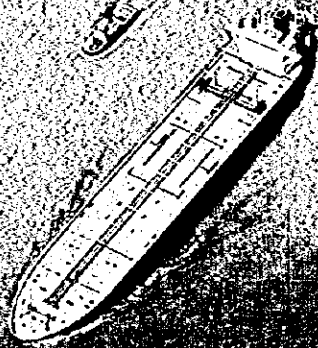社会開発調査部報告書

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)
THE REPUBLIC OF EL SALVADOR

THE STUDY FOR PORT REACTIVATION IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

FINAL REPORT (SUMMARY)

EXCHANGE RATE

1US dollar = 8.75 Colones = 130.00 Yen
(as of December 1997)

THE STUDY FOR PORT REACTIVATION IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

FINAL REPORT (SUMMARY)

PREFACE

In response to a request from the Government of the Republic of El Salvador, the Government of Japan decided to conduct a feasibility study on Port Reactivation in La Union Province of the Republic of El Salvador and entrusted to study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Hajime Kawate, Executive Director of the Overseas Coastal Area Development Institute of Japan (OCDI) and consisted of OCDI and Nippon Koei Co., Ltd.(NK) to the Republic of El Salvador, 3 times between November 1997 and November 1998.

The team held discussions with the officials concerned of the Government of the Republic of El Salvador and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this will contribute to the proportion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of El Salvador for their close cooperation extended to the study.

November 1998

Kimio FUJITA
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

November 1998

Mr. Kimio Fujita
President
Japan International Cooperation Agency

Dear Sir,

I have the honor to submit herewith the Report for the Study for Port Reactivation in La Union Province of the Republic of El Salvador.

This report is the outcome of works between November 1997 and November 1998 which included three field surveys. The work was undertaken by the Overseas Coastal Area Development Institute of Japan (OCDI) and Nippon Koei Co., Ltd. (NK) as per the contract with the Japan International Cooperation Agency (JICA).

Based on the findings of surveys and utilizing data and information collected, and consistent with the scope of work which was agreed upon by both governments, the report is formulated to cover the following subjects;
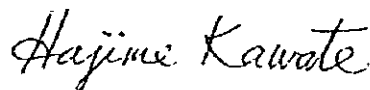(1) To formulate a master plan for the Port of La Union up to the year 2015
(2) To conduct a feasibility study on a short-term plan up to the year 2005 based on the master plan.

The study shows the importance of the overall development of the Port of La Union and it's proper administration, management and operation. I earnestly hope that necessary measures will be taken to implement the projects and recommendations.

I would like to note that the completion of the study is greatly owed to the collaboration with CEPA (Comision Ejecutiva Portuaria Autonoma) and other related ministries, government agencies, shipping lines and agents.

I am also greatly indebted to JICA, the Ministry of Foreign Affairs, the Ministry of Transport and the Embassy of Japan in El Salvador for giving us valuable advice and assistance at every step throughout the course of the study.

Yours sincerely,

Hajime KAWATE
Team Leader of Study for Port Reactivation
in La Union Province of Republic of El Salvador

HONDURAS

GUATEMARA

Anguiatu
Metapan
Citala
San Cristobal
CHALA TENANGO
Tejutra
SANTA ANA
Las Chinamas
Santa Ana
Charatenango
Sensun
tepeque
Sabanetas
Ahua chapan
CUSCA
TLAN
CABANAS
Hachadura
Ilobasco
AHUACHAPAN
SAN
SALVADOR
MORAZAN
Sonsonate
San Francisco
SONSONATE
San
Salvador
Cojuta pique
SAN
VICENTE
Acajutra
San Vicente
El Amatilo
LA LIBERTAD
Santiago
de Maria
SAN MIGUEL
La Libertad
Coma tan
LA UNION
Zacate
Coluca
San Miguel
USULUTAN
Cutuco
LA PAZ
La Union
Punta Gorda
Usulutan

PACIFIC OCEAN

Gulf of Fonseca

Location   Map

The Port of Cutuco (Present Situation)

Recommended Alternative Plan (C-3)
– Container Terminal (C) and Bulk Terminal (B) –

La Union Bay

Site-C

-2

-5

-2

-10

-10

C-3

City of La Union

Port of Cutuco

Port of Punta Gorda

B

B

SHORT TERM PLAN (2005)

MASTER PLAN (2015)

PORT RELATED AREA

CURRENT PORT AREA

OTHER PROJECTS

0 1 2 3 4 500m

Marina
(CORSAIN)

La Union Province

Power Plant
(CEL)
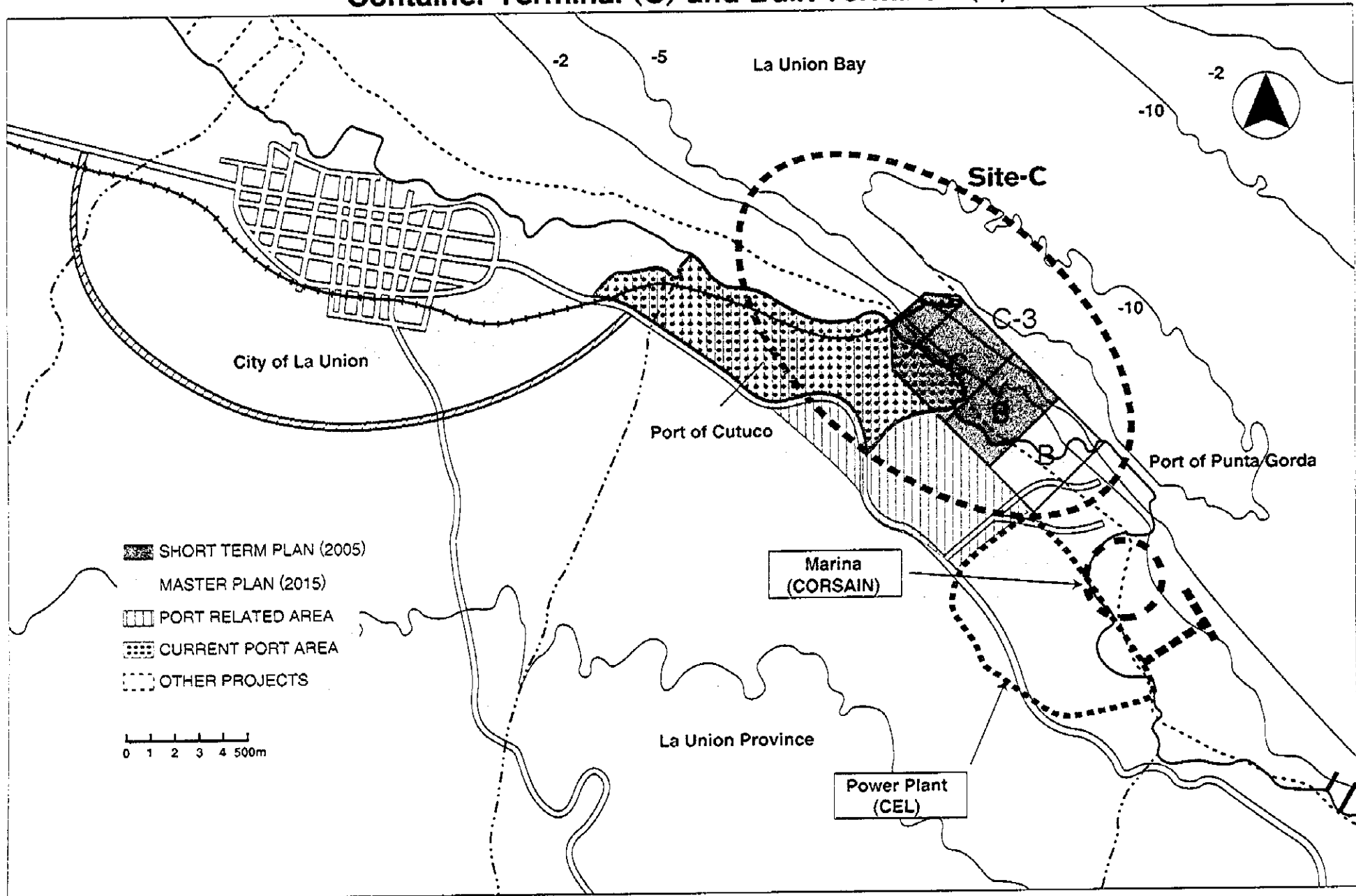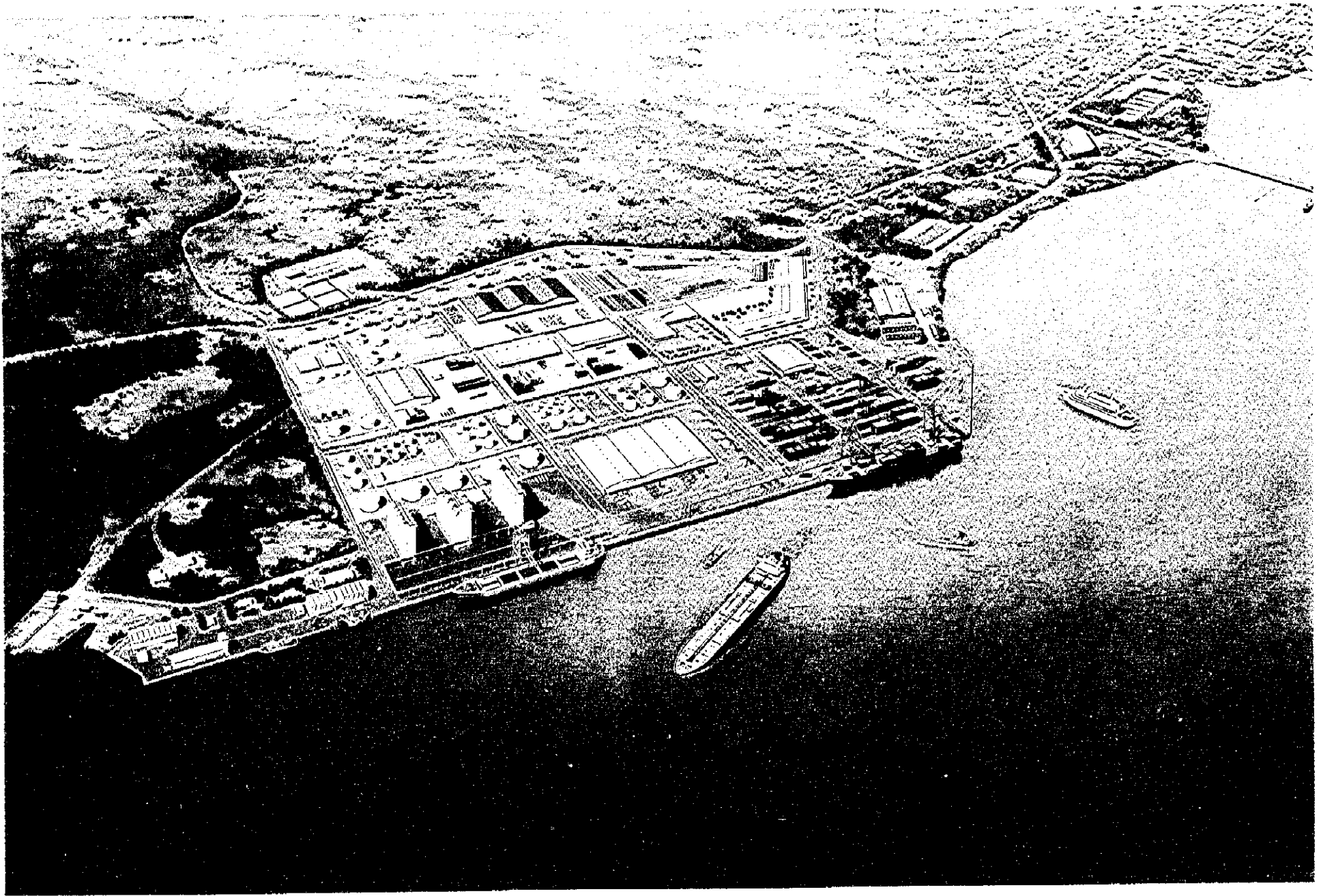
Master Plan (2015)

ABBREVIATION LIST

B	BCIE	Central American Bank for Economic Integration
	BCR	Benefit Cost ratio
	B/L	Bill of Lading
	BOD	Biochemical Oxygen Demand
	BOT	Build, Operate and Transfer

C	CEL	Comision Ejecutiva Hidroelectrica del Rio Lempa
	CEPA	Comision Ejecutiva Portuaria Autonoma
	CFC	Conversion Factor for Consumption
	CFS	Container Freight Station
	CIF	Cost, Insurance and Freight
	COD	Chemical Oxygen Demand
	CORSAIN	Corporacion Salvadorena de Inversiones

| D | DO | Dissolved Oxygen |
| | DWT | Dead Weight Tonnage |

E	EIA	Environmental Impact Assessment
	EIRR	Economic Internal Rate of Return
	EPZ	Export Processing Zone

F	FCL	Full Container Load
	FIRR	Financial Internal Rate of Return
	FOB	Free on Board
	FENADESAL	Ferrocarriles Nacionales de El Salvador
	FMLN	Frente Farabundo Marti de Liberacion Nacional

| G | GDP | Gross Domestic Products |
| | GT (GRT) | Gross Tonnage |

| H | HHW | Highest High Water |

I	IDB	Inter-American Development Bank
	IBRD	International Bank for Reconstruction and Development
	IEE	Initial Environmental Examination

L	LAQ	Lease a Quay
	LCL	Less than Container Load
	LLW	Lowest Low Water
	LUP	License to Use a Port
M	MALPOL	Prevention of Pollution of the Sea from Ships 1973 and the Protocol of 1978
	MHW	Mean High Water
	MLW	Mean Low Water
	MLWS	Mean Low Water Spring
	MSL	Mean Sea Level
	M.T.	Metric Ton
N	NPV	Net Present Value
O	ODA	Official Development Assistance
	OECF	The Overseas Economic Cooperation Fund, Japan
R	Ro-Ro	Roll-on Roll-off
S	SCF	Standard Conversion Factor
	SPM	Suspended Particulate Matter
	SS	Suspended Solid
T	TEU	Twenty-foot Equivalent Unit
	T-N	Total Nitrogen
	T-P	Total Phosphorus
U	UN	United Nations
	UNCTAD	United Nations Conference on Trade and Development
	UNDP	United Nations Development Programme
	US	United States of America

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Study for Port Reactivation in La Union Province of the Republic of El
Salvador

October 1997 - December 1998
Counterpart: Comision Ejecutiva Portuaria Autonoma (CEPA)

Background and Objectives of the Study

1.   El Salvador faces the Pacific Ocean with a coastline of 300
kilometers. It has three(3) major public ports: the Port of Acajutla (CEPA),
only 85 km away from the capital to the south-west, the Port of
Cutuco(CEPA-FENADESAL) and Punta Gorda (CORSAIN), facing the Gulf
of Fonseca, in La Union Province in the eastern region.

2.   Acajutla is the largest international port of the country. It handled
1.687 million tons of cargo in 1996. On the other hand, cargo volume at
Cutuco fell drastically from 236 thousand tons in 1975 to 63 thousand tons in
1995 due to the civil war. It has been closed, in addition, since 1996 because
of the possible collapse of its terribly timeworn and corroded structures built
in the 1910s. At present, the neighboring fishery port of Punta Gorda is
temporarily assuming its functions.

3.   The port reactivation, including new port construction, in La
Union Province is expected to play vitally important roles both in
strengthening the maritime transport sector of the country, especially in
container handling, due to its advantageous location and natural conditions
in the Gulf of Fonseca, and thus in supporting the overall socio-economic
activities of the said region.

4.   Under such circumstances, the Government of El Salvador
requested the Government of Japan to carry out the Study, which includes
formulation of a Master Plan for port reactivation in La Union with a target
year of 2015, and a feasibility study of a Short Term Plan for the period up to
the year 2005.

Method of the Study

5.   For the Master Plan, cargo volume in 2015 is forecasted according to two different GDP growth rate scenarios based on the past growth and the future prospect: Case 1 (5.0 % till 2005 and beyond up to 2015), and Case 2 (the same till 2005 but 3.5 % after that).

6.   Most containers are basically handled at La Union, considering its advantageous natural conditions and high efficiency of container handling. Regarding other cargoes, the total volume is shared properly between Acajutla for the western/central region and La Union for the eastern region, corresponding to the future population of the region.

7.   After required number of berths are calculated (same for both cases) on the basis of the target of cargo handling efficiency, appropriate project sites are selected, and the corresponding layout plans are prepared and evaluated from various points of view. Two alternatives are selected and proposed: one under the given condition for the Study, excluding the concession area of the existing Cutuco, and the other without considering it.

8.   The Short Term Plan with a target year of 2005 is formulated under ι .e framework of the Master Plan. It is evaluated from various viewpoints such as the national economy, financial situation of CEPA and the environment.

Outline of the Projects

9.   The basic target of the development of the Port of La Union up to the target year of the Master Plan is identified as follows.

(1) to become a core of distribution of international trading cargo in the eastern region
(2) to become a core of regional and economic development

10.   In order to accomplish the target, the development and planning of the port of La Union should be based on the following requirements.

(1) to fully cope with the international trading cargo of El Salvador on the Pacific side together with the Port of Acajutla (No more container

outflow to the Port of Quezal in Guatemala should be allowed.)

(2) to offer the service for container cargo of the country, including the southern part of Honduras, and other cargoes of the eastern region, while remaining cargoes of the western/central region are handled at Acajutla, taking advantage of geographical and natural conditions of respective ports (Acajutla is originally constructed for bulk cargo and its container handling is affected by a swell)

(3) to cope with increasing foreign trade and the growing containerization

(4) to support the development of the eastern region (improvement of related infrastructures and development of EPZs)

(5) to serve as a alternative port to Acajutla in case of earthquake and as a back-up port to handle heavier or taller cargoes

11. The Master Plan with a target year of 2015 and the Short Term Plan for the period up to the year 2005, considering the policy of CEPA, is summarized as follows;

(1) Project sites
     at the existing Port of Cutuco

(2) Main facilities to be developed
    a) The Master Plan (2015)
        One(1) container priority terminal (-13 (-14 *) m x 300m)
        terminal area 12 ha with two(2) gantry cranes
        Two(2) bulk cargo priority terminals (-13 (-14 *) m x 520 (-560*)m)
                (*) to accommodate easy future expansion at need
        Related works such as navigation channel and access road
        Project cost: approximately 150 million US dollars

    b) The Short Term Plan (2005)
        One(1) container priority terminal, one(1) bulk cargo priority terminals and related works will be implemented.
        Project cost: approximately 94 million US dollars

Evaluation

12.   The Economic Internal Return Rate (EIRR) calculated based on the countable benefit is 14.2 % and the Financial Internal Return Rate (FIRR) is 6.3 %. Therefore, the project is judged as being feasible both economically and financially. In addition, it will contribute a lot to regional development such as job generation.

13.   No technical problems are found in the project execution. Furthermore, the EIA revealed no significant unfavorable impact related to the project. Dredged materials are disposed properly, and impact on private activities is limited to the short term stage.

14.   It should be duly said that not only this project but also other related projects such as establishment of EPZs and improvement of social infrastructures should be realized as soon as possible to bring about multiplied favorable effects on the development of the region as well as the port.

Recommendation

(1) To fulfill the responsibility as public sector (overall plan in the national standpoint and arrangement of basic infrastructures)

(2) To strengthen the whole organization of CEPA (swift and sound decision making, proper administration on private participation, overall and flexible planning, utilization of statistics system, marketing promotion, establishment of environment section, etc.)

(3) To make necessary preparations for the new port (smooth finance, marketing and promotion involving shipping agencies and consignees, establishment of high efficiency and reliability, incentive for private participation under proper competitive environment)

(4) To play an important role in both regional development and national development, contributing to various kinds of economic activities directly and indirectly.

(5) To administrate and coordinate port development based on the overall plan(the Master Plan) with related authorities and persons

MEMBERS LIST

1. Members of Counterpart Team

Mr. Miguel A. Salaverria	President, CEPA (6/1/98-)
Mr. José A. Zablah Kuri	President, CEPA (-5/31/98)
Mr. Mario O. Chávez T.	General Manager, CEPA
Mr. Carlos M. Chávez R.	Engineering Manager, CEPA
Mr. Rolando A. Díaz B.	Planning Manager, CEPA
Mr. Guillermo Merlos G.	Administrative Manager, CEPA
Mr. Roberto Mendoza	Project Coordinator, Port of Acajutla Rehabilitation, CEPA
Mr. Herbert Erquicia	Marketing Manager, CEPA
Mr. Salvador Sanabria	FENADESAL Manager, CEPA
Mr. Marco Tulio Castillo	Administrative Department Manager, Port of Acajutla, CEPA
Mr. Fernando Olivares Rauda	Operative Department Manager, Port of Acajutla, CEPA
Mr. Salvador Portillo	Cargo Storage Manager, Port of Acajutla, CEPA
Mr. Andrés Abelino Cruz	Head of Tracks and Structures Department, FENADESAL, CEPA
Mr. Ceser Armando Estrada	Economist, Planning Unit, CEPA
Mrs. Patricia de Alfaro	Business Administrator, Planning Unit, CEPA
Mrs. Mirena de Fuentes	Economist, Planning Unit, CEPA
Miss. Celina Guardado	Assistant, Institutional Development Department, CEPA
Miss. Silvia Villalta	Assistant, Institutional Development Department, CEPA
Miss. Eddi Teresa Castro	Staff, Commercial Relations, CEPA
Mr. Israel Martínez	Agronomic Engineer, International Airport El Salvador, CEPA

2. Steering Committee

Mr. Américo F. Hidalgo T.	Presidential Commission for the Modernization of Public Sector
Mr. Ricardo E. Jiménes Z.	Ministry of Agriculture and Cattle (MAG)
Mr. César Funes Abrego	Ministry of Environment
Mr. Federico L. Gasteozoro	Salvadorian Tourism Corporation (CORSATUR)
Mr. José H. Reyes	Salvadorian Industrial Association (ASI)
Mr. Miguel A. Mejía L.	Navy
Mr. Alfonso S. Galeano	Ministry of Public Works (MOP)
Mr. Edgardo Suárez	Salvadorian Investment Corporation (CORSAIN)
Mr. Ricardo S. Flores Ortíz	Ministry of Foreign Affairs (MIREX)

3. Province of La Unión

Mr. Jorge Escobar	Governor of the Province of La Unión
Mr. Francisco Castillo	Mayor of the City of La Unión
Mr. Edgar Trigueros	Deputy Administrator, Mayor Office

4. Members of JICA Study Team

Mr. Hajime KAWATE	Leader, OCDI	Overall Management
Mr. Hidefumi IKEDA	Sub-Leader, OCDI	Port Planning / Environmental Consideration
Mr. Kazuyuki YAMAGUCHI	Member, OCDI	Demand Forecast / Economic Analysis and Financial Analysis
Mr. Teruo SUETSUGU	Member, OCDI	International Cargo Transportation / Regional Development
Mr. Katsushi SUZUKI	Member, OCDI	Port Administration, Management and Operation
Mr. Kenji NOMURA	Member, NK	Natural Condition
Mr. Ricardo A. IBARRA	Member, NK	Environmental Survey
Mr. Fujio SAIGUSA	Member, NK	Design of Port Facilities
Mr. Katsumi NAITO	Member, NK	Construction Method / Cost Estimate
Mr. Kazuhiro IWAKI	Member, OCDI	Coordination(1)
Mr. Yoshinobu SHAKUTO	Member, OCDI	Coordination(2)
Ms. Yoko MATSUZAKI	Member, OCDI	Interpreter

SUMMARY
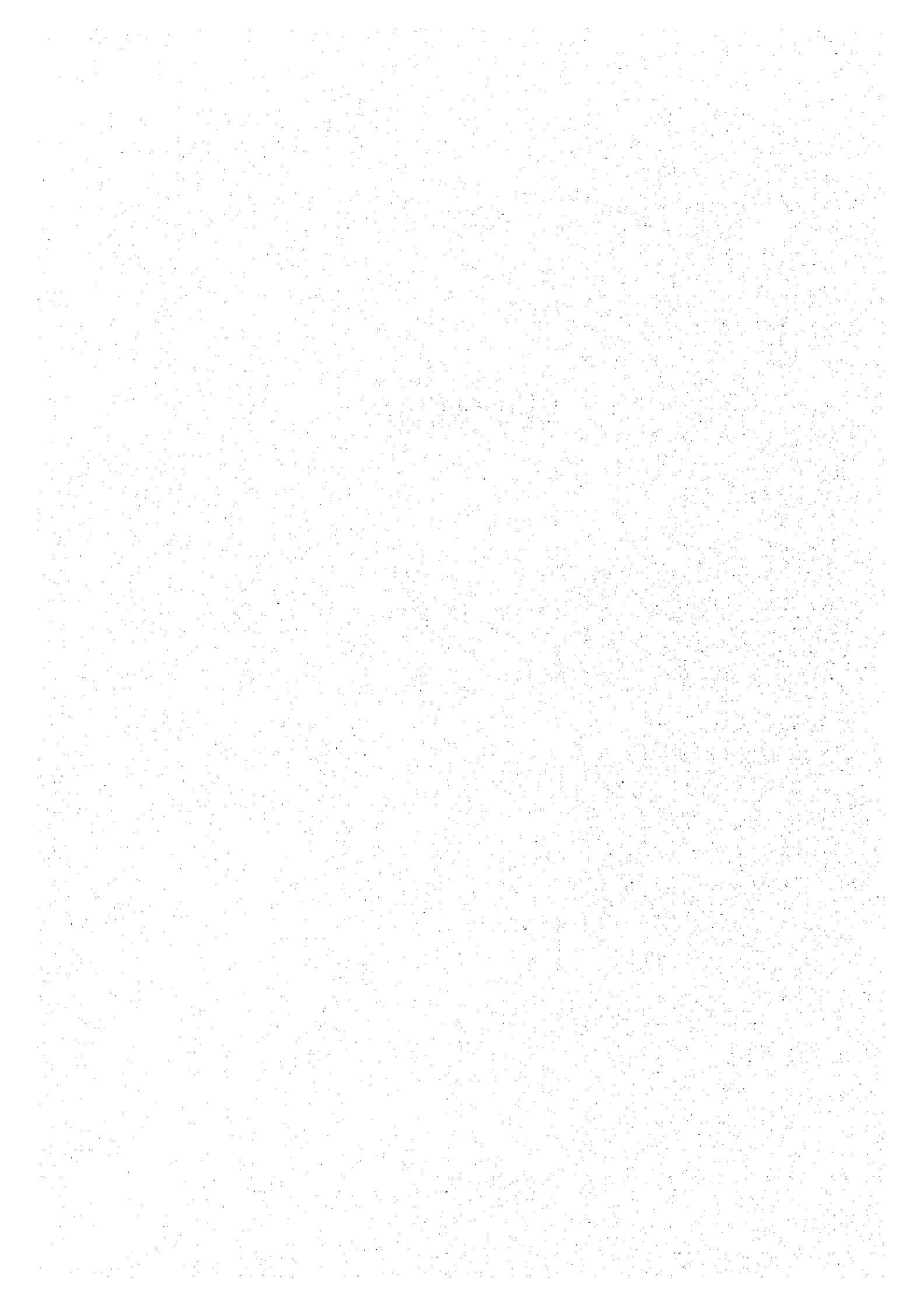
PART I

1. Outline of the Republic of El Salvador

1.   El Salvador is located in the heart of Central America facing the Pacific Ocean.   It shares borders with Guatemala on the west, and Honduras on the north and east.   Nicaragua is located to the southeast across the Gulf of Fonseca.   The population is said to reach 5.8 million now. The area of the country is around 21,000 km².

2.   The country is composed of 14 provinces, which could be divided into three different geographic regions: western region, central region and eastern region as shown in Figure I-1-1.   Their representative cities are Santa Ana, San Salvador (Capital), and San Miguel, respectively.

3.   The whole country entered a civil war in the early 1980's. However, the peace accord between the government and the anti-government power was accomplished in 1992 through the mediation of the UN.   The new democratically elected government has been making every efforts towards the recovery and steady growth of the country.

4.   Total GDP in 1996 was 50.2 billion colones in 1990 constant prices. Agriculture, Industry and Service sectors had respective shares of 13.6%, 25.7% and 54.4%. Average GDP growth rate since 1990 was 5.5% per annum, the third highest rate in Latin America after Chile and Peru. The GDP growth rate from 1992 - 1996 at current price is shown in Table I-1-1. GDP for the years 1997 to 2000 is expected to grow at a rate of about 5%.

Table I-1-1   GDP Growth Rate at Current Price

unit : %

Year	1992	1993	1994	1995	1996
GDP	7.5	7.4	6.0	6.3	3.0

Source : Central Bank

5.   According to the census of GDP per capita by Department conducted by UNDP in 1996, range of GDP per capita is extensive. GDP per capita in San Salvador is almost 4 times of that in La Union.

6.   According to the census taken in 1992, total population of El Salvador was 5,120,000 of which 45% was concentrated in the Central
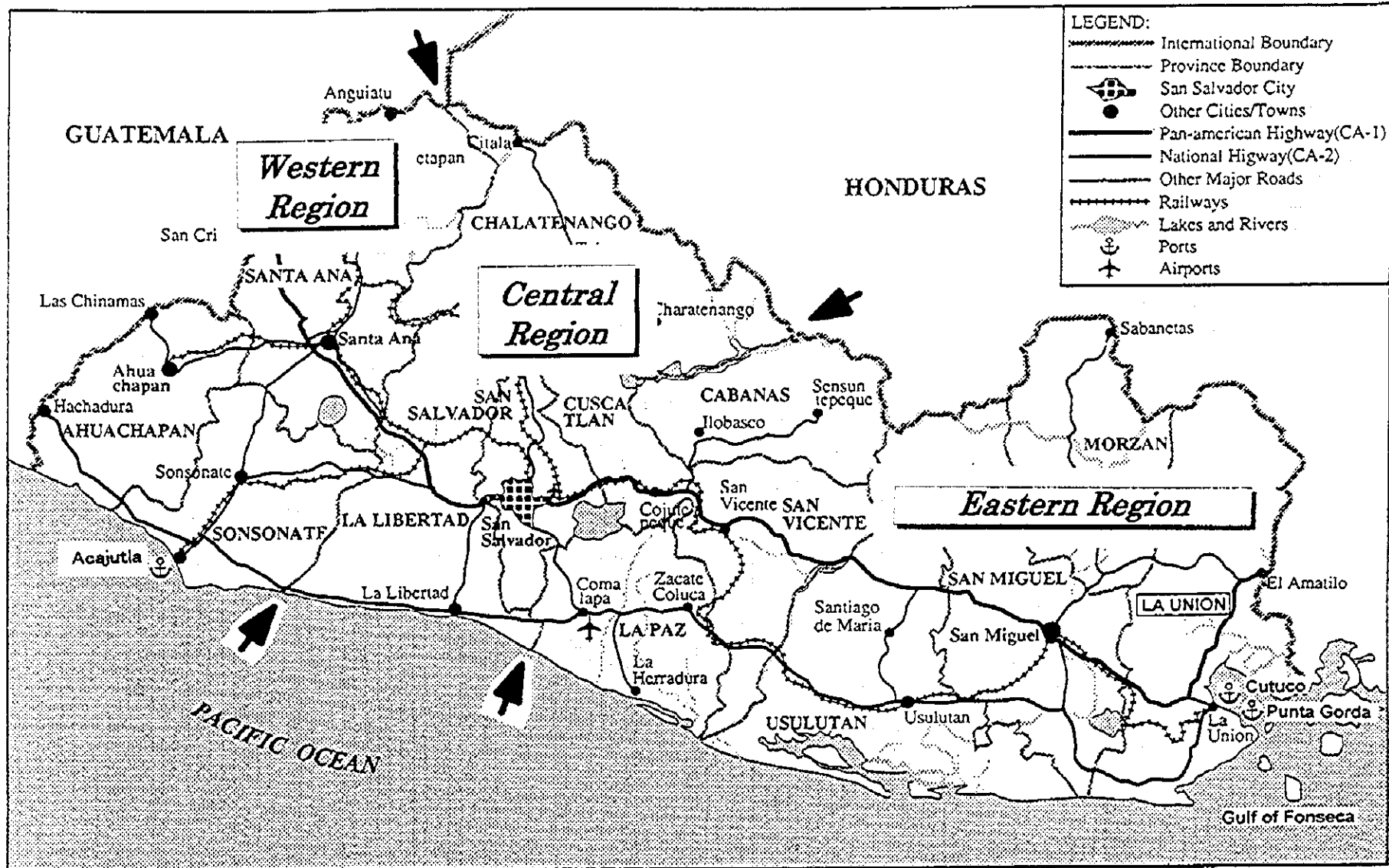
Figure I-1-1　　Three regions : western region, central region and eastern
region and the Port of Acajutla, Cutuco and Punta Gorda

Region. Twenty-nine percent of the total population is concentrated in San Salvador. Projected population growth rate between 1995 and 2015 is 1.4% to 2.1%.

7.   The FOB of export in 1995 is US$1.7 billion while that of import is US$3.4 billion. Traditional exports consist of four products, coffee (representing 80% of the total), sugar, cotton and shrimp, and all are highly influenced by external prices. Imports have risen rapidly, fueled by economic expansion, tariff reduction, and substantial family remittances from abroad .

8.   Totaling US$ 1.2 billion, family remittances represent 11.2% of GDP in 1996. Since 1990 family remittances have increased in importance and represent more than 80% of the trade deficit.

9.   An important component of the current 5-year plan (1994-1999) is the reactivation of the Port in La Union. By strengthening the maritime transportation sector of the country, this project is expected to contribute to the development of the eastern region of the country which was severely affected by the civil war.

2.   Overview of the Major Ports in El Salvador

1.   El Salvador has three major ports: the Port of Acajutla (commercial), Cutuco (commercial) and Punta Gorda (fishery). Acajutla is located 85 km away southwest of San Salvador. Cutuco and Punta Gorda are 185 km away east of the capital in the eastern region. They face the La Union bay.

2.   The Port of Acajutla is the largest port of the country. It consists of three major jetties (A, B and C). It handled 1,686,997 tons in 1996, including containers of 28,000 TEUs. Major cargoes are bulk cargoes such as grain, fertilizer and oil product for import and sugar and coffee for export.

3.   This port was constructed as a jetty-type port mainly suited for bulk cargo. In addition, as it faces the Pacific Ocean directly, ship calls of container liner and handling of containers are affected by a swell during the change of seasons. These are generally pointed out as bottlenecks for container operation even though the port is undergoing rehabilitation and improvement.

4.   The Port of Cutuco once enjoyed better days, exporting coffee and raw cotton, but was closed in 1996 for fear that its old and insufficiently maintained structure would collapse. Although CEPA intended to improve it by granting concessions to private companies, no proper proposals have been submitted.

5.   The Port of Punta Gorda lies about 800 m east of Cutuco. It was constructed as a tuna fishing base around 1980. Although it served only for local fishers (shrimp) till very recently, it started to play its originally designated role with Spanish investment, at the end of 1997 when the international environmental issue of tuna fishing involving dolphins was resolved.

Pacific Ocean

City of Acajutla

Railroad

Road

Port of Acajutla

Breakwater

Pier C

Pier B

Pier A

Submarine Pipe

S=1/20,000

0 1 2 3 4 500 m
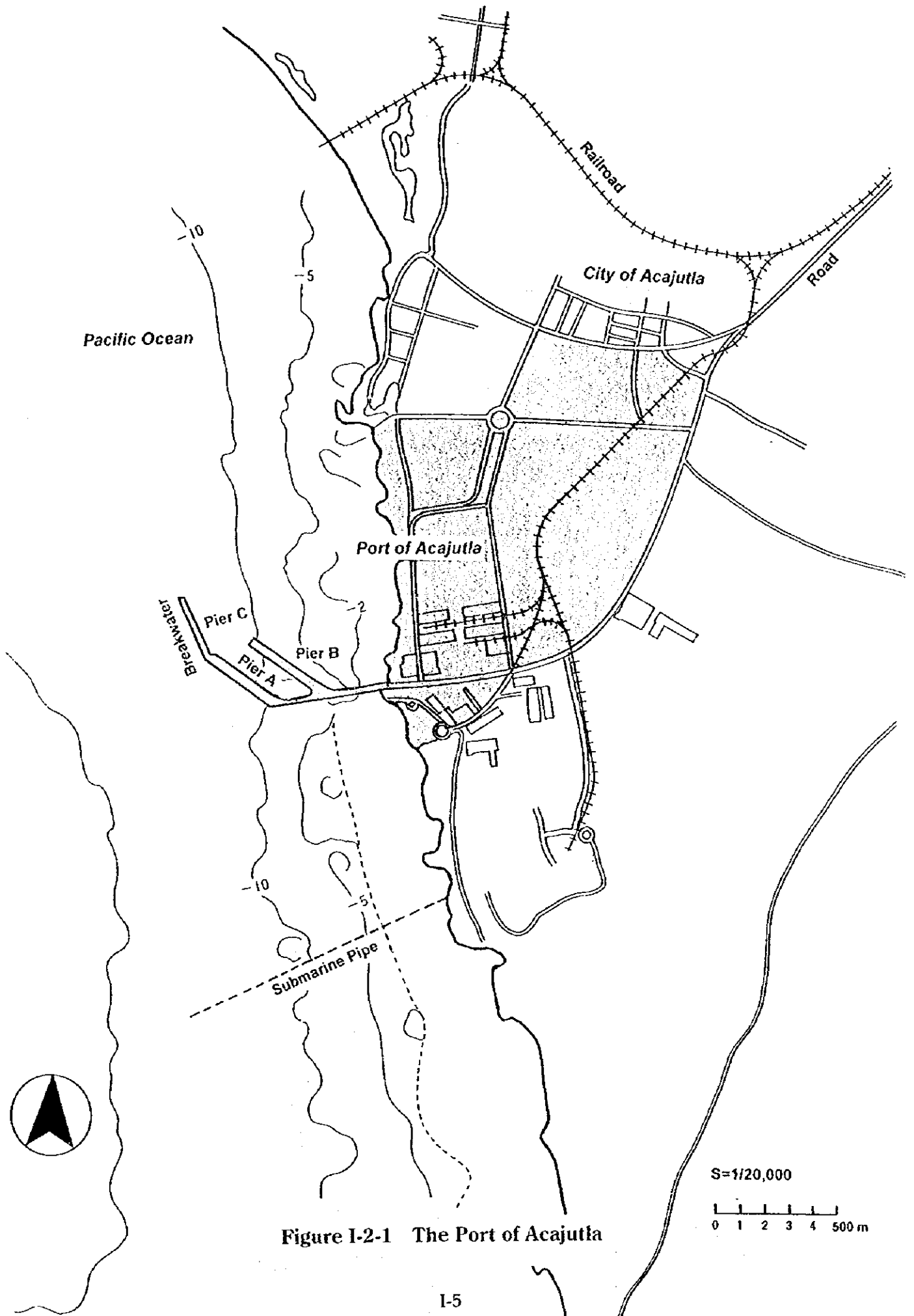
Figure I-2-1   The Port of Acajutla
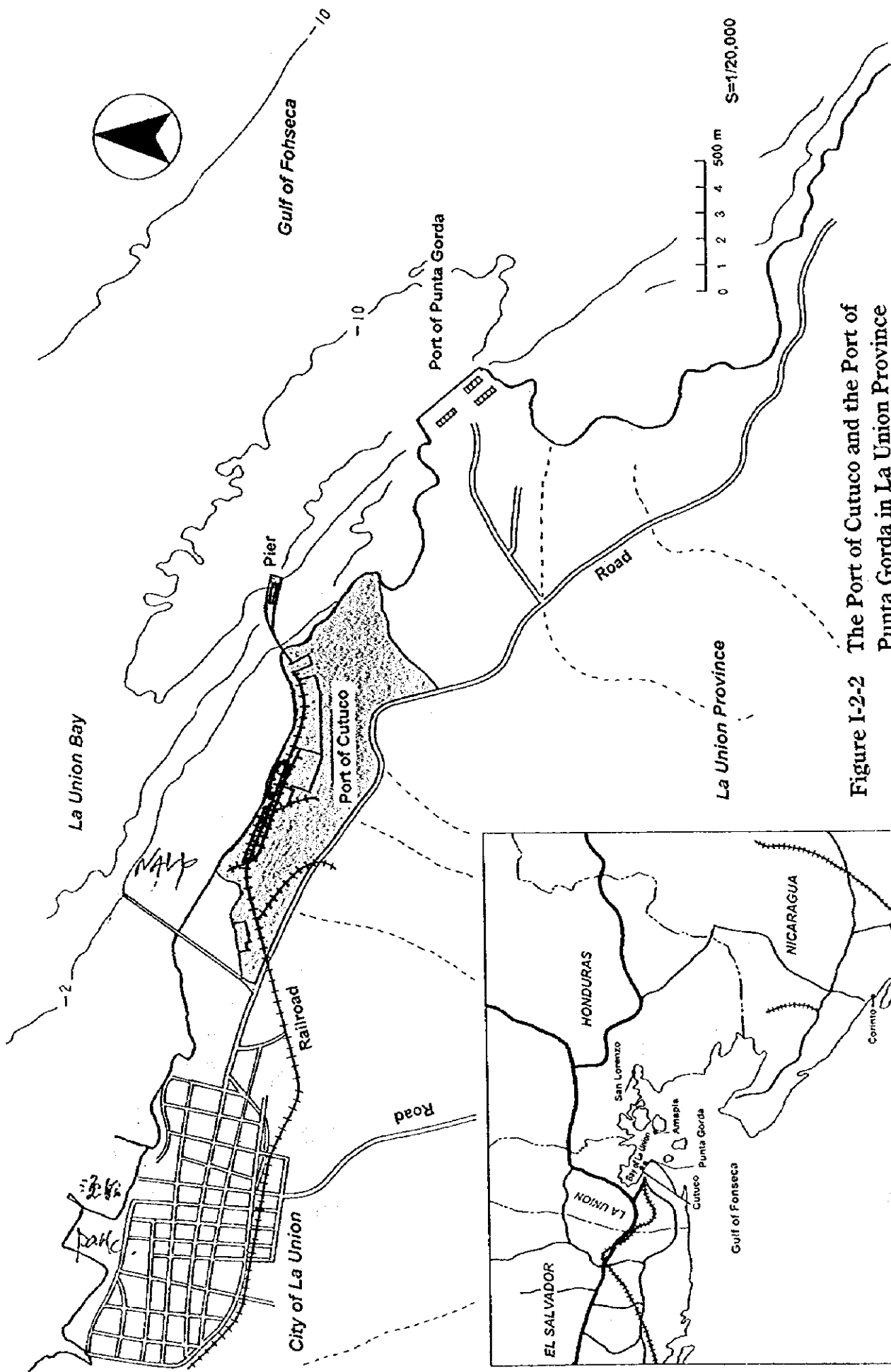
Figure I-2-2 The Port of Cutuco and the Port of Punta Gorda in La Union Province

3. Port Activities Related to Major Ports

1.   Salvadoran coastal ports which account for 45% of the total trade volume are handling mainly the cargoes for Asia countries and the west coast of the United States. The cargoes for European countries and the east coast of the United States are handled in ports of Guatemala and Honduras on the Atlantic side. Cargo is transported to El Salvador from these ports by land.

Port of Acajutla

2.   Acajutla's total import cargo volume share is in the range of 84% and 93%, and its share of export is in the range of 7% and 16%. Major exports are sugar, molasses, coffee, ethyl alcohol and major imports are cereal, fertilizer, soybean flour, iron and steel, industrial products, food, crude oil and refined oil, diesel oil and butane gas. During the civil war of the 1980s total cargo volume stagnated, but after the peace agreement in 1992, total cargo handling volume has increased yearly except in 1996. Some container liner operators shifted their calling port from Acajutla to Quezal so as not to be affected by long term swells, especially during the change of season. Figure I-3-1 shows Port of Acajutla cargo handling volume throughput.
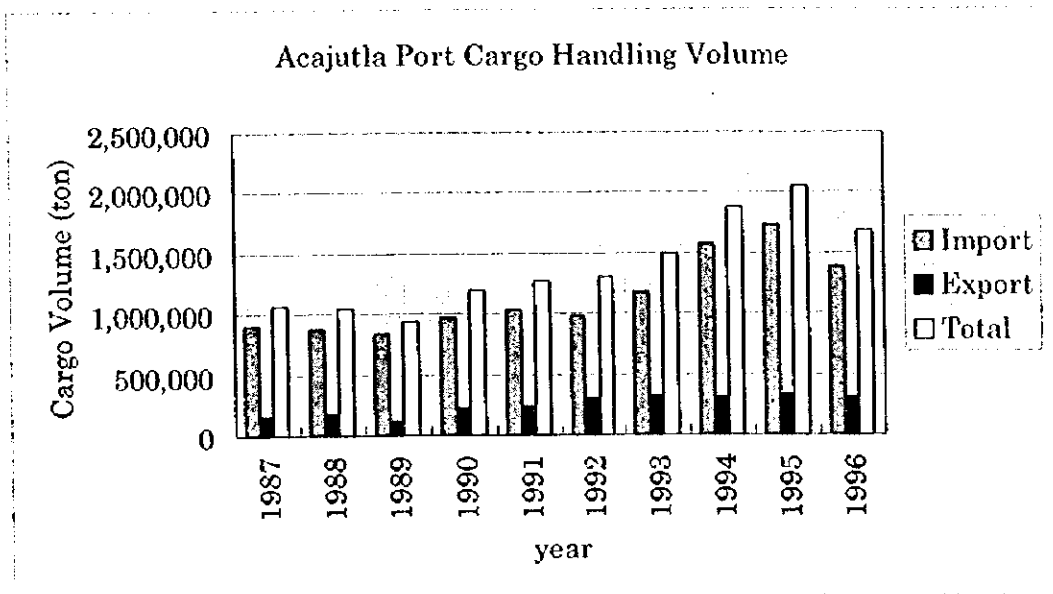
Source : CEPA

Figure I-3-1   Port of Acajutla Cargo Handling Volume Throughput

3.   Figure I-3-2 shows Acajutla Port Container Cargo Throughput

Acajutla Port Container Cargo Handling Volume Throughput
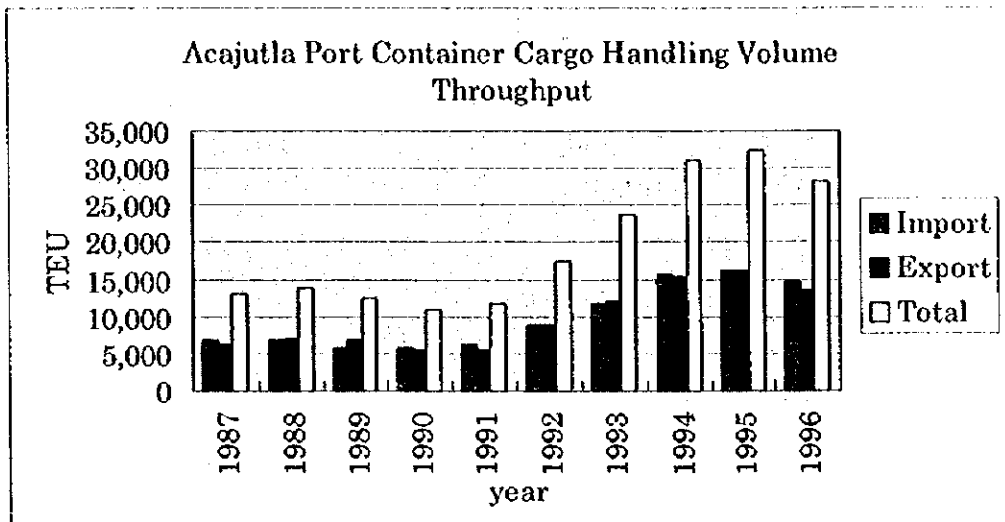
Source : CEPA

Figure I-3-2   Acajutla Port Container Cargo Throughput

Port of Cutuco

4.   The cargo volume of Cutuco was heavily influenced by the civil war. Export activity disappeared in 1992 and imports ceased in 1996. The main export commodities were coffee and cotton, the main import commodities were fertilizer, liquid and general cargoes. Figure I-3-3 shows Port of Cutuco cargo handling volume throughput.

Cutuco Port Handling Cargo Volume
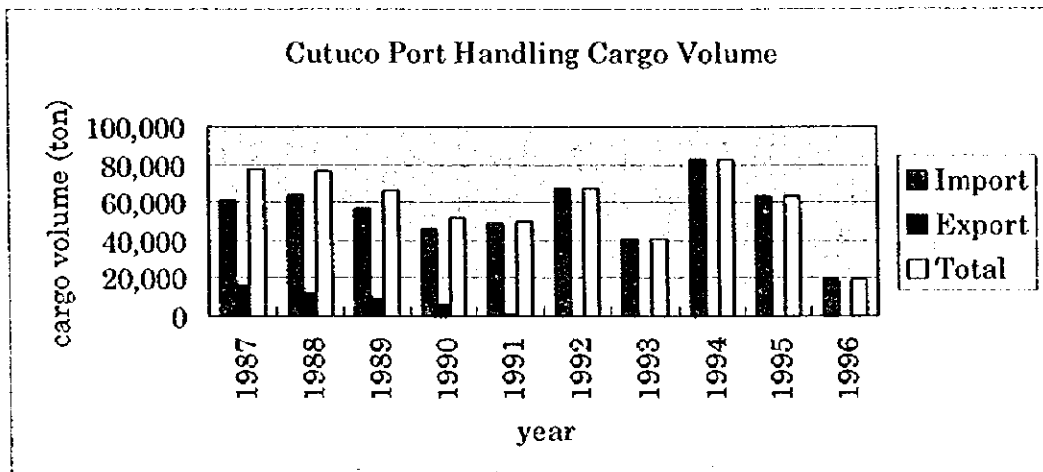
Source : CEPA

Figure I-3-3   Port of Cutuco Cargo Handling Volume Throughput

4. Present Situation of Port Administration

4.1 Port Administration Organization in El Salvador

1. In El Salvador, ports are divided into three groups, commercial ports, fishing ports and naval ports. Commercial ports are administrated by CEPA which is under the control of Ministry of Public Works (MOP). Fishing port of Punta Gorta is administrated by CORSAIN which is under the control of Ministry of Economy(MOE).

2. At Present, Administration of navigation safety and territorial sea area except port area belongs to Ministry of Defense (MOD).

4.2 Executive Autonomous Port Commission (CEPA)

1. CEPA is responsible for the management of the Port of Acajutla, the Port of Cutuco, the national railroads, property of the Salvadoran government and the international airport.

2. CEPA owns the land and all the facilities of the Port of Acajutla except private oil buoys. CEPA is in charge of the administration of the entire coastal and sea area of Port of Acajutla. The sea area boundary of the Port of Acajutla is not clear. In order to meet its objectives, CEPA has the following functions:

 1) Planning, construction and management of port facilities.
 2) Arranging the pilotage affairs.
 3) Administration of cargo handling operations, storage, transportation of cargo in the port area.
 4) Installation and operation of navigational aids on the sea.
 5) Receiving port dues and charges including those for cargo handling, transport and storage.
 6) Determination of the utilization and setting of rates for services, operations and equipment of the port.
 7) Others

3. CEPA Central Office has a staff of 226. It should be noted that the Port of Acajutla has 1,153 employees.

4. The international airport and Acajutla port adopt self-supporting

accounting systems. Though total income and total operation expenses of both sectors have been increasing every year, total annual operation profit has been more than 100 million colon constantly since 1993. Almost 80% of profit are contributed by the international airport sector. A 25% income tax is levied on the profit, and then a further 25% government contribution tax is levied on the balance.

Board of directors
Chairman B.D.

Legal counselor (1)

External auditor

General manager (13)

legal couns. Manager (9)

Internal auditing unit (17)

marketing manager (5)

Planning unit (4)

Planning Dept. (3)

Institutional development dept. (5)

Administrative manager (1)

Engineering manager (3)

Fixed asset administration (2)

Design department(10)

Follow up department(10)

Hum.Res. Dept. (4)

Info.sys. Dept. (3)

Finance Dept.(9)

Purchase Dept.(5)

Salary Adm.Sec (10)

Enginee-ring sys. Sect.(3)

accounting(14)

Acc and follw up purchasing(6)

Personnel Control Info.Sec (3)

Technical support dept.(2)

Budget (7)

local purchase(7)

Training sec. (4)

Commun. & net dept.(2)

Treasury(8)

Exterior purchases(4)

Occup. Higiene sec.unit (3)

Operation dept.(2)

Invoice & collection (9)

Special service(30)

Airport Manager

Port of Acajutla manager

Fenadesal manager

Note. ( ):Number of Employee ,Cafeteria of 4th,5th,6th,7th,11th floor and basement not included(8people)

Source : CEPA

Figure I-4-1 CEPA Organization Chart

I-11

4.3 National Modernization

1.   At present, a variety of services at the airport and seaports, the telecommunications company (ANTEL) and the distribution of electricity are in the process of being turned over to the private sector. A presidential commissioner for state modernization has been appointed to oversee these matters.

2.   In addition, introducing private participation to services at the Port of Acajutla, such as cargo handling, as a means to heighten efficiency and quality and to reduce the national expenditure is also being studied by Presidential Commission on Modernization.

Table I-4-1   Present Condition of Port Administration, Management and Operation

Category	Present Condition of CEPA	Remarks
1. For Autonomy		
a. Government control	Autonomous Organization under the control of MOP	
b. Control of personnel administration	Some parts are inflexible	*
2. For Authority		
a. Port polic and plan	No long-term development plan	*
b. Control of water area	Water area Boundary and standard of permission is not clear	*
c. Control of land area	There are no serious defects	
3. For financial independence		
a. Financial system	Adopting self-accounting system	
b. Port tariff	Simple and attractive tariff is necessary	*
4. Commercial management method		
a. Organization and personnel	Some parts are inflexible	*
b. Cargo handling	In the process of being privatized	*
c. Ship operation	There are no serious defects	
d. Information system	Currently being developed	
e. Statistics system	There is no strategic use	*
f. Port promotion	Strategic and concrete port promotion plan is necessary	*

*Note: Mark * means there are some weak points which should be improved.*

5. The Port of La Union

1.   The Port of Cutuco has one pier for general cargo and bulk cargo (solid and liquid), which consists of North Berth of South Berth with the following characteristics;

Table I-5-1   Characteristics of the Pier of the Port of Cutuco

Berth	Length	Width	Depth
North	152 m	7.6 m	9.2 m
South	174 m	6.1 m	7.2 m

Source: CEPA

2.   The access to the pier is by road and by railroad. The pier has piping facilities for liquid cargo, which are connected with tanks on land. Total land area is around 40 ha, including an administration office, a transit shed and warehouses.

3.   The Port of Punta Gorda has a wharf of 300 m in length and 9.5 m in depth. Its length is equivalent to 3 berths of tuna boats on average. Related facilities such as a ship dock for repair, freezer/refrigerated warehouses, a ice plant, a maintenance workshop and an administration building are arranged.

4.   The access road is paved from the town area of La Union to Punta Gorda via Cutuco. The navigation channel is a natural one from the outside of the bay, and common to both ports.

5.   Aside from the above-mentioned facilities, CORSAIN is studying a plan to build a small marina for cruiser boats traveling around North and South America. The site is just south of the existing Punta Gorda. It is also expected to contribute to regional development.

6.   As well, a thermal power plant was planned to the east of Punta Gorda by CEL with the World Bank. It has a capacity of 150 MW (-450MW), with a pier of 10-12 m in depth to unload fuel coal. The project has been waiting for private investment. Electricity demand and supply, improvement of power transmission and fuel price trend are important factors in attracting private investment.

7.　　By the way, much has been said for and against the concept of the "Dry Canal". The basic idea is to connect the Port of Cortes on the Caribbean side and the port of La Union on the Pacific side by highway. Its feasibility should be studied carefully since it requires a lot of investment. (Needless to say, it will promote regional development and trade as supplementary function.)

6. Natural Conditions around La Union

6.1 Location

(1) Gulf of Fonseca

1.　　Gulf of Fonseca is entered between Punta de Amapala and Punta Consiguina, 19 miles SE, and recedes about 30 miles NE to its head. The coasts of El Salvador and Honduras front the NW and NE shores of the gulf and contain Puerto Amapala, and Bahia San Lorenzo. The Estero Real, a navigable river, discharges into the SE side of the gulf and is bordered by Nicaragua.

2.　　Several prominent volcanic peaks rise on both sides of the gulf entrance and a number of high and conspicuous islands lie within the inner part. Punta de Amapala, the W entrance point, is low, flat, and fronted by a reef which extends up to 0.3 mile offshore. This reef, which is marked by breakers, has been reported (1994) to extend farther offshore than charted.

(2) La Union Bay

3.　　La Union Bay has enough depths for navigation over most of its area. The Bay is entered close E of Punta Chiquirin and extends about 8 miles in a NW direction. The N shore of the Bay is fronted by a large drying flat and with the exception of the approach channel, depths of 6m and less prevail over the remaining area.

6.2 Natural Conditions

(1) Weather Conditions

1.   In as much as the harbor is landlocked, the prevailing winds are usually light, but the heat is excessive.   During the dry season (December to May), winds blow mainly from the E-NE.   During the rainy season, the Chubascos blow usually from the SW.

(2) Tides

2.   The tidal differences are about 3.0m at springs and 1.8m at neaps.

(3) Currents

3.   Max current velocity observed by the study team at two points of the water area, one is between the Port of Cutuco and the Port of Punta Gorda and the other is in the approach channel inner part of the straight off the Punta Chiquirin was 1.03m/sec and 1.42m/sec respectively. These values are nearly equivalent to that of the existing observation records.   The current condition does not significantly affect the ship maneuvering in the channel, but the ship should be cautious when approaching to the berth.

(4) Waves

4.   Deep-water waves with direction SW are expected to affect the channel between Punta Chiquirin and Zacatillo Isle.   But, the channel is sheltered from the waves with another directions by the Conchaguita Isle and Meanguera isles.   SW waves shares the 22% of the total.

5.   They are transformed by wave diffraction into the channel. Consequently, all the waves at La Union Port are expected to be less than 0.3m in height.

(5) Sedimentation

6.   In the northern half of the Gulf of Fonseca, the seabed is the alluvial soil.   However, the southern part of the La Union Bay is not too much affected by the discharge from the Goascoran River.   The rock foundation under the seawater lies at the relatively shallow level.

7.   Although La Union Bay is shallower than the –10m depth mostly, there are some extent deeper than –10m (area: 2km x 300m) in front of the Cutuco Port and Punta Gorda. Both the sea maps published at the year 1984 and 1994 recognize this area. This also proves the stability of the seabed depths without sedimentation.

(6) Subsoil Condition

8.   According to the subsoil survey carried out by CEPA in 1954, clay layers with the thickness of 10-15m are formed under the seawater at both sides of Punta Gorda Port. Under the clay layer, there appear rock foundations with max –30m depth.

9.   According to the (10) borings conducted around the jetty of Cutuco Port in 1977, the relatively hard sandy layers with N valves more than 30 are recognized from the surface of the seabed.

PART II   MASTER PLAN (2015)

1. Basic Concept of the Development of the Port of La Union

1.   The Master Plan up to 2015 will be prepared, taking into consideration the development and modernization of national ports, especially in La Union Province, and their contribution to the development of the eastern region, which are included in the most important policies of El Salvador.

2.   Therefore, the basic target of the development of the Port of La Union up to the target year of the Master Plan is identified and summarized as follows.

   (1) to be the core of distribution of trading cargoes in the eastern region

   (2) to be the core of regional and economic development in the said region

3.   In order to accomplish the target, the development and planning of the port of La Union should be based on the following aspects.

   (1) to fully cope with the trading cargoes of El Salvador on the Pacific side together with the Port of Acajutla
   (No more container outflow to the Port of Quezal in Guatemala should be allowed.)

   (2) to offer the service for container cargo of the country, including the southern part of Honduras, and other cargoes of the eastern region, while remaining cargoes of the western/central region are handled at Acajutla, taking advantage of geographical and natural conditions of respective ports
   (Acajutla is originally constructed for bulk cargo and container liners are affected by a swell in calling at the port and handling containers)

   (3) to meet the increasing foreign trade and the growing containerization

   (4) to support the development of the eastern region
   (improvement of related infrastructures such as roads and new development of EPZs, which have been already established in the western/central region.)

   (5) to serve as a alternative port to Acajutla in case of earthquake and as a back-up port to handle heavier or taller cargoes

4.   Almost 30 % of the natural population reside in the eastern region. The Port of Cutuco had handled more than 20 % of the national cargo. Export of traditional products such as marine products and coffee in container or rapidly increasing import of car would be supported by the port. EPZs could make full use of the port. These are some of examples to suggest the high potential for development of the Port of La Union.

5.   It is necessary to always consider the relationship between port development and regional development in port planning. They are indispensable to each other. Port development serves as an incentive for regional development, while regional development, represented by increase of cargo transportation and introduction of new industries, will require port development.

2. Traffic Projection

Methodology
1.   Two different methods, macro forecast and micro forecast, are applied to estimate El Salvadoran ports total cargo volume. The former is to forecast the total cargo volume as a whole by statistical correlation between the cargo volume and socio-economic indices and/or time trend. The latter is a cumu ative method forecasting the cargo volume based on the analysis of the pattern of cargo flow, packing type and major commodities individually. The cargo volume forecast was carried out for total volume of El Salvador coastal ports and then forecast cargo volume was distributed to Acajutla port and La Union new port by proportional representation using economic indices of hinterland..

Cargo Related to EPZ
2.   Presence of the new port will accelerate activities of vicinity EPZ's. It is expected that almost 100ha of new EPZ will be developed near the new port in the Eastern region in proportion to the population ratio of Western region and Eastern region. Table II-2-1 shows expected cargo volume from/to EPZ adjacent to the new port.

Table II-2-1   Cargo Volume Related to EPZ adjacent to New Port

EPZ	Area of factory lot (ha)	Cargo volume (ton)
EPZ adjacent to a new port	75	177,900
Concordia EPZ (Usultan)	29	68,788
Total	104	246,688

3.   Table II-2-2 shows forecast result of El Salvadoran coastal ports International Trade cargo volume.

Table II-2-2 Summary of El Salvadoran Coastal Ports International Trade Cargo Volume Forecast

unit: ton

		1996 (actual)	2005	2015 Case 1	Case 2
Import	General Cargo	184,000	582,000	1,155,000	984,000
	Containerized Cargo	47,000	261,000	605,000	519,000
	Break Bulk	137,000	321,000	550,000	465,000
	Bulk Cargo	1,209,000	2,095,000	2,896,000	2,685,000
	Dry Bulk Cargo	827,000	991,000	1,107,000	1,107,000
	Liquid Bulk Cargo	382,000	1,104,000	1,789,000	1,578,000
	Total	1,393,000	2,677,000	4,051,000	3,669,000
Export	General Cargo	99,000	219,000	394,000	361,000
	Containerized Cargo	56,000	147,000	299,000	271,000
	Break Bulk	43,000	72,000	95,000	90,000
	Bulk Cargo	186,000	283,000	294,000	275,000
	Dry Bulk Cargo	80,000	126,000	83,000	83,000
	Liquid Bulk Cargo	106,000	157,000	211,000	192,000
	Total	285,000	502,000	688,000	636,000
Grand Total		1,678,000	3,179,000	4,739,000	4,305,000

Note : Outline of cargo forecast
Socio-economic frame
Population   year 2005   6,875,000   year 2015   7,977,000 (by MOE)
GDP (Case 1)   5.0%/year till 2015
    (Case 2)   5.0%/year till 2005, 3.5%/year till 2015   (the average growth in the past)

Cargo Distribution
4.   Distribution of cargo volume by ports is estimated by proportional representation using economic indices of the of hinterland. However, as the handling capacity of container cargo of Acajutla port is supposed to 30,000 boxes, balance of container cargo will be handled in La Union new port.   In addition, La Union new port will attract around 50% of the container cargo of San Lorenzo port in southern part of Honduras. Table II-2-3 shows distribution of cargo traffic. Table II-2-4 shows container cargo distribution forecast .

Table II-2-3 Distribution of Cargo Traffic

unit : ton

			El Salvador Cargo		La Union New Port Cargo Volume		
			total volume	Acajutla	La Union	Honduras Cargo	Total
2005	Import	General Cargo	582,000	378,718	203,282	7,282	210,564
		Break Bulk cargo	321,000	256,800	64,200		64,200
		Container cargo	261,000	121,918	139,082	7,282	146,364
		(TEU)	41,745	19,500	22,245	1,110	23,355
		Bulk Cargo	2,095,000	1,676,000	419,000		419,000
		Dry Bulk cargo	991,000	792,800	198,200		198,200
		Liquid Bulk cargo	1,104,000	883,200	220,800		220,800
		Total	2,677,000	2,054,718	622,282	7,282	629,564
	Export	General Cargo	219,000	126,266	92,734	7,282	100,015
		Break Bulk cargo	72,000	57,600	14,400		14,400
		Container cargo	147,000	68,666	78,334	7,282	85,615
		(TEU)	41,745	19,500	22,245	1,110	23,355
		Bulk Cargo	283,000	226,400	56,600		56,600
		Dry Bulk cargo	126,000	100,800	25,200		25,200
		Liquid Bulk cargo	157,000	125,600	31,400		31,400
		Total	502,000	352,666	149,334	7,282	156,615
	Domestic	Liquid Bulk cago	200,000		200,000		200,000
		Total	3,379,000	2,407,384	971,616	14,563	986,179
2015 Case1	Import	General Cargo	1,155,000	506,918	648,082	10,758	658,840
		Break Bulk cargo	550,000	385,000	165,000		165,000
		Container cargo	605,000	121,918	483,082	10,758	493,840
		(TEU)	96,766	19,500	77,266	1,640	78,906
		Bulk Cargo	2,896,000	2,027,200	868,800		868,800
		Dry Bulk cargo	1,107,000	774,900	332,100		332,100
		Liquid Bulk cargo	1,789,000	1,252,300	536,700		536,700
		Total	4,051,000	2,534,118	1,516,882	10,758	1,527,640
	Export	General Cargo	394,000	126,754	267,246	10,758	278,004
		Break Bulk cargo	95,000	66,500	28,500		28,500
		Container cargo	299,000	60,254	238,746	10,758	249,504
		(TEU)	96,766	19,500	77,266	1,640	78,906
		Bulk Cargo	294,000	205,800	88,200		88,200
		Dry Bulk cargo	83,000	58,100	24,900		24,900
		Liquid Bulk cargo	211,000	147,700	63,300		63,300
		Total	688,000	332,554	355,446	10,758	366,204
	Domestic	Liquid Bulk cago	346,000		346,000		346,000
		Total	5,085,000	2,866,672	2,218,328	21,516	2,239,844
2015 Case2	Import	General Cargo	981,000	417,418	536,582	10,758	547,340
		Break Bulk cargo	465,000	325,500	139,500		139,500
		Container cargo	519,000	121,918	397,082	10,758	407,840
		(TEU)	83,011	19,500	63,511	1,640	65,151
		Bulk Cargo	2,685,000	1,879,500	805,500		805,500
		Dry Bulk cargo	1,107,000	774,900	332,100		332,100
		Liquid Bulk cargo	1,578,000	1,104,600	473,400		473,400
		Total	3,069,000	2,326,918	1,342,082	10,758	1,352,840
	Export	General Cargo	361,000	126,660	234,340	10,758	245,098
		Break Bulk cargo	90,000	63,000	27,000		27,000
		Container cargo	271,000	63,660	207,340	10,758	218,098
		(TEU)	83,011	19,500	63,511	1,640	65,151
		Bulk Cargo	275,000	192,500	82,500		82,500
		Dry Bulk cargo	83,000	58,100	24,900		24,900
		Liquid Bulk cargo	192,000	134,400	57,600		57,600
		Total	636,000	319,160	316,840	10,758	327,598
	Domestic	Liquid Bulk cago	295,000		295,000		295,000
		Total	4,000,000	2,646,078	1,953,922	21,516	1,975,438

Table II-2-4 Container Cargo Distribution

Case 1

Year	Category	Total Volume (ton)	Acajutla Volume	Acajutla 40' Laden	Acajutla 40' Empty	Acajutla 40' Total	Acajutla 20' Laden	Acajutla 20' Empty	Acajutla 20' Total	La Union Volume	La Union 40' Laden	La Union 40' Empty	La Union 40' Total	La Union 20' Laden	La Union 20' Empty	La Union 20' Total
2005	Import	268,282	121,918	3,384	1,251	4,635	7,483	2,768	10,250	146,364	4,053	1,499	5,552	8,961	3,315	12,276
	FCL			3,214			5,762				3,850			6,900		
	LCL			169			1,721				203			2,061		
	Export	154,281	68,666	1,942	2,693	4,635	4,289	5,961	10,250	85,615	2,366	3,186	5,552	5,233	7,043	12,276
	FCL			1,806			2,788				2,200			3,401		
	LCL			136			1,501				166			1,832		
2015	Import	615,758	121,918	3,384	1,251	4,635	6,494	3,756	10,250	493,840	13,693	5,064	18,757	30,277	11,199	41,476
	FCL			3,215			5,000				13,008			23,314		
	LCL			169			1,494				685			6,964		
	Export	309,758	60,254	2,182	2,453	4,635	4,824	5,426	10,250	249,504	6,897	11,860	18,757	15,250	26,226	41,476
	FCL			2,029			3,136				6,414			9,913		
	LCL			153			1,688				483			5,338		

Case 2

Year	Category	Total Volume (ton)	Acajutla Volume	Acajutla 40' Laden	Acajutla 40' Empty	Acajutla 40' Total	Acajutla 20' Laden	Acajutla 20' Empty	Acajutla 20' Total	La Union Volume	La Union 40' Laden	La Union 40' Empty	La Union 40' Total	La Union 20' Laden	La Union 20' Empty	La Union 20' Total
2005	Import	268,282	121,918	3,384	1,251	4,635	7,483	2,768	10,250	146,364	4,053	1,499	5,552	8,961	3,315	12,276
	FCL			3,214			5,762				3,850			6,900		
	LCL			169			1,721				203			2,061		
	Export	154,281	68,666	1,942	2,693	4,635	4,289	5,961	10,250	85,615	2,366	3,186	5,552	5,233	7,043	12,276
	FCL			1,806			2,788				2,200			3,401		
	LCL			136			1,501				166			1,832		
2015	Import	529,758	137,548	3,384	1,251	4,635	7,483	2,767	10,250	392,210	11,273	4,214	15,487	24,927	9,320	34,247
	FCL			3,215			5,762				10,709			19,194		
	LCL			169			1,721				564			5,733		
	Export	281,759	55,499	1,759	2,876	4,635	3,891	6,359	10,250	226,260	5,928	9,559	15,487	13,331	20,916	34,247
	FCL			1,636			2,529				5,513			8,665		
	LCL			123			1,362				415			4,666		

3. Long Term Development Plan

1.   The standard ship size is assumed based on the current ships calling at Acajutla. The size of dry and liquid bulk ships in planning are already of Panamax, and that of general ships, which are mainly used to carry containers at Acajutla, would increase up to Panamax based on recent growth trends. (The maximum draft of the ship to transit the Panama Canal is 39.5 ft (12.04m).)

2.   Berth dimensions are determined on the basis of the standard ship dimensions. Taking into consideration the recent development of modern container terminals in Central America, that of La Union should be planned to have a berth depth of 13(-14 *) m and a length of 300 m, equipped with a back-up yard of 12 ha (300m x 400m). (Note: the figure with * is for future expansion at need.)

3.   Berth dimensions for dry and liquid bulk ships are 13(-14*) m in depth and 260(-280*)m in length. The depth of the area behind the berths is planned as the same as that of the container terminal (400 m) for the sake of possible future expansion.

4.   Required number of berth depends on cargo volume and cargo handling efficiency. The cargo volume is forecasted based on two scenarios, Case 1 and Case 2, as explained in the previous section. The cargo handling efficiency (cargo volume/ berthing hour) target is set up with reference to Acajutla.

5.   Two(2) gantry cranes are indispensable for highly efficient container handling (improvement ratio of handling efficiency is 3.20-3.84 times); conventional method using ship gear and movable hopper is adopted for dry bulk; and the ship pump is basic for liquid bulk. In addition, the working hours/ berthing hours/ ship is assumed to be improved by 1.06-1.20 times.

6.   As a result, required number of berths is calculated as shown in Table II-3-1. A container terminal should be used by container ships with priority. It is assumed that the port opens for 350 operating days (x 24 hours), and the proper planning occupancy ratio of a berth is 0.6 - 0.7 in reference to other port planning examples.

Table II-3-1　Required Number of Berths

(a)　Required Number of Berths (2015) for Case 1

	General	Container*	Dry Bulk	Liquid Bulk	Oil	Total
Cargo Volume ton(box*)/year	191,100	120,500	357,000	600,000	346,000	
Cargo Volume /Berthing Hour	80	31	80	135	135	
Required Berthing Time	2,389	3,923	4,463	4,444	2,563	17,781
Calculated Number of Berth	0.28	0.47	0.53	0.53	0.31	
Required Number of Berth	0.75		1.37			2.12
Number of Berth in Planning	1		2			3

(b)　Required Number of Berths (2015) for Case 2

	General	Container*	Dry Bulk	Liquid Bulk	Oil	Total
Cargo Volume ton(box*)/year	164,100	99,500	357,000	531,000	295,000	
Cargo Volume /Berthing Hour	80	31	80	135	135	
Required Berthing Time	2,051	3,239	4,463	3,933	2,185	15,871
Calculated Number of Berth	0.24	0.39	0.53	0.47	0.26	
Required Number of Berth	0.63		1.26			1.89
Number of Berth in Planning	1		2			3

(c)　Required Number of Berths (2005) for Case 1 and 2

	General	Container*	Dry Bulk	Liquid Bulk	Oil	Total
Cargo Volume ton(box*)/year	78,600	35,700	223,400	252,200	200,000	
Cargo Volume /Berthing Hour	80	26	80	135	135	
Required Berthing Time	983	1,395	2,793	1,868	1,481	8,519
Calculated Number of Berth	0.12	0.17	0.33	0.22	0.18	
Required Number of Berth	0.28		0.73			1.01
Number of Berth in Planning	1		1			2

7.   The required number of berths by cargo type in 2015 and 2005 for Case 1 is equal to that for Case 2, and is summarized as follows;

Table II-3-2   Required Number of Berths for Case 1 and Case 2

Year	Berth Type	Number	Ship of Priority
2015	Total	3	
	Container Berth	1	Container, General
	Bulk Berth	2	Dry, Liquid, and Oil
2005	Total	2	
	Container Berth	1	Container, General
	Bulk Berth	1	Dry, Liquid, and Oil

Note: Containers are also transported by many general ships. Oil is carried by small barges from Acajutla.

8.   The depth of the turning basin and access channel is 13 m for berthing pocket just in front of the quay wall, turning basin and access channel outside the La Union bay, and 12 m (considering the tidal benefit) for access channel in the bay. Minimum half length of the ship (150m) is adopted as the width of the channel.

9.   Under such a situation, potential sites for the port development of La Union bay are surveyed, taking into consideration the natural conditions, socio-economic activities and following principles.

   a) Sufficient area for port activities including future expansion
   b) Functional separation with necessary transportation
   c) Related plans, including utilization of existing facilities, if possible
   d) Environmental consideration

10.   With reference to c), the Port of Cutuco was reserved for new concessionaires, if any. The Port of Punta Gorda is expected to play its originally planned role as a tuna base.

11.   Based on the above, four layout plans for Alternative Site (A-1), (B-1), (B-2) and (B-3) are prepared as shown in Figure II-3-1. In the figure, three layout plans for Alternative Site (C-1), (C-2) and (C-3) are also described. Main features of the respective site are summarized as follows;

1) Alternative Site (A-1)

12.   This alternative is located between the Port of Cutuco and the Port of Punta Gorda. The area is a little too small to build a new port.

2) Alternative Site (B-1,2 and 3)

13.   This site is located between the Port of Punta Gorda and Pueblo Viejo. It could be classified into three alternatives depending on other projects. (B-1) utilizes the area fully. The project of the marina (CORSAIN) is considered by (B-2), and the power plant (CEL) is considered by (B-3), too. In (B-3), the existing private piers would be relocated in an appropriate manner.

3) Alternative Site (C-1,2 and 3)

14.   This site is prepared in the event that proper proposals aren't submitted for the aforementioned concession. It requires the demolition of the existing Cutuco. The existing pier of Cutuco is totally demolished(C-1). (C-3) is modified slightly from (A-1) to avoid the expensive hard rock dredging. The quay face line is almost in accordance with that of Punta Gorda. (C-2) occupies the position between (C-1) and (C-3).
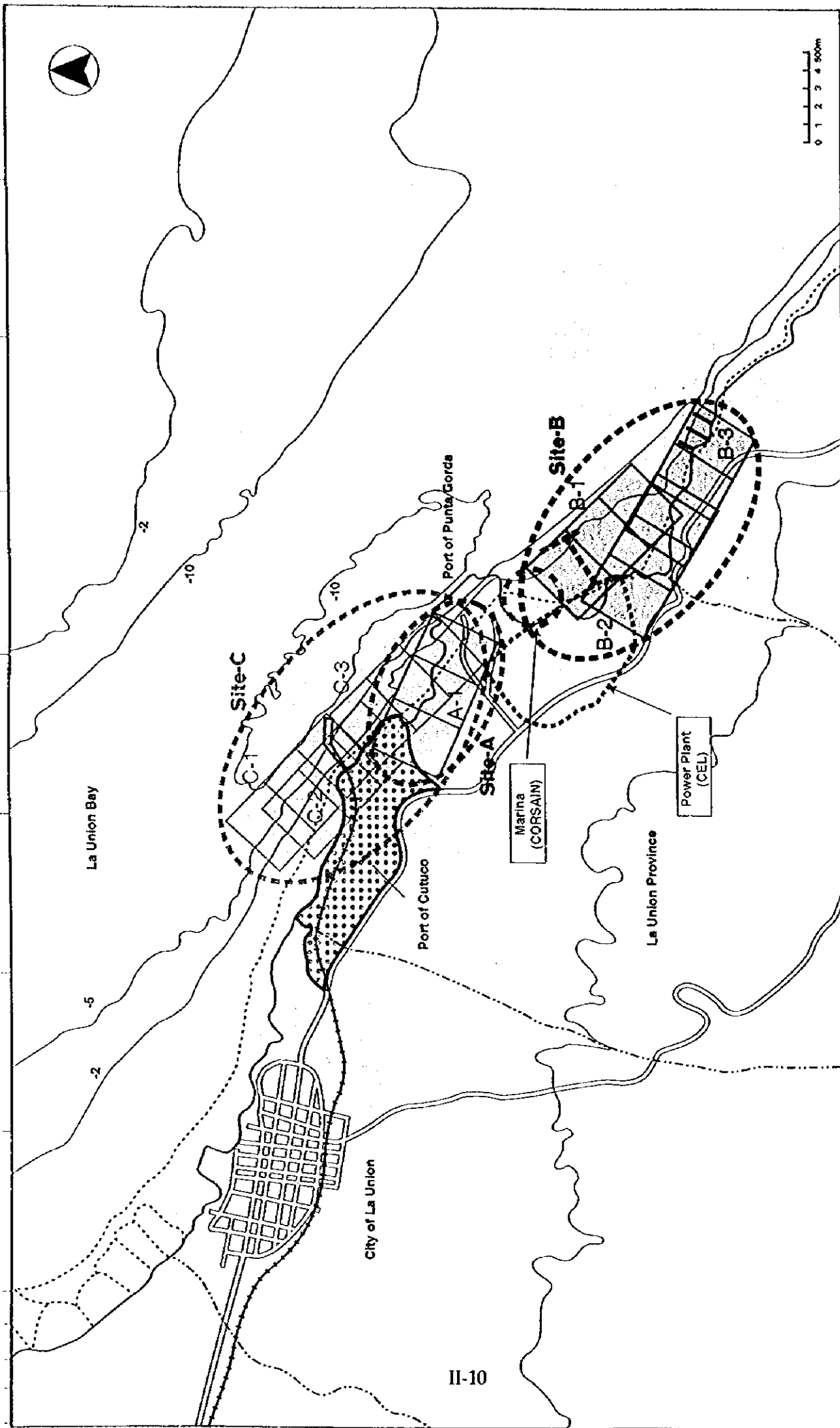
Figure II-3-1 Alternative Layout Plans (Site-A, B and C)

15.   The facilities other than aforementioned basic ones are calculated based on parameters set up with reference to present situation of Acajutla and similar port planning examples. Table II-3-3 shows required container cargo facilities. Transfer Crane System is selected for container handling.

Table II-3-3   Container Cargo Facilities

Facility	Size		
	2015		2005
	Case 1	Case 2	Case 1,2
Number of Berth	1 (300 m in length)		
Gantry Crane	2 (Panamax type)		
Apron	50 m x 300 m		
Container Yard	42,000 m^2 (1,200 slots*)	35,000 m^2 (1,000 slots*)	12,000 m^2 (350 slots*)
CFS	4,400 m^2	3,700 m^2	1,400 m^2
Maintenance Shop	1,000 m^2		
Terminal Office	1,500 m^2		
Terminal Gate	4 lanes		

Note: Reefer plugs should be equipped as necessary

16.   Concerning the bulk terminal, the width of the apron is the same as that of the container terminal, so that the gantry crane and tractors/chassises can be flexibly operated.

17.   The access road should be carefully planned not only around the site but also from the viewpoint of accessibility to national principal road network The land use will be determined based on the layout plan of port functions and the availability of the area surrounding the project site. The development of EPZs in the eastern region warrants special emphasis.

4. Rough Design, Implementation Work and Cost Estimate

4.1 Rough Structural Design

4.1.1 Design Conditions and Criteria

(1) Oceanographic Conditions

   1) Tides

1.   The M.H.W.S. is adopted as the design high water level (H.W.L.) in consideration of the records of water levels at La Union. And the datum level (DL) is determined to be the same as the chart datum.

     H.W.L.   +3.1m
     DL   ±0.0

   2) Waves

2.   La Union Bay is well sheltered by many isles and capes, and consequently all the waves at La Union Bay are expected to be less than 0.3m in height.

(2) Sub. il Conditions

3.   Subsoil conditions in La Union are typically different in the following two areas.

      ● Water areas at both sides of Punta Gorda Port
      ● Water area around the jetty of Cutuco Port

   1) Water areas at both sides of Punta Gorda Port
4.   Subsoil layers of this area are presumably composed of soft clay layer and hard layers (rock) underneath. Although the exact depths of hard (rock) layers all over this area are not confirmed by borings directly, the similar trend observed between Cutuco and Punta Gorda is assumed as well. As a result, design soil conditions at the area is set as follows.

Table II-4-1   Design Soil Conditions at the Both Sides of
Punta Gorda Port

Stratum	Symbol	Soil Characteristics	N-value	Unit Weight (t/m3)
Clayey stratum	OL	Clay with silt, soft to very soft, high plasticity.	0	1.45
Sandy silt/Sand stratum	SP	Sandy silt/ Silty sand	30-50	1.80
Gravel/Sand stratum	SP+G	Gravel and sand	>50	1.80

2) Water area around the jetty of Cutuco Port

5.　　　In 1977, ten (10) borings were conducted around the jetty of Cutuco Port. The results (N-values) are summarized in Figure II-4-1. (Note: "Off-Shore" means the off-shore side of Cutuco jetty, and "On-Shore" means the on-shore side of Cutuco jetty.)

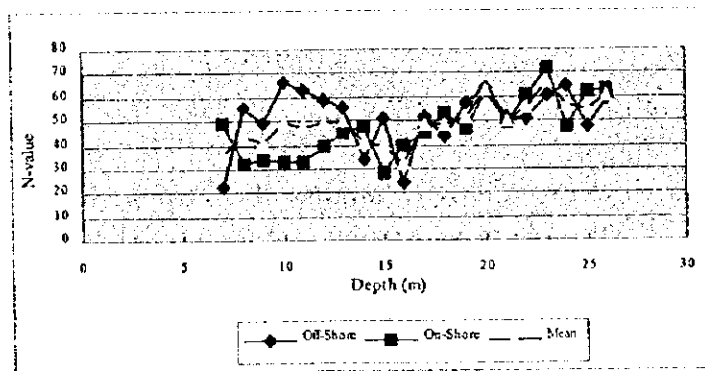**Figure II-4-1   Average N-values at Cutuco Port**

6.　　　The design soil conditions at the site are assumed as follows.

Table II-4-2   Design Soil Conditions around the Cutuco Port

Stratum	Symbol	Soil Characteristics	N-value	Unit Weight (t/m3)
Sandy silt/Sand stratum	SP	Sandy silt/ Silty sand	30-50	1.80
Gravel/Sand stratum	SP+G	Gravel and sand	>50	1.80

(3) Design Seismic Coefficient

7.　　The seismic coefficient method will be adopted in the facility design. In this method, the design seismic coefficient (kh) is determined to be 0.15 considering the classification of region where structures are planned, that of the subsoil condition and the degree of importance of the structure.

(4) Dimensions of Planned Ships

8.　　The maximum dimensions of vessels for the new berth are determined in the previous chapter of the Master Plan.

Table II-4-3　Dimensions of Planned Ships

Ship Type	DWT	Length(m)	Breadth(m)	Draft(m)
Container Ship	40,000	295	32.0	12.0
Bulk Carrier	50,000	216	31.5	12.4

(5) Dimensions of Berth

9.　　In La Union, the crown heights of container berth/ multi-purpose berth/passenger berth are set as +4.5m. (1.4m above the H.W.L.)

(6) Berthing Velocity and Tractive Force

10.　　The tractive force on a bit is assumed as follows corresponding to the planned ship size, acting in all directions.

Table II-4-4 Berthing Velocity and Tractive Force

Ship Size	Berthing Velocity (cm/sec)	Tractive Force (ton)
40,000-50,000DWT	10	70
5,000GT	10	50

(7) Surcharge on Berth

11.　　　Following design surcharge and live loads are presumed for the berthing facilities.

Table II-4-5　Design Surcharge Loads

Structural Type		Concrete Caisson Type	
Berth		Container	Multi-Purpose
Ordinary Condition	Surcharge	Within crane: 1t/m² Out of crane: 3t/m²	3t/m²
	Live Load	Container Crane	Heavy Crane
Earthquake Condition	Surcharge	Within crane: 1t/m² Out of crane: 3t/m²	1.5t/m²
	Live Load	Container Crane	Heavy Crane

4.1.2　Structural Design

1.　　　Soil conditions are one of the most important factors in determination of the suitable structural type.

It is clear from the subsoil survey results that there exists clay layer with the variable thickness and hard layer beneath them at La Union. However, this clay layer can not be expected to have any bearing capacity. So, the gravity type structures using the hard layer are chosen for the mooring facilities and revetment.

4.2　Rough Design, Implementation Work and Cost Estimate

1.　　　The construction schedule for long term development is shown in following table.

CONSTRUCTION SCHEDULE FOR LONG TERM DEVELOPMENT

PORT OF CUTUCO

Facility	Unit	Quantity	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
(-14m)Container Berth	LS	1																
(-14m)Bulk Berth(NO 1)	LS	1																
(-14m)Bulk Berth(NO 2)	LS	1																
Reclamation & Revetment	LS	1																
Building & Utilities	LS	1																
Channel, Basin & Anvigation Aids	LS	1																
Access Road	LS	1																
Loading Equipment	LS	1																

2.　　　The preliminary estimates of the project cost were worked out in respect of the master plan targeted for the year 2015.

Exchange rate is 1 US$ = 8.75 Colon = ¥ 130.

3.　　　The overall comparison of construction cost is shown in Table II-4-7.

Table II-4-6　Overall Comparison of Construction Cost

(Unit : Million US$)

Category	Unit	Proposed Location of Port						
		A-1	B-1	B-2	B-3	C-1	C-2	C-3
Long Term Development	LS	177	192	153	159	193	175	147

4.　　　The construction cost of the location (B-3) is estimated as 159 million US$ approximately. On the other hand, the construction cost of the location (C-3) is estimated as 147 million US$ approximately.

5.　　　Total project cost for the new port master plan (C-3) is approximately 147 million US$, of which approximately 11% of project cost represents cargo handling equipment. Breakdown of project cost is as follows;

(1) Container berths (-14m) ·· 32 million US$
(2) Bulk berth (-14m) NO.1 ·· 29 million US$
(3) Bulk berth (-14m) NO.2 ·· 22 million US$
(4) Channel, Basin and Navigation Aids ······················· 20 million US$
(5) Access Road ·· 1 million US$
(6) Others ·· 43 million US$

     Total   147 million US$

Others include loading equipment, tug boat, engineering fee and contingency.

5. Port Administration, Management and Operation

5.1 Required functions for CEPA

a) Control of Port Area, Infrastructure and Facilities

1) CEPA should formulate basic policy for national ports and prepare plan concerning development and conservation of port area.

2) Construction work, permission for usage of port infrastructure, facility and area should conform to the port policy and plan.

b) Organization improvement

1. In order to realize efficient port management and operation related to a basic policy and plan and ensure sound finance for the port development, it is necessary to introduce or reinforce sections which are in charge of the following functions:

Table II-5-1 Expected Roles of CEPA

Expected Role	Background
-Functional Port Planning and Arrangement -Supervision of New Terminal Construction	←New Terminal in La Union ← Joint Participation of CEPA and Private Enterprise in the Port of Acajutla, ←Dry Cannal, EPZ
-Active Marketing and Port Promotion -Attractive Tariff and Efficient Cargo Handling	←Progress of Containerization ←Competition among the Neighboring Ports ←Modernization Program of Public Sector
-Environmental Administration	←Prevention of Sea Area Pollution ←Raising Environmental Consciousness
-Flexible and Effective Reorganization	←New Role & Function for the Progress of Port Development and Modernization Plan

c) Basic Principles of Port Administration, Management and Operation

2. The most important function of a port is to be as a terminal where sea and land transportation meet. Efficiency and safety are thus vital in the transfer of cargo and passenger. For cargo handling, quickness, reliability and cost effectiveness are strongly required.

5.2 Construction and Operation of Terminals of Port of La Union

a) The Port of La Union as a Public Port

1.	Ports are important infrastructure for the national economy and have a public character in general. The Port of La Union consists only of one container terminal for the country and two bulk terminals for the eastern region. In addition, it serves as an alternative port to Acajutla. Accordingly, it is required to be open to public use.

b) Private Participation in Port Activities

2.	Public sector is said not always to be efficient and flexible in investment and personnel management. This is true especially in the field of service provision. Therefore, port services should be desirably provided by the private sector in principle.

3.	Table II-5-2 shows construction and management system of the new Port of La Union. Case B or C are recommended as the best system. Port activities such as cargo handling should be provided by the private sector, but construction work and overall administration should be left to the public sector as the minimum requirement for a port owner.

Table II-5-2 Construction and Management System of the New Port in La Union

Case	Planning & Supervision	Construction			Operation		Remarks
		Channel Dredging	Site Development	Terminal Facilities	Administrative Operations	Cargo Handling	
A	Public	Public	Public	Public	Public	Public	
B	Public	Public	Public	Public	Public	*Private*	
C	Public	Public	Public	Public	*Private*	*Private*	
D	Public	Public	Public	*Private*	*Private*	*Private*	
E	Public	Public	*Private*	*Private*	*Private*	*Private*	BOT*

Note. BOT (Build, Operate and Transfer): The public sector permits the private sector to construct a terminal under the condition that the private sector uses it for a certain period to recover the construction cost. After this period the terminal is transferred to the public sector.

c) Active Control of Related Regional Project

4.	At present, a concrete plan for the eastern region, including road improvement and establishment of EPZs, has not been drawn up yet. Government should draw up such a plan immediately. As well, government should make use of the private sector under an appropriate environment.

6. Overall Evaluation

1.   In order to select the best alternative, a comparative evaluation of the alternatives is performed as shown in Table II-6-1. Under the given conditions that Cutuco is reserved for new concessionaires, (B-3) is recommended with possibilities of other public works. Otherwise, (C-3) also deserves consideration.

Table II-6-1   Comparative Evaluation of the Alternatives

Evaluation	Alternative Plans						
	A-1	B-1	B-2	B-3	C-1	C-2	C-3
Terminal Plan	O	O			O		
Land Access	◎	O			◎		
Water Area Plan	O	O			O		
Water Access	O	◎			O		
Effect on Existing Piers	△ Cutuco	O	O	△ Private	△ Cutuco		
Use of Neighboring Area	O	◎	O	O	◎		
Future Expansion	△	◎			◎		
Construction Cost	△	△	O	O	△	△	O
Environmental Impact	O	O			O		
Effect on Other Projects	△ Cutuco	△ Marina Plant	△ Plant	◎	△ Cutuco		
Overall Evaluation				◎			◎

Note 1 :   ◎ Good,   O Fair,   △ Poor

Note 2 :   Environmental Impact is based on the result of Initial Environmental Evaluation (IEE), which is explained together with Environment Impact Assessment (EIA) in PART II.

2.   The above terminals will be constructed to meet the demands and based on their importance. The container terminal should be developed at once, followed by the first bulk terminal. (At this short term stage, a more economical plan should be considered.) The second bulk terminal will be constructed in the following years.

Preliminary Economic Analysis

EIRR

1.   Preliminary economic analysis calculation result of EIRR for B-3 is shown in the following Table II-6-2 . B-3 is feasible as even the worst case of Case C yields 12.0% given by the IBRD and IDB for social-infrastructure projects. C-3 is more feasible since construction cost is lower than B-3.

Table II-6-2   Summary of EIRR Calculation Result

Case	Case 1	Case 2
Base Case	15.4%	14.5%
Case A	14.2%	13.3%
Case B	14.1%	13.2%
Case C	12.9%	12.0%

Case A : The costs increased by 10 %

Case B : The benefits decreased by 10 %

Case C : The costs increased by 10 % and the benefits decreased
*   by 10 %*

Other Economic Effects

2.   The effects excluded in the calculation of EIRR are as follows.

1) Generation of job opportunities
2) Promotion of regional economic development
3) Savings in interest of cargo costs

PART III   SHORT TERM PLAN (2005)

1.   Basic Policy for the Short Term Plan

1.   Taking into consideration various requirements as an intermediate step of the Master Plan, the main targets of the short term plan up to the year of 2005 are summarized as follows:

(1) Immediate establishment of modern container terminal as main gateway of El Salvador

(2) Successive construction of required berths for other cargoes for the eastern region

(3) Reinforcement of effective administration and management system for the public ports

(4) Efficient port operation and cargo handling system, including private participation

(5) Economical investment, including appropriate financing, for smooth implementation of the project

(6) Enhanced cooperation for promotion of the regional development

(7) Necessary environmental consideration

2.   Demand Forecast

1.   The future demand of cargo traffic of La Union new port in 2005 is summarized in Table III-2-1.

Table III-2-1   Summary of La Union New Port Cargo Forecast in 2005

unit : ton

			Cargo Volume
2005	Import	General Cargo	210,564
		Break Bulk cargo	64,200
		Container cargo	146,361
		(TEU)	23,355
		Bulk Cargo	419,000
		Dry Bulk cargo	198,200
		Liquid Bulk cargo	220,800
		Total	629,564
	Export	General Cargo	100,015
		Break Bulk cargo	14,400
		Container cargo	85,615
		(TEU)	23,355
		Bulk Cargo	56,600
		Dry Bulk cargo	25,200
		Liquid Bulk cargo	31,400
		Total	156,615
	Domestic	Liquid Bulk cago	200,000
		Total	986,179

3. Physical Layout Plan

1.   The Short Term Plan with the target year of 2005 is proposed under the framework of the Master Plan for both "Alternative B-3" on the east side of the Port of Punta Gorda and "Alternative C-3" to facilitate project implementation(the site around the existing Port of Cutuco has become available for the Study).

2.   Basic physical requirement such as the number of berths is the same for both cases. However, the layout plan, especially land use plan, depends on the corresponding available area for port development. In the case of "Alternative C-3", the entire area of the existing Port of Cutuco will be considered as the available area for effective port development.

3.   At the short term stage, one container terminal and one bulk terminal are to be developed as below. The corresponding berths are consecutive for convenient use and easy expansion in future.

One(1) container berth
    Principally for container ship and general ship
    Length: 300m
    Dej h: -13 m   (capable of being deepened up to -14 m in future)
    Gantry crane: two(2) of Panamax type

    Terminal area: 12 ha (berth length of 300 m by depth of 400 m)
            Apron: 50 m in width
            Container yard: 12,000 m^2 (350 slots)
            CFS$^)$:   1,400 m^2
            Maintenance shop: 1,000 m^2
            Terminal office: 1,500 m^2
            Terminal gate: 4 lanes
            Transfer crane system: 4 transfer cranes
                            8 tractors
                    8 chassises

        Transit shed and warehouse (for general cargo)$^)$:   2,200 m^2
    *)   The existing warehouse of Cutuco will be utilized for C-3.

One(1) bulk berth
    Principally for dry bulk ship, liquid bulk ship and oil barge

Length: 260m   (capable of being extended up to 280 m in future)
Depth: -13 m   (capable of being deepened up to -14 m in future)

Turning basin and access channel

Depth: - 11 m   (Tidal benefit at La Union is fully considered.)
Diameter of turning basin: 600 m
Width of access channel: 150 m

Access road

Access road of 2 lanes and an alternative road bypassing the town area

Temporary measures for passenger cruisers

4.   West revetment is slightly modified to work as a tentative mooring facility with a depth of -7.5 m and a length of 220 m to meet the possible calls of passenger boats. It is cable of accommodating vessels up to 15,000 GT.

5.   Figure III-3-1, 3-2, 3-3 and 3-4 show the total layout plans for Alternative B-3, C-3, the channel and turning basin and rough alignment of the bypassing road.
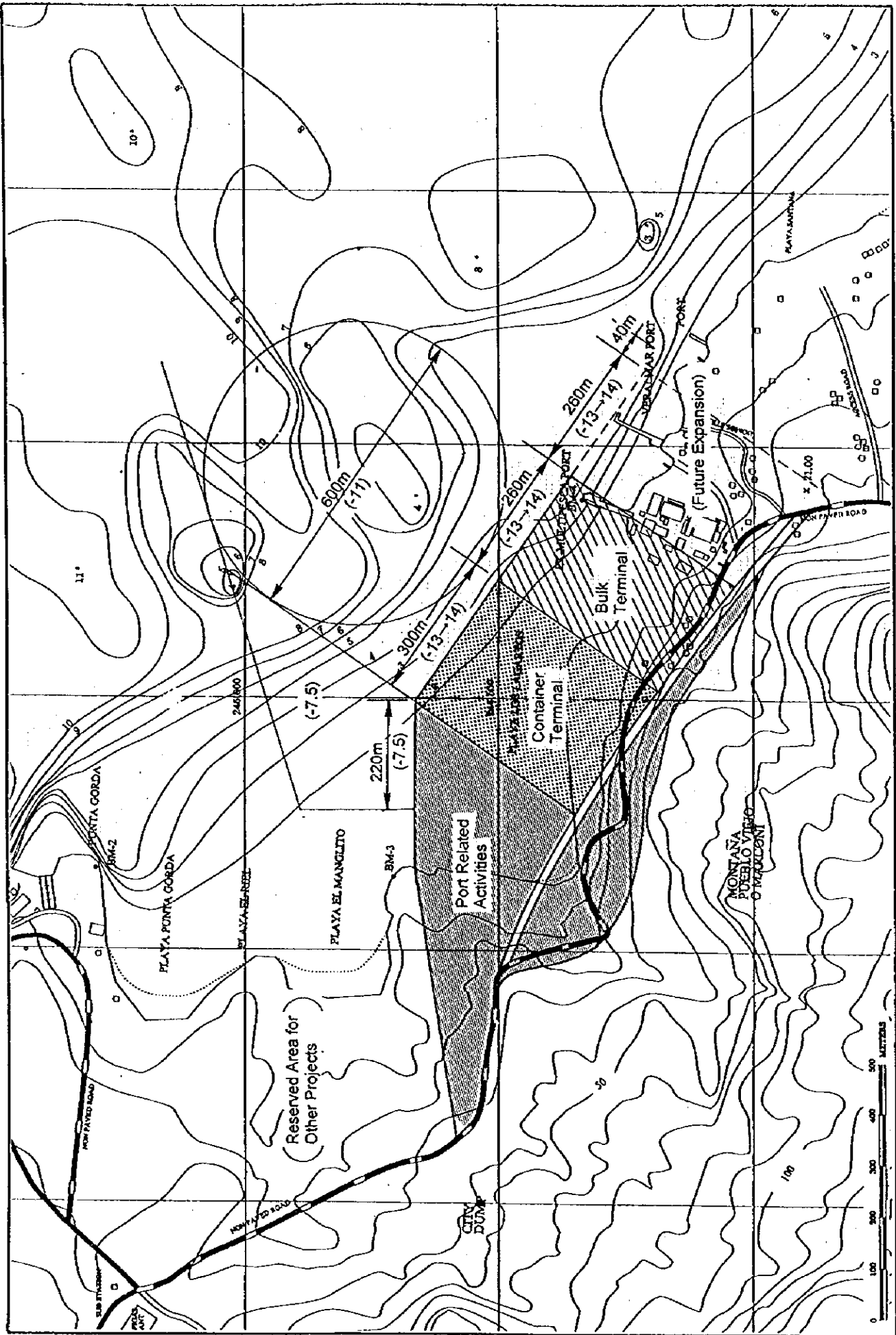
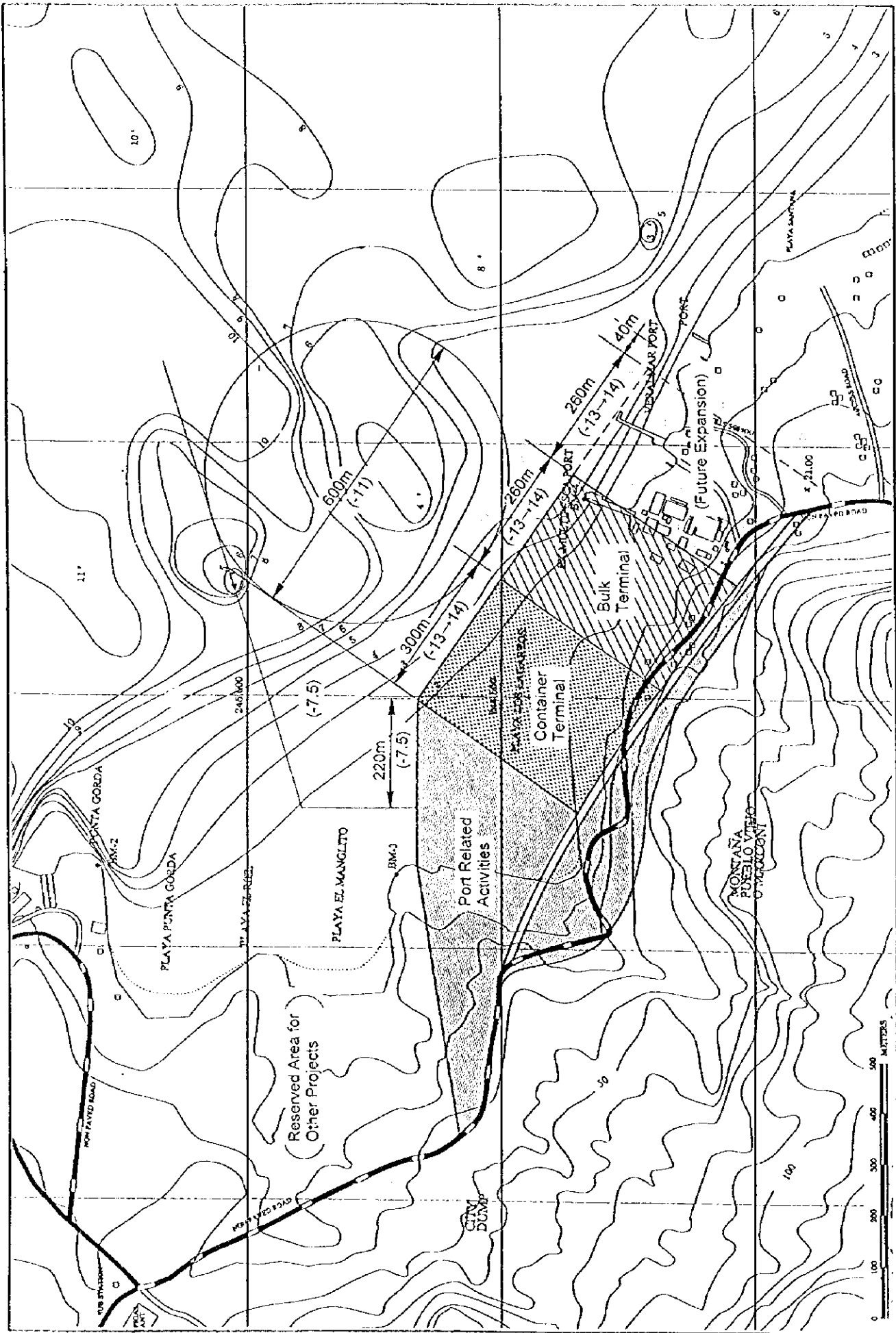Figure III-3-1   Layout Plan for Alternative B-3

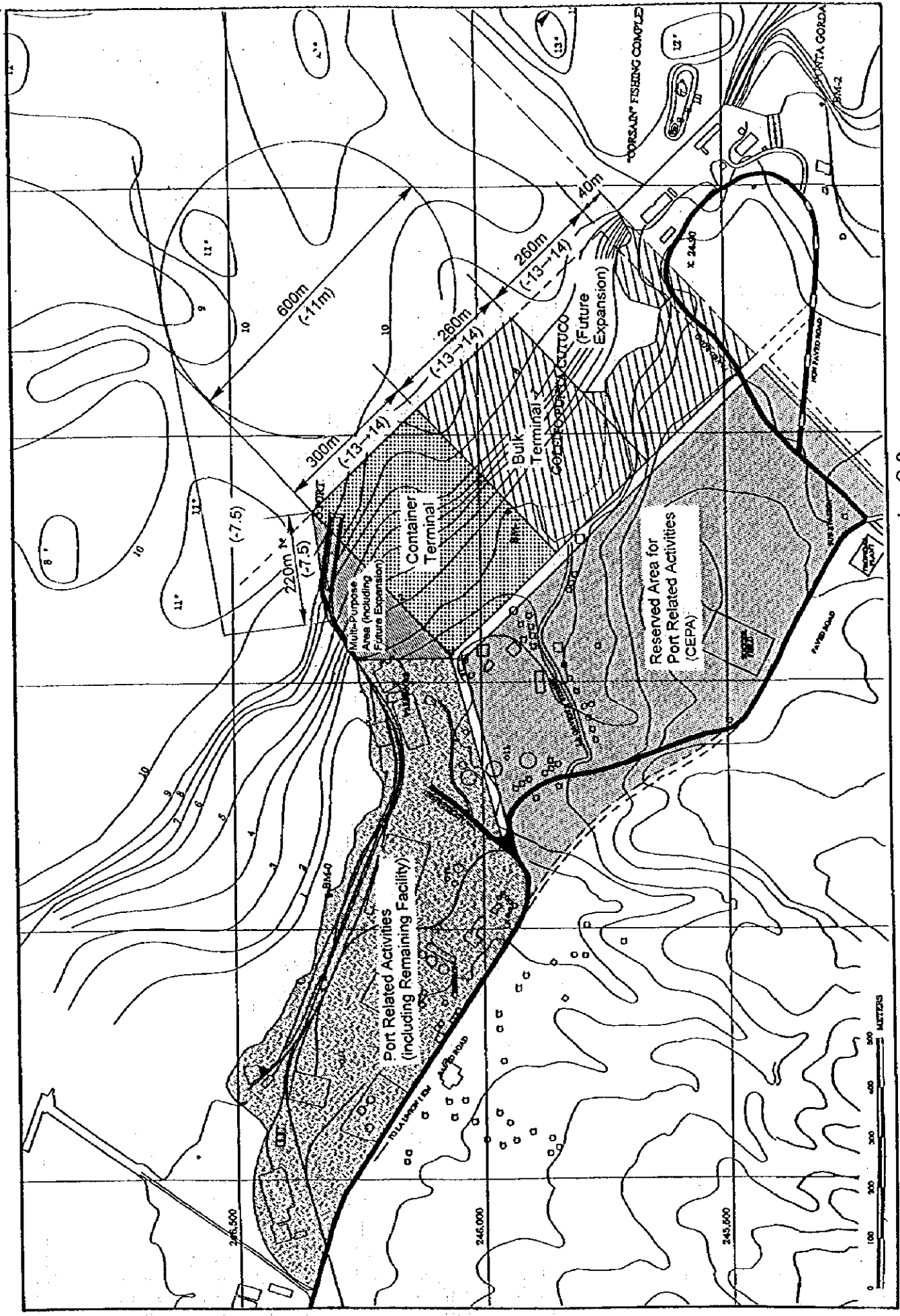Figure III-3-1 Layout Plan for Alternative B-3

Figure III-3-2   Layout Plan for Alternative C-3

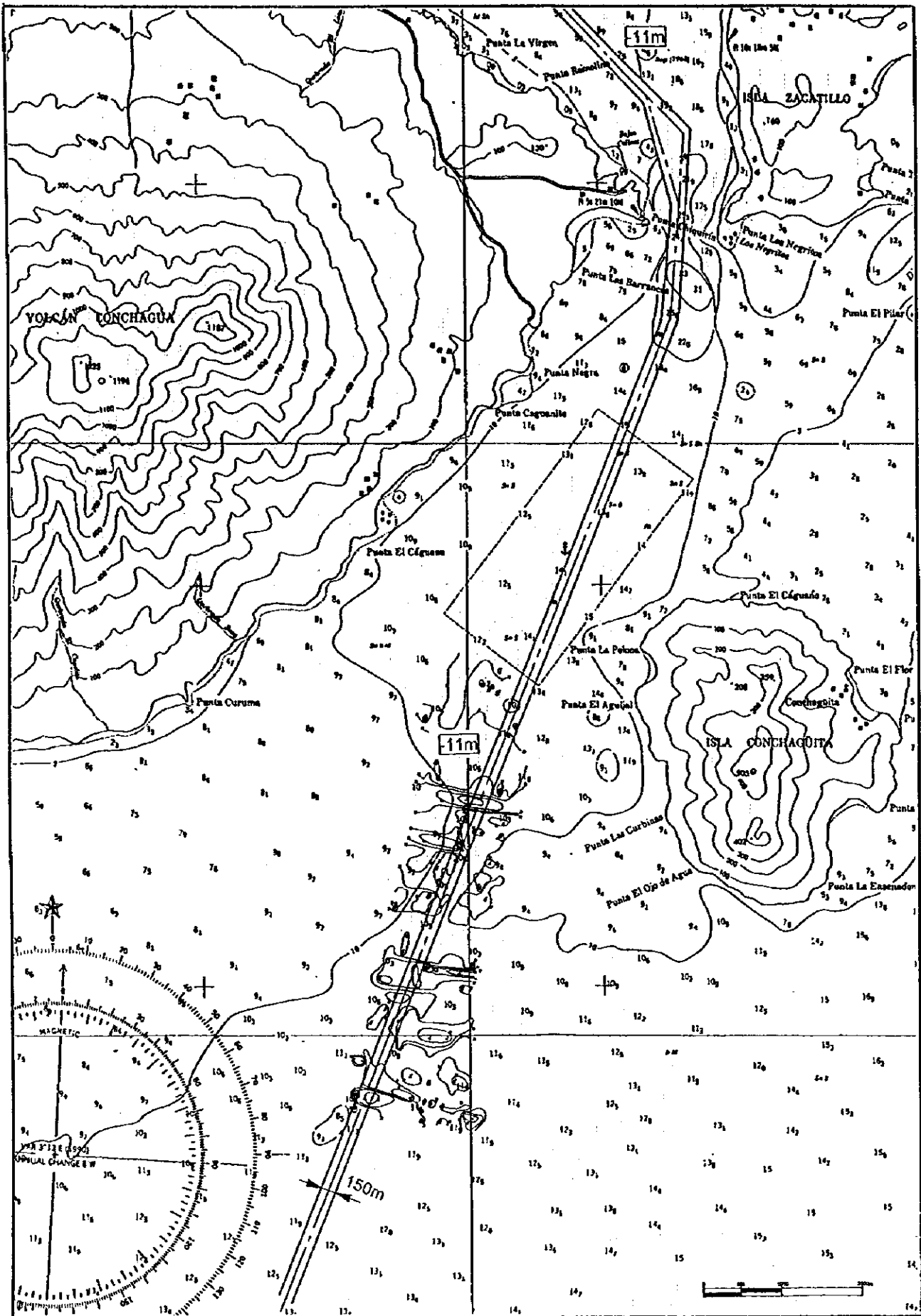Figure III-3-2 Layout Plan for Alternative C-3

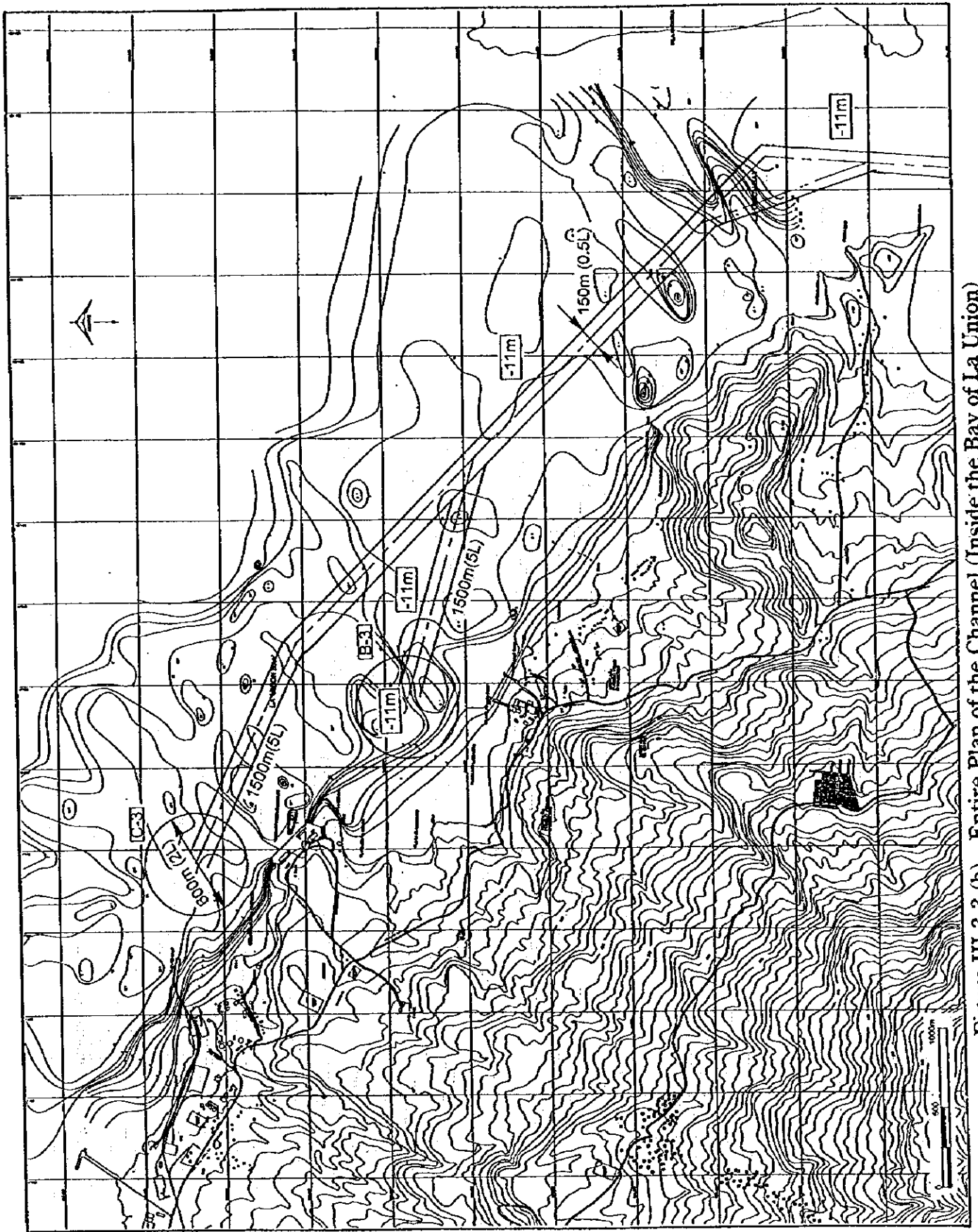Figure III-3-3 (a)   Entire Plan of the Channel (Outside the Bay of La Union)

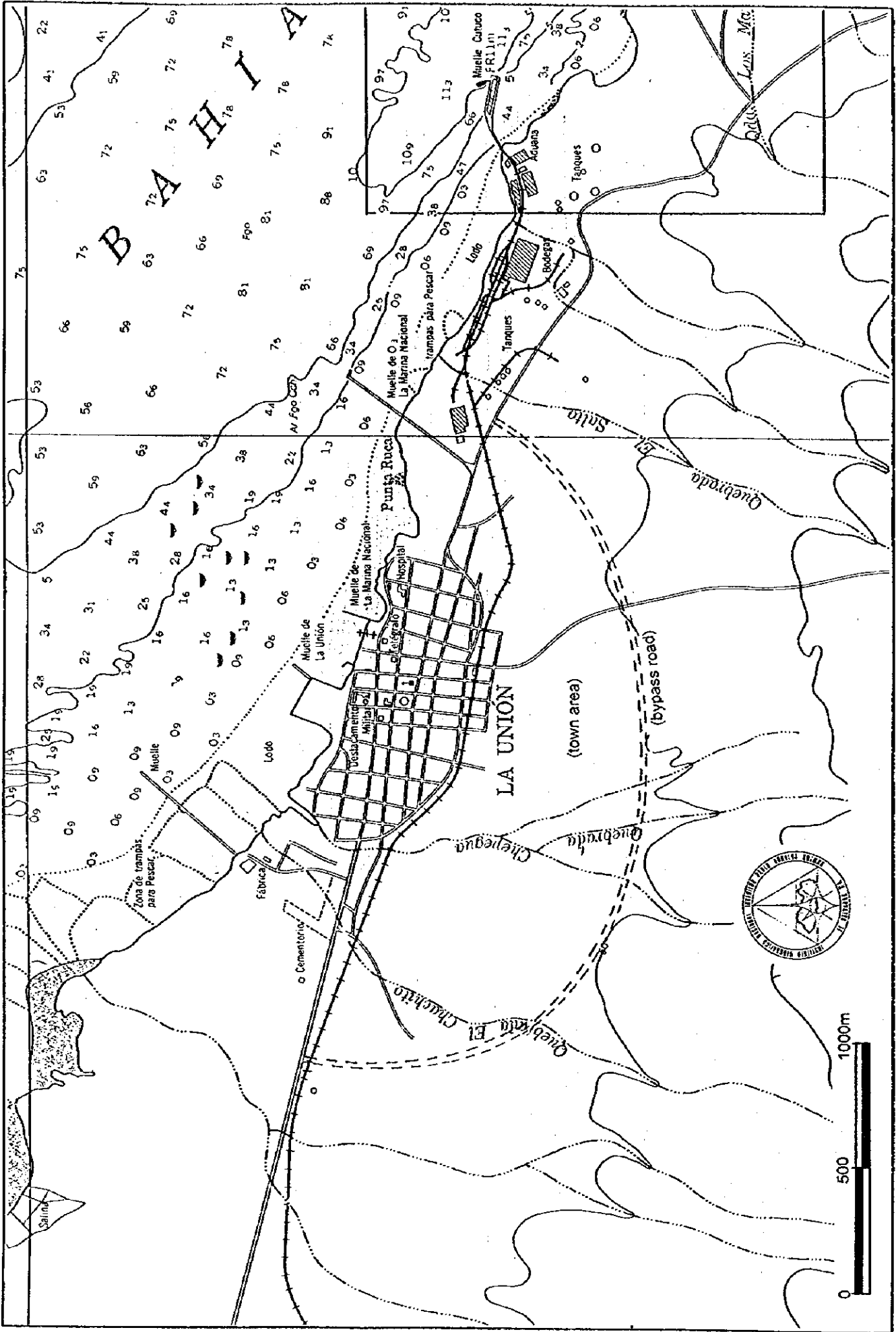Figure III-3-3 (b)   Entire Plan of the Channel (Inside the Bay of La Union)

Figure III-3-4 Rough Alignment of the Bypass Road

4. Preliminary Design

(1) Design Conditions

1.   Design conditions for the mooring facilities are set as follows.

Table III-4-1   Design Conditions for Container Berth/ Bulk Berth/Passenger Berth

Items	Design Conditions		
	Container Berth	Bulk Berth	Passenger Berth
Planned Ship	40,000DWT	50,000DWT	5,000GT
Planned Water Depth(m)	-14.0	-14.0	-7.5
Berth Length(m)	300	260	220
Crown Height(m)	+4.5	+4.5	+4.5
H.W.L.(m)	+3.1	+3.1	+3.1
Seismic coefficient	0.15	0.15	0.15

2.   Design soil conditions at the planned site are set as follows.

Table III-4-2   Design Soil Conditions

Stratum	Symbol	Soil Characteristics	N-value	Unit Weight (t/m3)
Sandy silt/Sand stratum	SP	Sandy silt/ Silty sand	30-50	1.80
Gravel/Sand stratum	SP+G	Gravel and sand	>50	1.80

3.   Following design surcharge and live loads are presumed for the berths.

Table III-4-3   Design Surcharge Loads

Items		Concrete Caisson Type		Concrete Block Type
Conditions	Surcharge	Container Berth	Bulk Berth	Passenger Berth
Ordinary Condition	Surcharge	Within crane: 1t/m2 Out of crane: 3t/m2	3t/m2	2t/m2
	Live Load	Container Crane	Heavy Crane	-
Earthquake Condition	Surcharge	Within crane: 1t/m2 Out of crane: 3t/m2	1.5t/m2	1t/m2
	Live Load	Container Crane	Heavy Crane	-

(2) Structural Design

4.   The design of gravity type quay-wall is preferably made according to the following sequence.
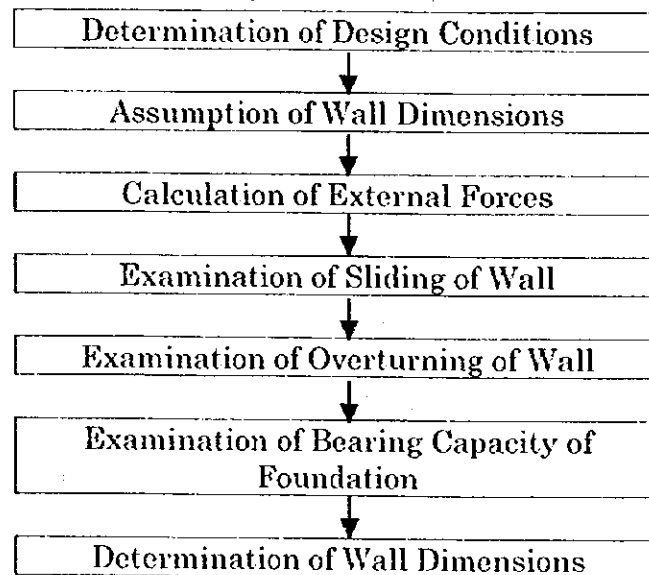

Figure III-4-1   Design Flow of Gravity Type Quay-wall

5.   The standard cross sections of container berth / bulk berth and passenger berth are shown in Figure III-4-2 and 4-3 respectively.
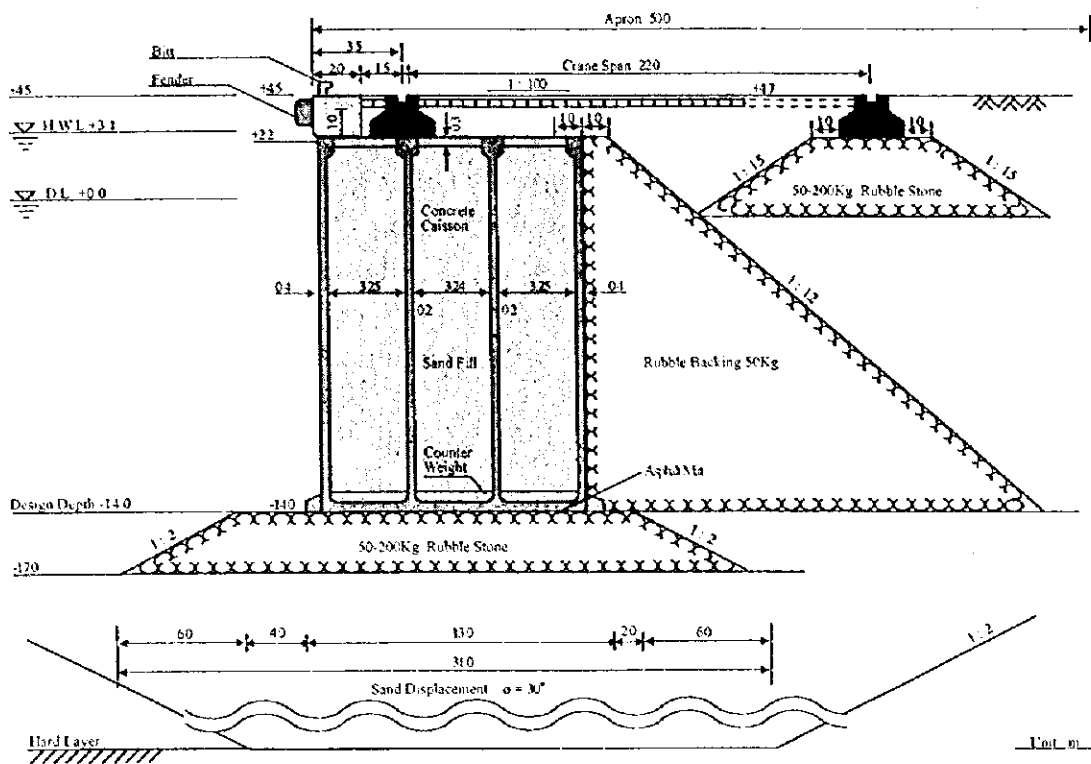
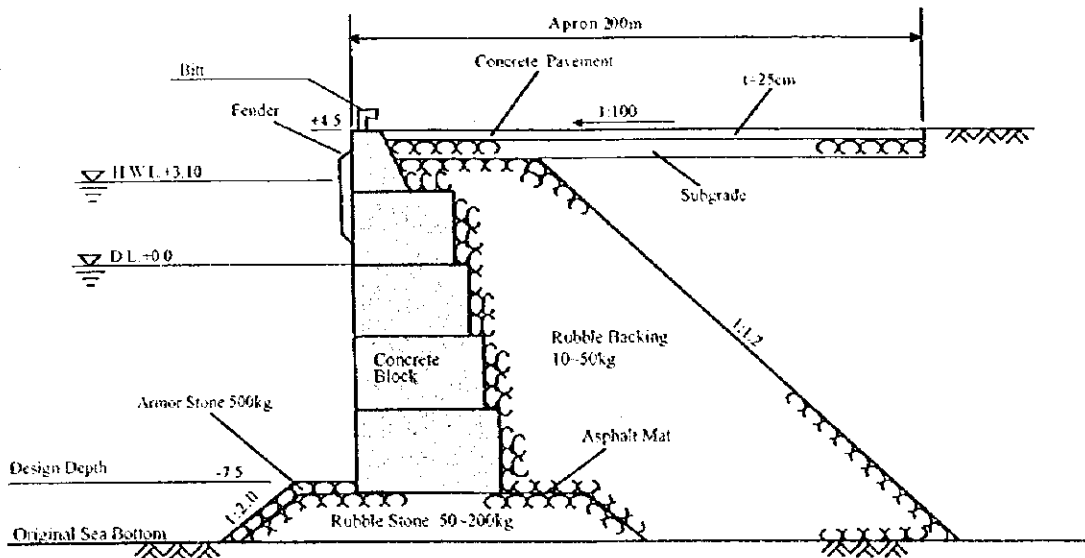**Figure III-4-2 Concrete Caisson Type Container / Bulk Berth (-14m)**

Figure III-4-3 Concrete Block Type Passenger Berth (-7.5m)

5. Implementation Work and Cost Estimate

5.1 Implementation Work

1.   Main port facilities for short-term development plan consist of container berth, container yard, bulk berth and yard, revetment and part of which is able to moor passenger boats, access road and building., etc. These facilities may be constructed with foreign equipment from abroad except locally labor, row materials and local available equipment.

2.   The implementation schedule of the project for financial arrangement, detailed design, preparation of tender, construction supervision, operation and maintenance of the port facilities is shown in Figure III-5-1.

3.   The construction schedule for short term development is shown in Figure III-5-2.

5.2 Cost Estimate

4.   As to unit cost indicated in Master Plan, some unit costs are revised and reduced in feasibility study considering update data and additional information, for example, to supply materials from borrow pit located in adjacent of the site., etc, It is carried out to save cost and to improve the precision of the cost estimate.

5.   The cost estimate for the short-term development plan(B-3) and (C-3) is summarized in Table III-5-1 and Table III-5-2 respectively.
Total project cost for the short-term development plan(C-3) amounts to 94 million US$ and also it is cheaper than the cost of (B-3), of which 70 million US$ represents the foreign currency component. of the total   cost, 72 million US$ would go for the container berth and yard, bulk berth and yard. Equipment cost is estimated in 23 million US$ including cargo handling and tug boats.

6.   On the other hand, total project cost for the short term development plan (B-3) amounts to 101 million US$, of which 75 million US$ represents the foreign currency component. Of the total cost, 78 million US$ would go for the container berth and yard, bulk berth and yard.

Item	Year	1999	2000	2001	2002	2003	2004	2005
I Preparation Works								
1. Obtaining funding		▭						
2. Land acquisition		▭						
3. Selection of Consultant		▭						
II Detailed Design								
1. Reviewing work on F/S		▨						
2. Detailed design		▨▨▨▨						
3. Preparation of Tender Documents			▨					
4. Pre-qualification of Tenders			▯		▯			
III Preparation Works for Construction								
1. Tendering				▯	□			
2. Tender evaluation				▭	▭			
3. Award of contract			(Civil)	▭	(Equip) ▭			
IV Construction								
1. Mobilization				▦				
2. Construction								
1) Container Berth					▓▓▓▓▓	▓▓▓		
2) Bulk Berth					▓▓▓▓▓	▓▓▓▓	▓▓	
3. Construction supervision					▨▨▨▨	▨▨▨▨	▨▨▨	
V Maintenance								
1 year after completion of Cons'n								▥▥▥▥

▭ Preparation Works (Government)

▨▨▨ Engineering Study(Consultant)

▓▓▓ Construction(Contractor)
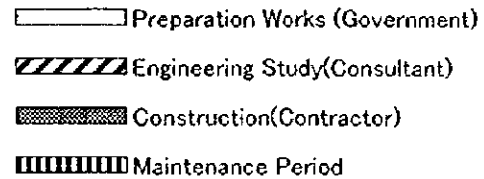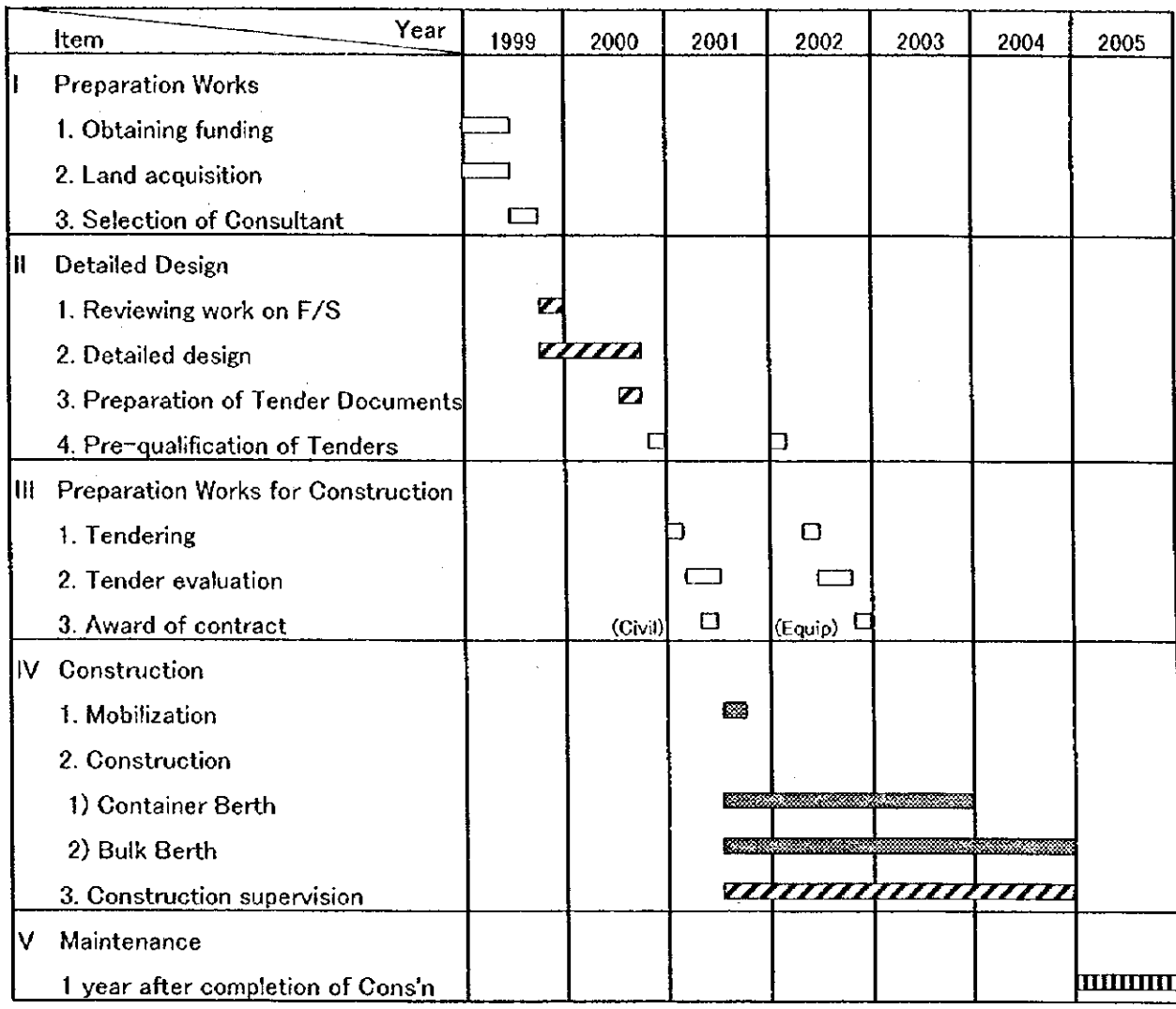
▥▥▥ Maintenance Period

Figure III-5-1   Implemention Schedule for Short Term Development

Table III-5-1 Summary of Construction Cost for Short Term Development (B-3)

(Unit : US$)

Place	Work Item	Unit	Quantity	Unit Price F.C	Unit Price L.C	Amount F.C	Amount L.C	Total
(-14m) Container Berth	Main Wharf L=300 (m)	l.s	1			6,809,000	4,206,000	11,015,000
	Passenger Wharf L=220 (m)	l.s	1			0	0	0
	Revetment	l.s	1			2,033,000	192,000	2,225,000
	Land Reclamation	l.s	1			2,271,000	4,217,000	6,488,000
	Pavement	l.s	1			3,220,000	6,000	3,226,000
	Building	l.s	1			240,000	360,000	600,000
	Utilities	l.s	1			729,000	449,000	1,178,000
	Sub Total							24,732,000
(-14m) Bulk Berth	Main Wharf L=260 (m)	l.s	1			6,143,000	3,963,000	10,106,000
	Revetment	l.s	1			969,000	46,000	1,015,000
	Land Reclamation	l.s	1			929,000	1,726,000	2,655,000
	Pavement	l.s	1			2,791,000	5,000	2,796,000
	Building	l.s	1			271,000	406,000	677,000
	Utilities	l.s	1			555,000	307,000	862,000
	Sub Total							18,111,000
Channel	Channel/Basin	l.s	1			10,033,000	0	10,033,000
	Navigation Aids	l.s	1			831,000	92,000	923,000
Road	Access Road Detour La Union City	l.s	1			1,395,000	3,264,000	4,659,000
Mobilization		l.s	1			3,922,000	1,924,000	5,846,000
Consultant	Engineering Fee	l.s	1			4,315,000	2,116,000	6,431,000
Contingency	Physical Contingency	l.s	1			4,746,000	2,328,000	7,074,000
	Sub Total							34,966,000
Equipment	Loading Equipment	l.s	1			18,932,000	0	18,932,000
	Tug Boat					3,846,000	0	3,846,000
	Sub Total							22,778,000
Land Acquisition							77,000	
	Total					74,980,000	25,684,000	100,664,000
						74.5%		100%

Table III-5-2 Summary of Construction Cost for Short Term Development (C-3)

(Unit : US$)

| Place	Work Item	Unit	Quantity	Unit Price F.C	Unit Price L.C	Amount F.C	Amount L.C	Total
(-14m) Container Berth	Main Wharf L=300 (m)	l.s	1			6,446,235	3,658,717	10,104,952
	Passenger Wharf L=220 (m)	l.s	1			1,465,382	883,174	2,348,556
	Revetment	l.s	1			114,141	63,761	177,902
	Land Reclamation	l.s	1			2,037,221	3,783,410	5,820,631
	Pavement	l.s	1			3,219,300	6,300	3,225,600
	Building	l.s	1			239,850	359,970	599,820
	Utilities	l.s	1			676,106	437,767	1,113,873
	Sub Total					14,198,235	9,193,099	23,391,334
(-14m) Bulk Berth	Main Wharf L=260 (m)	l.s	1			6,008,317	3,368,492	9,376,809
	Land Reclamation	l.s	1			1,822,254	3,384,186	5,206,440
	Pavement	l.s	1			2,790,060	5,460	2,795,520
	Building	l.s	1			270,600	406,120	676,720
	Utilities	l.s	1			544,562	358,213	902,775
	Sub Total					11,435,793	7,522,471	18,958,264
Channel	Channel/Basin	l.s	1			6,744,354	0	6,744,354
	Navigation Aids	l.s	1			831,000	92,000	923,000
Road	Access Road	l.s	1			345,000	810,000	1,155,000
	Detour La Union City					774,000	1,806,000	2,580,000
Mobilization		l.s	1			3,432,838	1,942,357	5,375,195
Consultant	Engineering Fee	l.s	1			3,776,122	2,136,593	5,912,715
Contingency	Physical Contingency	l.s	1			4,153,734	2,350,252	6,503,986
	Sub Total					20,057,048	9,137,202	29,194,250
Equipment	Loading Equipment	l.s	1			18,932,000	0	18,932,000
	Tug Boat					3,846,154	0	3,846,154
	Sub Total					22,778,154	0	22,778,154
	Total					68,469,230	25,852,772	94,322,002
						73.6%		100%

Note : Land Acquisition cost is inclusive
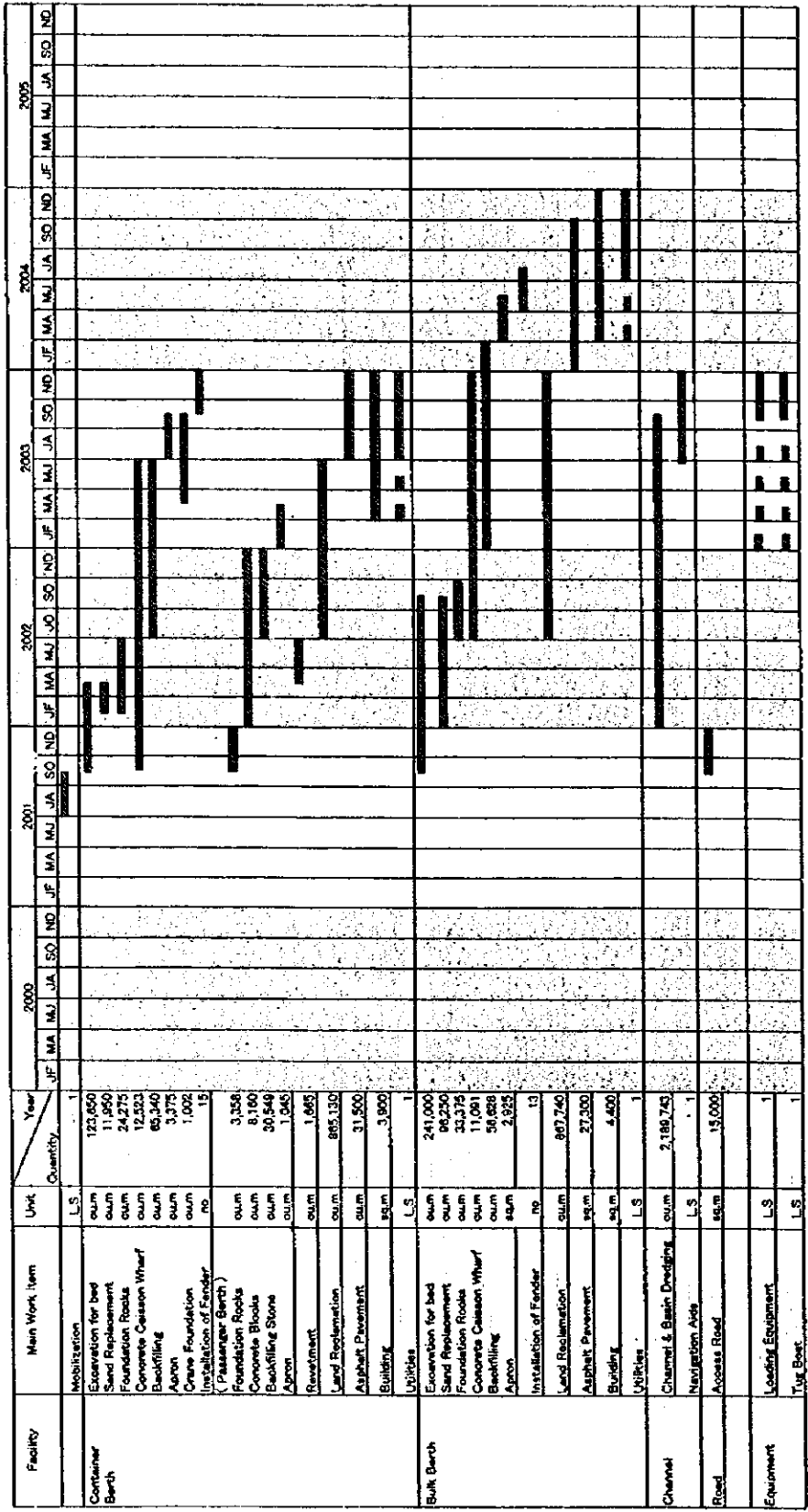
Figure III-5-2   Construction Schedule for Short Term Development

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