port, are also functioning as major container port handling 858,000 TEUs in total.

On the other hand, specialized ports are classified according to commodity types being handled. The throughputs of each type of specialized ports are 21.4 million tons by oil ports (including 14 million tons of exported crude oil), 0.4 million tons by gas ports, 1.2 million tons by cement port, 0.1 million tons by wood chip ports, and 1.5 million tons by other ports.

The result of the field survey on the secondary transport by truck conducted at Sai Gon Port shows that about 70% of trucks servicing feeder cargo transport for Sai Gon Port had origins and destinations in the HCMC while the remaining 3-8% were to and from Mekong Delta area. The secondary transport for containers by barge is served through the Sai Gon River and Dong Nai River. In 2000, Phuoc Long ICD, located at the upstream of the Sai Gon River in Dong Nai Province, transported 15,000 TEUs of containers by barge between ports of Sai Gon, Tan Cang and VICT.

Table 6.1 Cargo Throughputs of Ports in the SFEA, 2000

Area	Throughputs ('000 tons)	Share by Trade Type (%)			Share by Commodity Type v(%)		
		Export	Import	Domestic	Dry	Liquid	Container
Sai Gon	27,189	25.7	53.7	20.6	44.7	23.5	31.8
Dong Nai	1,266	21.3	44.2	34.5	56.2	43.8	0.0
Vung Tau	16,943	88.7	8.0	3.3	5.7	94.2	0.1
SFEA Total	45,578	49.0	36.4	14.6	30.6	50.3	19.1
Vietnam Total	73,319	39.6	31.5	28.9	45.0	39.1	15.9
% to Vietnam Total	62.2	76.9	71.9	31.3	42.2	80.1	74.6

6.2 Shipcalls

Shipcalls in 1998 and 2000 under the management of the Sai Gon Port Authority were 3,454 and 4,078 vessels respectively. Table 6.2.1 shows the shipcalls in 1998 and 2000 by ports under the above Authority. The total number of the calling vessels increased by 18% in 2000 compared to that in 1998, while shipcalls in Sai Gon Port and Tan Cang decreased by nearly 30% and 50% respectively.

Table 6.2.1 Shipcalls in 1998 and 2000 by Ports under the Sai Gon Port Authority

Port's Name	Year 1998	Year 2000
Sai Gon Port	1,267	957
Tan Cang	662	450
VICT	0	266
Ben Nghe Port	413	532
Nha Be Port Area	118	426
Other Ports	994	1,447
Total	3,454	4,078

(Source: VINAMARINE)

Shipcalls in 2000 by Ports in the South of Vietnam are shown in Table 6.2.2. Total shipcalls in this area in 2000 were 6,130 vessels. Nearly 70% of the total shipcalls were shipcalls in the HCMC Port Group, which were followed by Thi Vai River Port Group and Vung Tau Port Group.

Table 6.2.2 Shipcalls in 2000 by Ports in the South of Vietnam

Vessel size (DWT)	HCMC Port Group	Thi Vai River Port Group	Vung Tau Port Group	Total
<1,000	232	288	238	758
1,000-2,999	772	557	315	1,644
3,000-5,999	556	114	188	858
6,000-9,999	1,484	150	201	1,835
10,000-19,999	782	1	0	783
20,000-29,999	146	0	0	146
30,000-39,999	95	0	0	95
>40,000	11	0	0	11
Total	4,078	1,110	942	6,130

(Source: VINAMARINE)

Detailed information for each port are shown in the body of the Report.
According to this information, maximum size of a vessel in HCMC Port Group was 16,768 D.W.T. with 1,597 TEUs in container, 159m in length and 10.1m in draught for the Container Vessel, and 74,577 D.W.T. with 224m in length and 11.0m in draught for the Dry Cargo Vessel.
According to VINAMARINE, shipcalls in HCMC Port Group are defined as the number of vessels which sail the Long Tau River Channel.

6.3 Conditions and Terminal Operations of Existing Ports

6.3.1 Ho Chi Minh Port Group

(1) Major Ports

The group consists of 28 ports along the Sai Gon, Dong Nai, Nha Be, Long Tau and Soai Rap Rivers, of which 21 ports are specialized ports handling petroleum, wood chip, cement or like shipyard, and the rest is general ports handling container and general cargoes. Out of seven (7) general ports, four (4) major general ports, which are Tan Cang, Sai Gon, Ben Nghe and VICT, handled 85 percent out of total general cargo throughput including containers in 2000 in the SFEA ports.

Table 6.3.1 Summary of Four Major Ports in 2000

	Item	Tan Cang	Sai Gon Port	Ben Nghe Port	VICT	Total
1	Number of Berths	5	18	4	2	29
	Total length	706m	2,667m	816m	303m	4,492m
	(Maximum depth)	-9.5m	-11.0m	-10.5m	-10m	-11.0m
	No. of Buoy Berths	2	25	7	0	34
	(Maximum depth)	-10.5m	-13.0m	-9.5m	0	-13.0m
2	Maximum size of Vessel	16,000DWT	30,000DWT	30,000DWT	20,000DWT	30,000DWT at wharf
3	Available cargo storage area	19ha	30ha	28ha	8ha	85ha
4	Main cargo Equipment	Floating 1 RTG 9 CTNR C. 2 Other C. 9	RTG 2 Other C. 27	Mobile C. 7	CTNR.C 2 RTG 4	

1) Tan Cang

Ninety percent out of total cargoes in this port are containers. As far as port capacity is seen, the port will reach the maximum in the near future. To cope with capacity constraints, the port prepared Cat Lai Terminal along the Don Nai River in addition to the existing terminal.

2) Sai Gon Port

There are four (4) terminals: Nha Rong, Khanh Hoi, Tan Thuan and Tan Thuan II Terminals. General and bulk cargoes are handled mainly at Nha Rong ,Tan Thuan II Terminals and buoy berths, and container cargo at Khan Hoi and Tan Thuan Terminals.

More than 70 % of total cargo throughput is general and bulk cargo, and the rest is containers in this port. Main general cargo is bagged cargo like coffee, rice, fertilizer and cement. About 30 percent out of total cargo throughput are handled at buoy berths.

3) Ben Nghe Port

Cargo throughput in 2000 declined by 3 % compared with that in 1999. Sixty percent out of total cargo throughput in 2000 was general cargoes and the rest was containers. Thirty percent out of cargo throughput in 2000 was handled at buoy berths. This port has still

enough capacity as far as current cargo throughput is seen, but it is desirable for the port to prepare container yard and equipment as container storing port.

4) VICT

This port is the only pure container terminal in Vietnam. Container throughput is expected to reach 200 thousand TEUs (130 thousand TEUs in 2000) in 2001. Port capacity will be exceeded in the not too distant future, unless the yard and berth area of the port could be expanded.

(2) Other ports

Other general ports such as Tan Thuan Dong Port, Bien Don Port, Vegetable Port and Lotus Ports also are handling general cargoes including liquid cargo, but in 2000, the ports occupied only about 5 % out of the total cargo throughput of the above four (4) major general ports.

There are many specialized ports along the Sai Gon, Nha Be, Dong Nai, Long Tau and Soai Rap River such as Ba Son Shipyard, ELF Gas Sai Gon, VITAICO, PETECHIM, Hiep Phuoc Power Plant, Hiep Phuoc Cement, Phu Dong, Phuoc Khanh and VICO WOCHIMEX Ports.

6.3.2 Thi Vai Port Group

There are three ports along the Dong Nai River, which are Dong Nai, SCTGAS-VN and VT GAS Ports and 18 other ports along the Thi Vai River. This group consists of Dong Nai River Ports, Go Dau Port Area, Phu My Port Area and Cai Mep Port Area.

At present, in Go Dau Area, a dry cargo berth for 10,000DWT and a liquid cargo berth of 12,000 DWT of VEDAN Port, a specialized berth for 6,500DWT of UNIQUE GAS Port, a 3,000DWT berth of Long Thanh Super Phosphate Factory Port, a 2,000 DWT berth for Go Dau A Port and two (2) berths for 15,000DWT and a berth for 5,000DWT of Go Dau B Port are in operation.

Phu My Area drew the earliest attention of investors among port areas along the Thi Vai River because the river section has a deep riverbed and is able to accommodate ships of 30,000DWT with less investment. A pier for 10,000DWT oil tanker of Phu My Power Plant Port and a pier for 30,000DWT cargo ship of Baria Serece Port (Phu My Port) as the largest bulk port in this area have been constructed.

Cai Mep Area has a berth length of approx. 4km, river width of greater than 1,000m and riverbed depth of 30m in some sections. LPG Cai Mep Port is now being operated while VINAFOOD Port and Sai Gon Petroleum Port are under construction.

6.3.3 Vung Tau Port Group

There are five (5) ports along Dinh River inside the Vung Tau Peninsula and five (5) Crude Oil / Gas Fields (Sub Ports), about 63' to 125' off shore such as Bach Ho and Dai Hung Oil Fields.

Main ports in Vung Tau are divided into two (2) port areas through Dinh River. One is the area along Cu Lao Channel consisting of PTSC, PTSC Gas Oil, Dau Khi (Vietsovpetro) Ports. Another is the area along Cat Lo Channel. Almost all ports are oil related ports. Other ports are naval port and small sea product ports of CTHS Truong Sa Port and Cat Lo Port. Maximum size of vessel to be accommodated at these ports in Vung Tau is 10,000DWT.

6.4 Inland Clearance Depot (ICD)

Currently the following five inland clearance depots are found in the South of Vietnam;

- Phuoc Long ICD
- Transimex – Saigon ICD
- Bien Hoa ICD
- Dong Nai ICD
- Song Than ICD

ICD offers a wide range of container services such as FCL/FCL, LCL/LCL and import/export consolidation. Main role of ICD is to increase the efficiency of import/export activities in the ports through an effective customs clearance procedure.

Chapter 7 River Channels

7.1 Overview of River Channels

(1) Sai Gon-Vung Tau River Channel

1) General

Vessels calling ports of HCM City area shall pass through Vung Tau Cape, Ganh Rai Gulf, Nga Bay, Long Tau, Nha Be, and Sai Gon Rivers from the South China Sea. The length of this channel is 45 nautical miles from Buoy No.0 to Sai Gon port area. This river channel is not wide but it is rather deep and stable against siltation. Therefore this channel has been used in its natural state for a long time. In recent years the following issues have arisen; the transport demand in this channel has been increasing, the size of vessels has become larger, the navigational speed has increased and a need for reducing the waiting time of vessels has emerged. As a result, the channel should be improved and upgraded to meet the demand timely.

Aids to navigation, such as lighthouse, light beacon and light buoy, have been arranged along the channel since 1920. But the system was very simple. Since the south part of Vietnam has been liberated, the Government and Vietnam Maritime Sector have made many efforts to improve and assemble aids to navigation. But night navigation was not permitted. Maintenance works of the whole channel were implemented in 1992. Since that time the depth of the channel has been increased from -8.0m to -8.5m (above the Chart Datum Line).

In recent years, projects to increase vessel traffic capacity of the Sai Gon-Vung Tau channel have been implemented and the whole channel had more accurate dimensions. As a result, the depth of the whole route has become up to –8.5m and the width is now 150 m at minimum. Navigational mark system has been installed along the fairways adequately for the vessels of 20,000 – 25,000 DWT in both directions.

However, the existing channel is still narrow and quite long (45 nautical miles = 83.3 km) with a lot of curves and their radius is small (R=450-750m). And the air clearance is 55m above HWL in the Long Tau river and 45m in the Sai Gon River.

2) Volume of Cargo and Fleets

According to the statistics from over the past 40 years, the cargo throughput and the number of vessels through ports of HCM City have increased year by year. Phase 1954-1974:1956 is the year of the lowest cargo throughput (1,903,000 tons/year). In that year, the number of vessels was 1,161 units / year. Phase 1975-1995:In the first year after the liberation, cargo volume fell sharply but after that it increased gradually from the level of 1.5 million tons to 2.5 million tons (1987). In recent years, particularly since 1988, with the economic development of the country, the regional economy has developed strongly and the cargo volume and the number of vessels entering ports of HCMC has increased.

3) Channel Sections

The width of the channel is insufficient, particularly in the section belonging to the Sai Gon River (350-450m), and in the section of the Long Tau River (350-650m from the Da Han to Dan Xay river mouth). The channel width of the whole route is 150m at minimum.
In the Sai Gon River, there are 4 turning basins between Mui Den Do and Tan Cang. These turning basins have small turning radius (Radius 185m to 220m), necessitating the use of tugboats.

4) Navigation Restrictions

① Only ships or boats with LOA and draft less than 230m and 9.5m respectively are permitted to navigate in and out the HCMC ports except in special cases.
② Only ships or boats with LOA less than 160m are permitted to navigate at night in the channels between Vung Tau and HCM City.

(2) Soai Rap River Channel

Before 1862, the Soai Rap River was used as the transport channel from South China Sea to Ports in HCMC. The channel has a wide riverbed and has a small curve radius, particularly in the section of Nha Be Cape (R=690m). But a lot of shoals exist in the river mouth, the riverbed is shallow, minimum depth at the river mouth is approximately –5m above CDL according to the survey in 1994 and it is only available for the navigation of small vessels. After Ports in HCMC were developed, the number of vessels calling in and out of the ports increased and then deeper channel was required. As a result, Long Tau Channel became the main channel for the route from South China Sea to Sai Gon Ports.

In order to receive vessels of 10,000-20,000 DWT through Long Tau–Soai Rap Channel, the high-tension cable at the curve from Long Tau River to Soai Rap River needs to be lifted. At present the cable across the river has an air clearance of 33m, which allows only vessels of 3,000-5,000 DWT. The air clearance should be improved up to 55m in order to receive the same vessel size as in Long Tau Channel.

(3) Thi Vai River Channel

There are three (3) shallow sections on the route to access Ports in the Thi Vai River through Ganh Rai Bay. The shallowest one which has a minimum depth of –9.1m is situated around 10° 27' N, 107° 00' E in the entrance of the Thi Vai River. And others are the section 5km from the mouth of Ganh Rai Bay where the minimum depth is -10.6m and the sandbar at the mouth of Cai Mep River with a length of 4km and a minimum depth of -10.6m.

Vessels up to 15,000DWT can navigate the channel in its natural depth. Vessels of 30,000DWT can enter and leave the port by taking advantage of the tide. Pursuant to maritime announcement No.11/94/KT dated February 24th, 1994, VINAMARINE temporarily announced that the navigation channel in the Thi Vai River allows ships of 20,000DWT to access to Phu My Port and ships of 5,000DWT to Go Dau Port. And vessels of 20,000DWT are allowed to enter until Phuoc An Port, 3km upstream Phu My Port (Ba Ria Serece Port) by the Decision No.387 /QD-PCHH on

September 3rd, 1996.

(4) Maritime Casualties

According to the reports made by the sea authorities, maritime accidents and incidents occurred in the Vietnamese Waters in 2000 as follows; 49 collisions, 16 fender-benders, 12 aground cases and one case of fire. Among the accidents and incidents, 14 cases are serious, of which 8 occurred in SFEA waters. VINAMARINE is introducing measures to reduce maritime accidents and incidents.

Chapter 8 Port Administration, Management and Operation

(1) Port Administration

MOT has administrative power and state management responsibility over land, roads, railways, river, and maritime transport in accordance with the Prime Minister's Decree. The maritime administration framework is also set up centering on MOT.

Substantial administration and management functions for ports are under the mandate of the Vietnam National Maritime Bureau (VINAMARINE), which is one of the specialized management departments under the MOT. Main duties and powers of VINAMARINE concerning the port administration are as follows:

- to work out strategies, programs, five-year and long-term plans for development of the shipping industry,
- to make out draft laws, regulations, policies and rules of management, procedures and legal norms on maritime activities,
- to join in domestic and foreign investment projects of maritime infrastructure development acting as investor/sponsor or as administrative agency,
- to promulgate the statutes of ports, declare their opening navigation and issue the *entry permits to foreign ships*,

The organization of VINAMARINE consists of its headquarters, 3 branch offices (Hai Phong, Danang, HCMC), 20 Port Authorities and many organizations.

(2) Port Management and Operation

In Vietnam, various public organizations are concerned with the port management and supervision as listed below.

- VINAMARINE (MOT)
- VINALINES
- Other central government ministries
- Local governments (Provinces and Cities)
- Other public sectors

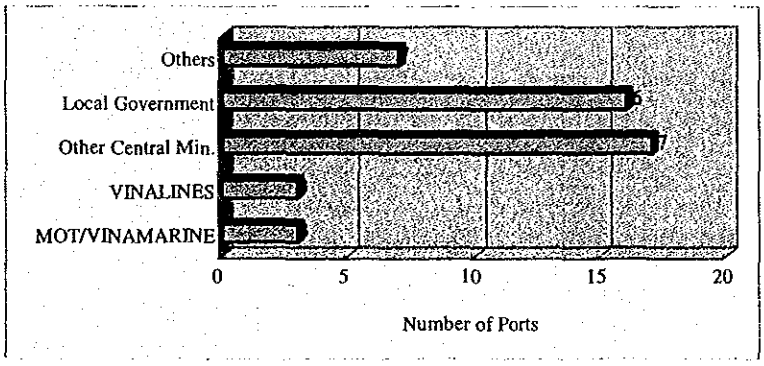


Figure 8.1 Supervisory Public Organizations for Port Activities in Study Area

In the study area, there are 46 ports controlled by the three Port Authorities excluding buoy berths and non-berth oil export sub-ports. Of these, the number of ports supervised by VINAMARINE and VINALINES is 3 respectively, and other central ministries and local government supervise 17 ports and 16 ports respectively (see Figure 8.1).

Meanwhile, the representative laws concerning the port management and port development are the Decree No.13/CP and No.24/2001/ND-CP which prescribes management of maritime activities at Vietnamese ports and maritime zones, and the Decree No.52/1999/ND-CP which covers investment and construction management for domestic investment projects and the Law on Foreign Investment in Vietnam.

(3) Port Management Body (PMB)

At almost all Vietnamese ports, port management and operation is performed by enterprises including SOE, public cooperation under the control of central ministries and provinces/cities, joint-venture companies and others. For example, the port management body (PMB) of Sai Gon Port is SOE under the authority of VINALINES. The PMB of Ben Nghe Port is a public cooperation organized by HCMC, and First Logistics Development (JV) Company (FLDC), which is the port operator of VICT, is a joint-venture company. Particularly, PMB of Sai Gon Port has a large organization being suitable for the port which has the highest throughput in Vietnam. Number of staff in the headquarters, which is largely responsible for port management, is 400 or more, however, the total number of staff including subsidiary companies, which are actually in charge of daily port operation, amounts to 4,000 or more.

(4) Computerization of Port Management and Operation

The terminal management and operation at VICT, which is a modern container port with 2 gantry cranes, is performed by using a sophisticated computer system called "VICT Information Network". This system has the capability to trace individual information or activities of containers in the yard, as well as vessel operation activities, CFS packing/unpacking activities, CFS cargo activities, gate operation arrival/exit process, customer's containers information reports and others. At present, VICT and shipping lines are connected by the EDI off-line through an e-mail system.

At Sai Gon Port, a computer system called " Management Information System (MIS)" has been introduced to enhance port management and operation. MIS is a network computer system with LAN, of which 2 terminals of Nha Rong and Khanh Hoi are connected with the main office by fiber optics and Tan Thuan terminal is connected by a leased line. Sai Gon Port and shipping companies are connected by an e-mail system.

(5) Port Tariff

In Vietnam, port tariffs are promulgated by the Government. These tariffs are generally applied for all ocean-going vessels operating at a port, entering or leaving a port or navigating through channels. The latest Decisions concerning port tariffs are as follows.

- Decision No. 85,86 & 87/2000/QD-BVGCP dated 10 November 2000

- Decision No. 48/2001/QD/BTC dated 28 May 2001

As for the Decision No.48/2001/QD/BTC, there is the following remarkable description: "the tonnage dues and maritime safety charge collection rates as from January 1st, 2002 shall be equal to 85% of the corresponding rates prescribed in Section 1 etc". Namely, in the case of the tonnage dues, tariff rates for international ship was 0.10 US$/GRT in 1998 and was revised to 0.085 US$/GRT in 2001. Furthermore, from January 1st, 2002, the Government intends to reduce some tariff rates by another 15%. It can be observed that the Government is making efforts to establish an appropriate tariff base.

On the other hand, port charge system for coastal shipping vessels differs from that for international shipping vessels. The rate for coastal shipping vessels is approximately 20% of that applied to international shipping vessels in tonnage dues and maritime safety charges.

(6) Foreign Direct Investment (FDI) for Port Development

The legal framework for encouragement of foreign direct investment (FDI) has been established through passage of the Law on Foreign Investment in Vietnam dated 29 December 1987, the 1992 amendment and Decree No.87/1993/CP to introduce concepts of "Build-Operate-Transfer (BOT)", and the latest 1996 amendment to expand BOT schemes. MPI is the body in charge of overall state management of FDI.

Two private terminal development projects at Phu My Port (Baria Serese Port) and VICT are listed as successful examples of port development through FDI, both within the study area. Phu My Port (Baria Serese Port) is the first private port in Vietnam. However, none of these are BOT projects.

Chapter 9 Review of Existing Port Development Plan

9.1 Background

The growth of cargo throughput of Vietnamese seaports in the period of 2000-2010 is related to the Socio-economic Development Strategy of the country. GDP of Vietnam is expected to grow at a rate of 9-10% from 2000 – 2010 in this plan. Vietnam has entered ASEAN and joined AFTA, and will focus on increasing trade as a means to bolster its economy. Vietnam is close to the international shipping routes. To take advantage of its strategic location, the transport sector is planning to develop the national commercial fleet and to improve seaports, especially deep-water ports in the focal economic areas.

9.2 General

Based on the current port system in Vietnam and the increased cargo volume expected in the next decade, the MOT has worked out the Master Plan for the development of ports in Vietnam up to the year 2010. In this plan, priority is given to the rehabilitation, improvement and modernization of existing main ports to handle the increased volume of cargo. The construction of some deep-sea ports at key economic zones to accommodate vessels up to 30,000 – 40,000 DWT is also being considered to meet the increased demand of import and export cargo generated based on the economic development plan. Vietnamese port development plan up to 2010 was announced in 1999 (No.202/1999/QD-TTg, Hanoi 12 Oct.).

9.3 Eight Port Groups and Cargo Throughput

Vietnamese seaport system is basically comprised of 8 port groups. A port group is composed of several ports that support each other due to geographical proximity. A group may include general ports, specialized ports, floating ports and ports for local economic development. The scale of 8 port groups composed from 114 ports is based on cargo throughput up to 2010.The capacity of ports will be 106 million tons in 2003 and 268 million tons in 2010.

9.4 Ten Key Ports

The following 10 key seaports shall be the focus of investment and development up to 2003.

General-purpose:	Cai Lan Seaport
General-purpose:	Hai Phong Seaport
General-purpose:	Cua Lo Seaport
General-purpose:	Da Nang (Tien Sa – Han River) Seaport
Specific-purpose:	Seaport for Dung Quat Industrial Park
General-purpose:	Quy Nhon Seaport
General-purpose:	Nha Trang Seaport
General-purpose:	Thi Vai Seaport
General-purpose:	Saigon Seaport
General-purpose:	Can Tho Seaport

Chapter 10 Evaluation of the Existing Ports

10.1 Evaluation of Natural and Environmental Conditions

10.1.1 Natural Conditions

Natural conditions in the Survey Area i.e. vicinity of the three possible port construction sites consisting of Thi Vai, Lower Cai Mep and Vung Tau, are summarized as seen in Table 10.1.1.

The major subjects to be considered are summarized below:

(1) Effect of Soft Foundation
There exists the very soft surface layer, of which N value is less than 3, with thickness of about 16 to 36 m at Thi Vai and Lower Cai Mep sites. The studies on necessity of soil improvement work and its work method will be discussed later in the preliminary design.

(2) Effect of Current
The ship maneuvering at the channels in Ganh Rai Bay and the estuary of the Thi Vai River will be discussed because of relatively fast current velocity.

(3) Effect of Waves
Due to rather long fetches in the Ganh Rai Bay, it is anticipated that high waves will be generated by the monsoon, which affect berth availability at the possible port at Vung Tau Site. In addition, possible high waves invaded from offshore due to typhoons are expected, which might require a breakwater.

(4) Effect on Sedimentation
The quantitative study and research on siltation and sedimentation has not been conducted yet in the Survey Area. Therefore, prior to the analyses of sedimentation/erosion by numerical simulations, additional natural condition surveys on current and river discharge are carried out during the 2nd period of site study.

10.1.2 Environmental Conditions

Following the review of environmental conservation system and standards in Vietnam, the Study Team carried out the field surveys on sediment and water quality in the river and sea in the survey areas in May 2001. Considering the results of surveys, in the port planning at Vung Tau, special attention shall be paid on maintaining well seawater exchange and proper treatment of industrial and human waste discharge.
The population densities in the survey area ranged from 173 (Cai Mep) to 1,277 (Vung Tau) person/km^2 in 1998. Since most of the houses are located along the National Highway No. 51, resettlement due to the port construction needs not be taken account in the survey areas. In the survey areas, there are many relics such as pagoda, temple, church, statue, etc. All of these, however, have been built since 1975 afterward, and no relics are being conserved by the government.

Table 10.1.1 Comparison of Natural Conditions in the Survey Area

No.	Natural Conditions	Thi Vai Site	Lower Cai Mep Site	Vung Tau Site (Ben Dinh-Sao Mai)
1	Geographical Condition			
	Present Situation of Sites	Surface behind riverbank is wet low land too, but when compared with Cai Mep site, elevation of surface at this site is preferably higher than Cai Mep.	Surface behind riverbank is covered with numerous mangroves. Many creeks run in all directions deep into the land side. The most land of the site is submerged during high water.	The site is located in the sea at bottom elevation of less than CDL-3 m.
2	Meteorological and Hydrographical Conditions			
	Wind and Typhoon (*Source*: Vung Tau Observatory, 40 years Data)	Monsoon: Dry season; E to NE wind direction with average velocity of 1 to 5 m/sec, and Rainy season; W to SW wind direction with average velocity of 5 to 10 m/sec. Typhoon: Maximum wind velocity; 30m/sec (WSW) in the past 40 years.		
	Effect due to Wind and Typhoon	Small	Small	Due to long distance of fetches (NE 7 km, W 12 km) in Ganh Rai Bay, waves, generated by strong winds in monsoon, might affect calmness.
	Calmness due to Wave	Negligibly small	Small	Waves due to the typhoon is anticipated. Based on the estimated wave height of 3.7m at recurrence period of fifty years, a breakwater might be needed.
	Water Level	HWL CDL+5.1 m [1)]	HWL CDL+4.9 m [1)]	HHWL CDL+4.43 m [2)]
	Maximum Current Velocity in Navigational Channel	1.3 m/sec [3)]	1.3 m/sec (Study Team)	1.2 m/sec (Study Team)
	Possible Sedimentation in Navigational Channel	Water flow discharged from the Thi Vai river might be less amount because of its narrow basin area. Disturbances due to currents could cause sedimentation / erosion, and might need maintenance dredging.		Access channel is needed to be constructed by dredging the shallow sea area, therefore maintenance dredging work will be necessary.
	Change of Riverbank and Coastline	According to a result of historical analysis, changes of the riverbank by eroding phenomena are found at these sites.		Not subject because of sea area
3	Geotechnical Condition (Study Team)			
	Thickness of the Very Soft Surface Clay Layer (N < 3)	11 to 16 m	29 to 31 m	8 m
	Unconfined Test (q_u) of the Very Soft Surface Layer	Average 0.22 kgf/cm^2	Average 0.29 kgf/cm^2	Average 0.15 kgf/cm^2
	Depth of Bearing Stratum (N > 50)	CDL -46 m to CDL -55 m	CDL -52 m	CDL -52 m

Note 1) High Water Level with 1 % Probability of Occurrence, *Source*: Thi Vai-Vung Tau Port System, 1997

Note 2) Highest High Water Level during 1955 to 2000, *Source*: Recorded at Vung Tau observatory in 2001.

Note 3) *Source*: Pre-Feasibility Study Report on Thi Vai General Port , 2000.

10.2 Cargo and Passenger Movement

(1) Continuous Increase in Dry Cargo

In recent years, the SFEA ports must have expanded their handling capacity to cope with a growing dry cargo of 2-3 million tons per year despite the very limited provision for new port infrastructure. Containerization has been promoted among the SFEA dry cargo with containerization rate increasing from 35.5% in 1996 to 38.5% in 2000. Thus, the SFEA ports must handle such cargo more efficiently providing for favorable multimodal arrangement and access transport.

(2) Strong North-South Linkage by Coastal Shipping

Vietnam's coastal shipping mainly serves medium to long-distance cargo haulage particularly between the north and the south. In terms of modal share, the VITRANSS Traffic Surveys in 1999 indicated that coastal shipping accounted for 65 % between the two major economies of Vietnam. This is true for the SFEA ports where the north cargo has dominant shares among all the coastal shipping cargo, with 85% and 88% for outgoing and incoming cargo shares respectively.

(3) High Inter-dependency of the SFEA Economy with Other Asian Economies by Overseas Shipping

The Study made an estimation of the SFEA's trading partners and these were classified into six groupings based on origin-destination: 1) East Asia, 2) the Americas, 3) Europe, 4) Middle East and South Asia, 5) Indonesia and Oceania and 6) Thailand, Malaysia and Singapore. The comparative analysis made shows that the SFEA economy is highly inter-dependent with other Asian economies.

(4) Widely Spread Port Hinterland and Long-distance Access Transport

The truck driver interview survey conducted in May 2001 revealed that there were many long-distance drivers coming from outside the SFEA to Saigon Port and Phuc Long ICD. With the recent completion and ongoing construction of transport infrastructure projects, such long access transport has been substantially improved in terms of travel time/cost savings, availability of container haulage and safety enhancement.

(5) Difficult Coexistence with Cargo Movement due to HCM Urban Transport

Even during the truck ban periods in the HCM urban area within the ring road, the roads are still heavily congested with passenger vehicles. There is an increasing pressure towards a stricter control for road freight transport. Under such circumstances, the barge transport via ICDs (Phuc Long and Transimex-Saigon) is deemed to be the designed solution although it will cost shippers additional expenses. Hopefully, the on-going trans-HCM highway project may provide the much-needed relief on HCM urban transport but a port group along the Saigon River.

(6) An Emerging Regional Cruise Market

The regional cruise has been active due partly to the establishment and business expansion of Star Cruises since 1993. The magnitude of cruise industry in the ASEAN region is estimated at around 0.8 million passengers in 2000. The shipcalls on the SFEA are increasing. For example, MACS HCMC, a VINAMARINE's subsidiary ground cruise operator, handled 179 voyages with 158,000 passengers between 1999 and 2000. Although the area is able to attract more cruise shipcalls, present cruise ports such as Nha Rong Terminal of Saigon Port and Baria Serece Port which are basically cargo ports which discourage cruise shipping lines.

10.3 Capacity of Navigation Channel

10.3.1 Evaluation of the Navigation Channel

(1) Long Tau River Channel

Long Tau River Channel is an important maritime route to ports of HCMC-Dong Nai. This has contributed to the regional socio-economic development for many decades. Recently maritime activity is increasingly developing, revealing an inherent disadvantage. Navigating vessels along the river will be very difficult. Therefore, calling vessels have to wait at Vung Tau anchorage as currently, the distance between the berthing area and the handling area is 70-80 km. Waterway faces difficulties. The access to ports in HCMC is long and curved and it is difficult for many vessels to navigate through. Riverbed is narrow and it is not deep. Therefore, this route is not able to meet the requirement of the vessel development (from 30,000 to 50,000 DWT).

Evaluation of the future available capacity of Long Tau River Channel is one of the most crucial issues for long-term port master planning. While the introduction of an appropriate VTS (Vessel Traffic Service) may be helpful for improving channel capacity and safety, the maximum size of vessels allowed for the channel will remain under 20,000-25,000DWT. The physical improvement of the channel by dredging the riverbed is not always feasible technically (or financially in this case). Therefore, it would be difficult to develop large-scale port system.

(2) Development of Upper Soai Rap River Channel

The development of a new channel by dredging the upper part of Soai Rap River up to the junction with Long Tau Rviver may be necessary to promote the planned industrial park project (Hiep Phuoc Industrial Park Project). It is very difficult at this moment to keep the channel of the lower part of Soai Rap River in adequate depth enough for the size of the vessels expected for the planned new port of the project.

(3) Development of Lower Soai Rap River

If the dredging of the lower part of Soai Rap River down to the meaningful level would be technically and financially feasible, its may be quite helpful to reduce the traffic load of Long Tau River channel, and if the Hiep Phuoc Industrial Park project would succeed to relocate the industrial activities from the center of HCMC, it may also effective in saving the heavy congestion

of the Saigon River Channel. In connection with this dredging affairs, there is another issue that if the total a Soai Rap River would be deeply dredged, substantial volume of the up-stream river flow might shift to Soai Rap River effecting serious reduction of Long Tau River flow that would create another navigational problem. However, these issues should carefully be examined on the firm base of engineering surveys and detailed feasibility analysis. It is considered almost impossible to conclude the issues within the Study, which is not expected to conduct such a large scale, time/budget consuming survey within its framework. It may therefore be reasonable to understand in this Study that the dredging of the total Soai Rap River is not feasible on the short-term basis.

10.3.2 Possible Traffic Through the Long Tau River Channel

(1) Calculation Condition

It is 80 km from the pilot station in Vung Tau to the VICT in HCMC. Most of the navigation passage is two-way traffic but the section between the point of 30 km and 40 km from the pilot station is limited to one-way traffic because this 10 km section has strong bends in the channel and the width is very small. Therefore pilots try to avoid operated vessels passing through each other in this section.

A vessel whose LOA is more than 160 m is restricted from navigating in the channel at night. Therefore, in the calculation we assume that such large vessels navigate only in the daytime while the other smaller vessels can navigate both during the day and the night.

The channel is used averagely not to occur the congestion in the both upstream and downstream the one-way section.

The vessel speed depends on its type, size and cargo. The traffic capacity of the channel increases if the vessel speed is high. In this calculation we assume that vessels of all category navigate in the channel at a minimum speed of 8 knots.

The effective transit capacity is though to be 80-90% of the actual transit capacity since the number of daily transits is considered to be subject to Poisson's distribution, and the waiting ratio will increase in case that traffic in vessel is more than 80-90% of actual transit capacity. So in this calculation we use 80% as an arrival ratio to the capacity.

(2) Vessel Interval

Vessels have their blockade area around themselves. The blockade length is said to be 8 L in the minimum. Therefore we assume 8L as the minimum vessel interval distance. We can get the time interval of vessels by dividing the vessel speed by the vessel interval distance. In addition, vessel interval distance should be doubled to 16L for night navigation from the viewpoint of safety.

We assume 4 type of vessels will navigate the channel. The mix ratio of vessels is based on the actual navigation statistics of Long Tau Channel in 2000.

Table 10.3.2(1) Time Interval of Vessel in the Channel

LOA (m)	Time Interval (h)	Vessel / hour	Mixing Ratio
70	0.047	21	0.5
150	0.101	10	0.4
180	0.122	8	0.1

Vessels whose LOA are more than 160 should navigate in daytime. Therefore the time interval of those vessels is 0.122 hour / vessel in daytime. On the other hand the average time interval of the other vessels in night is calculated as 0.142 hour / vessel.

Table10.3.2 (2) Vessel Number in a Day

	Using Time a Day	Time Interval of Vessels	Vessels in a Day
Daytime	5.2 h	0.122 h/v	42.6 v
Night	13.8 h	0.142 h/v	97.2 v
Total	18.8 h	-	139.8 v

(3) Adequate Number of Possible Navigational Vessels

We set a safety factors of 1.5 for days of bad weather and accidents. The adequate number of possible navigational vessels in a year is calculated as below.

139.8 x 360 / (1.5 x 1.5) =22,368 vessels / year

(4) Tidal Operation of Larger Vessels

High water level in the Long Tau River Channel is +3.5m above CDL. Therefore, vessels which have the maximum draft of 10.7m can navigate during peak tide. Larger vessels are assumed to pass through the channel in the time of high water from –3 hour to +3 hour. In this time, the water level of the channel keeps more than -9.5m above CDL. Voyage time from Vung Tau to HCMC takes 5.5 hours. Larger vessels can depart during 0.5 hour from the start of the high tide in each direction. If the time interval is 0.122 hour and the arrival ratio is 0.8, the number of larger vessels in a day is calculated as below.

(0.5/0.122) x 0.8 x = 3.3 vessel in a day.

Larger vessels can navigate only in daytime. Therefore, high water continues for 6 hours in daytime 182.5 days of the year,, if tidal cycle is assumed to be sinusoidal characteristics. The adequate number of Possible navigational vessels in a year is calculated as below. The safety and accident factors are ignored in this case.

182.5 x 3.3 = 602 vessels in a year

(5) Conclusion

8,156 vessels passed through the Long Tau Channel in 2000 of which 354 vessels were larger ones. In this calculation, a maximum of 22,368 vessels can pass through the channel including 602 larger vessels using a tidal operation. Therefore, more than twice the present number of transit vessels can pass through the channel, at least from the viewpoint of channel capacity.

10.3.3 Channel Operation

Traffic Control of Sai Gon, Long Tau, Thi Vai and Soai Rap River channels in the SFEA waters are presently implemented by manual under the pilot organization controlled by the Port Authority concerned, but the traffic density will become gradually high, as the SFEA economy will prosper in the near future. For safety of navigation, efficiency of maritime traffic flow and protection of environment, Vessel Traffic Service (VTS) should be introduced in these waters in the near future.

Port Authority of HCM City commenced studying the service with the assistance of the Canadian Government. The system to date in the world is as follows:

(1) Vessel Traffic Service (VTS)

1) Since the first VTS equipped with a surveillance radar was established in England in 1948, more than 500 of various style and scale have been put into operation all over the world. The scale of VTS covers port, river and coastal areas, and is connected among these areas.
2) There are the following kind of systems and services:
VTS station to receive information from ships
VTS station to surveille ship movement by radar and give information by radar
VTS station to surveille ship movement by radar and control ship movement
VTS station to intend to minimize risks for safety as well as to control ship movement and to intend to respond on public and private demand
Vessel Traffic Management Service (VTMS)
Vessel Traffic Management & Information Service (VTMIS)
3) International Maritime Organization (IMO) has recommended that AIS (Automatic Identification System) and VDR (Voyage Data Recorder) be installed in international going vessels greater than 3,000 GT and domestic vessels greater than 300 GT which are built after July 1, 2002, and to vessels which are built before July 1, 2002, until July 1, 2008, though the time is different by kind of vessels.
4) VTS will be improved by means of AIS and VDR in the future.

(2) VTS Service to be introduced in SFEA waters

The Maritime Organization in Vietnam shall introduce VTS first in the water area between Vung Tau and HCMC, and the style shall be recommended to be VTMS or VTMIS to control ship movement for safety of navigation and efficiency of maritime traffic, taking the following issues into account.

-The channel from Vung Tau to the Sai Gon River through the Long Tau River is very long (80 km),

compared with other river channels in the world.
-There are some one-way and bent channels, and turning basins in the channel.
-There are navigation restrictions for vessel in turning basins and vessel speed restriction in the Sai Gon River. After that will be started on the right lines, then it shall be introduced in the other waters of SFEA.

10.4 Capacity of Ports in HCM City

The maximum port capacities of four (4) main general ports, which are Tan Cang, Sai Gon Port, Ben Nghe Port and VICT, are examined from both sides of cargo and berth capacity in consideration of port operations and facilities, because the four main ports occupied 85 % (18 million tons) out of total cargo throughput (21 million tons) in the general ports in SFEA, according to the statistics of 2000.

(1) Cargo and Berthing Capacities

1) Maximum cargo capacity in a port shall be calculated mainly by using available cargo-stacking area, cargo dwelling time and annual working days.
2) Maximum berthing capacity in a port shall be calculated mainly by using the length of existing berths for ocean going vessels, number of berths required for calling model vessels, kind of cargoes and weight to be loaded and unloaded per vessel, cargo handling productivity, annual operating days, berth occupancy ratio by UNCTAD Report and maximum number of calling vessels.

(2) Overall Capacity

Maximum port capacity in a port shall be taken as the maximum cargo capacity or the maximum berthing capacity, whichever is smaller.

1) Figures to be used for the calculation
The calculation is made by adopting general formula and using approximate value given by the ports.
2) Port capacity used for this study
- Cat Lai Terminal is not included in Tan Cang.
- VICT excludes additional facilities on its final plan.

(3) Summary of Four (4) Major Port Capacity

As a result of the calculation, maximum port capacity of the above four (4) major general ports will be approximately 1.4 and 1.3 times of the total cargo and container throughput respectively, and 2.5 times of the number of calling ships in 2000 under present conditions. However, total cargo and container throughput will double and the total number of calling ships will triple if the recommended improvements are made. (See Table 10.4.1).

Table 10.4.1 Potential Capacity of Four (4) Major Ports in HCM City

No.	Item	Statistics in 2000 for total number of 4 major ports	Total maximum port capacity of 4 major ports at present conditions	Total maximum port capacity of 4 major ports at improved conditions
1	Cargo throughput (Thousand Tons)	17,542	25,000	36,000
2	Container (Thousand TEUs)	857	1,100	1,700
3	Maximum number of calling vessels	2,205	5,700	7,400

For the above-improved conditions of each port, the following issues are considered.

1) To improve cargo handling productivity on ship operation.
2) To reduce cargo dwelling time in port.
3) To increase the quantity of cargo equipment, especially RTGs and quayside container cranes.
4) To convert existing general cargo stockyard into container yard paved for RTG to cope with the future increase of container throughput.
5) It is assumed the volume of handling cargo per ship will increase at the improved condition.

The maximum cargo throughput of the four (4) major general ports will be 36 million tons including 1.7 million TEUs containers assuming that the recommended improvements are made. However, these improvements require a considerable investment. On the other hand, there are rigorous restrictions on road transport due to the heavy traffic in HCMC, and this will disturb the cargo flow coming in and out of the port.

In conclusion, the maximum port capacity of the four (4) major general ports in HCMC might be realistically up to cargo throughput of 25 million tons including containers of 1.1 million TEUs at the present conditions.

Infrastructures of the port site in HCM City's vicinity are quite perfect. The potential development is considered in two (2) aspects: From the aspect of development in scale, due to the rapid development of the city, the area for the new port is very limited. Especially, transportation of the hinterlands will be very difficult. From the aspect of development in quality, the most concern here is the development level of port can hardly keep up with the requirements to increase the depth and width of navigation channel in the future when ship size becomes large. In short, port site in HCM City's vicinity has advantages on port services but great disadvantages on channel, water surface area, environment, and transportation in the hinterlands from the viewpoint of a long-term development.

10.5 Port Administration, Management and Operation

10.5.1 Port Administration

(1) Participation of Many Different Ministries/Public-organizations to the Port Administration

In Vietnam, many different central ministries/public-organizations besides MOT participate in port administration. Such a situation may allow some rooms to cause inadequate coordination and discordant decision-making and supervision, in the process of performing the port administration. The main ministry that has the greatest responsibility for port administration needs to be clarified.

(2) Existence of Many Different Supervisory Public Organizations for Port Activities

In the study area, a large number of ports are supervised not only by MOT/VINAMARINE but also the many other central and local government agencies concerned. It is considered that the confusion of port management caused by lacking in coordination among their supervision and guidance shall seriously have a bad influence upon the national interest.
Adequate supervising and managing system to each port by public organization needs to be established, at least, for the national major ports as soon as possible.

(3) Diversity of the Organizational Type of PMB

At almost all Vietnamese ports, port management and operation is performed by enterprises including SOE, public cooperation organized by provinces/cities and joint-venture companies. Of these, joint-venture companies can almost be considered to be a private sector. On the other hand, the majority of SOEs have a character of a semi-public sector in the sense that they pursue profits as its main aim in spite of publicly owned companies.

Thus, the present situation concerning port management body of Vietnamese ports is indistinct because of the mixture of sectors having different characters.

(4) Insufficient Institutional Framework for the Performance of the Adequate Port Development and Management

In 1999, Vietnamese port development plan up to 2010 was announced by MOT/ VINAMARINE. It can be greatly appraised that the Government has announced the unified and planned direction for the future port development. However, if the nation's will and concrete measures toward the realization of this master plan cannot be prepared, it is regarded as only a plan.

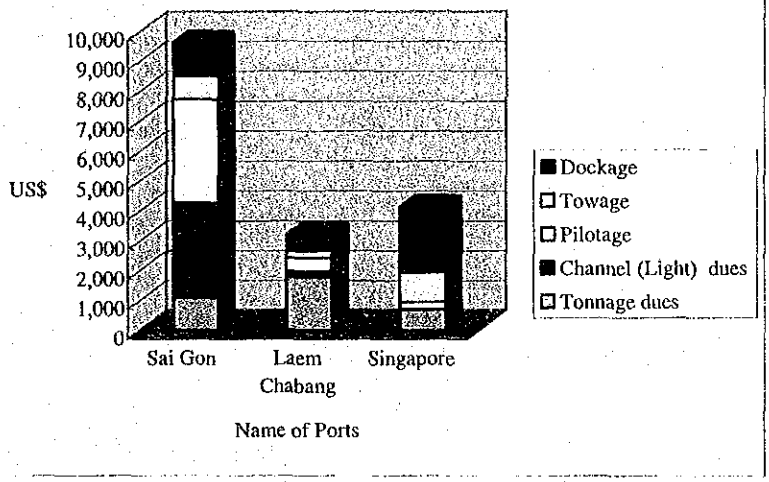
The further improvement of the institutional framework, which includes the formulation of individual port development plan and investment plan, etc, is indispensable.

(5) High-priced Port Entry Due compared with Neighboring Asian Ports

The total entry due for the foreign vessels calling Sai Gon Port is estimated approximately three times higher than that of Laem Chabang Port in Thailand by using latest each port tariff (see Figure

10.5.1). While it is understandable that this fact may come from the effect of the cost of maintaining the long bending river channel to the port, the large difference of port entry due between Vietnamese ports and Neighboring Asian ports means that Vietnamese ports would hold some handicaps in future:

Figure 10.5.1 Comparison of Entry Due of Three Ports



Source: Estimation by OCDI

The current port tariff system needs to be improved appropriately in future.

10.5.2 Port Management and Operation

(1) Delay of Computerization for Port Management and Terminal Operation

The procedures necessary for port management and terminal operation have been computerized rapidly in the world leading ports. In major overseas ports, EDI for necessary procedure for arrival/departure vessels has been introduced, and "Paperless Procedure" and "One Stop Service" has been implemented. Though Sai Gon Port and VICT have introduced the sophisticated computer systems for their terminal management and operation, the full scale EDI on-line operation is not available under the systems used in their ports.
It is necessary for Vietnam to promote the implementation of EDI, which would simplify and improve efficiency of port management and operation.

(2) Insufficiency of the Stock for Port-related Data and Information

Port statistics are very important as a tool for nationwide port development. It is essential to make full use of port statistics for recognizing present situation on port activities nationwide in establishing basic policy.
In Vietnam, there is only a very little data and information which is actually edited and opened to the public as port statistics. It is indispensable that the Government and ministerial agencies concerned prepare the adequate port statistics as soon as possible.

PART 2 MASTER PLAN

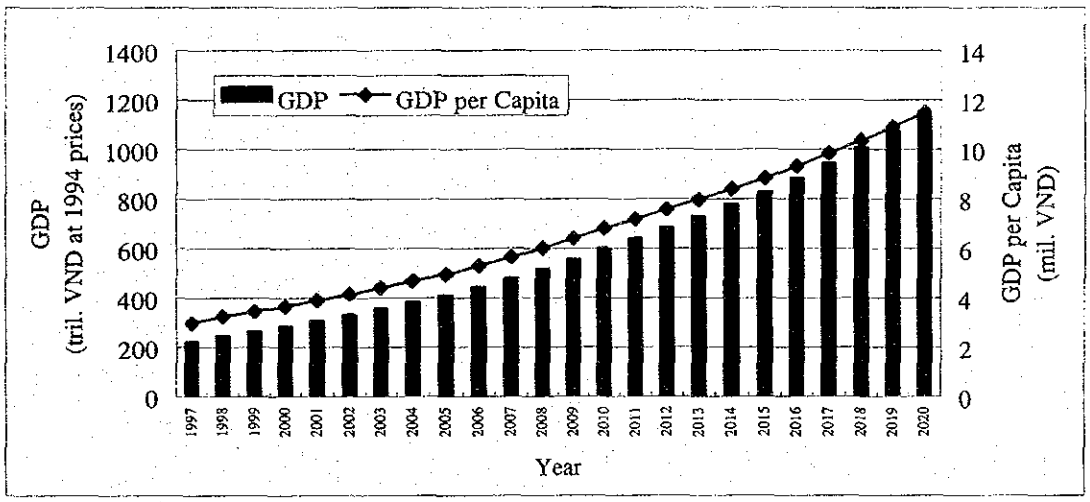
PART 2.1 PORT DEVELOPMENT STRATEGY and MASTER PLAN IN SFEA

Chapter 11 Demand Forecast

11.1 Socio-economic Framework

The VITRANSS GDP/GRDP Projection Model was developed to forecast future economic growth among various explainable factors such as population, employment and investment. Given the demographic framework and other updated planning indicators, future GDP has been projected. (Refer to Figure 11.1.1)

Figure 11.1.1 GDP Forecast Between 1997 and 2020



Source: The Study Team's estimate

The provincial-level forecast indicates that SFEA is expected to grow during the planning period 2000-2020 as follows: (Refer to Table 11.1.1)

- GDP will increase by 4.0 times.
- The industry sector will increase its share in GDP from 56.7% in 2000 to 59.6% in 2020.
- Population will increase from 8.5 million in 2000 to 12.0 million in 2020.
- GDP per capita of VND 16.3 million at 2000 current prices, will increase to VND 46.8 million accordingly. In US dollars, these figures translate to about US$1,125 and US$3,329 respectively (US$ 1 = VND 14,500).

Table 11.1.1 Economic Growth Forecast at SFEA

Province	GDP (bil. VND at 1994 constant prices)			Industry Sector's Share (%)		
	2000	2010	2020	2000	2010	2020
HCM City	52,342	101,652	186,649	46.0	52.3	54.5
Binh Duong	3,751	11,671	24,932	60.0	60.3	62.9
Dong Nai	10,422	35,953	75,126	56.6	56.8	61.4
Baria-Vung Tau	19,347	29,037	60,543	85.5	78.5	71.6
SFEA Total	85,862	178,313	347,250	56.7	58.0	59.6
Whole Country	275,918	598,574	1,143,799	35.9	38.1	40.8

11.2 Domestic Coastal Shipping Demand

This study uses the VITRANSS study's projected future cargo demand for domestic coastal shipping. Transport demand is strongly linked to socio-economic activities. In VITRANSS, future cargo demand by transport mode was estimated by forecast models developed based on the future socio-economic indicators such as GDP, population, etc.

Table 11.2.1 Future Coastal Shipping Traffic Demand to be handled in the SFEA

Commodity Type	Port Throughputs ('000 tons)			'10/'00	'20/'00
	2000	2010	2020		
Rice / Other Food Crops	842	2,027	2,989	2.4	3.5
Wood / Forestry Products	7	57	163	8.1	23.3
Steel / Iron	337	579	969	1.7	2.9
Construction Materials	75	110	314	1.5	4.2
Cement / Clinker	1,218	305	1,505	0.3	1.2
Fertilizer	609	898	1,249	1.5	2.1
Coal / Other Mining Products	528	2,983	2,971	5.6	5.6
Liquid Cargo	2,477	4,631	8,621	1.9	3.5
Manufacturing Goods	548	910	1,480	1.7	2.7
Total	6,643	12,500	20,261	1.9	3.0

Table 11.2.2 Future Domestic Cargo Movement to/from SFEA, 2020

(unit: '000 tons)

Commodity Type	Domestic Export (from SFEA)					Domestic Import (to SFEA)				
	North[1/]	Central[2/]	South[3/]	Mekong	Total	North[1/]	Central[2/]	South[3/]	Mekong	Total
Rice / Other Food Crops	1,917	573	0	0	2,490	336	159	0	4	499
Wood / Forestry Products	22	8	15	35	80	52	30	0	1	83
Steel / Iron	181	11	0	1	193	459	250	3	44	756
Construction Materials	61	28	0	0	89	28	193	0	4	225
Cement / Clinker	0	16	8	47	71	143	1,066	18	193	1,420
Fertilizer	334	60	0	4	398	490	293	1	65	849
Coal / Other Mining Products	47	321	0	0	368	2,535	17	0	3	2,555
Liquid Cargo	874	6,809	0	85	7,768	334	497	0	23	854
Manufacturing Goods	316	113	3	20	452	793	213	2	20	1,028
Total	3,752	7,939	26	192	11,909	5,170	2,718	24	357	8,269

Note: 1/ includes the regions of Red River Delta, North East and North West.
2/ includes the regions of North Central Coast, South Central Coast and Central Highlands
3/ includes the provinces in Northeastern South Region except the SFEA's provinces

11.3 Overseas Shipping Demand

(1) Methodology

Within the context of the changing trade environments, port traffic forecast needs to cover not only conventional trade activities to keep national economy but also liberalized trade transactions which sometimes multiply trade volume from final products because of frequently transporting parts and mean products within an internationally developed logistics network. In addition, global logistics management is a new phenomenon where huge international cargo is moved regardless of domestic demand, e.g. container transshipment bases. The Study has applied different forecast methods to delineate those traffic demand segments.

Table 11.3.1 Methods Used To Forecast Overseas Shipping Demand

Demand Segments	Cargo Types	Forecast Methods	Indicators
National Trade Balance	• Primary sector's products • Fossil fuels • Bulk industrial materials	• Future production, consumption and surplus/deficit are estimated by commodity type based on the Main Commodities Survey conducted by VITRANSS	• Population • Sectoral GDP • Government policies • Investment projects
Liberalized Trade Transactions	• Manufacturing goods and their parts/mean products	• Recent trade trend is expected to continue in line with industrial development	• Recent trade volumes • Industry sector's GDP
Regional Logistics Management	• Containerized cargo in transshipment • Transit cargo with neighboring countries	• The latest information on regional transshipment ports is duly examined. • The possibility to transship other Vietnamese cargo is assessed. • The on-going trans-Asia highway project is reviewed.	• Port statistics in neighbors • Container shipping schedule around Vietnam • Related cross-border road project document

(2) National Trade Balance

The VITRANSS conducted a series of traffic surveys and analyzed the present commodity-based traffic flow, totaling 13 commodity groups. Then, future production and consumption by commodity were forecast to specify possible cargo traffic demand including domestic and international movements. The Study has reinforced the VITRANSS projections in relation with the latest trade statistics and government policies which features the possible roles of the SFEA port system.

(3) Liberalized Trade Transactions

Vietnam imports numerous industrial goods not only for end-users but also for manufacturers who may use them as parts or intermediate materials of final products which may either be exported or sold to local markets. Such trade transactions have become apparent since the Tan Thuan EPZ and the Linh Trung EPZ started their respective operations in 1991 and 1992. In the future, liberalized trade regimes will further accelerate such transactions as Vietnam's economy becomes more integrated with the global economy.

By using a regression model, a clear correlation can be observed between the industry sector's GDP and the related trade volume in the past. Thus, the future demand has been forecast at 44.6 million tons in 2020 or 5.4 times' increase during the forecast period.

(4) Regional Logistics Management

Within the scope of the SFEA port system, two possibilities have been examined from a global logistics management viewpoint, i.e., transshipment containers at ports and transit cargo with neighboring countries. Regardless of competition among the regional hubs, the Study has identified three kinds of constant transshipment needs to the SFEA gateway port. They are (i) minor transshipment on an ad hoc basis for the convenience of shipping lines, (ii) transshipment of the foreign cargo handled at other Vietnamese ports, and (iii) transit cargo along the on-going Trans-Asia Highway Project (Phnom Penh – HCM City).

(5) Summary of SFEA Port Throughput

Based on the above-mentioned discussions and projections, the future traffic demand, which shall be handled at SFEA ports, are summarized in Figure 11.3.1 and Table 11.3.2. This shows that SFEA port cargoes will increase by 3.4 times during the forecast period with the containerized cargo showing a faster increase (5.4 times).

Figure 11.3.1 Forecast of SFEA Port Throughput

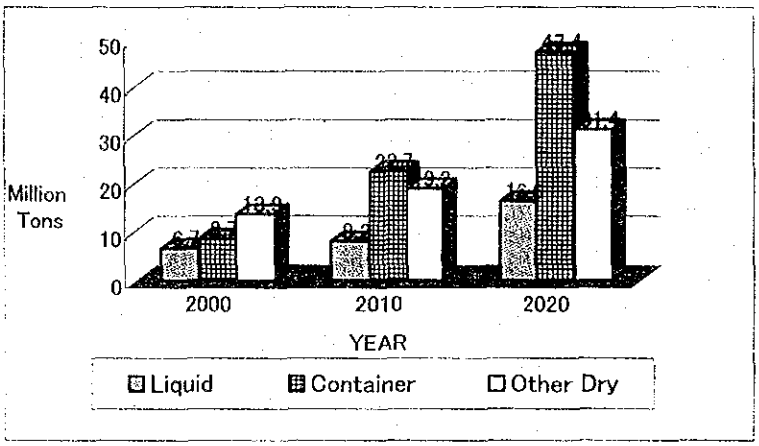


Table 11.3.2 Summarized Cargoes to be Handled by SFEA Ports

	Year 2010		Year 2020	
	Freight Volume ('000 tons)	Of which, Containerized ('000 TEU)	Freight Volume ('000 tons)	Of which, Containerized ('000 TEU)
Rice & Food Crops	4,700	141	5,600	168
Fishery Products	688	69	989	99
Industrial Crops	700	56	1,460	117
Forest Products	100	2	100	2
Steel & Iron	1,313	26	5,084	102
Fertilizer	3,491	0	4,435	0
Manufactured Goods	20,521	1,642	44,633	3,570
Refined Oil Products	3,599	0	7,945	0
Ad Hoc Transshipment	204	20	430	43
Transshipment with Other Vietnamese Ports	834	83	1,657	166
Transit Cargo with Cambodia	646	32	1,183	59
Overseas Shipping Total	36,796	2,071	73,516	4,326
Domestic Shipping Total 1/	13,334	203	21,918	418
SFEA Total	50,130	2,274	95,434	4,744

Note: 1/ Including transshipment cargo with other Vietnamese ports

11.4 Passenger Shipping Demand

(1) Coverage

This section deals with oceangoing cruise ships. Other passenger shipping forms, currently observed in SFEA such as hydrofoil fast craft for tourists and ferry boats for river crossing, are

disregarded since they do not require substantial port infrastructure.

(2) Identified Potentials and Constraints

Vietnam has geographical advantages in terms of cruise development. First, it is located between the regional cruise hub ports of Hong Kong and Singapore. The ships on world cruise programs are expected to pass by the country. Second, Vietnam is endowed with tourist attraction sites spread along its very long coastline. For example, all of the country's four UNESCO World Heritage sites are located within the cruise passengers' one-day excursion areas. Thus, these world cruises must drop their anchors at two or three Vietnamese ports. In addition, Laem Chabang Port in Thailand is now fast becoming a regional cruise hub.

However, there is no port dedicated to cruise shipping at present. Cruise ships must enter congested and dirty cargo ports or use tender boats. There is no cruise ship that starts and ends its tour in Vietnam. Therefore, the fly and cruise concept which can attract cruise passengers has never been practiced. It may be viable at HCMC if a satisfactory cruise port is developed along the Saigon River or its downstream.

(3) Demand Forecast

To identify a potential SFEA cruise market, the Study focuses on foreign visitors and local tourists who can afford cruise tours, and transit passengers probably coming from Bangkok and Hong Kong. Their individual demands are analyzed as follows:

- There is no doubt that the foreign visitors are the potential cruisers. Singapore has provided cruising opportunities to 2.5 % of its foreign visitors in 2000. It is assumed that cruisers among the foreign visitor arrivals to SFEA are 0.5 % in 2010 and 1.0 % in 2020. It means that the cruisers will buy fly-and-cruise packages and use a SFEA cruise port.
- On the other hand, local cruisers are forecast to be negligible due to prohibitive tour rates.
- The SFEA cruise ports received approximately 45,000 cruise passengers in transit in 2000. In line with the growing regular short cruises around both Bangkok and Hong Kong, SFEA will receive much more transit cruisers as their ports-of-call.

Table 11.4.1 Forecast of Cruise Passengers at SFEA

	2000	2010	2020
Embarked/Disembarked Passengers	Neg.	15,000	60,000
Transit Passengers	45,000	148,000	266,000

Chapter 12 Port Development/Administration Strategy

12.1 General Principles for Port Development

12.1.1 Maritime Strategy in Vietnam

"Emerging Issues in Transport, Communication and Infrastructure Development: Globalization and Integration of Transport: Regional Shipping and Port Development Strategies" by Economic and Social Commission for Asia and the Pacific (ESCAP) Report in July 2000 is referred to in this section.

(1) Container Fleet Forecast in the World

In order to explore implications of the ship size increase, the study developed two scenarios on the future network of liner shipping. The base case explores a relatively conservative hypothesis, in which the growing demand for the carriage of containerized cargoes will be met by continuation of slow creep in ship size similar to that which characterized the 1970's and 1980's, allowing for increase in scale of the largest vessels in service, up to 8,000 TEU in 2006 and 12,000 TEU in 2011. This is combined with an increase in the number of strings that are operated in each of the major trades. The number of ports included on each string is similar to the number included on the major services of today. Under this base case scenario, it has been projected that a total of around 950 vessels with capacity of more than 3,500 TEU, of which 30 ships are in the range of 9,000-13,000 TEU capacity for the trans-Pacific, Far East-Europe and North American Atlantic Coast services, will be operated by 2011.

The 'big ships' scenario starts from a different assumption that the major carriers will attempt to exploit further economies of scale, and deploy vessels of 9,000-13,000 TEU on the major trade routes, which will be radically simplified, calling at only one or two ports in Asia. Some of these streamlined routes appear to have some potential, particularly if other hubs can be included on a route with minimal deviation, which is the case in the Far East-Europe trade and on the Suez route to the USA, while the trans-Pacific route appears less promising for streamlined large ship service. Under this big ships scenario, less than 890 vessels with capacity of more than 3,500 TEU are required while 127 ships of 9,000-13,000 TEU capacity will be in service by 2011. This implies the elimination of some of the smaller inter-continental services in the base case – typically operated by vessels in the order of 4,000 TEU – by the 10,000 TEU and 12,000 TEU ships of the streamlined East-West services.

In the base case, it is expected that the new ports of Kwangyang, Tanjung Pelepas and the transshipment hub emerging in Shanghai will capture substantial transshipment volumes. The traditional ports centres of Singapore, Kaohsiung and Hong Kong are expected to retain their importance throughout the period. Following implementations are indispensable for the above ports in order to maintain the status of a hub port.

- provide a deepwater berth (15~16m depth at present and 17~18m depth maybe in future) and a big scale gantry crane with outreach longer than 48m
- increase efficiency of container handling operation remarkably

- lower container handling charge in competition with other hub ports
- adopt information technology (EDI system etc) actively

If the 'big ships' scenario does eventuate, it will have implications for both total trans-shipment volumes and the distribution of trans-shipment opportunities between ports. The big beneficiary from streamlining the routes is Singapore, mainly at the expense of Tanjung Pelepas and Port Klang, as shipping lines operating very large vessels are forced to concentrate their calls on the port with the largest cargo base. Shanghai also appears likely to benefit from this consolidation, mainly at the expense of the Korean ports.

(2) Container Fleet Forecast on Vietnam Routes

In the base case, if container handling volumes of nearly two million TEUs in some port of Vietnam are achieved, there is a possibility that the Panamax type vessels on the trunk routes will use a port in Vietnam similar to the case of Laem Chabang Port in Thailand. The port in Vietnam will be required to provide appropriate berthing facilities to accommodate larger ships. In addition, a regional transshipment port in Vietnam might have some possibility due to the booming of container service in Asia. However, it is noted that a transshipment port has to satisfy aforementioned conditions required to maintain the status of a hub port. Since transshipment cargoes offer port authorities and terminal operators an opportunity to develop their business at a faster rate than the development of their economic hinterlands would permit, the competition for this business is fierce and very volatile. Therefore, careful and long-term consideration will be necessary to develop a transshipment port in Vietnam.

In the big ship case, it is expected that if container handling volumes in Asia increase remarkably, 2,200 TEU vessels, which presently represent the maximum size vessel on the South East route, will be replaced by vessels bigger than 3,000 TEU. And similar vessels will be deployed on Vietnam route due to rapid increase of container cargoes in Vietnam, most probably caused by the AFTA effect. In addition, trunk-line services with a big scale container fleet has possibility due to the conclusion of the Vietnam-US Bilateral Trade Agreement.

Based on two scenarios, a following container fleet is forecasted to be deployed on Vietnam routes in ten years. (For example ship size of 3,000 – 4,000 TEU container ship is 40,000-50,000 DWT, LOA of 250-300m and a draught of 11-13m).

Local routes in Vietnam have been used for cargo shipment from the North and Central Vietnam to the new port for transit to other countries. Considering features of ports in Vietnam, it is expected that 500-1,000 TEU vessels, which are popular at present, will continue to be deployed.

(3) Other Ships on Vietnam Routes

1) Bulk Cargo Ships

In general, bulk cargoes do not represent a large portion of the total cargo handling volume as in the case of container cargo and bulk cargo vessels of about 30,000 DWT are presently deployed in HCMC port group. However, vessels with 50,000 DWT capacities will be considered in the new port, due to future growth of bulk cargo vessels in Vietnam.

2) Passenger Ships

Ship dimensions such as length, draft and air draught are major constraints when passenger ships navigate the Long Tau River Channel. For example, only ships or boats with LOA, draught and air draught less than 230m, 9.5m and 45m respectively are permitted to come in and out the HCMC ports (in case of night navigation, ships and boats with LOA less than 160m are permitted).

It is expected that limited cruise ships in Intra-Asia, which satisfy the above restrictions, will come into the HCMC ports. Recently, the following ship came into a HCMC port.

Name of a passenger ship:	Crystal Harmony
LOA:	240.9 m
Draught:	8.0 m
Moulded Breadth	29.6 m
Gross Tonnage:	48,621 GRT

It is expected that development of cruise terminals in HCMC area will be more and more active due to the high potential of the tourist industry in Vietnam.

(4) Maritime Strategy in Vietnam

Following maritime strategy will be proposed.

1) Short-term Development

- Enhance the potential of maritime transportation in order to correspond to the booming of container service in Asia.
- Enhance the potential of a bulk cargo distribution base for supporting regional industries.
- Enhance the maritime networking for the coastal shipping.

2) Long-term Development

- Develop trunk-line services between Asia and Europe/America in order to enhance the potential of trade industries.
- Enhance the transportation by a bulk cargo corresponding to the diversification of the regional industries.
- Attract cruise ships to HCMC ports in order to encourage the tourist industry in Vietnam.

12.1.2 Regional Development and Transport Network

(1) Sustainable Regional Development by the Decentralization Policy

SFEA is one of the most vital socio-economic centers of the country, and expected to expand its function even in the future. SFEA will be one of the leading international areas in Vietnam and will function to cover a wide area including Asian countries. The area will serve as a dynamic and advanced complex supported by well-balanced industrial, commercial, agricultural and cultural activities. SFEA is surrounded by the vast open space available for the international and domestic enterprises, and is blessed with the fertile agricultural land in Mekong Delta and Central Highland areas as its hinterlands. These enterprises and the hinterlands generate a huge volume of

export-and-import goods in the region.

The industry sector, a locomotive of the economy in SFEA, achieved a remarkable development in the middle of the 1990s. The number of IZs established in the area has exceeded 30, and is planned to be doubled in the future even though this to some extent may depend on international and domestic economic situations. Most of the existing IZs are specialized in light industries, producing garment, footwear, machine parts, processed food etc.

Newly established and projected IZs in SFEA are located or planned to be located along the Dong Nai River and Thi Vai River. In particular, those IZs in HCMC are planned in the northern-east area and in the southern area where they plan to construct new urban areas. IZs in the other provinces are planned to be located in the remote areas along the major national roads. In these newly established and projected IZs, heavy industry such as power generation, cement and fertilizer manufacturing is planned to be located. And the existing enterprises located in the urban areas are also expected to move to these IZs. IZs in the urban areas are planned to be occupied only by hi-tech and clean industry.

HCMC which play a vital role in the economic development in SFEA has a population density that exceed the national average by 10 times. HCMC now occupies about 20% of the national total in GDP (about 60% to SFEA), and attracts about 60% of the foreign direct investment in SFEA. Under these circumstances, HCMC has been suffering from serious urban problems such as traffic congestion and various kinds of environmental deterioration in the city area.

To overcome such a situation, the concerned authorities in SFEA have been studying long-term regional development plans to construct a new urban area in Phu My area and in Ba Ria-Vung Tau province and to shift the major IZs to the suburbs of Bien Hoa City in Dong Nai province and to the southern area of Binh Duong province. For well-balanced regional development in SFEA, it is recommended to disperse the development centers to several areas in the region.

(2) Integrated Transport Network in the Region and Gateway Port

For the well-balanced regional development, it is indispensable to establish the transport network that connects the development centers and the hinterlands in SFEA efficiently and effectively.
This transport network is the Corridor Plans suggested even in the VITRANSS report that combine traffic modes of roads, railways and inland waterways etc. They propose a North-South Coastal corridor, a Nha Trang - Da Lat - HCMC corridor, a HCMC - Vung Tau corridor, and a HCMC - Can Tho corridor as high priority projects in the region.

In HCMC they have already been in the preparation stage to construct East-West Highway and Phu My Bridge etc. to develop the northern-east area of the city. A new road is planned to construct even in the southern area of the city as a high priority project under the next Five Year Plan. This road will help develop a new city and IZs in the area. In addition, the construction of an outer-ring highway in HCMC is now being considered to mitigate traffic congestions in the city caused by heavy trucks and to have the easy access to the ports as well.
With the above situations, a port development as a gateway of the transport network to connect the development centers in SFEA and its hinterlands becomes significant and indispensable for the

effective regional development including the industrial and agricultural developments. Moreover, if the ports and other transport infrastructures would be appropriately developed in the area, they could attract more ocean-going vessels callings and thus could develop the region in multiplication.

12.1.3 Basic Concept of Long-term Port Development

Vietnam is a north and south long maritime state like Japan. Most ports in Vietnam exist along riverside and there is no deep port for performing efficient trade now. For this reason, it depends on secondary transportation for the northern part through Hong Kong, and for the southern part through Singapore. Moreover, main ports have problems. Port charges such as a pilot's fee for the long navigation channel are high compared with the other main ports in foreign countries.

Vietnam introduced a Doi Moi policy and has accomplished rapid economic development. There is especially a remarkable thing in development in light-industries fields, such as garments and miscellaneous goods. Moreover, agricultural products, such as rice and coffee, are also extended. In order to export these light-industries goods and agricultural products and to carry out economic development further, the development of transportation infrastructure and the increase in efficiency of transportation are indispensable.

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 as one of the bases of the maritime Silk Road in the 21st century. Moreover, the importance will also increase as a base of transportation for coastal service, which connects the southern part and northern part of Vietnam.

Formulating the port development of the south of Vietnam in the 21st century, it carries out based on the following fundamental views.

(1) To Support the People's Lives and Activities

As various industrial production activities become borderless, industrial production and people's lives are dependent on trade. Therefore, it is essential that a port performs its functions properly to develop the economy and support everybody life of citizens.

(2) To Coordinate with Industrial Development

A port creates the vitality of an area and jobs by making the transportation and port-related industry active. Companies in the area will benefit in terms of production and inter-trading opportunities.

(3) To Make HCM City more Attractive as an International City

The selection of the port's relocation and functions in a city has important environmental implications. A city's charm is heightened and international and attractive urban areas are recreated. A port should be redeveloped as a place, which can attract new businesses such as international business, tourism, cruise and entertainment.

(4) To Preserve the Natural Environment

Harmonization of port development and environmental preservation is necessary to protect the precious natural environment, which will be inherited by next generations.

(5) To Concentrate Investment in Important Ports

The limited funds should be used effectively. Therefore, the investment should be concentrated to important port facilities. In addition, the investment effect should be seen at an early stage.

(6) To Minimize the Risk through phased Investment

To minimize the investment risk by a step-wise development, time flexibility is required.

(7) To Harmonize with other Infrastructure

Other transport infrastructures such as bridges over the access channel and highway are necessary for effective operation.

12.1.4 Basic Direction of Port Development

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

The number of vessels forecast to use the Long Tau River channel is double the channel's capacity while the volume of cargo to be handled at ports is forecast to be double the actual handling capacity. Because the traffic congestion in the center of city is already severe, such an increase in cargo is not desirable. In addition, vessel size will become larger. Therefore, it is necessary to develop new ports outside the center of city.

On the basis of concept above, the fundamental direction of port development in each area is proposed below.

(1) Port Development in HCMC Area

In the area around Saigon River banks, the investment cost for port construction is generally lower than that in Thi Vai and Vung Tau areas and there are also advantages in terms of port services. But this area also has great disadvantages related to the channel, water surface area, environment, and transportation in the hinterlands. While new ports should be constructed in the suburban area step-by-step, the charm of HCMC as an international city should be increased taking advantage of the various functions of port and waterfront.

The main direction of port development of HCMC should be toward the north-east, adjoining to Thuan An (Binh Duong province), Bien Hoa (Dong Nai province) and its auxiliary development

directions should be toward the south and south-east to the sea, adjoining to Nha Be, Binh Chanh, Hiep Phuoc, and the new urban area of Nhon Thach – Long Thanh. The city center will be extended to Thu Thiem to take advantages of its geological location, natural conditions, land, infrastructure and environment.

The existing inner city ports such as Sai Gon, Ben Nghe, Tan Thuan, Tan Cang and Ba Son have limits of extension and development. The selective relocation of port function in a city is necessary to improve its urban environment. A city charm will be heightened and international and attractive urbane space is recreated. A port should be redeveloped as a space where new businesses, such as international business, tourism, cruise and an amusement can be improved.

New ports should be constructed in the suburban area step-by-step. Cat Lai IZ Port Group and Hiep Phuoc Port Group will be the major ports of HCMC. The access channel and water area will be improved in cooperating with the port development in Dong Nai River (Cat Lai) and in the upper Soai Rap River.

The development of transport infrastructure, particularly the construction of the city's road network including the outer ring road in conformity with port facilities is prioritized.

(2) Port Development in Thi Vai River Area

There are four candidate sites for port development along the Thi Vai River where relatively deep navigational channel is available up to almost the end of the main stream of the river. They are Go Dau, Phuoc An, Thi Vai and Cai Mep areas.

Go Dau is one of the oldest industrial areas that has its own port facilities that could be expanded to serve the future potential cargoes of the new industries expected to be located near the existing ones. Development of industrial port at Phuoc An is still in the conceptual stage, and realization of the project is not confirmed at this stage. This port will be developed in conformity with Nhon Thach IZ

In this Study, the major roles of these two candidate ports, even if realized, are considered to serve only for the potential cargo traffic to/from their limited direct hinterland.

On the other hand, the other candidate ports, namely Thi Vai and Cai Mep of which location and channel conditions are more advantageous, may reasonably be considered as the ports with both transit function to/from the northern part of the area and direct service function for the industrial zone behind.

Judging from the various conditions confirmed so far on Thi Vai River area, it might be considered that the overall capacity of Thi Vai and Cai Mep sites might not be enough to accommodate total future port demand beyond year of 2020.

Selection of a priority port development site should carefully be examined based on the site surveys including the detailed natural conditions. Particularly, the development of an access channel to Thi Vai area is limited due to two sharp bends.

(3) Port Development in Vung Tau Area

Vung Tau Area is blessed with an advantageous location close to the trunk ocean shipping route and deep approaching channel, which are ones of the most vital requirements for an international container hub-port. At the same time, it has some potential disadvantages such as necessity of the breakwater(s), adverse effects of monsoon on maneuverability of the entering vessels, long distance to the center of economic activities of the area, expensive access road including the relocation of the existing residences and the expansion of the width of the NR51 to the nearest trunk road (if the site would be selected in Ben Dinh Sao Mai area), possible unstable movement of the seabed, highly complicated sedimentation mechanism of the estuary and unconfirmed scale of the future international transshipment and/or transit traffic demand under severe competitive situation of the Asian hub-port business.

Considering the above conditions, the port development policy of this area should carefully be studied on the long-term basis on such factors as the relevant natural conditions, total estimated cost of the project, transshipment and/or transit market in the future international container movement, modal allocation between water and land traffic of the sea-born cargo, appropriate road network in the area, the possible core sites of port traffic generation and so on.

12.2 General Principles for Port Administration, Management and Operation

12.2.1 Further Improvement of Port Administration System

(1) Classification of Ports

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) functions of ports, 2) contents and quantity 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 the importance of port infrastructure into consideration, the role of central government for port administration is very important. Representative roles to be played by central government are listed as follows.

- Policy formulation for the development and administration of nationwide ports
- Establishment of necessary laws and regulations
- Formulation of investment plan for nationwide ports
- Budget distribution and financial assistance to each port
- Authorization of port development/management plan of each port

The lack of only one function of these may disturb the appropriate execution of nation-wide port administration. Without a unified administration system, it is difficult to make the best use of limited coastal areas.

The port administration such as a policy-making and monitoring for port development and improvement should be performed by one administrative apparatus, namely, one main ministry or a combination of one ministry and one government agency, under a unified philosophy.

(3) Improvement of Institutional Framework for Port Administration

The further improvement of the institutional framework for port administration is very significant in order to realize the smooth and steady port development and management. However, it can be found that some important functions to be conducted by the central government and PMB respectively do not have been institutionally established yet in Vietnam.

Particularly, as for the following functions, the institutionalization in the framework of the whole port administration needs to be immediately examined.

+ Formulation of port development plan for individual Major-port
+ Formulation of short-term investment plan
+ Establishment of new coordinating organization for the port development and improvement

(4) Establishment of Appropriate Port Management System

There are roughly two different types on the characteristic of the port management entity: namely, one is a public sector, and the other is a private sector.
In the case of Vietnam that has to accelerate the national growth through the promotion of maritime international transportation, it is considered that port management by a public sector is more suitable. It is because that it is necessary for the port management body (PMB) to promote the future port management powerfully, making full use of the public function which differs from a business motivation by a private sector.

Meanwhile, at almost all Vietnamese ports, port management and operation is performed by enterprises including SOE, public corporation organized by central and local government, and private company such as the First Logistics Development JV Company (FLDC). Of these, each of SOE and public corporation has a both feature of a public and private sector, and it can be defined that they are semi-public entities.
Consequently, it is a subject how can be installed the public characteristic to these enterprises.
The appropriate port management system for Vietnamese major ports has to be examined and established, as soon as possible.

(5) Establishment of Appropriate Port Tariff Base

It greatly is evaluated that Vietnamese government has made an effort to bring down the base of port tariffs until now. According to the Decree No.48/2001/QD/BTC dated 28 May 2001 which covers the maritime charge and fee rates, the rate of the tonnage dues and maritime safety charges is supposed to be decreased to further 85% of a present rate from January 1, 2002.
In this decision, the strong will of the Government to the correction of the tariff base is felt. However, the charge gap between the Vietnamese ports and neighboring Asian ports will still remain even if this measure is realized. It is important to make a constant effort towards a further reduction of port tariff base and the introduction of new concepts such as a "time-conscious" tariff structure.
In order to increase the calling ships and ensure the growth of the national economy, the establishment of appropriate port tariff base is indispensable.

12.2.2 Realization of Efficient Port Management/Operation

(1) Positive Introduction of EDI (Electronic Data Interchange) System

It is essential for Vietnam to consider positively the introduction of a more advanced information system for port/terminal management and operation. The relevant government agencies and PMBs should make an effort to introduce a "one-stop service system" and a full-scaled EDI system in main ports. Particularly, MOT and VINAMARINE is expected to show strong leadership towards these matters.

(2) Improvement of Port Statistics System

It is one of the most significant assignments for any government in the modern society to compile and publish reliable statistics on every sector of the country including natural and socio-economic conditions and situation of national assets and activities. A port statistics should clarify at least the trend of cargo handling volume by lot and the origin/destination of each kind of commodity and cargo type, as well as number of calling vessels, number of passenger and situation of basin, warehouse and stock yard, etc.

However, the port-related information and statistical data made public are markedly few in Vietnam. In order to improve this present situation concerning port statistics, it needs just from now to start the study towards building an appropriate port statistics system including the obligation by the regulation.

(3) Introduction of Appropriate Staff Training System

Staff training system should be designed and developed with comprehensive training program structure covering across various training demands of all relevant staffs and operators so that effective improvement of total power or capability of the organization could be expected. In other words, staff training for each staffs and operators needs to be conducted under the programs well coordinated with constant exchange of relevant information: for instant, on new technologies for port operation or development, and recent trend of administrative or legal requirements.

12.2.3 Promotion of Private Sector Participation (PSP)

PSP is a main stream of port management businesses of the world regardless containerized or not. Also in Vietnam, PSP for developing a public infrastructure has positively been conducted through the preparation of relevant regulations in recent years.

It is important and indispensable for the Government to promote further PSP in the port development and operation.
Possible measures for Promoting the PSP can be proposed as follows:

- It is important that the participation field will be enlarged on not only port development projects but also port service projects.
- In order to eliminate or minimize the market risks, it is necessary to balance the risks between public and private sector. The appropriate measures should be considered carefully by the related government agencies and PMB to avoid risks incurred to BOT participants.
- It is desirable that the government should establish firm and concrete selection criteria of PSP applicants. Furthermore, the government should make every effort to open the PSP-related information to the public as much as possible in order to upgrade the quality of PSP system.
- Generally speaking, it is important to give appropriate incentives to domestic and foreign investors through promoting deregulation in order to attract more investment.