Japan International Cooperation Agency(JICA)
Department of Transportation And Communications (DOTC)

No.

Final Report

The Feasibility Study on the Development of Road RO-RO Terminal System for Mobility Enhancement in the Republic of the Philippines

Summary

November 2007

The Overseas Coastal Area Development Institute of Japan (OCDI)
Pacific Consultants International (PCI)

SD
JR
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PREFACE

In response to a request from the Government of the Republic of the Philippines (hereinafter referred to as "GOP"), the Government of Japan decided to conduct a Feasibility Study on the Development of Road RO-RO Terminal System for Mobility Enhancement in the Republic of the Philippines and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team to the Philippines four times between August 2006 and September 2007, which was headed by Dr. Haruo Okada and composed of members from the Overseas Coastal Area Development Institute of Japan (OCDI) and Pacific Consultants International (PCI).

The team held discussions with the officials concerned of the GOP 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 report will contribute to the promotion of this Road RO-RO Terminal System and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the GOP for the close cooperation they extended to the team.

November 2007

Eiji Hashimoto

Vice President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

November 2007

Mr. Eiji Hashimoto
Vice President
Japan International Cooperation Agency

Dear Mr. Hashimoto,

It is my great pleasure to submit herewith the Final Report of the Feasibility Study on the Development of Road RO-RO Terminal System for Mobility Enhancement in the Republic of the Philippines.

The study team composed of the Overseas Coastal Area Development Institute of Japan (OCDI) and Pacific Consultants International (PCI) conducted surveys in the Republic of the Philippines over the period between August 2006 and September 2007 according to the contract with the Japan International Cooperation Agency (JICA).

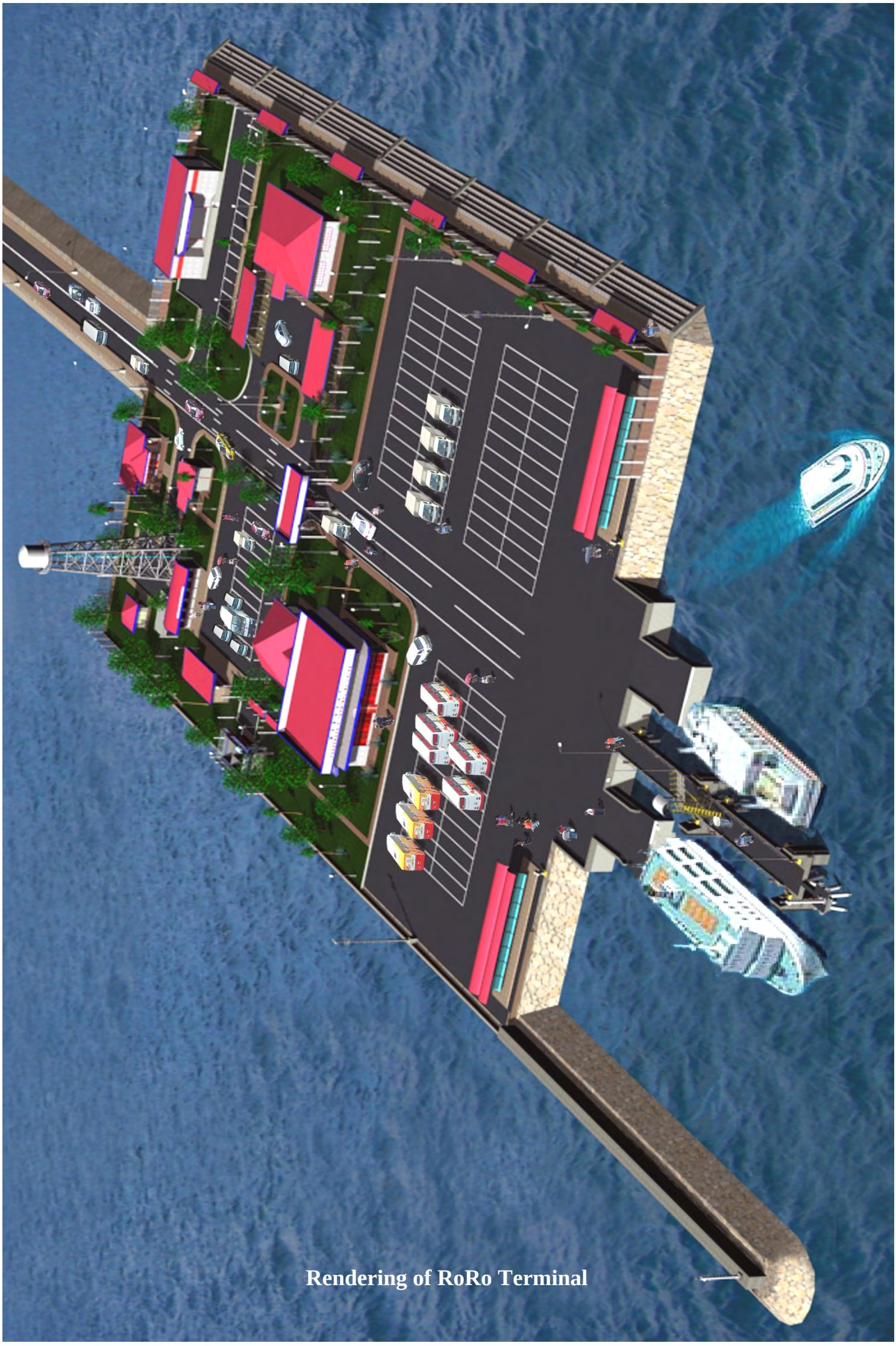
The study team compiled this report, which proposes a selection of RRTS routes to be developed by 2015 and a selection of RoRo terminals on the selected routes including a feasibility study of 15 RoRo terminals ports, through close consultation with officials of the Government of the Republic of the Philippines and other authorities concerned.

On behalf of the study team, I would like to express my sincere appreciation to the Government of the Philippines and other authorities for their diligent cooperation and assistance and for the heartfelt hospitality which they extended to the study team during our stay in the Philippines.

I am also very grateful to the Japan International Cooperation Agency, the Ministry of Foreign Affairs of Japan, the Ministry of Land, Infrastructure and Transport of Japan, Japan Bank for International Cooperation and the Embassy of Japan in the Republic of the Philippines for giving us valuable suggestions and assistance during the course of the study.

Yours faithfully,

Haruo Okada
Team Leader
The Feasibility Study on the Development of Road RO-RO Terminal System for Mobility Enhancement in the Republic of the Philippines



Rendering of RoRo Terminal

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LIST OF ABBREVIATIONS

A	AC	Asphalt Concrete
	AC	Asphalt Concrete Pavement
	ACP	Asphalt Concrete Pavement
	ADB	Asian Development Bank
	AO	Administrative Order
	APEC	Asia-Pacific Economic Corporation Conference
	ARMM	Autonomous Region in Muslim Mindanao
	ASEAN	Association of South East Asian Nations
	ATI	Asian Terminal, Inc.
	ATS	Abolitz Transport System Corporation
B	B	Bulk Cargo
	B/B	Break Bulk Cargo
	BD	Breasting Dolphin
C	CAR	Cordillera Administrative Region
	CDO	Cagayan De Oro
	CENRO	Community Environmental and Natural Resources Office
	CEZA	Cagayan Economic Zone Authority
	CODMRO	Cagayan De Oro Maritime Regional Office
	COTMRO	Cotabato Maritime Regional Office
	CPA	Cebu Port Authority
D	D	Depth
	DBP	Development Bank of Philippines
	DENR	Department of Environment and National Resources
	DMRO	Davao Maritime Regional Office
	DOTC	Department of Transportation and Communication
	DPWH	Department of Public Works and Highways
	D/R	Dock Receipt
	DSDP	Domestic Shipping Development Plan
	DTI	Department of Trade and Industry
	DW	Dead Weight (Tonnage)
	DWT	Deadweight Tonnage
E	EIRR	Economic Internal Rate of Return
	EMB	Environmental Management Bureau
	EO	Executive Order
F	FIRR	Financial Internal Rate of Return
	F/S	Feasibility Study
G	GCR	Greater Capital Region
	GDP	Gross Domestic Product
	GNP	Gross National Product
	GOP	Government of the Philippines
	GRDP	Gross Regional Domestic Product
	GRT	Gross Tonnage
H	HDW	Howaldtswerke Deutsche Werft AG
	hpa	hectopascal

I	I/A	Implementing Arrangement
	IAPH	International Association of Ports and Harbours
	IEE	Initial Environmental Examination
	IRR	Internal Rate of Return
	IT	Information Technology
	ITDP	Inter-modal Transport Development Project
J	JBIC	Japan Bank for International Cooperation
	JICA	Japan International Cooperation Agency
	JV	Joint Venture
K	KfW	Kredittanstalt fuer Widerauflau (Germany)
	KVA	Kilovolt-Ampere
L	L/A	Loan Agreement
	LGU	Local Government Unit
M	MARINA	Maritime Industry Authority
	MC	Memorandum Circular
	MD	Mooring Dolphin
	M/M	Minutes of Meeting
	MM	Metro Manila
	MMDA	Metropolitan Manila Development Authority
	MRT	Metro Rail Transit
	MT	Metric Ton
	MTPDP	Medium-Term Philippine Development Plan
N	NAMRIA	National Mapping Resource Information Authority
	NCR	National Capital Region
	NEDA	National Economic and Development Authority
	N.M.	Nautical Mile
	NPPD	National Plan for Port Development
	NPV	Net Present Value
	NSO	National Statistics Office
O	OCDI	Overseas Coastal Area Development Institute of Japan
	O-D	Origin and Destination
	ODA	Official Development Assistance
	OECD	Organization for Economic Cooperation and Development
	OECF	Overseas Economic Cooperation Fund (Currently JBIC)
P	PB	Pile Bent
	P/C	Passenger Cargo
	PCC	Portland Concrete Cement
	PCCP	Portland Concrete Cement Pavement
	PCG	Philippine Coast Guard
	PCI	Pacific Consultants International
	PENRO	Provincial Environment and Natural Resources Offices
	Php	Philippine pesos
	PMO	Port Management Office (PPA)
	PMO-Ports Office	Project Management Office (DOTC)
	POPCOM	Population Commission
	PPA	Philippine Ports Authority
	PSP	Private Sector Participation

R	RA	Republic Act
	RC	Reinforced Concrete
	RCBC	Reinforced Concrete Box Culvert
	RCDG	Reinforced Concrete Deck Girder
	RO/RO	Roll On / Roll Off
	ROA	Return on Assets
	ROE	Return on Equity
	ROI	Return on Investment
	RRTS	Road Ro-Ro Terminal System
S	SBMA	Subic Bay Metropolitan Authority
	SC	Steering Committee
	SLDP	Sustainable Logistics Development Program
	SONA	State of Nations Address
	SRNH	Strongly Republic Nautical Highway
T	TEU	Twenty Feet Equivalent Unit
	TMO	Terminal Management Office
	TOR	Terms of Reference
U	USAID	US Agency for International Development
V	VAT	Value Added Tax
	VOC	Vehicle Operating Cost

Executive Summary

1. Background and Objective of the Study

Maritime Transport is playing a vital role in the Philippines, an archipelagic country. The Department of Transportation and Communications (DOTC) has been making efforts to promote and upgrade the maritime transport. It has conducted a series of development studies: Cebu Integrated Port Development Study (2002), Master Plan for the Strategic Development of National Port System (2004), Domestic Shipping Development Plan (2005), and Southern Philippine Intermodal Transport Development Project (2006). In the course of these studies, DOTC has been taking steps to realize its proposal of a RoRo transport network between Luzon and Mindanao via Mindoro, Panay and Negros islands. The Strong Republic Nautical Highway (SRNH) became a reality in 2003.

Since the operation of SRNH started, the advantage of the RoRo transport system has been understood widely among public and private sectors. The government of the Philippines took steps to promote the RoRo transport system further by issuing Executive Order (EO) 170 in 2003, which aimed at the development of the Road RoRo Terminal System (RRTS) and directed those agencies concerned to establish procedures to facilitate the RoRo transport service. The development of three Nautical Highways, i.e., the Eastern, Central and Western Nautical Highways are one of the priority projects in the Medium-Term Philippine Development Plan (2004-2010).

The objectives of the study are:

(1) Selection of RRTS routes to be developed by 2015,

(2) Selection of RoRo Terminals on the selected Routes

(3) Implementation of the Feasibility Study of 15 RoRo Terminals ports.

2. Premise of the Study

The study shall be conducted on the basis of the policies and the achievements of the following development plans and studies:

(1) Medium-Term Philippine Development Plan (MTPDP) 2004-2010

(2) The Study on the Master Plan for the Strategic Development of National port System, 2004 (National Port Master Plan)

(3) Domestic Shipping Development Plan, 2005 (DSDP),

(4) EO 170, 170A and 170B

3. Outline of Study

3.1 Concept of RRTS

The National Port Master Plan classified the RoRo port into four categories in accordance with their roles and functions (see Figure 1):

(1) Maritime Trunk Routes

The long-distance inter-island maritime transport routes connecting Luzon and Mindanao Islands via Visayas Region. There are two routes; Manila - Cebu - North Mindanao, and Western route; Manila-Iloilo/Bacolod - Western Mindanao - South Mindanao

(2) RoRo Routes for Mobility Enhancement in the Regions

a. North - South RoRo trunk routes (Nautical Highways)
b. East-west complementary routes between the North-south trunk routes

(3) Remote Island Link

(4) Feeder Link (Social reform related RoRo link)

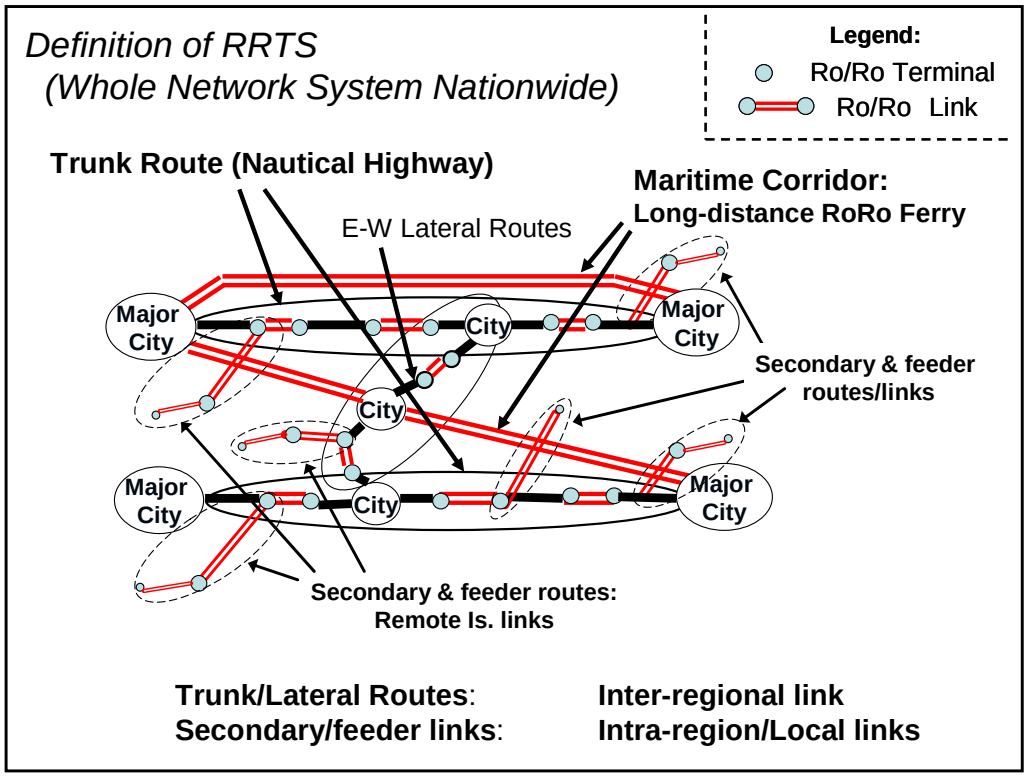


Figure 1 Hierarchy of RRTS Routes

Among these four categories, the study focuses on the second category.

3.2 Present Situation of RoRo Transport

As of August 2007, two Nautical Highways are operational over the full lengths.

(1) Pan-Philippine Highway

Manila - Matnog (Southern Luzon) - Allen (Samar Is.) - (Bridge) - Liloan (Leyte Is.) - Lipata (North Mindanao)

(2) Strong Republic Nautical Highway

Manila - Batangas - Calapan (Mindoro Is.) Roxas - Caticlan (Panay Is.) Iloilo - Bacolod (Negros Is.) - Dumaguete - Dapitan (North Mindanao)

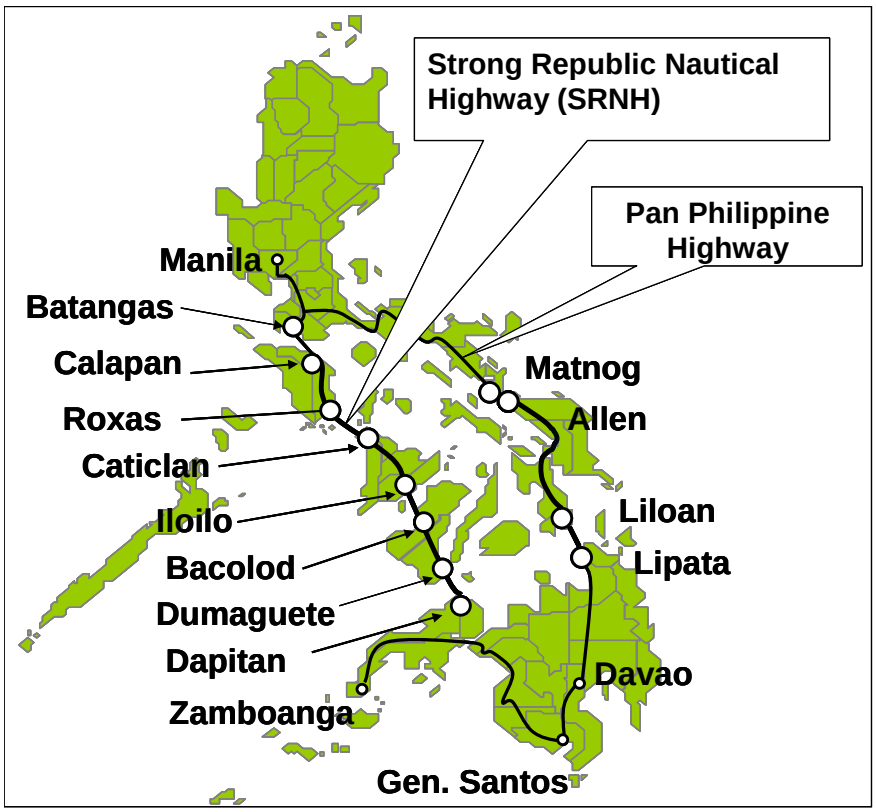


Figure 2 Existing RoRo Trunk Routes

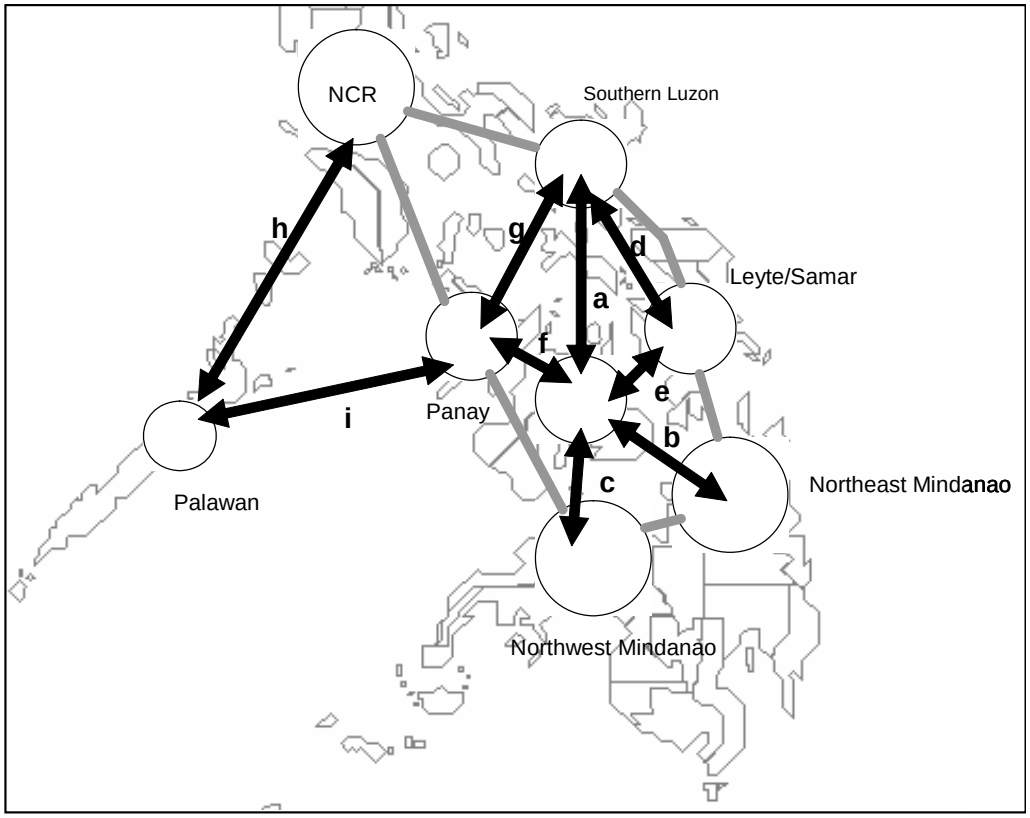
3.3 Basic Concept Employed in the Selection of RRTS Routes

The study aims at mobility enhancement in the regions. Figure 3 shows the geographic locations of Visayas and adjacent regions and under developed RoRo links under development.

a) Cebu Is. - Masbate Is. - Southern Luzon
b) Cebu Is. - Bohol Is. - North Mindanao
c) Cebu Is. - Negros Is. - North Mindanao
d) Southern Luzon - Masbate Is. - Leyte/Samar Is.
e) Cebu Is. - Bohol Is. - Leyte/Samar Is.
f) Cebu Is. - Negros Is. - Panay Is.
g) Panay Is. - Masbate Is. - Southern Luzon

a) through c) correspond to the Central Nautical Highway indicated in MTPDP that connect Southern Luzon - Masbate Is. - Cebu Is. - North Mindanao, d) corresponds to a part of the Eastern Nautical Highway, e) through g) compose the East- west links proposed by DOTC. In addition, the following two links correspond to the Palawan links, which were proposed in the National Port Master Plan,

h) Batangas - Palawan
i) Iloilo - Palawan



Source: Study Team

Figure 3 Underdeveloped Inter-Regional RoRo Links

4. Selection of RRTS Routes and RoRo Links to be Developed and RoRo Terminals that require Feasibility Studies

4.1 Selection of RRTS Routes for Priority Development

The above mentioned Inter-regional links “a” through “i” are grouped into the following eight routes in accordance with the actual cargo and passenger flows. These eight routes are called the Strong Nautical Highways (SRNH) taking after the name of the Western Nautical Highway.

(1) SRNH 1 Eastern Nautical Highway (Pan-Philippine Highway)

The existing East trunk route

-Eastern Nautical Highway Extension

The route interconnects Leyte Is. and Sorsogon Province via Biliran and Masbate Islands.

(2) SRNH 2 Western Nautical Highway

The existing west trunk route that extends from Batangas to Dapitan in Mindanao via Mindoro, Panay, and Negros Islands.

(3) SRNH 3 Central Nautical Highway

The route is comprised of three links a, b, c as shown in Figure 3, and extends from Legaspi to North Mindanao via Masbate, Cebu and Bohol Islands.

-Central Nautical Highway Extension

Link c that passes from West Mindanao to Cebu City via Negros is included in the Central Nautical Highway as its extension.

(4) SRNH 4 Negros – Southern Leyte Nautical Highway

The route denoted by e and f in Figure 3 interconnects Negros and Southern Leyte regions. It extends from Bacolod City in Negros to the Eastern SRNH in Southern Leyte via Cebu, Bohol Islands.

(5) SRNH 5 Panay – Leyte Nautical Highway

The route denoted by e and f in Figure 3, passes the northern part of Visayas island: from Roxas City in Panay Is. to Tacloban in Leyte Is. via Negros and Cebu Islands.

(6) SRNH 6 Panay – Masbate Nautical Highway

This route corresponds to link g in Figure 3. It extends from Roxas City to Masbate City where it merges with the Central SRNH.

(7) SRNH 7 Batangas – Palawan Nautical Highway

This route corresponds to link h in Figure 3. It extends from Batangas City to Puerto Princesa in Palawan via Mindoro Is. and Busuanga Is.

(8) SRNH 8 Iloilo – Palawan Nautical Highway

This route corresponds to c in Figure 3. It connects Taytay (Palawan Is.) and Iloilo (Panay Is.) via Cuyo Island. It merges with Western SRNH at Iloilo

4.2 Selection of RoRo Links on the Eight SRNH

The eight routes are conceptual routes and include several alternative RoRo links. The advantages and disadvantages of the alternative RoRo links have been examined from the following viewpoints. Those links evaluated to be the most competitive are chosen.

a. Distance of sea link
b. Traffic volume: existing and potential
c. Existing situation of port facilities, access road and social/environmental impacts
d. Opinion of RoRo Ferry operators
e. Current port administration: PPA, CPA, LGU or Private operator

Table 1 summarized the selected RoRo terminals on the SRN. The locations of the selected RoRo terminals are shown in Figure 4.

Table 1 Selected RoRo Terminals and the Selection of RoRo Ports for Feasibility Study

No.	RRTS Route	Port[1]		Administration	Connection	Port	RoRo Service	Proposal	Freq.	Ramp	F/S Category
1	Easter SRNH	Matnog	Sorsogon	PPA	Allen/San Isidro		Operational	PPA Pre-F/S	18/day	3	
		Allen/Dadap	Northern Samar	Private	Matnog		operational		18/day	3	
		Liloan	Southern Leyte	PPA	Lipata		operational		4/day	3	
		San Ricardo	Southern Leyte	PPA	Lipata	New	Not yet in service	PPA Pre-F/S	-	None	
		Lipata	Surigao del Norte	PPA	Liloan/San Ricardo		operational	PPA Pre-F/S	4/day	3	
	Eastern SRNH. E	**Naval**	Biliran	PPA	Esperanza	Improve.	Not yet in service		-	None	**1**
2	Central SRNH	**San Antonio**[3]	Pilar, Sorsogon	PPA	Masbate	New	Not yet in service	PPA Pre-F/S	-	None	**1**
		Masbate		PPA	San Antonio		To Cebu/Lucena		3/wk each	2	
		Esperanza[3]	Masbate	(PPA)	Daanbantayan/Bogo	New	Not yet in service	SONA	-	None	**1**
		Daanbantayan	Cebu	LGU	Esperanza	New	Not yet in service		-	None	**1**
		Cebu	Cebu	CPA	Tubigon		operational			5	
		Tubigon	Bohol	PPA	Cebu		operational		7/day	2	
		Jagna	Bohol	PPA	Balingoan/CDO/Nasipit		operational		3/week	1	
		Balingoan	Misamis Oriental	PPA	Jagna		operational		3/day	2	
		Cagayan de Oro	Misamis Oriental	PPA	Jagna		operational		3/week	2	
		Nasipit	Agusan del Norte	PPA	Jagna		operational		3/week	3	
	Central SRNH Ext	Mainit (Santander)	Cebu	Private	Sibulan (Dumaguete)		operational		3/day	2	
		Matiao (Santaande	Cebu		Tampi (Dumaguete)		operational		6/day	2	
3	Western SRNH	Batangas	Batangas City	PPA			operational		26/day	8	
		Calapan	Mindoro Oriental	PPA			operational		26/day	8	
		Roxas	Mindoro Oriental	PPA			operational		6/day	1	
		Caticlan	Antique	LGU	Roxas	New	operational		4/day	1	**2**
		Dumangas	Iloilo	PPA	Bacolod	Improve.	operational		2/day	1	**2**
		Bacolod (BREDCO	Negros Occidental	Private	Dumangas		operational		4/day		
		Dumaguete	Negros Oriental	PPA	Dapitan		operational		4/day	1	
		Siaton[2]	Negros Or.	PPA	Dapitan	New	None	Fund requested	-	None	
		Dapitan	Zamboanga del Norte	PPA	Dumaguete/Siaton		operational		4/day	2	
4	Negros Southern Leyte SRNH	San Carlos	Negros Occ.	PPA	Toledo		operational		8/day	3	
		Toledo	Cebu	CPA	San Carlos	Improve.	operational		8/day	1	**2**
		Pt. Engano	Cebu	CPA	Getafe	Improve.	operational		3/day	1	**2**
		Getafe	Bohol	PPA	Pt. Engano	Improve.	operational		3/day	1	**2**
		Ubay	Bohol	PPA	Bato/Maasin	Improve.	operational		2/day	2	**2**
		Bato	Leyte	Private	Ubay		operational				
		Maasin[3]	Southern Leyte	PPA	Ubay		To and from Cebu	SONA		1	
5	Panay Leyte SRN	**Culasi, Ajuy**	Iloilo	Private/CPA	Victorias		None		-	None	**2**
		Cadiz	Negros Occ.	LGU			None		-	None	
		Escalante	Negros Occ.	LGU	Tabuelan		RoRo operational		3/day	2	
		Tabuelan	Cebu	Private/CPA	Escalante		RoRo operational		3/day	1	**2**
		Bogo	Cebu	CPA/LGU	Palompon		None		-	2	**2**
		Palompon	Leyte						-	1	
6	Panay Masbate SRNH	**Balud**	Masbate	LGU	Culasi, Roxas	New	None		-	None	**1**
		Aroroy[2,3]	Masbate	PPA	San Antonio		None	SONA,Fund Reqtd	-	None	
7	Batangas Palawa	San Jose[2]	Mindoro	PPA	Coron/Taytay		From Batangas	Fund requested	-	1	
		Coron	Palawan	PPA	San Jose/Taytay				-		
	SRNH	**Taytay**[2]	Palwan	PPA	Coron	New	None	Fund requested	-		**1**
8	Iloilo Palawan SRNH	San Jose de Buenavista	Aklan	PPA	Cuyo/Taytay		None		-	1	
		Cuyo	Palawan	PPA	Taytay/S. Jose de B. Vista				-	1	

Legend

1	RoRo Terminals along the RRTS Trunk and Complementary Routes
2	PPA 8 ports under evaluation of NEDA for Funding
3	SONA ports

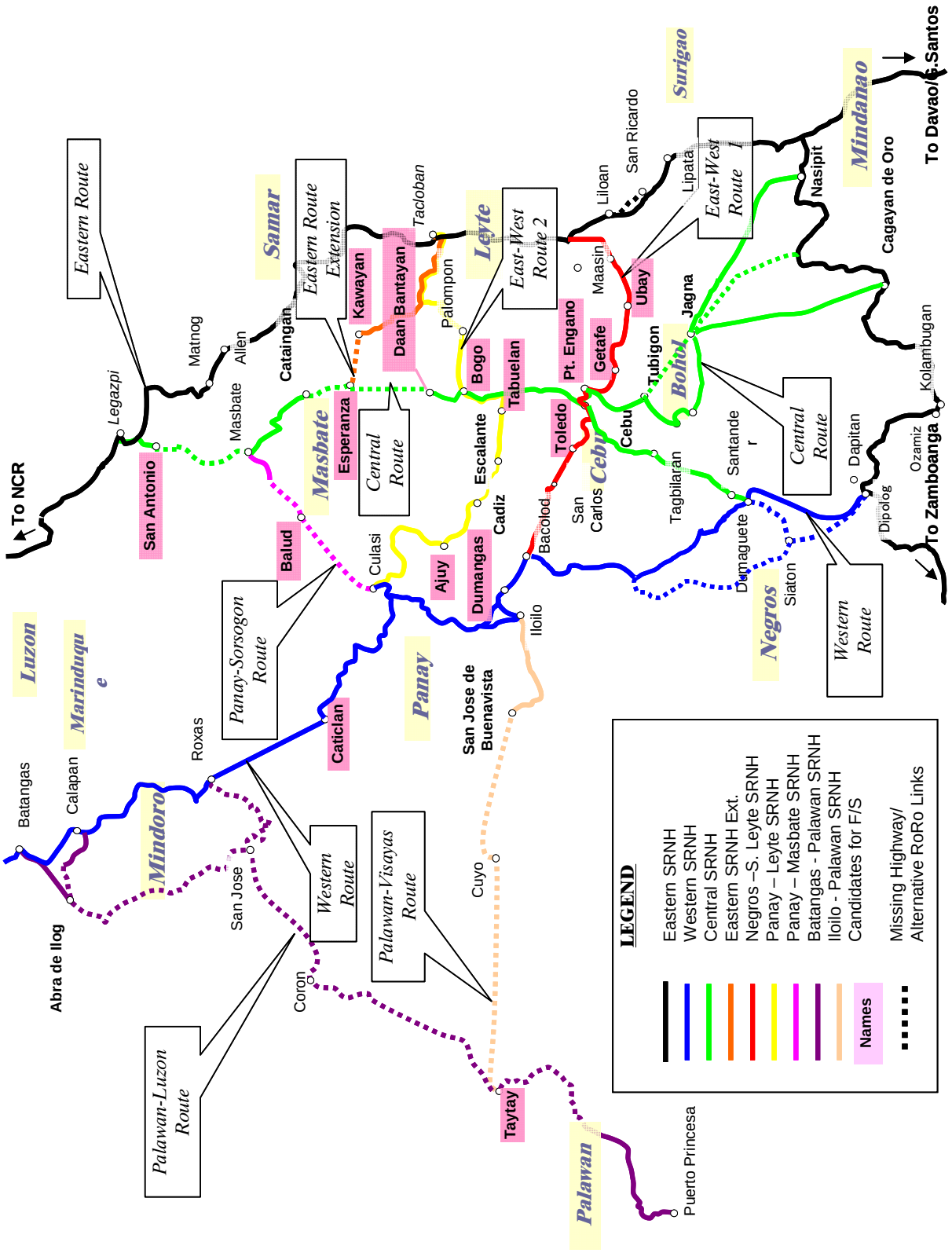


Figure 4 Selected SRNH Route and RoRo Terminals

4.3 Selection of RoRo Terminals for Feasibility Study

The above selected SRNH routes compose the arterial routes of RRTS and, therefore, the government is responsible for leading the development. The study is intended to identify and propose the projects that should be implemented by the government by 2015. Thus, prior to the formulation of the projects, the feasibility of the development plans of all the RoRo ports composing SRNH should be evaluated.

Accordingly, 15 ports for the feasibility study have been selected in the light of the following criteria (see Table 1).

- Category 1: New RoRo ports on New SRNH which do not have development plans
- Category 2: New or existing Ports that requires large scale investments and that have no development plans

5. Traffic Forecast

The traffic forecasts estimated for the year 2009 and 2024 presented in the National Port Master Plan have been employed for the traffic forecast in 2015. The results are listed in Table 2.

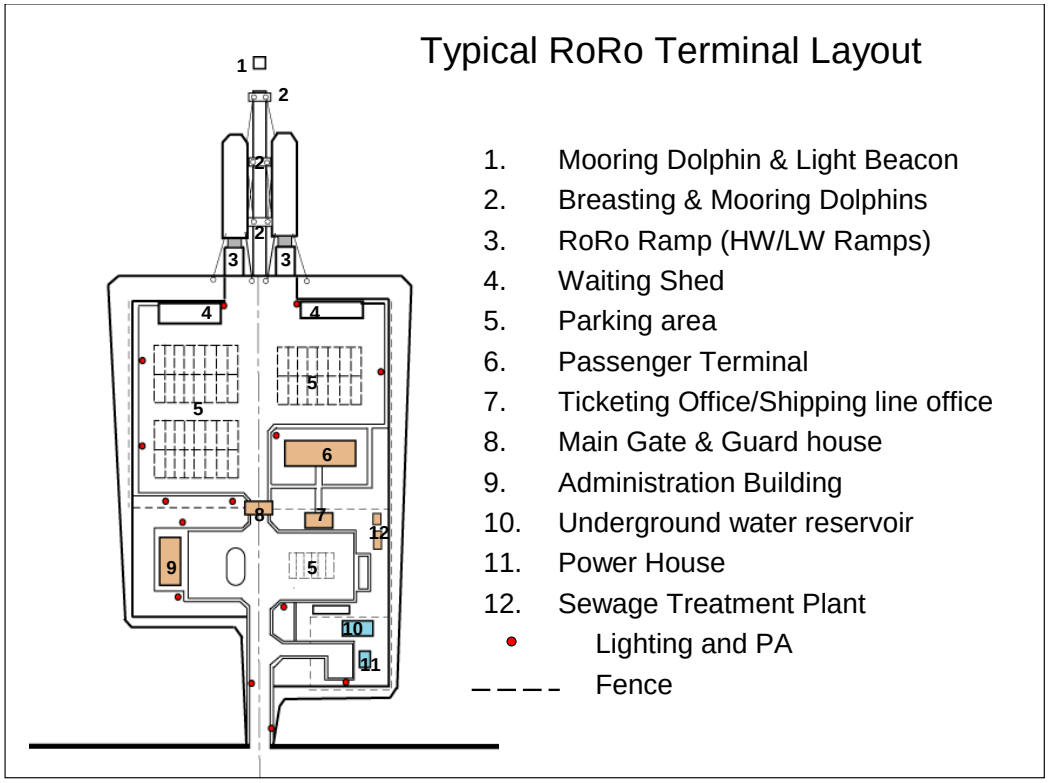
Table 2 Cargo and Passenger Forecast

Route	RoRo Ferry Link	Cargo (t)		Passenger (Pax)	
		2005	2015	2005	2015
Eastern SRNH	Matnog- Allen	1,772,017	3,373,467	1,594,887	2,957,478
	Liloan, San Ricardo- Lipata	366,110	647,039	435,499	769,309
Eastern SRNH Extension	San Andres - Masbate	21,840	42,048	85,127	168,085
	Esperanza - Kawayan	97,500	185,615	104,300	193,409
Western SRNH	Batangas – Calapan	651,779	1,059,154	1,123,086	1,796,554
	Roxas – Caticlan	163,061	338,426	652,769	1,026,903
	Iloilo, Dumangas - Bacolod	190,442	518,280	220,320	346,431
	Dumaguete, Siaton - Dapitan	132,296	276,623	519,308	806,469
Central SRNH Route	Pilar, San Antonio – Masbate	161,700	311,317	360,600	712,011
	Esperanza – Daanbantayan	157,900	294,319	206,600	344,465
	Cebu - Tubigon	105,860	191,015	1,444,945	2,028,412
	Janga - Balingoan	214,415	372,725	118,800	151,852
	Benoni, Guinsiliban - Balingoan	22,756	38,104	386,287	449,186
Negros Southern Leyte SRNH	San Carlos - Toledo	114,285	253,790	265,266	394,171
	Pt. Engano - Getafe	114,285	206,217	164,427	230,822
	Ubay - Maasin	155,235	286,106	137,925	215,736
	San Ricardo - Lipata	366,110	647,039	435,499	769,309
Panay Leyte SRNH	Ajuy – Cadiz, Victorias	74,300	202,204	131,400	206,613
	Escalante - Tabuelan	152,336	338,289	159,860	237,544
	Bogo - Palompon	114,400	210,845	149,857	234,399
Panay Masbate SRNH	Culasi - Balud	62,000	142,131	74,700	131,708
Batangas Palawan SRNH	San Jose - Coron - Taytay	147,400	231,550	121,000	190,442
Iloilo Palawan SRNH	San Jose de Buenavista - Cuyo - Taytay	142,500	295,752	71,500	112,480

Source: Study Team

6. Layout Plan of RoRo Terminals

A standard layout plan that includes all the necessary facilities have been employed for the RoRo terminals of SRNH (see Figure 5). For the newly developed Terminals, the standard berth was placed at the locations where the water depth of at the RoRo ramp is deep enough for the design ships. For the expansion of the existing RoRo ports, the layout plan has been modified so that the existing facilities are fully utilized and only those lacking have been added. For the RoRo ports that are exposed to open sea, breakwaters are added to the standard layout plan.



Source: Study Team

Figure 5 Standard Layout of RoRo Terminal

7. Economic Feasibility Evaluation

7.1 Methodology

The economic feasibility evaluation has been carried for route by route instead of link by link because the economic benefits are generated only when the routes are operational over the full lengths. The cost components include not only construction costs and maintenance costs of port and highway infrastructures but also the costs of ship procurement and operation costs.

The following cost components are employed in the economic analysis:

- Port and Highway construction costs: Estimated costs were converted to the economic costs (see Table 3). The construction costs of highways are estimated for gravel road.
- Annual maintenance costs: 1% of initial construction costs of ports and highways and 5% of ship procurement cost.
- Annual ship operation cost: P 20million for 500 GRT ships and P102million for 2,000 GRT ships. The annual operation costs include ship lease cost over the first 20 years.
- The project life is assumed to be 25 years.

Table 3 Economic Price of Project and RoRo Vessels Procurement Costs

Route	Link	Economic Cost (1,000 pesos)	
1. Western SRNH	Batangas – Calapan – Roxas – **Caticlan** –	Construction Cost of Caticlan Port	***P418,021***
		Purchase Cost of 11 RoRo Vessels (500 GRT)	***P1,130,738***
	Dumangas – Bacolod – Dumaguete, Siaton -	Construction Cost of Dumangas Port	***P98,532***
		Purchase Cost of 9 RoRo Vessels (500 GRT)	***P641,413***
2. Central SRNH	**San Antonio**– Masbate– **Esperanza** – **Daan Bantayan** – Cebu	Construction Cost of San Antonio Port, Esperanza Port and Daan Bantayan	***P943,305***
		Purchase Cost of 17 RoRo Vessels (500 GRT)	***P1,745,700***
		Gravel Pavement Construction Cost	***P203,067***
3. Eastern SRNH Ext.	San Antonio - Masbate- Esperanza - **Naval**	Construction Cost of Naval Port	***P128,395***
		Purchase Cost of 5 RoRo Vessel (500 GRT)	***P595,125***
4. Negros-S. Leyte SRNH	Bacolod - San Carlos - **Toledo** -	Construction Cost of Toledo Port	***P204,544***
		Purchase Cost of 3 RoRo Vessels (500 GRT)	***P317,400***
	Pt. Engano - **Getafe**- **Ubay** - Maasin- San Ricardo -	Construction Cost of Pt. Engano, Getafe and Ubay Ports	***P656,762***
		Purchase Cost of 11RoRo Vessel (500 GRT)	***P1,051,388***
5. Panay-Leyte SRNH	**Ajuy** – Cadiz– Escalante - **Tabuelan** – **Bogo** -	Construction Cost of Ajuy, Tabuelan and Bogo Ports	***P640,208***
		Purchase Cost of 13 RoRo Vessels (500 GRT)	***P1,196,863***
6. Panay - Masbate SRNH	Culasi - **Balud**	Construction Cost of Balud Port	***P345,423***
		Purchase Cost of 3 RoRo Vessel (500 GRT)	***P347,156***
		Gravel Pavement Construction Cost	***P270,756***
7. Batangas-Palawan SRNH	San Jose – Coron – **Taytay**	Construction Cost Taytay Port (50% of total cost) and San Jose Port	***P782,409***
		Purchase Cost of 3 RoRo Vessel (2,000 GRT)	***P981,956***
		Gravel Pavement Construction Cost	***P67,689***
8. Iloilo-Palawan SRNH	San Jose de Buenavista – Cuyo– **Taytay**	Construction Cost Taytay Port (50% of total cost) and San Jose de	***P303,409***
		Purchase Cost of 3 RoRo Vessel (2,000 GRT)	***P981,956***
		Gravel Pavement Construction Cost	***P67,689***

7.2 Benefits of Projects

Economic benefits consist of quantifiable and non-quantifiable benefits.

1) Benefit elements for quantitative evaluation

There are three basic elements of economic benefits, i.e. reduction of travel time, reduction of transport cost and reduction of spoilage/pilferage. These three benefit components are generated by the following elements.

-Reduction of cargo transport cost

-Reduction of passenger travel time

-Saving of vessel fuel cost by RoRo vessel system

-Reduction of cargo damages, pilferage and robbery cost by security and safety facilities

-Reduction of vessel operation cost by smooth mooring operation system

-Reduction of vehicle operation cost in smooth access road and adequate parking area system

-Reduction of suspension of shipping services

-Passenger suspension time reduction

-Saving vehicle operation costs (VOCs) in terms of running cost, fixed costs and time costs

2) Benefits for qualitative evaluation

In addition to the quantitative benefit, the following indirect benefits will be generated.

-Reduction of investment cost for storage or warehouse and cargo handling equipment.

-Promotion of logistics business

-Promotion of market of high value perishable agricultural or fish products with shorter travel time.

-Promotion of service businesses at the port and along the connecting highways

-Encourage travel and promotion of tourism businesses.

-Promotion of shipbuilding and improvements in ship maintenance

-Improvement of maritime transport safety

7.3 Evaluation of Economic Feasibility

Economic Internal Rate of Return (EIRR) has been calculated by SRNH routes as the difference in the costs and benefits between with and without cases.

Table 4 Economic Internal Rate of Return (EIRR)

SRNH	Route (RoRo links)	EIRR	Sensitivity Analysis								
		Base Case	Cost	0%	0%	10% up	20% up	10% up	10% up	20% up	20% up
			Benefit	-10%	-20%	0%	0%	-10%	-20%	-10%	-20%
1. Eastern SRNH Ext.	San Antonio - Masbate- Esperanza - Naval	28.6%		25.2%	21.5%	25.5%	22.7%	22.2%	18.6%	19.5%	16.1%
2. Western SRNH	Batangas – Calapan – Roxas – Caticlan – Iloilo	15.4%		13.2%	9.7%	13.4%	10.9%	10.3%	6.8%	7.7%	4.0%
	Iloilo-Dumangas – Bacolod – Dumaguete, Siaton - Dapitan	88.9%		78.8%	68.1%	79.8%	71.7%	70.1%	59.7%	62.4%	52.4%
3. Central SRNH	Legaspi-San Antonio– Masbate– Esperanza – Daan Bantayan – Cebu	19.4%		17.1%	14.7%	17.3%	15.5%	15.2%	12.8%	13.4%	11.1%
4. Negros-S. Leyte SRNH	Bacolod - San Carlos - Toledo - Cebu	22.8%		19.5%	16.2%	19.8%	17.3%	16.8%	13.7%	14.4%	11.5%
	Cebu-Pt. Engano - Getafe- Ubay - Maasin- San Ricardo - Lipata	22.2%		19.2%	16.1%	19.5%	17.1%	16.7%	13.8%	14.5%	11.7%
5. Panay-Leyte SRNH	Roxas-Ajuy – Cadiz– Escalante - Tabuelan – Bogo - Palompon -Tacloban	37.1%		32.7%	28.1%	33.1%	29.6%	28.9%	24.7%	25.8%	21.8%
6. Panay - Masbate SRNH	Roxas - Culasi - Balud - Masbate	34.8%		32.0%	29.1%	32.3%	30.1%	29.6%	26.8%	27.5%	24.9%
7. Batangas-Palawan SRNH	Batangas - Abra de Ilog - San Jose – Coron – Taytay - Puerto Princesa	16.4%		14.1%	11.6%	14.3%	12.4%	12.0%	9.6%	10.2%	7.8%
8. Iloilo-Palawan SRNH	Iloilo - San Jose de Buenavista – Cuyo– Taytay	51.3%		46.3%	41.0%	46.8%	42.8%	42.0%	36.9%	38.2%	33.2%

As indicated in Table 4, EIRR is larger than 15%, which is the hurdle value in the evaluation. The projects are assessed to be economically feasible.

8. Financial Analysis

The financial analysis has been carried out for individual RoRo terminals. The base case employed the current tariff system. In addition, sensitivity analyses have also been carried out for the following nine cases to assess the financial feasibility and examine possible funding schemes:

Case 1 : The project cost increases by 10%

Case 2 : The revenue decreases by 10%

Case 3 : The project cost increases by 10% and the revenue decreases by 10%

Case 4 : Increases by 10% of the tariff rate is assumed every 5 year after 2010

Case 5 : Double price of the tariff rate is assumed after 2010

Case 6 : 20% of project cost subsidized by the government

Case 7 : 40% of project cost subsidized by the government

Case 8 : Traffic volume increases by 10%

Case 9 : Traffic volume increases by 20%

The results are shown in Table 5.

Table 5 Financial Analysis (FIRR)

Name of Port	FIIR (%) Case									
	Base case	1	2	3	4	5	6	7	8	9
San Antonio	3.3	2.7	2.6	2.0	5.9	8.0	4.7	6.6	3.9	4.4
Esperanza	3.5	2.9	2.8	2.2	6.2	8.5	5.0	7.1	4.2	4.8
Daanbantayan	-	-	-	-	3.0	4.8	1.8	3.6	-	1.5
Naval	3.1	2.5	2.4	1.8	5.7	8.0	4.6	6.6	3.7	4.3
Balud	-	-	-	-	-	-	-	-	-	-
Ajui	1.5	-	-	-	4.1	6.2	2.9	4.7	2.1	2.6
Tabuelan	0.8	-	-	-	3.5	5.9	2.3	4.3	1.4	2.0
Bogo	1.5	0.9	-	-	4.2	6.6	3.0	4.9	2.1	2.7
Caticlan	-	-	-	-	2.7	4.8	-	2.3	-	-
Dumangas	4.8	4.3	4.2	3.7	9.7	17.4	6.0	7.5	5.3	5.8
Toledo	-	-	-	-	2.3	4.8	-	1.7	-	-
Pt.Engano	-	-	-	-	-	2.6	-	-	-	-
Getafe	-	-	-	-	2.1	4.6	-	1.5	-	-
Ubay	-	-	-	-	2.2	4.6	-	1.7	-	-
Taytay	3.9	3.2	3.1	2.5	6.6	9.3	5.5	7.8	4.6	5.2
Package A	1.8	1.2	1.1	-	4.4	6.5	3.2	5.2	2.4	3.0
Package B	-	-	-	-	3.4	5.9	1.4	3.1	-	-
15 Ports	-	-	-	-	3.8	6.2	2.2	4.0	1.4	2.0

As seen in Table 5, only four terminals attain FIRR higher than 2% as far as the current tariff system is employed. Thus, either an increase of tariff (see Case 4 and 5) or government subsidies is needed to make the projects financially viable.

Assuming that the operation cost should be paid by revenue and the government subsidies are provided up to the extent that the FIRR exceeds 2%, the amounts of subsidies have been computed. The results are shown in percentage terms on the initial construction costs (see Table 6).

Table 6 Amount of Subsidy needed to Attain FIRR 2%

Name of Port	Government subsidy (Percentage on construction cost)
	Adjustment of FIRR; 2.0%
Daanbantayan	30.0%
Balud	84.5%
Ajuy	12.0%
Tabuelan	22.0%
Bogo	12.0%
Caticlan	48.0%
Toledo	54.0%
Pt.Engano	74.5%
Getafe	58.0%
Ubay	55.0%

In this way, if port tariffs are not revised, it is necessary to include Government subsidies shown in Table 6 among initial investment costs. In the development of a RoRo terminal, government subsidizes the facilities shown in Table 7. Port management body bears other construction costs and

maintenance / operating cost using its own revenue.

In principle, PPA, CPA develops basic facilities by Government subsidies and port management body develops operation facilities using port fees.

Table 7 Facilities that should be Covered by Subsidy

	Basic facilities				Operation facilities						
Item	Marine Works	Navigational Aids	Berthing Facilities	Civil Works	Utilities Works	Electrical Works	Lightings	Appurtenant Works	Access Road	Building Works	RORO Ramp, Fender
Daanbantayan	■										
Balud	■	■	■	■	■	■	■	■			
Ajuy	■										
Tabuelan	■										
Bogo	■										
Caticlan	■										
Toledo	■	■	■	■							
Pt.Engano	■	■	■	■	■	■					
Getafe	■	■	■	■	■						
Ubay	■	■	■	■							

9. Social and Environmental Considerations

In the course of the study, IEE check lists have been prepared for 21 ports based on the field surveys. The results have been fed back during the stage of the selection of RoRo terminals. When social and environmental impacts are expected to be substantial, alternative ports have been chosen. Thus, social and environmental impacts caused by the development of the 15 selected RoRo terminals are assessed to be manageable.

10. Project Proposal

SRNH's are effectively utilized only when they are operational as the transport network. Thus, the development of RoRo terminal should be done in a package. The study proposes to implement the project in three packages:

- Package A: six terminals on the SRNH connected to Masbate Is.

  San Antonio, Balud, Esperanza, Naval, Daan Bantayan, Taytay

  Total project cost: P 2,472 million

- Package B: nine terminals on other SRNH

  Dumangas, Culasi/Ajuy, Toledo, Tabuelan, Bogo, Punta Engano, Getafe, Ubay, Caticlan/Tabon

  Total project cost: P 3,080 million

- Package C: Three sections of highways

  Esperanza-Cataingan Highway (Masbate Is.)

  Balud - Milagros Highway (Masbate Is.)

  Taytay Terminal Access Road (Palawan Is.)

  Total project cost: P 780 million

11. Conclusions and Recommendations

11.1 Conclusions

The priority routes proposed in the study were not selected based on the grounds that each of them has great potential in terms of future traffic demand but that collectively they can form an effective nationwide trunk traffic network. As the proposed trunk traffic network is considered to be able to cope effectively with traffic demand to be generated among regions and islands all over the country at least in the coming three decades, the most important step to be taken is to develop this trunk traffic network as soon as possible recognizing that this network is one of the most basic and indispensable national infrastructures to support social/economic development of the nation.

The improvement and development of the fifteen RORO terminals proposed in the study should be followed by the improvement of the other RORO terminals on the priority routes to ensure that all terminals meet the same structural standards. At the same time, it is also necessary to improve the existing roads and highways continuously. Only through these efforts can transport safety, environmental preservation and a reduction in transport time be realized, thereby enhancing the social and economic development of the nation as a whole.

The traffic routes which can not be covered by the above-mentioned efforts are those which connect small remote islands, those which cater to local traffic demand within regions and those used exclusively for industrial purposes. Different from the above-mentioned trunk traffic routes, it is considered appropriate that these traffic routes be developed mainly by the related LGUs and private entities.

Regarding the sharing of roles between public and private entities, it is proposed in the study that the improvement and development of roads, highways, ports and RORO terminals should basically be the responsibility of the former while the procurement, management and operations of RORO vessels should be the responsibility of the latter with supportive measures from the government. However, our proposal does not include details of the procurement, management and operations of RORO vessels. This is because representatives of RORO vessel operators could not reach a consensus on desirable supportive measures from the government and their own business plans. In the economic analysis of the priority routes and financial analysis of RORO vessel operations, therefore, the procurement cost for RORO vessels was calculated under the assumption that existing RORO vessels will be fully utilized in order to minimize the procurement cost of RORO vessels. For this reason, RORO vessels to be introduced are assumed to be mainly 500GRT class, but needless to say, vessel size should increase according to the increase of traffic volume and the greater profitability of RORO vessel operations in future.

11.2 Recommendations

DOTC shall try to promote the following policy issues on its own initiative.

1) Authorization of the National Nautical Highway Network

The National Nautical Highways proposed in the study are highly important national transport infrastructure for unifying the whole land of the Philippines.

It is important for the government of the Philippines, therefore, to authorize the proposed highways and RoRo links which form the National Nautical Highway Network as “The National Nautical Highways” and “The National Nautical Highway RoRo Links” and declare them in the government policy as the priority projects for government investment in the coming ten years.

2) Formulation of a System to Approve New National Nautical Highway RoRo Links

It is recommendable for the government of the Philippines to formulate a system to approve new RoRo terminal projects and RoRo vessel services being proposed now and that will be proposed in future by PPA, CPA, LGU and private entities (in addition to the projects on the links proposed in the study).

In this case, the criteria to be applied for the approval of such new projects should be based on whether the projects meet the technical/managerial standards prepared by the government and whether the offered new terminals can contribute to expanding and strengthening the National Nautical Highway Network proposed in the study.

3) Scheme to Implement the Infrastructure Projects Proposed in the Study

Given the great importance of national transport infrastructure, it is considered appropriate that government agencies directly implement the infrastructure projects (with the exception of RoRo vessel operations) proposed in the study as follows.

- Highways and Roads: DPWH
- RoRo Terminals: PPA, CPA

  Given the current state of privatization and decentralization, it is also necessary for the government, however, to formulate a system enabling it to entrust the management/operations of RoRo terminals to private entities by lease or concession when they request to manage and operate the terminals for themselves. However, it will be first necessary to carefully examine their business plans.
- DOTC shall be the sole agency responsible for receiving loans to implement the projects

It is recommendable for the government to formulate a system to properly supervise and guide LGUs and private entities which have been entrusted with the management of RoRo terminals (in other words, implemented projects which cannot be taken over by government agencies).

4) Supportive Measures for RoRo Vessel Operators to be Prepared by the Government

Based on the premise that RoRo vessel services will continue to be provided by private entities, it is recommendable for the government to prepare supportive measures for RoRo vessel operators to prevent the lowering of service quality and suspension of operations until an adequate volume of transport is generated. It is also recommendable to prepare suitable measures to prevent a decline in efficiency and sustainability of operations that could arise from excessive competition among RoRo operators. It is required to formulate a system to restrict the provision of excessive tonnage on a RoRo link compared to the actual traffic volume.

Part I

1. Introduction

1.1 Objectives of the Study

The Philippines is a country composed of more than seven thousand large and small islands and has unique geographical characteristics which are not seen in any other country in the world. For not only is the country composed of a large number of islands but it also has a unique geographical configuration in that its two major islands of Luzon and Mindanao are located on the northern and southern ends of the country while most of the other islands are dotted between these two islands.

Another geographical characteristic is that the distance between each of these islands is too great to permit direct connection by subterranean tunnels or long-span bridges and instead require several hours of sailing. This geographical condition has presented various difficulties in planning the nationwide transport network. To form an effective nationwide transport network, an important issue is to determine what type of marine transport is most suitable.

Based on these geographical conditions, the government of the Philippines has introduced the concept of "Road and RoRo Terminal System (RRTS)" and tried to improve the nationwide traffic situation through the construction of more and more RoRo terminals and by encouraging private RoRo operators to provide services on the links connecting these terminals. It would certainly be convenient for the residents in nearby areas to have more RoRo terminals. This way of traffic infrastructure development, however, has various problems. Firstly, unless the government carefully supervises the construction of terminals by LGUs and/or private operators based on a fixed standard, there is a possibility that terminals lacking efficiency, reliability and safety will be constructed one after another, in addition, many more roads must be constructed to provide access to all of these RoRo terminals. And secondly, increasing the number of terminals will lead to a dispersion of traffic and ultimately unprofitable RoRo operations. As a result, it will become difficult at some of these terminals to continuously provide efficient, safe and reliable RoRo services with high service frequency. Accordingly, the economic feasibility of this manner of infrastructure development is rather low.

An alternative way to secure higher economic feasibility is to develop an efficient nationwide trunk traffic network using existing well-maintained highways and a limited number of short-distance RoRo links with standardized RoRo terminals on both ends. Restricting the number of RoRo links involves political problem as it is impossible to satisfy the demands of all LGUs, but in this way a higher level of transport efficiency can be achieved with a lower level of investment.

Based on the above-mentioned idea, the government of the Philippines has designated a series of alternate land and sea routes as Nautical Highways and proposed to cover the whole country with the network composed of such highways. The nationwide trunk traffic network already authorized by the government is composed of four north-south trunk routes (i.e. the Eastern Nautical Highway, the Eastern Nautical Highway Extension, the Central Nautical Highway and the Western Nautical Highway) and several east-west complementary routes. Among these routes, RO/RO operators began operations in 1993 between Mindoro (Roxas) and Panay (Caticlan) islands, and as a result, the Western Nautical Highway is developing as a full-fledged nautical highway with steadily increasing traffic volume at present.

The government of the Philippines is trying to develop each route on the abovementioned planned nationwide traffic network one by one according to the economic and social needs of the country and the region. Based on the abovementioned situation, the objective of the study is firstly to identify the priority routes for development in the coming decade until 2015 from among routes in the authorized nationwide traffic network and propose "the National Nautical Highway Network" composed of such trunk traffic routes. Next, the most suitable RO/RO terminal from among several terminal alternatives on the priority route will be selected, and finally, measures to secure financial

soundness of the RO/RO terminal and RO/RO vessel operations will be examined. The last issue will be very important in terms of government policy to maintain firmly the National Nautical Highway Network as a most basic and important infrastructure of the country.

1.2 Basic Concepts Applied to Select the Priority Routes

(1) The north-south Nautical Highways, the Eastern Nautical Highway and the Western Nautical Highway, are the most important trunk traffic routes of the country. The government of the Philippines must continue to improve these two highways at all costs in accordance with the expected traffic increase in future.

(2) The purpose of developing the priority routes is mainly to facilitate economic and social development of relatively underdeveloped areas such as Sorsogon, Leyte and Bohol by developing traffic routes connecting the above two trunk traffic routes and the Visayas area via Masbate Island and further enhance accessibility to the Palawan area by developing traffic route connecting the Western Nautical Highway and Palawan Island.

(3) The Nautical Highway Network we propose is formed mainly to connect the Visayas area to the above-mentioned two trunk traffic routes via Masbate Island. This network will greatly improve accessibility from the second most important hub of the country, the port of Cebu, as well as from the port of Manila to relatively underdeveloped areas such as Sorsogon, Leyte, Samar, Bohol and North Mindanao. The development of this network, therefore, is expected to contribute greatly to the economic and social development of these areas.

(4) As mentioned above, the port of Cebu located in the center of the Visayas area is the second most important hub of the country in terms of long-distance marine transport following the port of Manila. The port of Cebu must continue to serve as the base port for middle and long-distance transport from domestic and overseas ports in future. It is important, therefore, to continue to improve and develop the port of Cebu at all costs in accordance with the expected traffic increase in future.

(5) In the case of long-distance transport, for example between Luzon and Mindanao, transport means such as long-haul ferry will be much more beneficial in terms of costs and time than using Nautical Highways including many RO/RO links for both cargoes and passengers. In this case, Nautical Highways can not compete with long haul ferries. Therefore, the major purpose of developing Nautical Highways should not be to facilitate long-distance transport. Transport via Nautical Highways should be mainly for shorter distances, two RO/RO links at most. At such a distance, trucks can return to the starting point within a day or at most two minimizing idling time. In the case of long and/or middle-distance transport, long and/or middle haul ferries will remain as strong competitors. The Nautical Highways share the role of domestic transport with middle and long-distance ferries, bunker boats, fast boats and so on to secure the smooth transport of passengers and cargoes throughout the country.

(6) On the Nautical Highways it is necessary to guarantee RO/RO services with appropriate frequency and reliability regardless of profitability of RO/RO operations. It is anticipated that it will be difficult to achieve profitability on the newly opened RO/RO links for at least several years due to the inadequate traffic demand. Accordingly, it will be required to prepare supportive measures including provision of subsidy by the government.

2. Background of the Study

2.1 Historical Studies on Maritime Transport Study in the Philippines

RoRo ferries have been operational since 1970's. In 1983, RoRo ferry service started between Matnog (Luzon Is.) and San Isidro (Samar Is.) and between Liloan (Leyte Is.) and Lipata (Mindanao Is.), and Pan-Philippine became seamless highway from Apari, northern most towns in Luzon Is., and Davao City in Mindanao Is.

RoRo ferries have been thereafter introduced in the short-distance links in Visayas Region and some other areas. To promote the RoRo ferry service further, DOTV has conducted a series of studies and projects. Some of those are:

(1) 1992 Nationwide Roll-on Roll-off Transport System Development Study (DOTC-JICA)

(2) 2000 Social Reform Related Feeder Port Development Project (DOTC-JBIC)

(3) 2001 Bohol Ferry Link and Terminal Feasibility Study (DOTC)

(4) 2001 Development Project for the Trans-Visayas Intermodal Transport Network (DOTC)

(5) 2004 Master Plan for the Strategic Development of the National Port System (DOTC-JICA)

(6) 2005 Domestic Shipping Development Plan (DOTC, MARINA-JICA)

(7) 2005 Projects Proposed by the Development Bank of the Philippines (DBP)

(8) 2006 Inter-modal Transport Development Project for the Southern Philippines (DOTC-ADB)

The study (1) and projects (2) intended to develop individual RoRo links over the country. Those studies after 2001 aimed at developing RoRo ports as a network system. This current study shall make much use of the achievements of these historical studies and projects with updates reflecting resent socioeconomic situation.

2.2 Development Plans and Policies

2.2.1 Medium-Term Philippine Development Plan (MTPDP) 2004 – 2010

1) Ports

The government will prioritize infrastructure projects that are strategic and critical to stimulate trade and investments, such as: (a) RORO ports and the highways connecting them; (b) roads and rail systems that will decongest Metro Manila, the Clark-Subic Highway, and highways that are catalytic to development in Luzon, Visayas and Mindanao; (c) roads and airports to tourism hubs; and (d) affirmative action projects for Mindanao and other highly impoverished conflict-ridden areas.

To further enhance privatization and in support of Executive Order (EO) 170, Promoting Private Sector Participation and Investment in the Development and Operation of the Road Roll-on/Roll-off (RORO) Terminal System, and 170-A, Amending EO 170 to Expand the Coverage of the RORO Terminal System, the Terms of Reference for the privatization of existing government-owned SRNH RORO ports/terminals shall be prepared.

A comprehensive review of the present port tariff system shall be undertaken and consequent development and implementation of a cost-based tariff shall be pursued. The application of the SRNH RORO tariff, which eliminates cargo-handling costs, will be expanded to cover all ports where RORO operations are being carried out.

The nautical highway system introduced in 2003 to maximize the use of the RORO system to transport produce from Mindanao through the Visayas to Luzon has reduced travel time by 10 hours, and reduced costs by 40 percent for passengers and 30 percent for cargo. The project cost of the Nautical Highway is Php 40,000 million.

2) Highways

i) Overall Transport Infrastructure

We will prioritize infrastructure projects that are strategic and critical to stimulate trade and investments, such as the roll-on-roll-off (RORO) ports and the highways connecting them.

To enhance mobility and improve linkage between islands/provide accesses to markets/activity centers, as well as support the agro-fisheries sector, the government shall expand the coverage of the Strong Republic Nautical Highway (SRNH) through the completion of the vital links of the Western, Eastern and Central Nautical Highway.

· **Nautical Highway to Link the Entire Country**

Reduce transport cost from Mindanao through the Visayas to Luzon. The nautical highway system introduced in 2003 to maximize the use of the RORO system to transport produce from Mindanao through the Visayas to Luzon has reduced travel time by 10 hours, and reduced cost by 40 percent for passengers and 30 percent for cargo.

· **Enhancing Tourism Complexes**

Roads leading to major tourism destinations shall be improved ports shall be rehabilitated/upgraded to serve as gateways to tourism complexes.

2.2.2 Institutional Strengthening for the Promotion of RoRo Transportation

1) Executive Orders

i) EXECUTIVE ORDER NO.170 (January 22, 2003)

PROMOTING PRIVATE SECTOR PARTICIPATION AND INVESTMENT IN THE DEVELOPMENT AND OPERATION OF THE ROAD ROLL-ON / ROLL-OFF TERMINAL SYSTEM

· Definition of terms:

-Roll-on/Roll-off or Ro-Ro Operations shall refer to the method of loading and discharging of self-powered vehicles, such as cars, and trucks, on their own wheels by their owners or drivers between vessel and shore via a ramp;

-Ro-Ro vessel shall refer to a ship type or design duly approved for Ro-Ro operations;

-Road Ro-Ro Terminal System (RRTS) shall refer to the network of terminals all over the country, separated by a distance of not more than fifty (50) nautical miles and linked by Ro-Ro vessels; (*1)

-Lane-meter shall refer to one (1) meter of deck with a width of 2.5 to 3.0 meters.

RRTS Toll – The RRTS toll shall consist of the following: (*2)

-A terminal fee levied by the RO-Ro terminal operator on vehicles and passengers for the use of the terminal;

-A passage fee levied by the Ro-Ro vessels operator on self-powered vehicles based on lane-meter;

-A passage fee levied by the Ro-Ro vessel operator on passengers; and

-A berthing fee levied by the Ro-Ro terminal operator on the Ro-Ro vessel for mooring or berthing at the Ro-Ro terminal

· Private Commercial Terminals

The PPA and the CPA shall ensure that Ro-Ro terminals established and constructed through private investments shall be operated as private commercial terminals. The PPA and CPA shall likewise take concrete steps to privatize state-owned Ro-Ro terminals to attract investments in the RRTS.

· Private Sector Financing for the RRTS

The Development Bank of the Philippines shall make available long-term loan/financing to eligible projects and qualified borrowers under its Sustainable Logistics Development Program.

ii) EXECUTIVE ORDER NO.170-A (June 9, 2003)

AMENDING EXECUTIVE ORDER NO. 170 TO EXPAND THE COVERAGE OF THE ROAD ROLL-ON/ROLL-OFF TERMINAL SYSTEM

(*1) of Executive Order No. 170 is amended to read as follows:

"c. Road Ro-Ro Terminal System (RRTS) shall refer to the network of terminals all over the country, regardless of the distance covered and linked by Ro-Ro vessels;"

(*2) of Executive Order No. 170 is amended to add thereto a new paragraph which shall read as follows:

"The RRTS toll shall be applicable to:

-All self-powered vehicles loaded and discharged on their own wheels by their owners or drivers between vessel and shore via a ramp; and

-All vessels to the extent that they are actually engaged in Ro-Ro operations."

The Department of Trade and Industry and the Department of Transportation and Communications (DOTC) are directed to formulate and submit for the approval of the President an incentive program for Ro-Ro vessel and terminal operators in pioneering, missionary, developmental or underdeveloped routes or links.

iii) EXECUTIVE ORDER NO.170-B (September 19, 2005)

Encouraging Further Expansion of The Country’s Road Roll-On/Roll-Off Terminal System (RRTS) And Reduction of Transport Cost Through Increase In The Number of RORO-Capable Pots And Conversion of More Private Non-Commercial Port Operations To Private Commercial Port Operations

· Transport Cost Reduction

The port authorities and Maritime Industry Authority (MARINA) to ensure that the spirit and intent of Executive Order (EO no.170, series of 2003, as amended, to lower the cost of transport is reflected in the Road Roll-On/Roll-Off Terminal System (RRTS) charges, and that the reduction of cargo handling costs is passed on to the users in form of lower freight rates. In no case shall the existing cargo handling charges be retained in any form or manner, such as, change in the nomenclature of the fee/charge, provided that cargo conforms with the prescribed operating norms for RORO where there is no participation and responsibility over the cargo attached to the cargo handler

and/or terminal operator as contemplated in EO 170, as amended.

· Encouraging Conversion to Private Commercial Ports.

All port authorities to allow and encourage the conversion of private non-commercial ports into private commercial ports under the RRTS network. Proximity to and direct competition with a public port shall not be a valid cause for non-approved of any private port conversion; and

· DOTC as Lead Agency

The Department of Transportation and Communications (DOTC) shall coordinate the activities of the aforementioned agencies, monitor their compliance with the directives under this EO and related issuances, seek the cooperation of the private sector and regularly report to the office of the President progress of the government's program to realize the ultimate goal of bringing down transport costs.

2) ADMINISTRATIVE ORDER

i) ADMINISTRATIVE ORDER NO.123 (July 4, 2005)

AUTHORIZING THE SECRETARY OF THE DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS TO PERFORM ALL POWERS AND FUNCTIONS NECESSARY TO CONNECT THE COUNTRY THROUGH THE DEVELOPMENT OF TRANSPORTATION NETWORKS SUCH AS THE ROLL-ON/ROLL-OFF SYSTEM

· Role of the DOTC Secretary.

The DOTC Secretary is hereby authorized to direct, manage and coordinate all activities, mobilize available government agencies concerned for the implementation of the RO-RO System in accordance with applicable laws.

· Cooperation and Support of Government Agencies.

All departments, bureaus, offices and other government agencies and instrumentalities, including government-owned and/or controlled corporations are hereby directed to extend full cooperation, support and assistance to the DOTC and the DOTC Secretary regarding all matters and requests specifically related to and covered by this order.

The following departments, agencies and corporations shall form the core of the interagency group for the development and implementations of RO-RO system with the following composition:

-Secretary, DOTC	-	Chairman
-Administrator, MARINA	-	Co-Vice-Chairman
-General Manager, PPA	-	Co-Vice-Chairman

As members, the following departments/entities shall be included and represented by an Assistant Secretary or an Official of equivalent rank:

-DPWH, DA, DOT, DTI, DILG, DBP

The private sector shall also be included and represented from the following associations:

-Federation of Philippine Industries

-Philippine Chamber of Commerce and Industry

-Distribution Management Association of the Philippines

3) State of Nations Address 2006 (July, 2006)

i) TRANSPORT INFRASTRUCTURE

· Expansion of the nautical highway system

The government pursued the expansion of the Nautical Highway System to maximize the use of Ro-Ro facilities to move passengers and cargo from Mindanao through the Visayas to Luzon.

The travel time from Mindanao through Visayas to Luzon has been reduced by 10 hours and cargo transport cost by 30 percent. All ports and road connections along these Ro-Ro routes are in place, regular services in all routes are being ensured and port facilities are being expanded as needed.

3. Socio-Economic Background Information

3.1 Socioeconomic Situation and Geographical Conditions

3.1.1 Population

The last national census was done in 2000. The population of the Philippines in 2000 was 76,946 thousand and was estimated to be 85,258 thousand in 2005. The annual population growth rate over the five years is 2.05%. It is estimated the annual population growth rate for the period from 2005 through 2010 is 1.95%, that for the period 2010 through 2015 is 1.82% and for the period 2015 through 2020 is 1.64%. With this growth rate, the populations are estimated to be 94 million in 2010, 103 million in 2015 and 112 million in 2020.

3.1.2 Geography/Natural Conditions

1) Geographic Locations

The Philippines comprise of 7,107 islands with a total area of about 300,000 square kilometers and lie approximately between latitudes of 5 deg. north and 20 deg. north and longitudes of 116 deg. east and 127 deg. east.

Luzon in the north, and Mindanao in the south, is the two largest islands of the group. The most important islands in Visayas are Samar, Negros, Panay, Palawan, Mindoro, Leyte, Cebu, Bohol and Masbate. These eleven Islands comprise 94% of the total area.

2) Topography

A large number of islands subdivide the waters of the Philippines into several different seas which are connected by numerous channels and passages. The structures of the seabed and the land make the region a very complex structure. Deep trenches, chains of high mountains, rows of volcanoes, deep sea basins and countless coral islands form a complexity of arena not found in other parts of the world.

Luzon Island is the most mountainous with extensive valleys and plains running through its interiors. The Visayas region has a severe dissection of topography due to its exposure to typhoons from the Pacific torrential rains. Mindanao has a diverse structural elements and different forms of physiographic development including fault block mountains, volcanic peaks, uplifted plateaus and a low flat basins.

3) Water Resources

There are more than 300 independent major river basins spread over the archipelago, each of which has at least 40 sq. km. of basin area.

The total annual run-off in the river basins is estimated at about 455 million cu. m. while the ground storage is estimated at about 1.22 million cu. m. with a recharge estimated at 32 thousand cu. m. per annum.

4) Climate

The climate of the Philippines is hot and humid. The mean monthly relative humidity varies from 71% in March to 85% in September whereas the mean annual temperature is 26.6^{o}C.The coolest month falls in January at a mean annual temperature of 25.5 ^{o}C while the warmest month

occurs in May at a mean annual temperature of 28.3 °C.

The two main seasons are the NE monsoon season from October to April and the SW monsoon season from May to September.

Typhoons are tropical revolving storms with wind speeds of 64 knots or more. An average of nine typhoons is reported each year and most of these occur from July to December.

5) Precipitation

Rainfall is abundant over the whole area, but relatively dry spells occur over the northern half with the "East Trade Wind" in spring which brings occasional droughts. Annual amounts range from 100 cm to 400 cm over the complex coastal region. The mean monthly rainfall varies greatly with locality from year to year.

6) Hydrography

The tide is mainly semi-diurnal on the east and west coasts of Luzon and Samar and the east and south coast of Mindanao. The spring range is generally 1.5 m, but increases to 2.0 m on the east and north shores of Moro Gulf to about 2.5 m at the head of Sibuko Bay.

7) Earthquake and Volcanic Activity

The tectonic structure in parts of the area is such to produce a region of earthquake and volcanic activity. Luzon, Visayas and Mindanao, are subject to earthquake and/or volcanic activity.

3.1.3 Economic Indices

The sector GDP's of the Philippines since 1980 are shown in Table 3-1 The Table also indicate the GDP's that the Part Master Plan Study forecasted for the years 2009 and 2024 as well as the GDP estimated for the year 2015 by the interpolation.

Table 3-2 shows the average GDP growth rate over the period from 1980 through 2001and from 2001 through 2005 as well as that for the period from 2001 through 2009, which was estimated in the National Port Master Plan Study.

Table 3-1 Gross Domestic Product by Year

Period	Agriculture, Fishery and Forestry	Industry	Service	GDP
1980	143,295	247,059	219,414	609,768
2001	197,737	336,697	454,824	989,258
2003	215,273	363,486	506,313	1,085,072
2004	226,612	380,542	545,019	1,152,174
2005	230,762	399,076	579,635	1,209,473
2009 Projection	250,487	478,817	671,982	1,401,287
2015 Projection	299,095	623,544	900,520	1,825,382
2024 Projection	390,251	926,646	1,397,003	2,713,900

At Constant 1985 Prices
Source: National Port Master Plan

Table 3-2 GDP Annual Growth Ratio Projection

Period	Agriculture, Fishery and Forestry	Industry	Service	GDP
2001/1980	1.55%	1.48%	3.53%	2.33%
2005/2001	3.14%	3.46%	4.97%	4.10%
2009/2001 Projection (Master Plan)	2.66%	3.99%	4.43%	3.94%

At Constant 1985 Prices
Source: National Port Master Plan

The GRDP of the regions in 2004 and 2005 and the share in GDP are shown Table 3-3.

Table 3-3 GRDP and Share in GDP

REGION / YEAR		2004	2005	share in 2005
PHILIPPINES		1,152,173,648	1,209,473,420	100.0%
NCR	METRO MANILA	359,935,947	385,563,464	31.9%
CAR	CORDILLERA	27,072,040	27,358,400	2.3%
I	ILOCOS	34,140,881	36,182,938	3.0%
II	CAGAYAN VALLEY	24,952,247	23,603,603	2.0%
III	CENTRAL LUZON	99,546,666	102,456,033	8.5%
IVA	CALABARZON	146,407,181	150,870,269	12.5%
IVB	MIMAROPA	31,688,281	33,738,962	2.8%
V	BICOL	32,794,799	34,418,605	2.8%
VI	WESTERN VISAYAS	83,263,309	88,186,673	7.3%
VII	CENTRAL VISAYAS	81,051,613	85,944,059	7.1%
VIII	EASTERN VISAYAS	25,821,065	26,853,445	2.2%
IX	ZAMBOANGA PENINSULA	29,901,025	32,048,198	2.6%
X	NORTHERN MINDANAO	56,003,274	58,137,919	4.8%
XI	DAVAO REGION	53,189,016	55,844,756	4.6%
XII	SOCCSKSARGEN	40,944,703	41,871,725	3.5%
XIII	CARAGA	14,983,513	15,508,688	1.3%
ARMM	MUSLIM MINDANAO	10,478,088	10,885,684	0.9%

Unit: In Thousand Pesos, Levels at constant 1985 price
Source: National Statistical Coordination Board

3.1.4 Agricultural Products

Agricultural products are the major commodities transported by domestic shipping as well as industrial products and processed foods. Rice, corn, sugar are widely grown over the country, but there are only few provinces that produce larger volume than their local consumption. The following is brief explanation of the situation of the production of these three agricultural products in the southern Luzon, Visayas and Northern Mindanao Regions.

1) Rice

Total rice production of the Philippines in 2005was 14.8million tons. Of the total Western Visayas Region, i.e. Panay Is. and Negros Occidental Province, produced 1.8million tons, while

Southern Luzon Region, i.e. Bicol Region, produced 0.9 million tons.

The Philippine is importing rice. In 2005, the import volume was 470 thousand tons. The total volume of 15 million tons, which is the sum of the domestic production and import volumes, was consumed. This implies that the average consumption per person was 177 kg. Thus, it is assessed that those provinces where the rice production per person exceed 177 kg has surplus and otherwise assessed to have shortage. It is recognized that rice is shipped from the provinces in Western Visayas Region and Northern Mindanao Regions to other provinces.

2) Corn

In 2005, the total production of corn was 5.3 million tons. North Mindanao Region (Region X) produced 940,000 tons including 650, 000 tons produced in Bukidnon Province. The corn productions in other regions were less than 200,000 tons. Both import and export volumes of corn were about 1,000 or 2,000 tons. It is recognized that domestic production and consumption are balanced Assuming that the total volume corn was consumed in domestic markets, per capita corn consumption is estimated to be 62 kg. It is assessed that a provinces where the per capita corn production is larger than 62 kg has surplus and otherwise the province has shortage. The provinces that have surplus are those in North Mindanao and few others: Negros Occidental (Negros Is), Capiz (Panay Is.) and Palawan. All other provinces in Visayas and Bicol Regions have shortage. Corn is a material for processed food, animal feed and etc., corn is consumed more in the industrial provinces in NCR and suburbs than other provinces.

3) Sugar

Sugar cane production of whole Philippines in 2005 was 22.9million tons. Negros Occidental Province produced 11.5million tons that account for more than 50% of national production. Bukidnon Province in North Mindanao produced 2.9 million tons, which account for 12.5%, and both Batangas and Negros Oriental Provinces produced 1.7 million tons (7.5%) respectively. The total production of these four provinces accounted for 80% of the total production of the country.

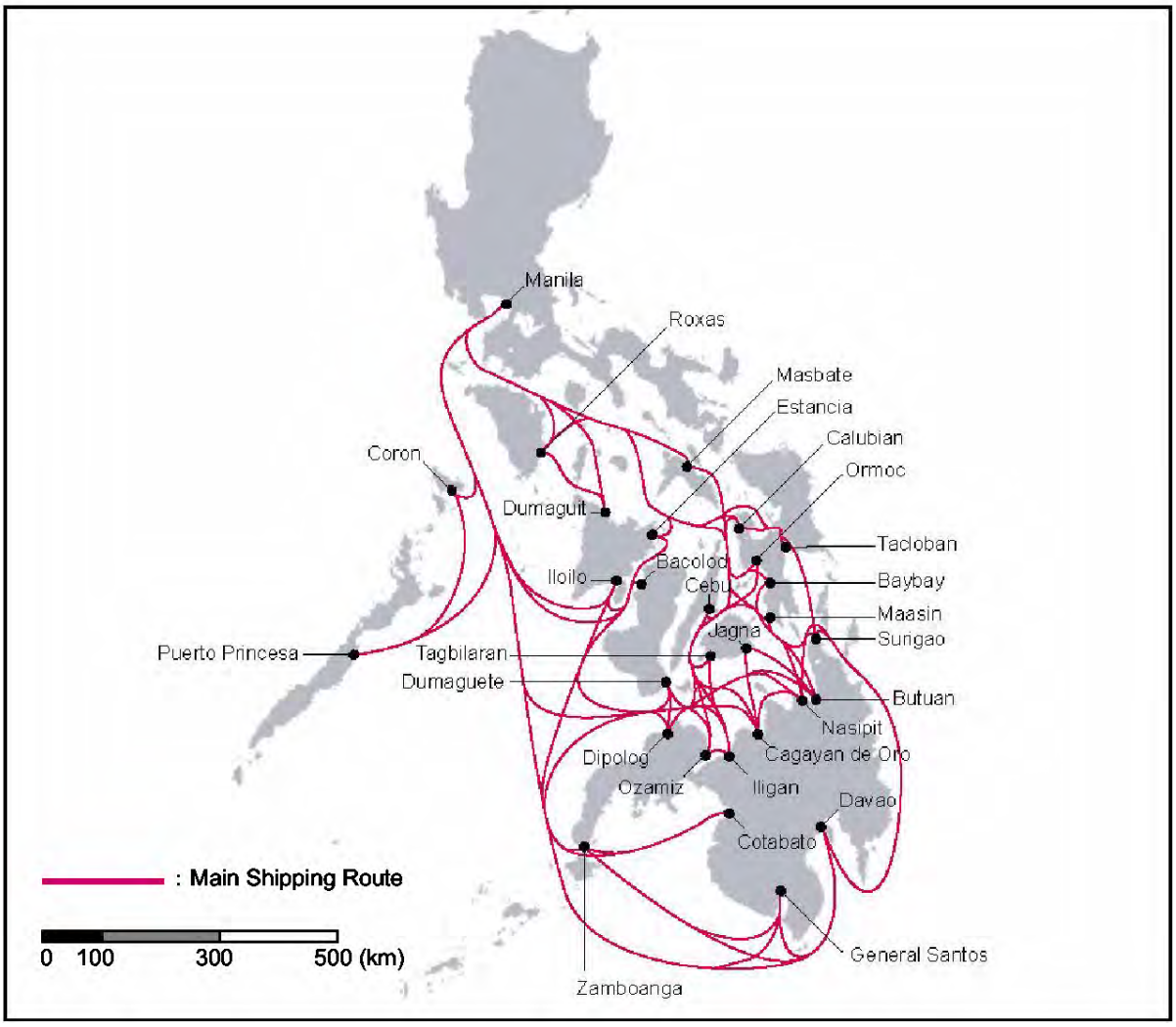
3.2 Transport System in the Philippines

3.2.1 Shipping

1) Long-distance shipping

Long-distance shipping comprises of liner service and trampers. Liner service is provided by long-distance RoRo ferries and container carriers, while tramper service is provided by liquid and dry bulk ships that transport petroleum products and cement. The principal routes of liners are Manila-Cebu/Iloilo-Zamboanga-General Santos-Davao. There are several major sea routes connecting the following major islands with Manila or Cebu/Iloilo: Mindoro, Palawan, Romblon, Masbate, Negros, Bohol and North coast of Mindanao (see Figure 3-1).

Though the long-distance shipping service routes cover most of the major islands, the service frequencies per week are three times or less except some major shipping routes such as Manila-Iloilo / Cebu/ Bacolod/ Dumaguete/ Cagayan de Oro/ Davao. It is also observed that the service routes of the long-distance shipping are between Manila and Visayas/Mindanao Islands.



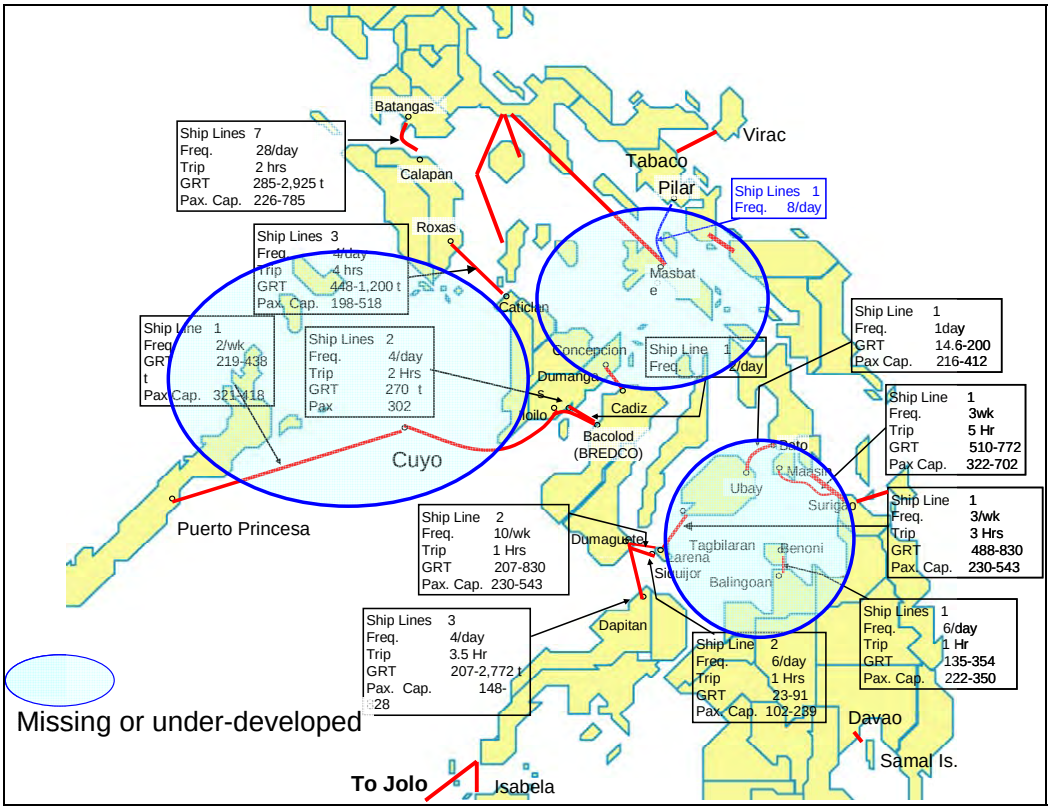
Source: Domestic Shipping Development Plan, 2006

Figure 3-1 Sea Route of Long-Distance Liner Shipping

2) Short-Distance RoRo Ferries

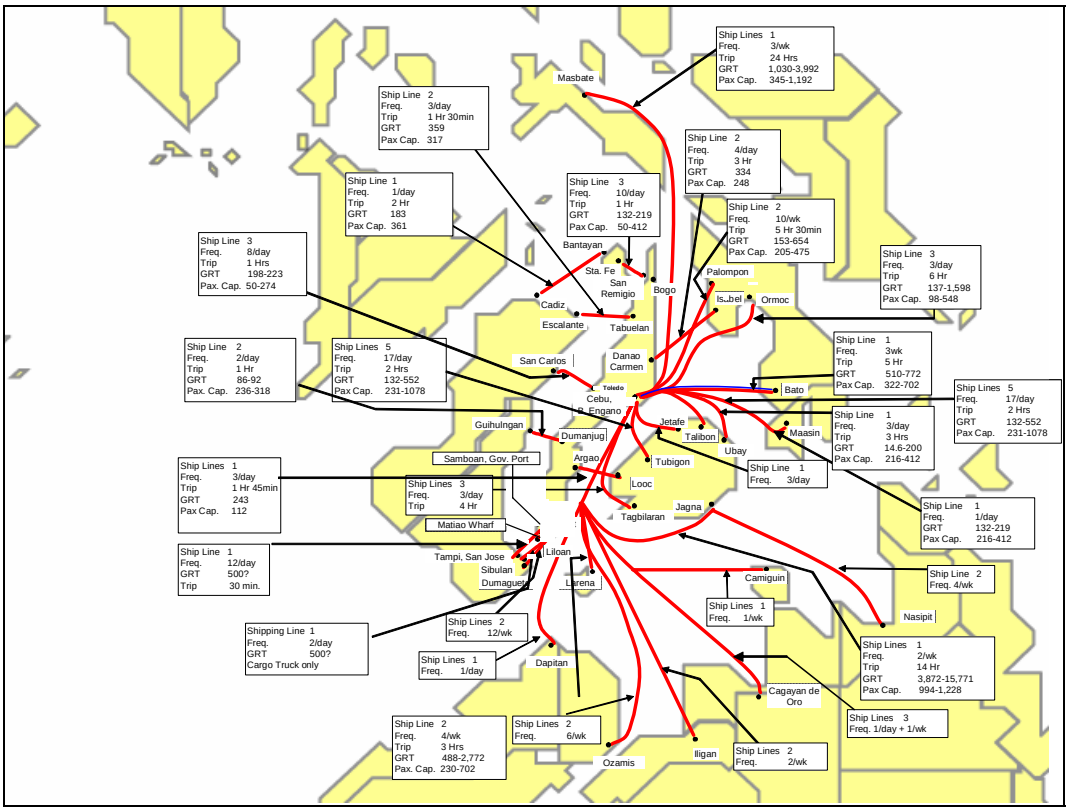
RoRo ferry service routes cover almost all the major islands. Figure 3-2 shows the RoRo ferry service links other than Cebu Island that are currently operational. It should be noted that Figure 3-3 shows only those links connecting main islands, and that, in addition to the links shown in the figure, there are many RoRo ferry service links between main islands and remote islands such as Marinduque, Romblon, Catanduanes and Sulu Archipelago.

In the figure, red lines indicate RoRo ferry links, while blue line indicate fast craft service links. Characteristic values are also indicated in the figure: the number of shipping lines operating in the link, service frequency, travel time, size of ships and passenger capacities.



Source: Study Team

Figure 3-2 Existing RoRo Ferry Links (excluding Cebu Is.)

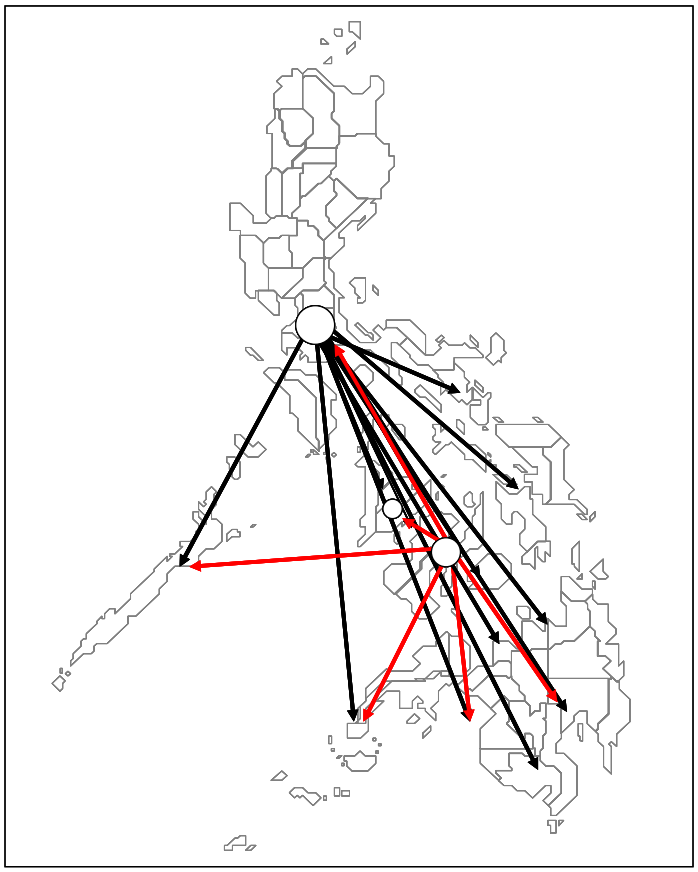


Source: Study Team

Figure 3-3 Existing Short-Distance RoRo Ferry Links (Cebu Island connections)

3.2.2 Air Transport

Five airlines are serving domestic air links connecting major cities. Basically, air links formulate a star (hub-spoke) shape: Manila and Cebu are the principal hubs (See Figure 3-4). Service frequencies between large cities such as Manila, Cebu, Iloilo, Zamboanga and Davao are high enough to make one or more round trips in a day, while in other links the service frequencies are once a day or few services per week.



Source: Study Team

Figure 3-4 Existing Air routes

3.2.3 Land Transport

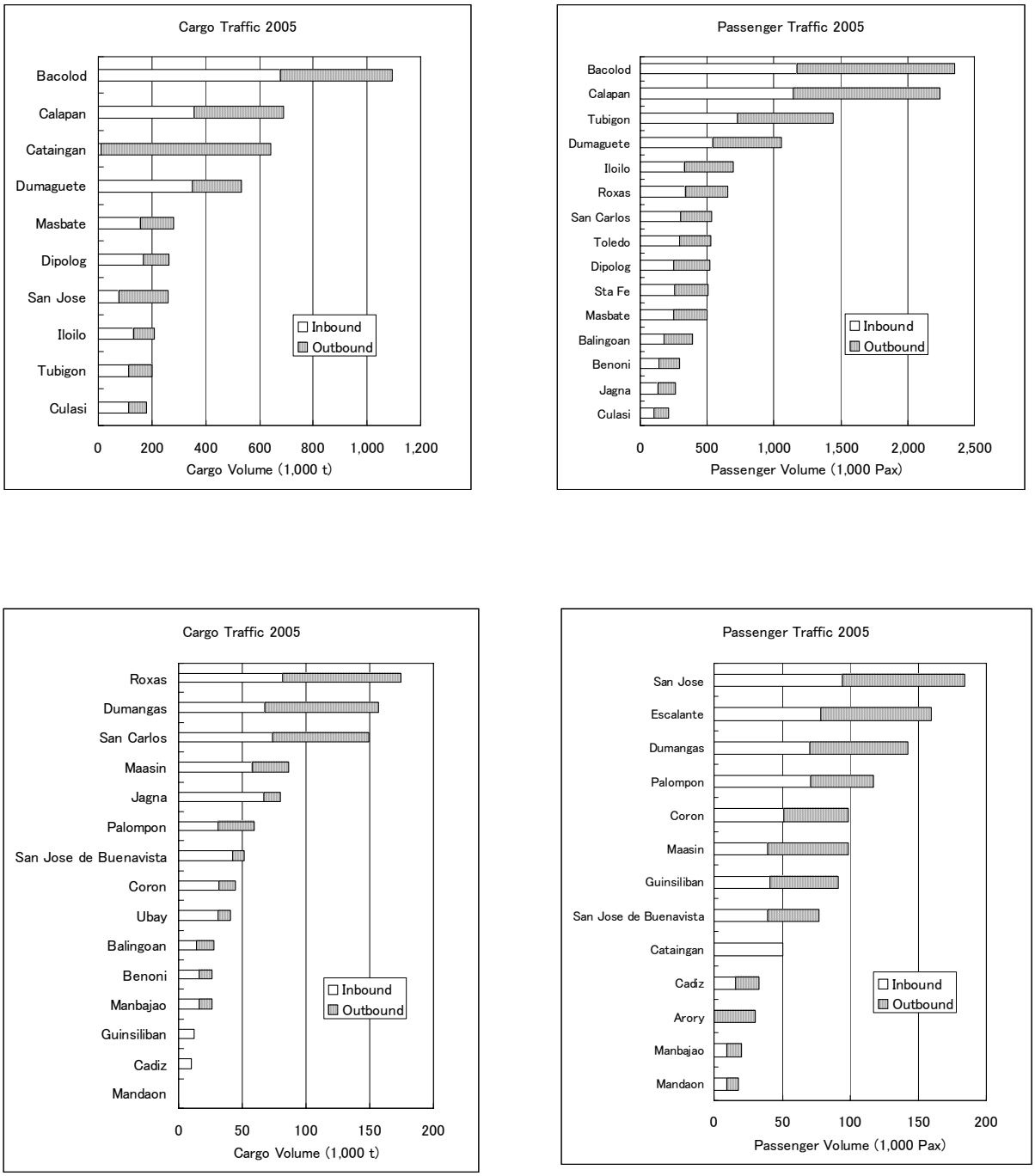
Many provincial bus operators have been providing long-distance bus services along Pan-Philippine Highways. Since the start of RoRo ferry operation between Roxas (Mindoro Is.) and Caticlan (Panay Is.) 20 buses are plying daily between Manila and Panay Island. The frequencies of long-distance bus services are as follows:

Manila - Samar Is.	:	14 buses per day
Manila - Leyte Is.	:	18 buses per day
Manila - Bohol Is.	:	3 buses per day (6 buses during peak season)
Manila : Mindanao Is.	:	4 buses per day
Cebu - Bacolod (Negros Is.)	:	8 buses per day
Cebu – Dumaguete	:	2 buses per day
Cebu – Davao	:	1 bus per day

3.3 Present Situation of Short-Distance RoRo Ferry Service

3.3.1 Cargo Passenger Traffic at RoRo Ports

The cargo and passenger traffic at some existing RoRo ports in 2005 are shown in Figure 3-5. Bacolod and Calapan Ports, which are on the Western SRNH, handled large volumes, while some other ports handled only small traffic volumes: less than 100,000 tons or passengers.



Source: Study Team, Field survey

Figure 3-5 Cargo and Passenger Traffic at some RoRo Ports in 2005

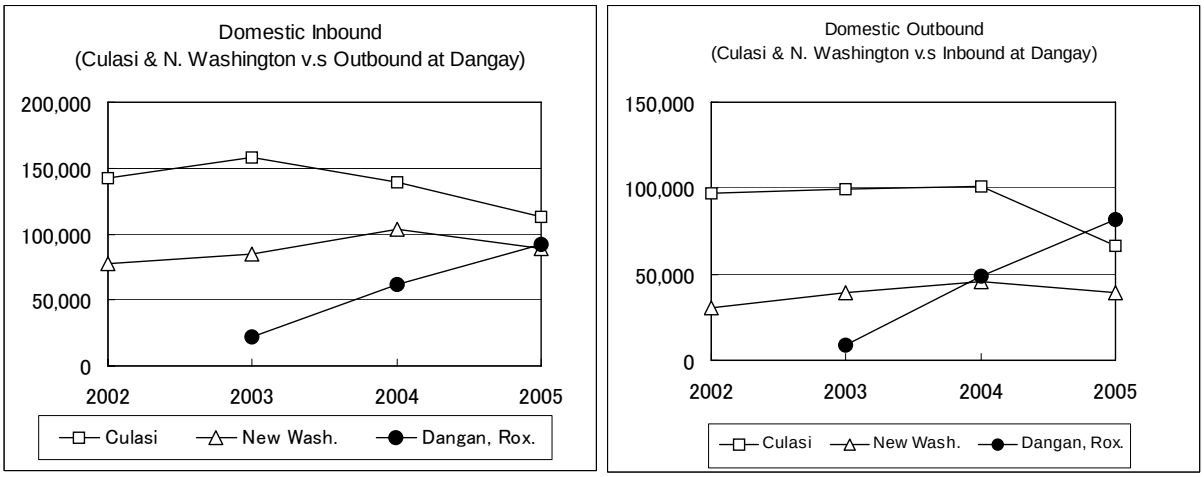
3.3.2 Users of RoRo Ferry

The users of RoRo ferry comprise of passenger cars, Jeepnies, buses, medium size of cargo truck (two axes), large size trucks (three axes), and other types, which include motorcycles, tricycles, trailers, as well as passengers. The composition of these types of vehicles varies by RoRo link, due to the development levels of RoRo service, traffic volumes and local features.

3.3.3 Impact of RoRo Ferry Service on the Conventional Shipping

1) Impact

The Strong Republic Nautical Highways has been operational since the RoRo ferry service between Roxas (Mindoro Occidental) and Caticlan (Aklan) started operation in 2003. The impact of the new RoRo service on the traditional transport service might be assessed by comparing the traffic volumes at Caticlan, Roxas (Culasi port in Capiz) and Kalibo (New Washington port in Aklan) since 2002. As observed in Figure 3-6, both inbound and outbound cargo traffic volumes at Culasi and New Washington Port show a decline, while those at Caticlan Port has been rapidly increasing since the start of RoRo service in 2003. It is also observed that the cargo volumes handled at Caticlan Port are much larger than the decrease at Culasi and New Washington Ports. This implies that, in addition to the shift from the traditional route to the new route, new traffic was generated by the new transport service.



Source: PPA Statistics, edited by Study Team

Figure 3-6 Impact of RoRo Ferry on the Conventional Shipping Service

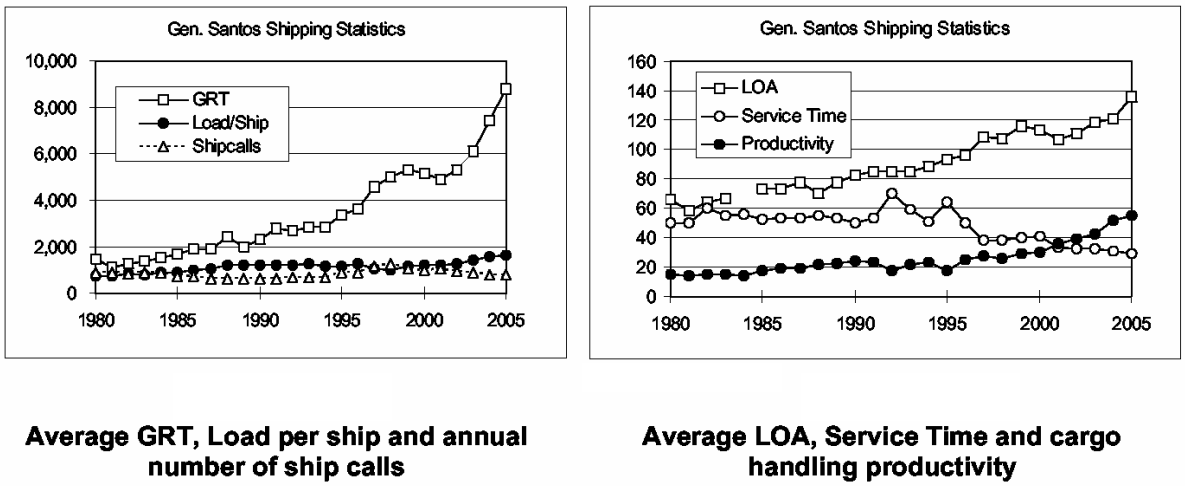
2) Advantage of RoRo Ferry service

The concept of the nautical highway is aiming at the reduction of transportation cost between Mindanao and Luzon and to promote shipping service by establishing alternative shipping service to traditional shipping service. Therefore, it is important to recognize what is the advantage of RoRo transport system and how it achieve the reduction of transport cost.

It is generally recognized that, the longer the travel distance, the more advantageous to use ship than trucks. For long distance shipping, it is worldwide trend to employ larger ships for the maximum use of for the scale merit. In fact, the long-distance shipping lines have been replacing their fleet by larger ships. The improvement of the cargo handling productivity is well exhibited at General Santos Port where the long-distance RoRo ferries are the principal carriers of the domestic cargoes. Playing the principal roles domestic cargoes. The left chart of Figure 3-7 shows the annual variation of the average ship size (GRT), total number of ship calls and cargo volumes embarked and disembarked per ship, while the right chart of the Figure 3-7 shows the average LOA, service time per ship and

cargo handling productivity (number of containers handled per hour).

The following are the comparison of the advantage and disadvantage of the long-distance shipping and the short-distance RoRo transport system (see Figure 3-8):



Average GRT, Load per ship and annual number of ship calls

Average LOA, Service Time and cargo handling productivity

Figure 3-7 Improvement in Cargo Handling Productivity of Long-distance RoRo Ferry

1. Advantage and disadvantage of long-distance shipping

Advantage of long-distance shipping

- Trucks are used only short-distance between the origin and the port of shipment and between the destination port and the final destination. No truck cost is needed during the voyage.
- Since cargo is shipped without truck, no cost is needed to send back trucks.
- Advantageous to ship large volume to the same destination.

Disadvantage of Long-distance Shipping

- Cargo handling cost and time are required at the ports need Cost and time,
- Fewer frequency of service: once a day or few times a week. This requires the adjustment in the shipment schedule with ship service schedule.
- Shipment in small volume may increase shipmen time and cost: especially for the case of less container load.

2. Advantages and disadvantages of Short-distance RoRo transport

Advantages of Short-distance RoRo Transport

- Cargo handling cost and time can be decreased. This also reduce the total shipment cost and time,
- Flexibility in the scheduling of shipment or travel, because of the more frequent services: at least three times a day.
- Advantageous for the shipment of small volume that includes various items to be delivered to or collected from different places,
- Reduction of spoilage due to the elimination of cargo handling throughout the shipment.

Disadvantage of Short-distance RoRo transport

- Cost of truck and driver over a whole round trip is needed.
- Cargoes are not insured by the shipping line

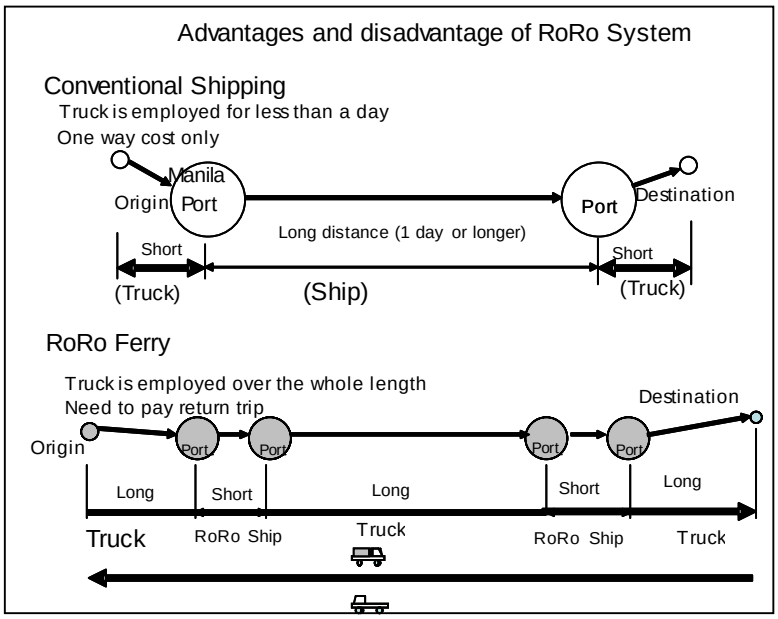


Figure 3-8 Advantages and Disadvantages of Long-Distance Shipping and Short-Distance RoRo Transport System

RoRo transport system is most advantageous for break bulk cargos, because the handling of these cargoes takes longer and, in turn, more cost. This is especially true for bagged cargoes such as Cement, cereals, fertilizer, animal feeds and also cargoes in boxes such as industrial products and processed foods. Figure 3-9 shows how the RoRo transport system exhibits its advantage over the conventional shipping. In the figure approximate time needed for shipment is also indicated. The RoRo transport is most advantageous when cargoes are delivered directly from origin to ultimate destination. It is also considerable advantage that, with RoRo transport system, transit shed or warehouses are not required. This also contributes to the reduction of transport costs.

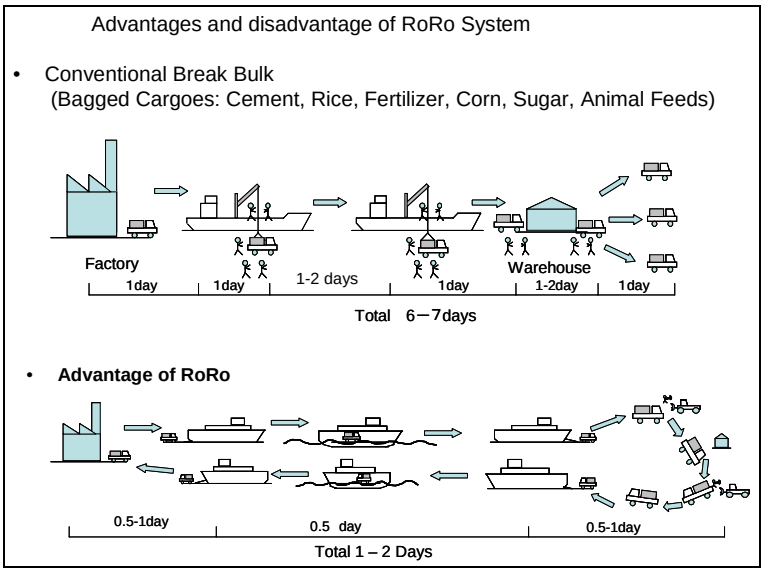


Figure 3-9 Effective Use of RoRo Transport System

In fact, since the start of full operation of the Western SRNH in 2003, Nestle Corporation that distributes dairy products and coffee, has drastically reduces its distribution centers in Mindoro, Panay and Negros Islands.

3.3.4 Role of the Strong Republic Nautical Highways

The Strong Republic Nautical Highways have been operational throughout the full length the since 2003. One of the objectives of the development of the SRNH is to reduce the cost and travel time between Mindanao and Luzon. Thus, it might be interesting to see how many cars and passengers travel the whole route along SRNH.

Table 3-4 shows the results of the Origin and Destination survey carried out by interviewing passengers and drivers at the RoRo ports along SRNH. Though the sample numbers of interviews are quite limited, the results indicate that most of the passengers and cars are traveling one or two RoRo links. Only a few passengers and cars (indicated in Bold Italics in Table 3-4) are traveling all the way from Mindanao to Luzon. Thus, it can be concluded that the majority of the user of RoRo services travel over one or two links.

Table 3-4 Origin and Destination of Passengers and Cars along Western SRNH

	Passenger				Driver			
Port	Sample	Travel route	Freqency	Share	Sample	Travel route	Freqency	Share
Calapan	45	Mindoro-Luzon	45	100.0%	34	Mindoro	30	88.2%
						Panay	4	11.8%
Roxas	59	Manila-Panay	32	54.2%	33	Luzon-Panay	21	63.6%
		Mindoro-Romblon	13	22.0%		Mindoro -Romblon	5	15.2%
		Mindoro-Panay	8	13.6%		Luzon-Mindoro	5	15.2%
		Manila-Romblon	2	3.4%		Luzon-Negros	2	6.1%
		Manila-Negros	2	3.4%				
		Mindoro-Negros	1	1.7%				
Caticlan	15	Panay-Luzon	15	100%	10	Luzon-Panay	10	100%
Iloilo	48	Panay-Negros	25	52.1%				
		Panay-Luzon	9	18.8%				
		Panay-Cebu	8	16.7%				
		Panay-Mindanao	4	8.3%				
		Panay-Bohol	2	4.2%				
Dumangas	21	Panay-Negros	21	100%				
Bacolod	8	Negros-Panay	8	100%	13	Negros - Panay	9	69.2%
						Panay-Cebu	4	30.8%
Dumaguete	9	Negros-Mindanao	9	100.0%	12	Mindanao-Negros	8	66.7%
						Mindanao-Cebu	2	16.7%
						Mindanao-Luzon	***1***	***8.3%***
						Negros-Panay	1	8.3%
Dipolog	30	Mindanao-Cebu	10	33.3%	15	Mindanao-Negros	10	66.7%
		Mindanao-Negros	15	50.0%		Mindanao-Cebu	5	33.3%
		Mindanao-Luzon	***4***	13.3%				
		Mindanao-Leyte	***1***	3.3%				

Source: Study Team, field survey

4. Study Approach and Methodology

4.1 Definition of RRTS

The definition of the term "Road RORO Terminal System (RRTS)" is given in Executive Order No. 170: The Network of Terminals all over the Country linked by Roads and Ro-Ro Vessels. Thus, RRTS means a whole transport system that consists of highways and RoRo ferry services. The whole RRTS is composed of a hierarchy comprised of four categories, which were classified in the "Master Plan for the Strategic Development of the National Port System, DOTC-JICA, 2004" (hereinafter called "the Port Master Plan").

The Port Master Plan aims at the establishment of a "Nationwide maritime transport network" and the formulation of "Maritime transport bases to support regional society". The Master Plan named each class of the four categories of RoRo ports as follows:

-RoRo Ports in Major Corridors

-RoRo ports to enhance passenger/cargo mobility in the region: those RRTS Routes consist of the ports of this category is called the Complementary RRTS Route

-RoRo ports to support daily life in remote islands

-RoRo ports to support Social Reform

In accordance with the classification of these four categories, the entire RRTS is schematically exhibited as shown in Figure 4-1.

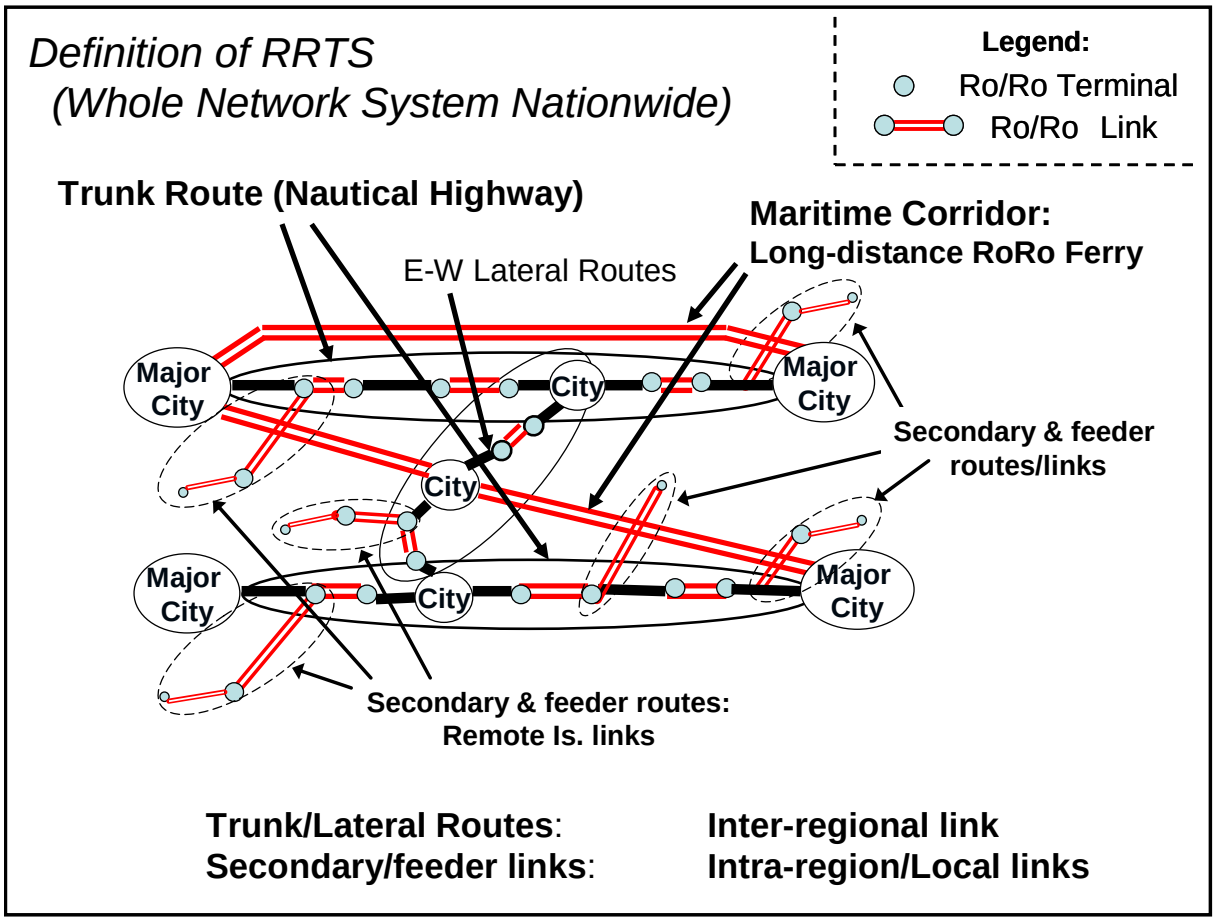


Figure 4-1 Road RoRo Terminal System (Source: Study Team)

4.2 Study Approach

The study shall be conducted in three Phases. The Objectives and the tasks of the three Phases are as follows:

- **Phase 1:** To identify priority RRTS routes for implementation in the medium-term (target year 2015)

During this Phase, those Inter-regional RoRo transport routs shall be selected to provide the most effective network of North-South corridor and the complementary routes that interconnect NCR, Southern Luzon, Visayas and North Mindanao Regions. The possible candidate routes shall be formulated from the following proposed RoRo links and terminals:

-The three nautical highways indicated in NTPDP,

-Those routes that have been proposed by DOTC, PPA, DBP and missionary route identified by MARINA,

-Those ports mentioned in SONA, 2006

- **Phase 2:** To select RORO ports including access roads to be improved for the identified RRTS routes

Selection was made in the following manner;

-The RoRo ports that constitute the above selected RoRo routes shall be classified into three categories:

-Category 1; those ports that constitute a RoRo link along the Central corridor or complementary routes and that are either newly developed.

-Category 2; those ports that are along complementary routes and that require large scale improvement such as deep water RoRo berth and reclamation.

-Category 3; all other ports.

Total of 15 ports shall be chosen for the feasibility study from the ports in the category 1 and 2. Ports in category 3 may be chosen in case the number of selected RoRo ports within Categories 1 and 2 are less than 15.

- **Phase 3:** To conduct feasibility evaluation of the 15 selected RoRo ports. The project packages shall be formulated on the basis of the feasibility Study.

The above mentioned study approach is schematically shown in Figure 4-2.

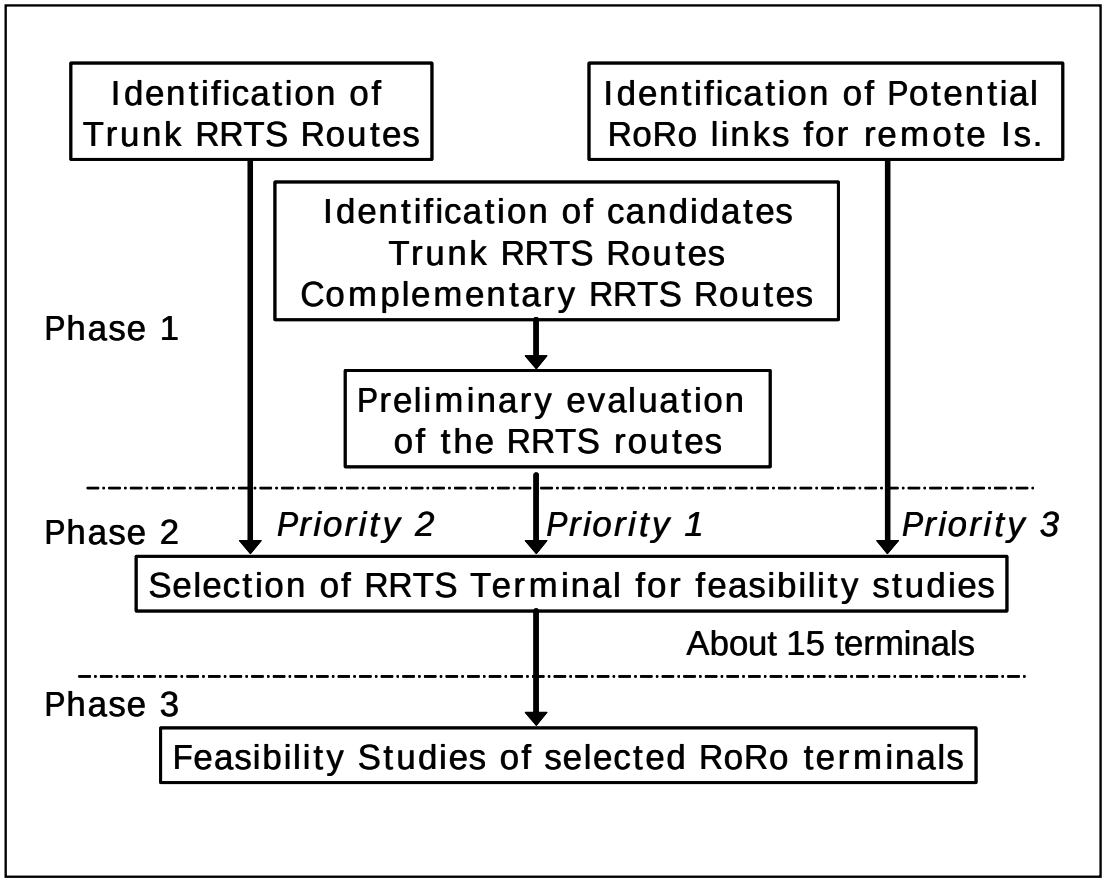


Figure 4-2 Study Approach (Source: Study Team)

5. Premises of the Study

5.1 Shipping

5.1.1 Procurement of RoRo Ships and Funding Scheme

In accordance with the recommendation of the Domestic Shipping Development Plan, DOTC-JICA, 2005, the Ship Leasing Corporation has been established and started its activity. Thus, it is assumed that by 2015, which is the target year of this study, the Ship Leasing scheme will be available for shipping lines to procure RoRo ships of suitable sizes and capacities.

5.1.2 Promotion of Domestic Shipyards

There are large and small scale shipyards and ship repair yards in the Philippines. Tsuneishi and Keppel are building large ocean going vessels for foreign shipping lines, while many small to medium scale shipyards located in Cebu Islands are rather involved in ship repair business for the domestic fleet. As new RoRo links are developed, more RoRo ships are needed. The procurement of secondhand ships is likely to become more difficult, and it is necessary to build new RoRo ships locally. To this end, the promotion of local shipbuilding business is also vital elements in the RoRo transport network. Some program for the financial support for the shipyard should be implemented.

5.1.3 Standardization of RoRo Ships

Based on the March 2005 Study Report on Roll-on Roll-off Vessels to promote the Strong Republic Nautical Highway, the Transnational Diversified Group Inc. evaluated the appropriate size and specifications of RoRo vessels considered most suited for domestic operations given the local conditions such as the type of cargo mix traffic, customs and traditions, distances between port terminals as well as the prevailing weather and sea conditions among other factors. Table 5-1 hereunder illustrates the five (5) categories of RoRo vessels according to size and its particulars which have been in used nationwide.

Based on the above evaluation as well as the fact observed in nationwide, the standard size of RoRo vessels to be adopted for the RRTS Study shall be as follows:

-Category Type-V **500 GRT** shall be considered as the standard RoRo vessels operating between terminals of relatively short distance such as those in the Visayas region.

-For relatively longer distance such as the Taytay –Coron- San Jose Route, larger vessels of Category Type-II **2,000 GRT** shall be deployed.

Table 5-1 Standard Size and Specifications of RoRo Vessels

Type Specifications	Type I	Type II	Type III	Type IV	Type V	Remarks
GRT (Gross Tonnage)	5,000	2,000	1,000	700	500	
Loa (m)	125	90	69	52	44	
Lpp (m)	115	85	65	48	40	
Breadth (m)	20.0	16.8	14.0	12.8	11.8	
D (m)	17.0	10.6	9.8	9.2	8.5	Bottom car deck top
D' (m)	7.0	5.6	4.8	4.2	3.5	Freeboard deck
Draft (m)	5.5	4.2	3.6	3.2	2.6	
Dead Weight (ton)	2,800	1,070	665	400	255	
Cargo Dead Weight (ton)	1,500	625	375	225	175	
No. of Car Deck	2	1	1	1	1	
Number of Stowage Rows	5	5	4	3	3	
Load Capacity (No. of Vehicles)						
Case1: 22ton Trucks	60	25	15	9	7	
Case2: 8ton Trucks	88	35	22	12	9	
Case3: 4ton Trucks	126	50	30	23	16	
Passengers	600	500	400	320	240	
Max. Cruising Distance (NM)	8,000	1,200	800	800	800	
Cruising Speed (Knots)	18	16	15	13	12	

5.1.4 Fares

Freight rates are influenced by the following factors;

-Economy of scale

-Size of operating vessels' capacity

-Volume of cargo trade

-Trade and transport practices

-Cost of vessel acquisition

-Port productivity

Economy of scale is the most important factor in achieving a lower unit cost. Vessel owners try to provide services so that maximum benefit could be obtained on condition that they could respond to the transportation demand. In most cases, domestic passenger and RoRo cargo are set based on the transportation distance.

5.2 Highways

5.2.1 Existing Situation of Highways

1) Western Route

Western Route link from Batangas (Luzon) to Dipolog (Mindanao), total distance is approximately 900km includes water travel. Link of islands are Mindoro, Panay and Negros.

i) Mindoro Island

Western Route in Mindoro Island through eastern coastal route from northern port of Calapan and southern port Roxas, distance is approximately 146km in actual drive survey. By actual site reconnaissance in this study, it's surveyed that all section of this route is improved and constructed after 1999. Moreover, the road projects are planed in this section by DPWH as shown in Table 5-2. Consequently the Western Rote in Mindoro Island is sufficient for RRTS.

Table 5-2 The Road Project in the Route of Mindoro Island by DPWH

Section	Project Name
Calapan – Mansalay	Financing Strategy DPWH SONA Project
Calapan – Mansalay	Mindoro East Coast Road Package, Calapan – Socorro Road, Socorro – Bongabon Road
Calapan – Mansalay	Road Upgrading "Mindoro East Coast Road, Bongabon-Roxas 24.9km, Roxas-Mansalay 13.6km"
Calapan – Mansalay	Improvement of RORO Access Road, From National Highway to Roxas and Calapan Ports

ii) Panay Island

Panay Island is located in south east side of Mindoro Island. Western Route in Panay Island from northern Caticlan port to southeast Dumangas port via Culasi and Iloilo. From Caticlan to Culasi the route go northern coastal route, and go in the southern direction to Iloilo City by inland route. Distance from Caticlan to Culasi is approximately 152km, from Culasi to Iloilo is 122km and from Iloilo to Dumangas is 43km, total distance from Caticlan to Dumangas is 317km in actual drive survey. By actual site reconnaissance in this study, it's surveyed that almost section of this route is improved and constructed after 1999. Moreover, the many road projects are ongoing and planed in this rote by DPWH. The contents of the projects as shown in Table 5-3. Consequently the Western Rote in Panay Island is sufficient for RRTS.

Table 5-3 The Road Project in the Route of Panay Island by DPWH

Section	Project Name
Kalibo - Nabas	Kalibo-Nabas Road (Rehab. 42.0km)
Iloilo - Asluan	Iloilo-Asluan Road (Rehab. 81.85km)"
Nabas - Libertad	Nabas-Libertad Road, Aklan 48.7km
Caticlan - Roxas	Panay Island Package Caticlan-Kalibo-Roxas Road
Iloilo - Caticlan	Iloilo City-Caticlan Highway (Iloilo-Ivisan-Caticlan) 60.0km

iii) Negros Island

Negros Island is located between Panay Island and Cebu Island. Northern port of the Western Route in Negros Island is Bacolod port and two alternatives southern ports are planed Dumaguete and Siaton. Three (3) alternatives existed from Bacolod to Dumaguete southern direction. Alternative 1 is across the mountain aria to San Carlos City and goes to Dumaguete through along east side coastal road. Alternative 2 is from Bacolod to San Carlos via Cadiz City and Escalante along northern coastal route to San Carlos and same rote with Alternative 1. Alternative 3 is from Bacolod go to southern direction along western coastal route to Kabankalan and across the island to Dumaguete.

Distance from Bacolod to Dumaguete and Siaton of each alternative are as shown in Table 5-4, however road condition of alternative 1 is bad because this route through to mountain aria

and alternative 2 and 3 are good condition.

Table 5-4 Distance from Bacolod to Siaton

Alternatives	Route	Total
Alternative 1	Bacolod－SanCarlos －Dumaguete	210km
Alternative 2	Bacolod－Cadiz－San Carlos－Dumaguete	310km
Alternative 3	Bacolod－Kabankalan－Bais－Dumaguete	180km

Moreover, the many road projects are planed in Negros Island by DPWH. The contents of these projects are as shown in Table 5-5. Consequently the Western Rote in Negros Island is sufficient for RRTS.

Table 5-5 The Road Project in the Route of Negros Island by DPWH

Section	Project Name
Dumaguete - Basay	Dumaguete-Siaton-Basay Road, 123.2km
Bais - Kabankalan	Bais-Kabankalan Road, 20.0km
San carlos - Dumaguete	San Carlos-Dumaguete Road, 44.0km
Bacolod - San Carlos	Bacolod-Kabankalan Road, NRIMP 2, 16.0km
Bacolod - San Carlos	Bacolod-Murcia-Don Dalvador-Benedicto-San Carlos Road, 82.0km
Escalante - Vallehermoso	Negros Island Package, Escalante-Vallehermoso Road

2) Central Route

Central Route link from Legazpi (Southern Luzon) to Cagayan de Oro (Northern Mindanao), total distance is approximately 700 km includes water travel. Link of islands are Masbate, Cebu and Bohol.

i) Masbate Island

Central Route in Masbate Island through eastern coastal route from northern port of Masbate and southern port Esperanza, distance is approximately 120 km in actual drive survey.

Road condition of Masbate – Cataingan section of this route is paved by asphalt good and fair condition but Cataingan – Esperanza approx. 35 km section is not paved very bad.

Regarding the road projects by DPWH, there are not planed. The road of Cataingan – Esperanza section should be improved for the link of the Central Route in Masbate Island.

ii) Cebu Island

Cebu Island is located in south side of Masbate Island and between Negros Island and Bohol Island. Central Route in Cebu Island from northern Daanbantayan port to central Pt. Engano port through eastern coastal route. Distance from Daanbantayan to Pt. Engano is approximately 140 km. By actual survey 70% paved. Bogo – Cebu – Pt. Engano section is good paved road.

Moreover, the road projects are planed in Bogo - Cebu section by DPWH and the contents of these projects as shown in Table 5-6. Some portion of Daanbantayan – Bogo section should be improved, however consequently the Central Rote in Cebu Island is sufficient for RRTS.

Table 5-6 The Road Project in the Route of Cebu Island by DPWH

Section	Project Name
Cebu - Toledo Section	Cebu South Road, (Rehab. 31.2km, 3 Bridges) Talisay Jct.-Toledo Section
Mandaue - Liloan	Cebu North Coastal Road Project (Msndaue-Consolacion-Liloan Section)
Cebu - Bogo Section	Cebu-Bogo Road, 106km
Cebu - San Remigio	Toledo-Tabuelan-San Remigio Road 68.2km

iii) Bohol Island

Bohol Island is located in south east side of Cebu Island. Central Route in Bohol Island is from western Tubigon port to southeast Jagna port and northern Tagbilaran port. Two alternatives routes existed inter island. Alternative 1 is across the mountain aria to Jagna directly, and Alternative 2 is go to Tagbilaran along western coastal route. Distance from Tubigon to Jagna of alternative 1 is approx. 80 km in actual drive survey and alternative 2 is 70 km by map count respectively.

Regarding alternative 1, by actual site reconnaissance in this study, it's surveyed that almost section of this route is improved and constructed after 1999. Moreover, the road projects are planed in both sections by DPWH and the contents of these projects as shown in Table 5-7. Consequently the Central Rote in Bohol Island is sufficient for RRTS.

Table 5-7 The Road Project in the Route of Bohol Island by DPWH

Section	Project Name
Calape – Tagbilaran City - Valencia	Bohol Circumferential Road, Phase II
Candijay – Jagna – Valencia	Bohol Circumferential Road, Phase II
Jagna – Sierra – Bullones – Clarin – Tubigon	SONA Projects 70km

3) Eastern Route

Eastern Route is arterial route that link Luzon and Mindanao by through Pan Philippine Highway via Samar Island and Leyte Island. Distance from Matnog to Lipata is approx. 500 km include 2 water travels that is Matnog – Allen and San Ricardo – Lipata sections. Some portion of concrete pavement in Samar Island is damaged therefore maintenance should be needed. Meanwhile, road conditions of southern Luzon, Leyte Island, northern Mindanao are almost good.

At southern port that link to Lipata, Liloan port is operated now however San Ricardo port is candidate to new link to Lipata because distance of water way will be shortened. Road from Liloan to San Ricardo is under construction and will be completed in 2007. Moreover, the road projects are planed in Leyte Island by DPWH and the contents of these projects as shown in Table 5-8. Consequently the Central Rote in Bohol Island is sufficient for RRTS.

Table 5-8 The Road Project in the Route of Leyte Island by DPWH

Section	Project Name
Naval - Biliran	Naval-Biliran Highway (26km)
Palompon - Matagob	Sto Rosario-Matang-ob-Palompon Road 23.0km

4) Negros – S.Leyte SRNH

Negros – S.Leyte is southern link of east-west direction that links Negros, Cebu, Bohol and Leyte Islands.

i) Negros Island

Negros – S.Leyte Route in Negros Island is same as Western Route of Bacolod-San Carlos section. Two alternatives exist one is go through to across the inland aria, and second is go through to northern coastal via Victorias and Escalante. The road projects are planed in this section by DPWH and the contents of these projects as shown in Table 5-5. Consequently the Negros – S.Leyte SRNH of Negros Island is sufficient for RRTS.

ii) Cebu Island

Negros – S.Leyte Route in Cebu Island links eastern Toledo port and western Pt. Engano port of Cebu City. Distance from Toledo to Pt. Engano is approx. 40 km. Existing road conditions of this section are almost paved and keeps for good condition. Moreover, the road projects are planed in this section by DPWH and the contents of these projects as shown in Table 5-6. Consequently the West-East Rote 1 of Cebu Island is sufficient for RRTS.

iii) Bohol Island

Negros – S.Leyte Route in Bohol Island links northeast Getafe port and northwest Ubay port. Distance from Getafe to Tapal is approx. 40 km and almost paved and keeps for good condition. Consequently the West-East Rote 1 of Bohol Island is sufficient for RRTS.

iv) Leyte Island

Negros – S.Leyte Route is linked from Maasin port that located southeast of Leyte Island to the Eastern Route of Pan Philippine Highway at Sogod Leyte Island. Consequently Negros – S.Leyte Route of Leyte Island is sufficient for RRTS.

5) Panay – Leyte SRNH

Panay – Leyte Route is northern link of east-west direction that linked Panay, Negros, Cebu, and Leyte Islands. Panay – Leyte Route in Panay Island links northern Culasi port and northeast Ajuy port. Distance from Culasi to Ajuy is approx. 100 km. Maintenance of some portion of asphalt concrete pavement should be needed, however almost sections are kept for good condition. Moreover, the road projects are planed in this section by DPWH and the contents of these projects as shown in Table 5-3 in Western Route. Regarding other islands Negros, Cebu and Leyte, Consequently the road condition of Panay – Leyte Route is sufficient for RRTS.

6) Panay – Masbate SRNH

Panay - Masbate Route link from San Antonio (Southern Luzon) to Culasi (Northern Panay), total distance is 250 km include water travel. Link of islands are Masbate, and Panay Island. Inland road condition of Masbate Island is as follows. Panay - Masbate Route in Masbate Island traverses west side of Masbate Island from eastern port of Masbate city to western port Balud. Road is paved from Masbate city to Milagros but section between Milagros and Balud is non-paved rough road for approx. 45km. Regarding the road projects by DPWH, there are not planed except port access road same as Central Route in Masbate Island. The road improvement of Balud – Milagros sections is essential for the link of the Panay – Masbate Route in Masbate Island.

5.2.2 Standardization for Highways on RRTS Routes

In this study standard of highway on RRTS should be adopted DPWH standards, because RRTS will be managed for National Road. Standards of DPWH are shown as follows.

1) Project Design Consideration

Design standards are set so that the economic benefit and the safety of the road would be maximized. For the project study, the DPWH Minimum Design Standard for Highways has been referred. The standards are usually being adopted for a two (2) lane road in rural areas.

2) Proposed Improvement Options/Alternatives

Considering the above mentioned design consideration, the proposed improvement options adopted consist of Portland Concrete Cement (PCC), Asphalt Concrete (AC) and gravel pavement with a carriageway width of 6.1 meters with shoulder width of 2.0 meters on both sides and with provision for lateral and cross drains. The temporary structures are to be replaced with a permanent Reinforced Concrete Deck Girder (RCDG) or Reinforced Concrete Box Culvert (RCBC).

5.2.3 Unit cost employed in the RRTS Route Evaluation

The unit price analysis method was used in establishing the improvement/ construction costs of the project roads. The unit price analysis is in accordance with the DPWH Standard Specification, which composes of two main elements of construction costs, the direct and indirect costs. The unit prices adopted for the feasibility study have been based on the on-going civil works. These estimates are based and adjusted to 2005 price levels.

The project cost is the summation of the unit prices multiplied by the quantity of every individual item comprising the improvement considered. The items of civil works include earth works, pavement and shoulders, drainage structures, bridges and miscellaneous. Road Right-of-Way Cost, as maybe required, is also a part of the project costs.

In this study almost road condition of candidate routes are good except Masbate Island that compose Central SRNH and Panay-Masbate SRNH. Cataingan-Esperanza section of Central SRNH in Masbate Island is not paved and very rough, length of the section is approximately 30 km. Some bridges are fair and good condition, therefore the total cost of this section is estimated for only earth works and pavement. The results of this section road construction costs are as follows.

PCCP (Portland Cement Concrete Pavement) Paved width: 6.1 m

-Unit cost per 1 m: 3578.59 × 6.1 = P21,829.40/m

-Total cost: 21,829.40 × 30,000 = P654,882,000

Gravel Pavement:

-Unit cost per 1 m: 1,003.00 × 6.1 = P6,118.30/m

-Total cost: 6,118.30 × 30,000 = P183,549,000

Balud-Milagros section of Panay-Masbate SRNH in Masbate Island is also not paved and very rough, length of the section is approximately 40 km. 9 bridges are fair and 6 bridges are good condition, therefore the total cost of this section is estimated for only earth works. The results of this section road construction costs are as follows.

PCCP (Portland Cement Concrete Pavement) Paved width: 6.1 m

-Unit cost per 1 m: 3578.59 × 6.1 = P21,829.40/m

-Total cost: 21,829.40 × 40,000 = P873,176,000

Gravel Pavement:

-Unit cost per 1 m: 1,003.00 × 6.1 = P6,118.30/m

-Total cost: 6,118.30 × 40,000 = P244,732,000

5.2.4 Financing Scheme of Highway

The project cost is broken down into economic and financial costs. The economic costs consist of both foreign and local currency costs, but exclude local taxes. The financial costs are the economic costs plus taxes.

The foreign currency components consists of the costs for imported equipment and spare parts, foreign currency of locally purchased goods and services, salaries of expatriate personnel and foreign overheads/profits. The local currency component, on the other hand, is composed of the local component cost of local materials, equipment and supplies, wages, local supervision, transport and freight and local overheads and profits.

For evaluation purposes and the estimation of shadow priced economic costs, the cost component financial sharing has been estimated at 50% for foreign component, 35% as local component and 15% for local taxes.

5.3 RoRo Terminals

5.3.1 Current Status of Existing RoRo Ports

1) Candidate Routes

Field reconnaissance surveys have been conducted jointly by the study Team and the Counter Part study Team as well as the local consultants. The surveys were carried out along the candidate routes identified in Chapter 6. The results of the surveys were summarized in Appendix I-7-1-1 route by route and port by port.

The highways connecting RoRo ports were also surveyed to identify those sections that need improvements. In general, the highways along the candidate routes are fairly well developed except in Masbate Island, a part of the highway in Palawan Island and eastern coast al highway in Mindoro Island. More specifically, the following sections need improvements:

-Central Route;

Almost all the highway links in Masbate Island, except Masbate City – Cataingan – Placer.

-Panay-Sorsogon Route;

Balud – Aroroy section in Masbate Island

-Palawan – Luzon Route;

Roxas – TayTay in Palawan and San Jose – Abra de Ilog- Calapan in Mindoro Island

-Palawan Visayas Route;

San Jose de Buenavista – Iloilo in Panay Island

2) RoRo Ports

As a preparatory work for the preparation of layout plans, the Study Team carried out field reconnaissance surveys for the existing RoRo ports along the candidate routes. The ocular surveys included natural conditions, status of existing infrastructures as well as environmental and socio-economic concerns. These together with other related studies are among the bases in the evaluation of the potentials of the candidate sites proposed for development.

The result of surveys is summarized the Table 5-9 - Summary Inventory of Existing RoRo Ports.

Table 5-9 Inventory of Existing RoRo Ports - Summary

RRTS Route	Port	Admin by	Link with	RoRo Service	Existing Conditions				Govnt Develp Plans	
					Natural Condition	Depth	Ramp	Remarks	SONA2006	PPA
1. Eastern SRNH	**Matnog**	PPA	Allen/Dap Dap	Operational	Behind Isd.	-5m~	3	Well functioning port. PPA plans addt'l pier/ramp by expansion of existing due to congestion.		Expansion
1. Eastern SRNH	**Allen**	Prv	Matnog	Operational	Waves	-5m~	Capable	Basic facilities are well functioning at Allen. Dap Dap is minimal. San Isidro is not utilized as it is far south.		
1. Eastern SRNH	**Liloan**	PPA	Lipata	Operational	Well sheltered	-4m~	1	Well functioning port.		
1. Eastern SRNH	**San Ricardo**	PPA	Lipata	None	Waves	-4m~	1	Existing is damaged. PPA plans a new RoRo port as an alternative to Liloan.		New Port
1. Eastern SRNH	**Lipata**	PPA	San Ricardo/Liloan	Operational	Waves	-5m~	2	Well functioning port. PPA plans addt'l pier/ramp by expansion of existing due to congestion.		Expansion
Eastern SRNH Ext	**Kawayan**	PPA	Maripipi	None	Behind Isd.	Shallow	None	Causesay only. PPA constructs pier/ramp.		
Eastern SRNH Ext	**Naval**	PPA	Esperanza	None	Behind Isd.	-3m~	None	Existing port with pier and reclaimed area in front of town.	x	
2. Western SRNH	**Batangas**	PPA	Capalan/Abra de Ilog	Operational	Well sheltered	-5m~	8	Successful and typical RoRo port in the country.		
2. Western SRNH	**Calapan**	PPA	Batangas	Operational	Waves	-4m~	7	Well functioning port.		
2. Western SRNH	**Roxas**	PPA	Caticlan	Operational	Waves	-3m~	1	Constructed as an alternative to Bulalacao.		
2. Western SRNH	**Caticlan**	LGU/PPA	Roxas	Operational	Behind Id., Waves	-4m~	2	Well functioning RoRo port, however prone to SW waves. Recommended to construct an offshore breakwater at the existing site, or shift to a new site as an option.		
2. Western SRNH	**Dumangas**	PPA	Bacolod	Operational	Current, Siltation	~-3m	1	Existing feeder port with pier and wide reclaimed backup area. Addt'l ramps required to make it as a RoRo port.		
2. Western SRNH	**Bacolod**	BREDCO	Iloilo/Dumangas	Operational	Well shelterd	Capable	Capable	Well functioning port.		
2. Western SRNH	**Dumaguete**	PPA	Dapitan	Operational	Well shelterd	-7m~	1	Well functioning port.		
2. Western SRNH	**Siaton**	PPA	Dapitan	None	Sheltered beach	Shallow		PPA plans a new RoRo port as an alternative to Dumaguete.		New Port
2. Western SRNH	**Dapitan**	PPA	Dumaguete/Siaton	Operational	Well shelterd	-4m~	2	Well functioning port.		
3. Central SRNH	**San Antonio**	PPA	Masbate	None	Beach facing SW	Shallow		PPA plans a new RoRo port as an alternative to Pilar Port (shallow).	x	New Port
3. Central SRNH	**Masbate**	PPA	San Antonio	Operational	Well sheltered	-9m~	3	Well functioning port.		
3. Central SRNH	**Cataingan**	LGU		None	Well sheltered	-4m~	None	Existing feeder port with pier and reclaimed area. No RoRo function.		
3. Central SRNH	**Esperanza**	PPA	Naval/Daanbantayan	None	Open to SW	Reef		To make it as a RoRo port, causeway, reclamation, pier/ramp and breakwater required.	x	
3. Central SRNH	**Daanbantayan**	CPA	Esperanza	None	Open to NE	Reef		Provincial project is underway. To make it as a RoRo port, causeway, reclamation, pier/ramp and breakwater required.		
3. Central SRNH	**Cebu**	CPA	Tubigon	Operational	Well sheltered	Deep	Capable	Well functioning port.		
3. Central SRNH	**Tubigon**	PPA	Cebu	Operational	Sheltered	-5m~	2	Well functioning port.	x	
3. Central SRNH	**Jagna**	PPA	Benoni/Mambajao	Operational	Sheltered	-3m~	1	Well functioning port that can accommodate large passenger vessels.	x	
3. Central SRNH	**Mambajao**	PPA	Jagna	None	Open to North	-3m~	1	Poor/damaged facilities.	x	
3. Central SRNH	**Benoni**	PPA	Jagna/Balingoan	Operational	Sheltered	NA	2	RoRo functioning with minimum facilities.		
3. Central SRNH	**Guinsiliban**	PPA	Balingoan	Operational	Open to South	NA	1	Poor/damaged facilities.	x	
3. Central SRNH	**Nasipit**	PPA	Jagna	Operational	Well sheltered	Capable	NA	Well functioning port.		
3. Central SRNH	**Balingoan**	PPA	Benoni/Guinsiliban	Operational	Well sheltered	-3m~	2	Well functioning port.		
3. Central SRNH	**Cagayan de Oro**	PPA	Jagna	Operational	Well sheltered	Deep	NA	Well functioning port.		
Central Ext	**Santander**	CPA/Prv	Dumaguete	Operational	Waves	NA	Capable	Minimum facilities are functioning at each private port.	x	

RRTS Route	Port	Admin by	Link with	RoRo Service	Existing Conditions				Govnt Develp Plans	
					Natural Condition	Depth	Ramp	Remarks	SONA2006	PPA
4. Negros--S.Leyte SRNH	**San Carlos**	PPA	Toledo	Operational	Well sheltered	Capable	3	Well functioning port.		
	Toledo	CPA	San Carlos	Operational	Open to West	-3m~	1	Well functioning however incovenient ramp layout and poor backup area.		
	Pt. Engano	CPA	Getafe	Operational	Open to East	-3m~	1	Port on reef Beside Hilton htl. Presently used for tourism. Wide expansion required to make it as a RoRo port.		
	Getafe	PPA	Pt. Engano	Operational	Well sheltered	-3m~	1	Minimum RoRo function. Wide expansion required to make it as a RoRo port.		
	Ubay	PPA	Maasin/Bato	Operational	Well sheltered	-2m~	2	Minimum RoRo function. Poor backup area. PPA constructs reclamation for backup area.	**x**	
	Tapal	PPA	Maasin	None	Well sheltered	-4m~	1	Being utilized for cargoes. Ubay is more advantageous for RoRo.		
	Maasin	PPA	Ubay/Tapal	Operational	Sheltered	-5m~	1	Well functioning port.	**x**	
5. Panay--Leyte SRNH	**Ajuy**	LGU	Victorias/Cadiz	None	Well sheltered	-3m~	None	Existing feeder port with pier. Ramps and backup area required to make it as a RoRo port.		
	Victorias	LGU	Culasi/Ajuy	None	Mangrove	Shallow	None	Quite few potential for development due to social/environmental conditions.		
	Cadiz	LGU	Culasi/Ajuy	None	Open to North	Shallow		As an alternative to Victorias or Manalula, LGU constructs causeway, pier/ramp to make it as a RoRo port.		
	Escalante	PPA/Prv	Tabuelan	Operational	Well sheltered	-3m~	Capable	Operated by private ramps at Yap, Balcerona. 1ramp underway by PPA.		
	Tabuelan	CPA/LGU	Escalante	Operational	Well sheltered	-1m~	2	Poor infrastructure for RoRo. Wide expansion required to make it as a RoRo port.		
	Bogo	CPA/LGU	Palompon	None	Well sheltered	-7m~	2	Poor RoRo function with no backup area. Wide expansion required to make it as a RoRo port.		
	Palompon	PPA	Bogo	None	Well sheltered	-4m~	1	Good infrastructure however under-untilized.		
6. Panay--Masbate SRNH	**Aroroy**	PPA	San Antonio	None	Open to NE	Shallow	None	Existing feeder port. PPA plans a new RoRo port as an alternative to existing port (shallow).	**x**	New Port
	Balud	LGU	Culasi/Roxas	None	Open to West	Reef Shallow		To make it as a RoRo port, causeway, reclamation, pier/ramp and breakwater required.		
7. Batangas--Pawalan SRNH	**San Jose**	PPA	Coron	None	Well sheltered, Siltation	-4m~	2	Functioning port however prone to siltation. PPA plans a new RoRO port adjacent to the existing.		New Port
	Coron	PPA	San Jose/Taytay	Operational	Well sheltered	-10m~	1	Well functioning port.		
	Taytay	PPA	Coron/Cuyo	None	Well sheltered	Reef Capable		PPA plans a new RoRo port at a totally new port. Site is 20km away from the municipal.		New Port
8. Iloilo--Palawan SRNH	**Cuyo**	PPA	Taytay/S.J.Buenavista	None	Waves	-3m~	1	Existing RoRo port however facilities are poor.		
	San Jose de Buenavista	PPA	Cuyo	None	SW waves	-3m~	1	Potential facilities however under-utilized. Extension of breakwater is rq'd.		

3) Site Surveys

As part of the engineering study effort, the Study Team carried out surveys on natural conditions for the potential sites comprising of the following:

-Topographic/Hydrographic surveys (17 ports)

-Current observations (8 ports)

-Soil investigations (Boring) (15 ports), and

-IEE (Initial Environmental Examinations. Checklists based on DENR format are prepared) (21 ports)

4) Status of Existing RoRo Facilities

The lists hereunder summarize the results of the inspections on RoRo Terminal operations nationwide.

(1) Safety of Operations

-Generally, the so called Mediterranean style docking operations is being practiced nationwide. This mode of berthing which is unconventional is unstable against wave, current and wind forces. In order to avert possible occurrence of disaster, shipping operators are forced to keep their engines running despite the unwarranted added operational expense brought about by steeply rising cost of fuel. As a remedial measure, berthing structures must be provided for the safe mooring of vessels alongside.

-Navigational aids facilities including light beacon and buoys to assist the safe approach of vessels into the terminal area are either non existent or dilapidated. Buoy markers to identify the existence of shallow depths are either lacking or insufficient. Given this deplorable condition, day or night time operations are quite hazardous.

-Some ports are not sheltered and are prone to monsoon wave attacks. This poses hazard to berthing operations and safety of passengers. This also caused the damage to the berthing structures, fender system (as well as to the ship) due to the uncontrolled banging of the vessel caused by wave actions while the vessel is moored alongside. Breakwater must therefore be provided to shelter the mooring areas from such occurrences.

-The mixture of passengers and cargos embarking/disembarking is not only chaotic but is posing hazard to the safety of passengers. To avert this deplorable condition, a dedicated boarding/de-boarding stairway must be provided to cater and segregate the boarding /de-boarding of passengers through the deck of the berthing facility while vehicles are being loaded or unloaded through the ramps.

-The berthing structures are not provided with sufficient and appropriate mooring facilities such as bollards and bitts for the safe anchoring of vessels.

(2) Enhancement of Friendly Services

-Some ports either lack or is not sufficiently provided with basic amenities including passenger terminal building, ticket booth, waiting shed, covered walkway, among others for the convenience of the riding public. The amenities in certain ports where provided are not properly arrange to allow for a systematic terminal operations.

-To enhance security measures, perimeter fence must be provided to segregate departing passengers from the general public. To avert the possible smuggling of explosives, the terminal building must be provided with an X-Ray machine to scan the hand carried baggage and luggage of departing passengers.

-Poor arrangement of the onshore facilities including the truck holding space and parking

area do not allow the orderly movement of vehicular traffic in and around the terminal premises. This is causing traffic congestion and disorderliness thus creating the chaotic condition in and around the terminal area. Sufficient backup area coupled with well planned arrangement of backup facilities would greatly reduce if not entirely eliminate these deplorable problems.

-The far distance between the passenger terminal building / waiting shed and the location of the berthing area is causing inconvenience to passengers particularly during the occurrence of bad weather conditions.

-The lack or insufficiency of potable water coupled with frequent brownouts is causing inconvenience to passengers. The lack of water is the primary cause of the unsanitary condition of the toilet facilities and maintenance of the cleanliness of the building facilities and its surroundings. The occurrence of frequent brownouts on the one hand is rendering the electrical appliances of the building facilities in-operational. To remedy this situation, other sources of water supply must be tapped including the development of deep wells and springs, provision of reservoir and elevated tank for distribution of water. A standby generator must be provided to be operated in times of brownouts.

(3) Environmental and Social Concerns

-In most ports, a number of houses / shops / dwellers are located inside the port area and along the access road. This coupled with uncontrolled movement of traffic and vendors are adding to the chaotic operation of the terminal. As remedial measures, an area for the relocation of settlers must be provided in accordance with pertinent laws and regulations. As a support to the livelihood of the inhabitants in the nearby areas, a vendor terminal facility furnished with basic necessities including water and electricity must be provided. This will not only enhance cleanliness and orderliness in the terminal area but would also generate income for the port from the reasonable rental of the facility. This will also discourage the proliferation of moving vendors inside the port area and would create an atmosphere of cooperativeness between the community and the port terminal.

-In previous development, septic tanks are the primary mode of treating waste water sewage brought about by the operation of the port. Considering the volume of passengers, the use of septic tanks for waste water treatment particularly for BOD contents will no longer be sufficient. Therefore, pursuant to DENR regulations, a sewage treatment plant will be provided for each port.

5.3.2 Standardization of Port Facilities

In order to determine the required infrastructures best suited for the development of each of the proposed RoRo Terminal Site, the following basic concepts are considered:

(1) Ensure Safety of navigations particularly during night time operations through the provision of navigation aid facilities, provision of berthing facilities for the safe mooring of vessels while at berth, provision of dedicated Passenger boarding/de-boarding facility to ensure safety of passengers during boarding and de-boarding, among others.

(2) Provision of basic facilities such as perimeter fence to segregate the operation area from common facilities for public use, provision of x-ray facility to avert possible smuggling of explosives through hand carried luggage/baggage, etc., as counter measures against the possible occurrence of terrorism.

(3) Provision of basic on-shore facilities such as passenger terminal building behind the mooring areas for the safe and convenient use of passengers while waiting for boarding, adequate water supply system, vehicle holding and parking areas among others to enhance Services.

(4) Address Environmental and Social concerns through the provision of Sewerage Treatment Plant as mandated by the Environmental Management Bureau of the DENR to maintain sanitation and

cleanliness, Vendors' Terminal Facility as supporting measures for the livelihood of the inhabitants in the area, among others.

To attain the foregoing objectives, topo/hydro surveys were conducted in the proposed sites in addition to current observations, soil investigations and Initial Environment Examination (IEE) .The needed infrastructure and facilities for the development of the proposed RORO Terminals were drawn up on the basis of the results of the said surveys, investigations and IEE including the following:

(1) As mentioned above, to enhance safety of navigation, light beacons are provided for all the proposed ports. Light buoy markers will also provided in certain places where deemed appropriate to identify shallow areas along the access channel.

(2) Where appropriate, the berthing facilities are located in the offing at a depth to permit safe maneuvering and docking of the objective vessels and at a depth to avoid accumulation of silts to avert costly maintenance dredging works.

(3) Pursuant to PPA Design Standard, the berthing depth shall be determined based on the draft of the largest objective vessel to moor alongside at mean low low water level (MLLW=+0.00m) plus an allowance of about 1.0m.

(4) As much as practicable, efforts have been made to locate the potential sites in coves for natural protection against monsoon waves. However, not all the proposed sites are provided with natural inlets or coves and in such cases, breakwaters are provided to protect the mooring area from monsoon waves either from the southwest direction or northeast direction.

(5) The backup space for the construction of the building facilities, vehicle holding area and parking space among others are provided as closely as possible at the back of the berthing structures for the convenience of port users.

(6) Utilities work including water supply, power supply, standby generator, indoor and outdoor lightings, etc., needed to enhance operating services are provided. In the absence of a power supply, the standby generator(s) will be used during terminal operating hours.

(7) To secure the operation area of the RORO Terminals, perimeter fence are provided to segregate it from areas allocated for public use. As mentioned earlier, X-Ray facilities will be provided for the scanning of hand carried luggage/baggage to avert the possible smuggling of explosives.

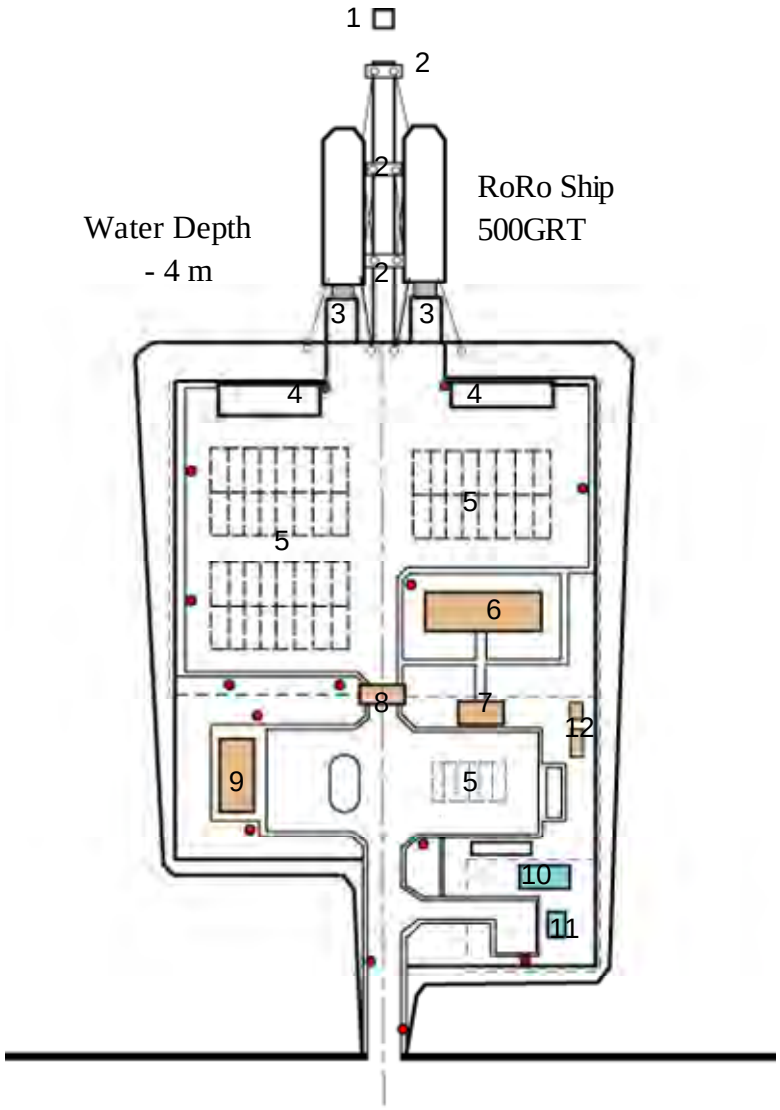
The size of RORO vessels adopted for the Project will range from 500 GRT to 1000 GRT. Relative thereto, **500 GRT** vessels are considered to be deployed between terminals of relatively short distance such as those in the Visayas region and **2000 GRT** for relatively longer distance such as the Taytay –Coron- San Jose Route.

The depth of water for the basin and mooring area were determined based on the draft of the objective vessel to berth alongside at mean low low water level (MLLW=+0.00m) plus an allowance of about 1.0m as shown hereunder:

-For 500 GRT: Water Depth = Draft 2.6m + Allowance 1.0m = 3.6m, say 4.0m

-For2000 GRT: Water Depth = Draft 4.2m + Allowance 1.0m = 5.2m, say 5.5m

Based on the standardization items as stated above, Figure 5-1 shows a Model Layout for RoRo Terminal in the RRTS Study.

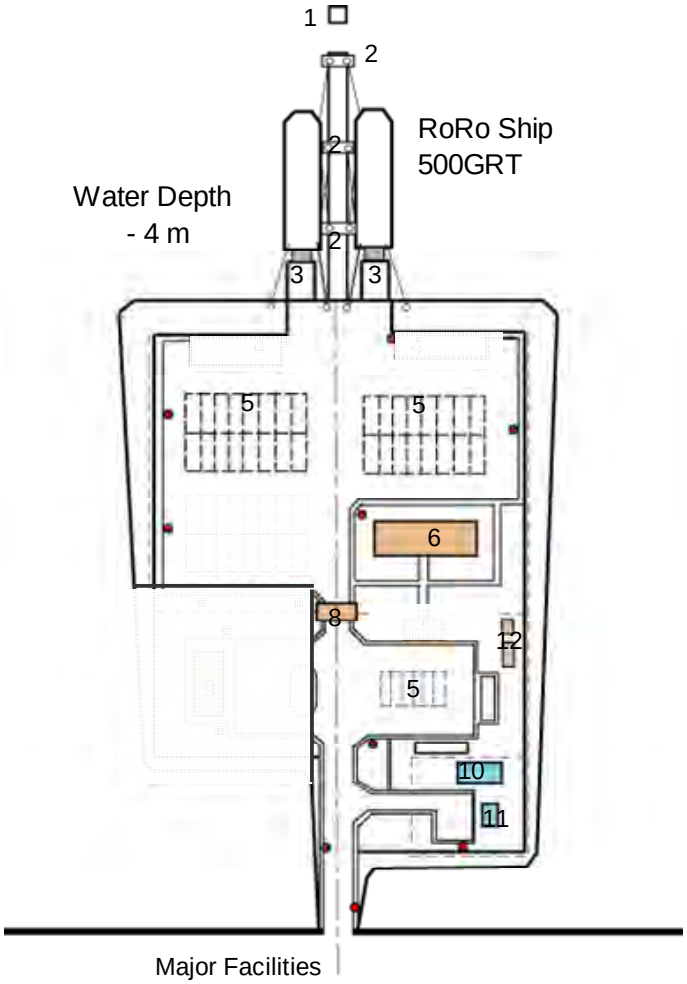


Major Facilities

1.Mooring Dolphin & Light Beacon
2.Breasting & Mooring Dolphins
3.RoRo Ramp (HW/LW Ramps)
4.Waiting Shed
5.Parking area
6.Passenger Terminal
7.Ticketing Office/Shipping line office
8.Main Gate & Guard house
9.Administration Building
10.Underground water reservoir
11.Power House
12.Sewage Treatment Plant
● Lighting and PA
– – – Fence

Figure 5-1 Model Layout Plan for RoRo Terminal

All the proposed facilities are deemed essential for safe operations and for the enhancement of friendly services. Considering the cost for initial capital outlay, construction of the terminal could be undertaken on phased development basis as shown in Figure 5-2 hereunder. As can be seen, the construction of the administration office and other building facilities including the corresponding marine and civil works construction could be deferred for the future. While this scenario will reduce the initial capital outlay by 15%, there appears to be no merit considering the additional cost for remobilization which is quite substantial should the suspended construction be pursued in the near future for completion by 2015.



Major Facilities

1.Mooring Dolphin & Light Beacon
2.Breasting & Mooring Dolphins
3.RoRo Ramp (HW/LW Ramps)
4.Waiting Shed
5.Parking area
6.Passenger Terminal
7.Ticketing Office/Shipping line office
8.Main Gate & Guard house
9.Administration Building
10.Underground water reservoir
11.Power House
12.Sewage Treatment Plant
Lighting and PA
Fence

Figure 5-2 Model Layout Plan for RoRo Terminal (Reference)

5.3.3 Unit Cost Adopted for the Construction of RoRo Terminals

Based on the prevailing market situations, the following unit cost were adopted for this study effort.

Table 5-10 Unit Cost Adopted for the Cost Estimation

Item	Description of Works	Unit	Unit Price (Php)	Remarks
1	**Marine Works**			
1-1	Breakwater (Armor Stone)	m3	4,500	
1-2	Breakwater (Core Store)	m3	3,600	
1-3	Breakwater (Top Concrete)	m3	15,000	
1-4	Dredging	m3	360	
1-5	Revetment (Armor Stone)	m3	4,500	
1-6	Revetment (Core Stone)	m3	3,600	
1-7	Revetment (Filter Cloth)	m2	740	
1-8	Reclamation	m3	350	
1-9	Parapet Concrete	l.m.	12,000	
1-10	Banca Landing (Core Stone)	m3	3,600	
1-11	Banca Landing (Cocrete Stair)	m3	15,000	
2	**Navigational Aids**			
2-1	Light Beacon	set	1,500,000	
2-2	Buoy Marker	set	2,500,000	
3	**Berthing Facilities**			
3-1	Demolition & Renovation	L.S.	5,000,000	
3-2	Breasting Dolphin (Pile)	pcs	404,000	
3-3	Breasting Dolphin (Concrete)	m3	12,000	
3-4	Mooring Dolphin (Pile)	pcs	404,000	
3-5	Mooring Dolphin (Concrete)	m3	12,000	
3-6	Pier (Pile)	pcs	404,000	
3-7	Pier (Concrete)	m3	12,000	
3-8	Steel Sheet Pile Wall (Pile)	l.m.	320,000	
3-9	Steel Sheet Pile Wall (Tie Cable)	pcs	300,000	
3-10	Steel Sheet Pile Wall (Coping Concrete)	m3	15,000	
3-11	Pile Bent (Pile)	pcs	404,000	
3-12	Pile Bent (Concrete)	m3	12,000	
3-13	Passenger Walkway	l.m.	200,000	Connecting Dolphins
3-14	RoRo Ramp (Pile)	pcs	404,000	
3-15	RoRo Ramp (Concrete)	m3	12,000	
3-16	Fender (Cylinder)	pcs	400,000	
3-17	Fender (V-type)	pcs	120,000	
3-18	Mooring Bitt	pcs	150,000	
3-19	Boarding Stairs	nos	500,000	for Passenger Boarding
4	**Civil Works**			
4-1	Causeway (Rockmound w/Pavement)	l.m.	25,000	
4-2	Pavement	m2	4,000	
4-3	Pavement Marking	L.S.	500,000	
4-4	Sidewalk	m2	1,500	
4-5	Curb and Gutter	l.m.	1,200	
4-6	Landscaping	m2	400	

5	**Building Works**			
5-1	Passenger Building	m2	25,000	
5-2	Control House	m2	40,000	
5-3	Admin Building	m2	20,000	
5-4	Guard House	m2	15,000	
5-5	Waiting Shed	m2	25,000	
5-6	Ticket Booth	m2	35,000	
5-7	Canteen	m2	25,000	
5-8	Power House	m2	35,000	
5-9	Sewege Treatment House	m2	30,000	
5-10	Public Toilet	m2	15,000	
5-11	Main Gate	m2	15,000	
5-12	Covered Parking	m2	15,000	
5-13	Covered Walk	m2	20,000	
5-14	Vendor House	m2	25,000	
5-15	Coast Guard Office	m2	35,000	
6	**Utilities Works**			
6-1	Sewage Treatment Plant	L.S.	10,000,000	
6-2	Elevated Water Tank	L.S.	3,000,000	
6-3	Underground Reservoir	m2	30,000	
6-4	Water Supply Distribution	L.S.	10,000,000	
6-5	Drainage System	L.S.	10,000,000	
6-6	Fire Fighting System	L.S.	1,500,000	
7	**Electrical Works**			
7-1	Power Supply System	L.S.	10,000,000	
7-2	Standby Generator	L.S.	7,200,000	
8	**Lightings**			
8-1	High Mast Lighting	set	600,000	
8-2	Double Arm Lighting	set	400,000	
8-3	Single Arm Lighting	set	200,000	
8-4	Dome Lighting	set	100,000	
9	**Appurtenant Works**			
9-1	Gate	L.S.	500,000	
9-2	Perimeter Fence	l.m.	7,500	
9-3	Public Address System	L.S.	500,000	
9-4	Weigh Bridge	set	2,000,000	
9-4	Xray Scanner & Metal Detector	set	5,000,000	
10	**Access Road**			to N'tl Hwy only
	Concrete Pavement	l.m.	22,000	
	Gravel Surface	l.m.	6,200	

5.3.4 Tariff System

1) Present situation

Tariff is classified into “Port charges” and “Cargo handling charges” by PPA, while other government agencies such as CPA regulate their own tariff systems. The draft of the port tariff is prepared by PPA itself. PPA’s port tariff is applied not only to PPA ports but also to most ports under other agencies such as CPA, LGU, and private companies.

Meanwhile, the draft of cargo handling tariff is prepared in each port by respective private cargo handling companies. The draft is brought to PPA-PMO and submitted to the related organizations and cargo suppliers. Then, the draft of cargo handling tariffs will be brought to PPA

head office for final approval by the PPA board. Other authorities such as CPA apply similar procedures in deciding their own cargo handling tariff.

2) PPA Port Tariffs of Domestic Cargoes

PPA port tariffs of domestic cargoes consist of "Charges on Vessel", "Charges on Cargoes" and "Charges on Storage". Same port tariff structure is seen in CPA. CPA port tariff rates are the same as PPA.

3) Cargo Handling Tariff of Domestic

Cargo handling tariffs are different in each PPA port. The tariff system lacks uniformity. In fact, different units, classification of commodities and classification of items are basically applied.

PPA adopted a universal rate for collecting the government share from the revenues of cargo handlers pegging the rate at 10% for domestic and 20% for international cargo. CPA also adopted new fixed rates the same as PPA.

By the PPA Memorandum Circular No.25-2004 dated 26 August 2004, the RO-RO Terminal Fee cash ticket shall be inclusive of the Value-Added Tax (VAT) and shall be printed and issued in four (4) color-coded denominations corresponding to each vehicle type.

6. Identification of the Candidate RRTS Routes

6.1 Objective of RRTS Development

The RRTS development aims at the reduction of cost of the transportation between Mindanao and Luzon Islands, especially the cost of transportation of agricultural products in Mindanao to Manila. However, while the long-distance shipping has successfully achieved the improvement in the productivity by introducing large size RoRo ships, the Western SRNH, which consists of three short-distance RoRo links, rather promote inter-and intra-regional transport between Luzon and Visayas, Visayas and Mindanao. There are many short-distance RoRo ferry links within Visayas Region. Thus, the RRTS development should focus on the inter-regional transport.

6.2 Economic Benefits of RoRo Transport Routes

The economic benefit of the development of RoRo transport route is not only the reduction of the cost and time of cargo handling at the ports, but also providing shorter routes between the regions through the development of complementary Routes. So far, some agricultural products in Mindanao have been firstly shipped to Manila and then re distributed to all the regions via existing hub-spoke transport network or Pan-Philippine Highway. Due to the frequent ferry service, cargos are no longer need to be stored in the shed or warehouses. This also reduces the travel time drastically.

In addition, RoRo transport will provide the small scale industries, agribusiness and shop owners of the access to the markets in other regions and islands, because they can easily ship their products of various kinds in small batches to various destinations. The RoRo ferry also encourages bus companies to operate long distance bus along the RoRo routes. The long-distance bus service surely promotes the tourism. Over the past five years, the number of car owners has been increasing rapidly especially in Visayas and Mindanao Regions. This implies that the potential users of RoRo are expanding. RoRo ferries surely expand the mobility of these vehicles as well as passengers.

6.3 Identification of Candidate RRTS Routes for Evaluation

As discussed above, the principal goal of the development of RRTS for Mobility Enhancement in the region is to develop inter-modal transport routes between the islands especially in Eastern Visayas, Bicol and Northern Mindanao Regions (See Figure 6-1), i.e., the development of the following RRTS Routes:

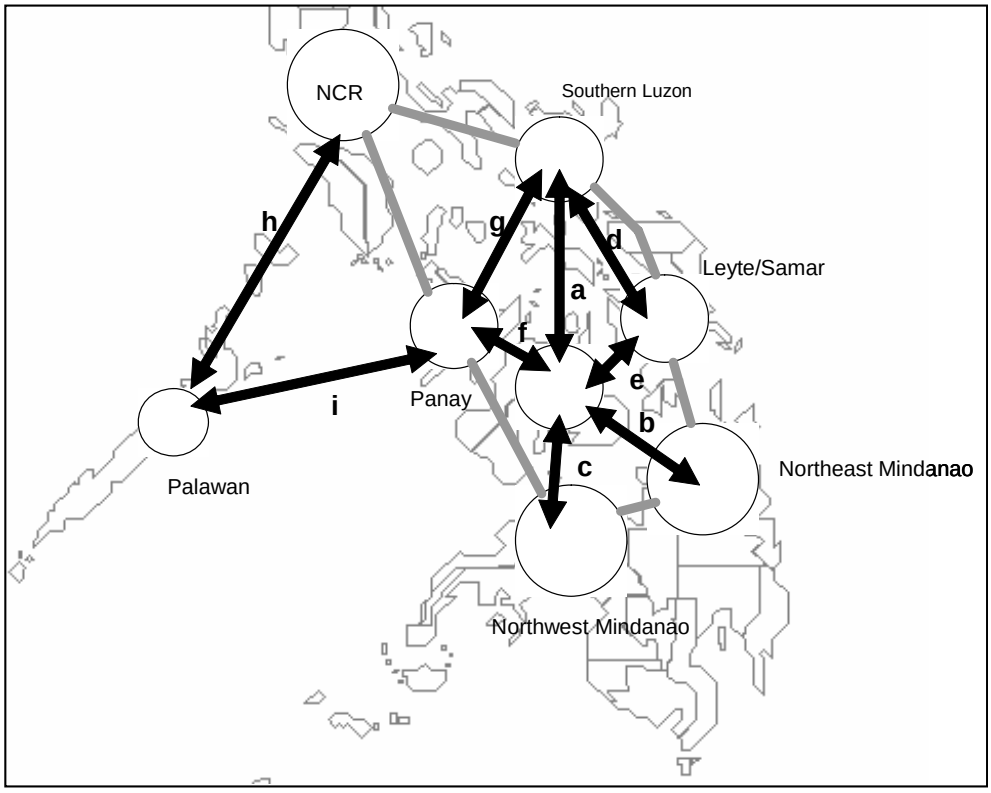
a) Cebu Is.– Masbate – Southern Luzon provinces
b) Cebu Is. – Bohol – Northeast Mindanao regions
c) Cebu. Is. – Negros. Is. – Northwest Mindanao provinces.
d) Southern Luzon Provinces – Masbate – Leyte/Samar provinces
e) Cebu Is. – Bohol Is. – Leyte/Samar Is.
f) Cebu Is. – Negros Is. – Panay Is.
g) Panay Is. – Masbate – Southern Luzon provinces

In the light of the RRTS corridors presented in the MTPDP, the Central Corridor aims to realize the connections a), b) and c), while Eastern Corridor extension aims at the realization of connection d).

The RRTS routes proposed by DOTC (See Figure 2-8) other than the North-South Corridors, i.e., Route 1 through Route 5, aim to realize the connections e),f) and g) together with the connections

h) Palawan – Luzon and
i) Palawan – Visayas.

These connections from a) to i) are schematically shown in Figure 6-1



Source: Study Team

Figure 6-1 Inter-Regional Transport Network that wants Development

The RRTS will be most effective service for the inter-regional transportation with one or two RoRo links rather than long-distance transport via island hopping. However, they are grouped into the following seven routes, since the RoRo links denoted by a) through h) shall be forming nautical highway network as a whole. The nautical highways should be interconnected to each other for the most effective use. The full stretches of the nautical highways, i.e. both ends of each nautical highway and the junctions to other nautical highways, can be defined as follows:

1. Eastern Corridor (Pan-Philippine Highway) and extension

- This is the existing Pan-Philippine highways from Manila up to Mindanao (Manila - Matnog-Allen/Dapdap - Tacloban City - Liloan - Lipata - Surigao City - Highway network in Mindanao).

- The route also include an extension from Tacloban City to Masbate (Tacloban City - a port in Masbate)

2. Western Corridor (SRNH)

- This is also the existing nautical highway extending from Batangas to Mindanao (Batangas- Calapan - Roxas - Caticlan - Iloilo - Bacolod - Dumaguete - Dapitan - Mindanao North Coastal Highway)

3. Central Corredor (Central Corridor-MTPDP)

-This route covers the connections a), b), c) and extends from Legaspi City, which is the junction with the existing Pan-Philippine Highway Route (Eastern Corridor) to Surigao City, which is another junction with Pan-Philippine Highway in North east Mindanao via Masbate, Cebu, Bohol and Camiguin Islands:

-This route has an extension that extends from Cebu City to Dumaguete City, which is the junction with the Western Corridor (the Strong Nautical Highway).

4. Negros - Southern Leyte Lateral Route

- This route covers the connections e) and f). Since several RoRo links are currently operational between Panay, Negros, Cebu and Bohol Islands, two possible routes are identified. One possible route is from Bacolod City, which is the junction woth the Western Corridor, Southern Leyte via Cebu and Bohol.

5. Panay -Leyte Lateral Route

- The other possible route passes through the northern part of Panay, Negros and Cebu Island and then leads to Northern part of Leyte and merges to the Pan Philippine Highway at Tacloban City. The latter route is called “Ease-west complementary Route 2”, hereafter.

6. Panay - Masbate Lateral Route

-This rout is the connection g) and stretches from Culasi (Roxas, Capiz) , which is the diversion point at the existing Western Corridor, to Masbate City where the Central Corridor leads to Legaspi City where the rout merges to the Pan-Philippine Highway via Masbate Island

7. Batangas - Palawan Route

-The route is the connection h). This route was identified in the Port Master Plan and the original route proposed by DOTC is the direct connection between TayTay (Palawan) and Manila with a stopover at Coron, Busuanga Is. Since the length of the original RoRo link is quite long, an alternative RoRo route from TayTay to Batangas City, which is the Junction with Western Trunk Route, via Mindoro Is. was identified. The entire stretch of the alternative route id from Puerto Princes (Palawan) to Batangas City via, TayTay, Coron, Mindoro Is.

8. Panay - Palawan Route

-This route is the connection i). The route starts from TayTay Port, which is the junction with Palawan Luzon Complementary Route and, after a stopover at Cuyo Island, reached Panay Island then ended at Iloilo City, which is the junction with Western Corridor and Ease-west complementary Route 1.

These eight routes are conceptual route. Each rout includes some alternative RoRo links. Figure 6-2 and Figure 6-3 are the route maps that schematically show all the possible alternative highways and RoRo links. Figure 6-2 is drawn for the entire route except Palawan route, while Figure 6-3 is drawn for the two Palawan routes.

The alternative RoRo links shall be examined the advantages and disadvantages from the viewpoints of the following:

-Distance of RoRo link.

-Traffic volume: present and future potential

-Situation of the existing Port infrastructure, access road, environment

-Opinion of shipping lines

-Port administration: PPA, CPA, LGU or Private

Through the evaluation, the following eight routes have been chosen. The RoRo terminals along the routes have also been identified. To simplify the name, these eight routes are hereafter called SRNH, taking after the name of Western SRNH.

The specific passages of the eight routes are as flows. The RoRo links are indicated by rectangles.

1. Trunk Nautical Highways

· **SRNH 1 Eastern Nautical Highway (Pan-Philippine Highway)**

NCR – **Matnog – Allen** –(HWY in Samar Is.) - Tacloban City– (HWY in Leyte Is.) - Sogod – **Liloan – Lipata** – Surigao City – (Mindanao HWY)

Eastern Nautical Highway Extension

Tacloban City – (Biliran Is.) - **Naval – Esperanza** – (Central SRNH)

· **SRNH 2 Western Nautical Highway**

NCR – **Batangas – Calapan** – (HWY in Mindoro Is) - **Roxas – Caticlan** – (HWY in Panay Is. - Roxas City –(HWY in Panay Is.) - Iloilo City - **Dumangas – Bacolod** - (HWY in Negros Is.) – **Dumaguete – Dapitan** – (Mindanao HWY)

· **SRNH 3 Central Nautical Highway**

(SRNH 1) - Legaspi City – (HWY to Pilar) - **San Antonio - Masbate** - (HWY in Masbate Is.) - **Esperanza – Daan Bantayan** - Cebu City - **Cebu – Tubigon** – (HWY in Bohol Is.) - **Jagna – Balingoan/Cagayan de Oro/Nasipit** – (Mindanao HWY)

Central Nautical Highway Extension

Cebu City – **Santander – Dumaguete** – (Mindanao HWY)

2. Complementary Nautical Highways

· **SRNH 4 Negros – Southern Leyte Nautical Highway**

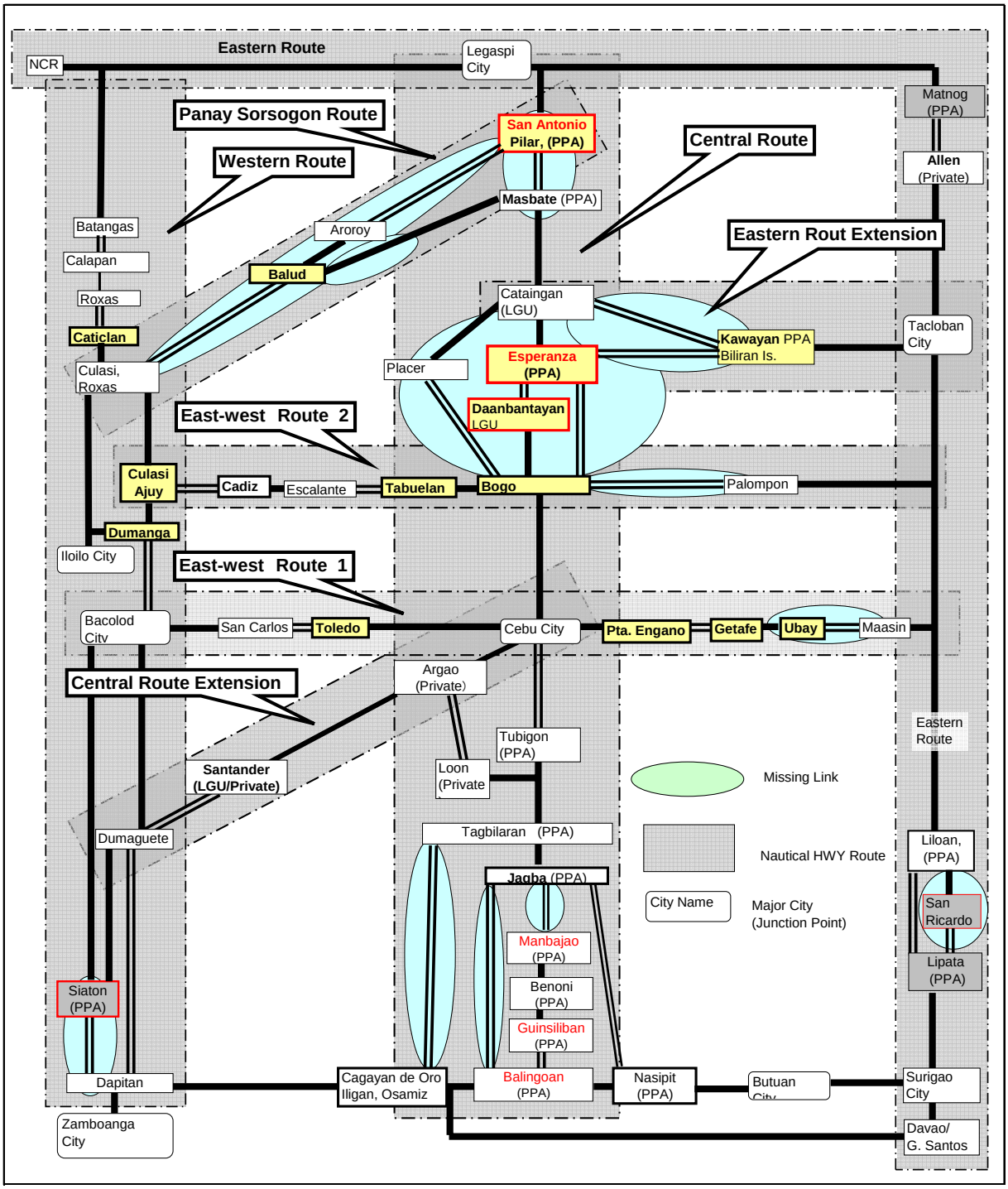
(Western SRNH) - Bacolod City– (HWY in Negros Is.) - **San Carlos - Toledo** –(HWY in Cebu Is.) - Cebu City – (Cebu - Mactan Bridge) - **Pt. Engano - Getafe** - (HWY in Bohol Is.) - **Ubay – Maasin/Bato** – Sogod – (Eastern SRNH)

· **SRNH 5 Panay – Leyte Nautical Highway**

(Western SRNH) - Roxas City (Capis) – **Culasi (Ajuy) – Cadiz** – (HWY in Negros Is.) - **Escalante – Tabuelan** – (HWY in Cebu Is.) - **Bogo – Palompon** - Tacloban City - (Eastern SRNH)

· **SRNH 6 Panay – Masbate Nautical Highway**

(Western SRNH) - Roxas City - **Culasi (Roxas City) – Balud** – (HWY in Masbate Is.) - Masbate City – (Central SRNH)



1. **Eastern Trunk Route (Pan-Philippine Highway)**
2. **Eastern Trunk Route and Extension**
3. **Central Trunk Route and Extension**
4. **Western Trunk Route**
5. **East-West Complementary Route -1**
6. **East-West Complementary Route -2**
7. **Panay - Sorsogon Complementary Route**

Highway Link — Port Name — New Port

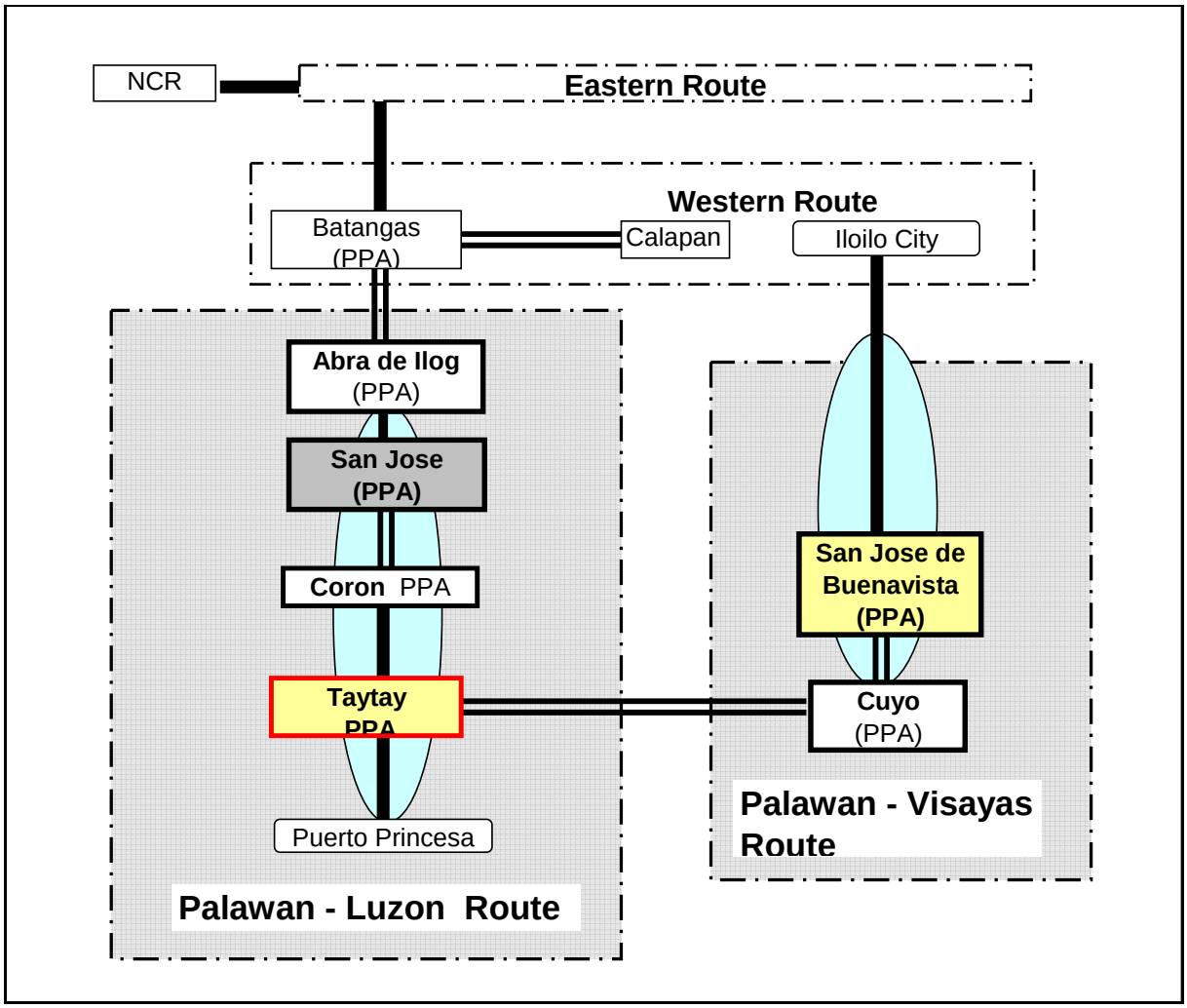
RoRo Link

Port Name — SONA Port — **Port Name** — Candidate for F/S

Ver. March 13, 2007

Source: Study Team

Figure 6-2 Nautical Highway Routes (Except Palawan routes) and Alternative RoRo Links (1)



8. Palawan - Luzon Complementary Route

9. Palawan - Visayas Complementary Route

Port Name — RoRo Terminal along the Route

Port Name — Candidate RoRo Terminal for F/S

Port Name PPA — Pre-feasibility Study Completed by PPA

Port Name — SONA Port

New Port

RoRo Link of the Route

Highway Link along the Route

Missing Link

Figure 6-3 Nautical Highway Routes (Palawan routes) and Alternative RoRo Links (2)

7. Selection of RoRo Ports for the Feasibility Studies

The eight SRNH's formulate the trunk routes of RRTS. Therefore, the SRNH should be developed as network rather than link by link. Therefore, all the RoRo ports that constitute the eight SRNH's and that need to be developed or upgraded must have their development and upgrading plans. Thus, the study team employed the following criteria in choosing 15 ports for the feasibility study:

- Category 1: Those new RoRo ports along new SRNH's that have no development plans yet.
- Category 2: Those existing RoRo ports along either new or operational SRNH that require large scale improvement ports and that has no development plans yet.
- Category 3: All other RoRo ports in SRNH.

Those ports that fell on the category 1 are given first priority in the selection of 15 ports for the feasibility study. The second priority is given to those pots that fell on the Category 2. The study team has selected 6 ports in Category 1 and 9 ports in Category 2.

The locations of the 15 ports for the feasibility study are indicated in Figure 7-1.

Table 7-1 List of the RoRo Terminals along the nautical Highways

No.	RRTS Route	Port[1]		Administration	Connection	Port	RoRo Service	Proposal	Freq.	Ramp	F/S Category
1	Easter SRNH	Matnog	Sorsogon	PPA	Allen/San Isidro		Opeartional	PPA Pre-F/S	18/day	3	
		Allen/Dadap	Northern Samar	Private	Matnog		Opeartional		18/day	3	
		Liloan	Southern Leyte	PPA	Lipata		Opeartional		4/day	3	
		San Ricardo	Southern Leyte	PPA	Lipata	New	Not yet in service	PPA Pre-F/S	-	None	
		Lipata	Surigao del Norte	PPA	Liloan/San Ricardo		Opeartional	PPA Pre-F/S	4/day	3	
	Eastern SRNH. E	**Naval**	Biliran	PPA	Esperanza	Improve.	Not yet in service		-	None	**1**
2	Central SRNH	**San Antonio[3]**	Pilar, Sorsogon	PPA	Masbate	New	Not yet in service	PPA Pre-F/S	-	None	**1**
		Masbate		PPA	San Antonio		To Cebu/Lucena		3/wk each	2	
		Esperanza[3]	Masbate	(PPA)	Daanbantayan/Bogo	New	Not yet in service	SONA	-	None	**1**
		Daanbantayan	Cebu	LGU	Esperanza	New	Not yet in service		-	None	**1**
		Cebu	Cebu	CPA	Tubigon		Opeartional			5	
		Tubigon	Bohol	PPA	Cebu		Opeartional		7/day	2	
		Jagna	Bohol	PPA	Balingoan/CDO/Nasipit		Opeartional		3/week	1	
		Balingoan	Misamis Oriental	PPA	Jagna		Opeartional		3/day	2	
		Cagayan de Oro	Misamis Oriental	PPA	Jagna		Opeartional		3/week	2	
		Nasipit	Agusan del Norte	PPA	Jagna		Opeartional		3/week	3	
	Central SRNH Ext	Mainit (Santander)	Cebu	Private	Sibulan (Dumaguete)		Opeartional		3/day	2	
		Matiao (Santaande	Cebu		Tampi (Dumaguete)		Opeartional		6/day	2	
3	Western SRNH	Batangas	Batangas City	PPA			Opeartional		26/day	8	
		Calapan	Mindoro Oriental	PPA			Opeartional		26/day	8	
		Roxas	Mindoro Oriental	PPA			Opeartional		6/day	1	
		Caticlan	Antique	LGU	Roxas	New	Opeartional		4/day	1	**2**
		Dumangas	Iloilo	PPA	Bacolod	Improve.	Opeartional		2/day	1	**2**
		Bacolod (BREDCO	Negros Occidental	Private	Dumangas		Opeartional		4/day		
		Dumaguete	Negros Oriental	PPA	Dapitan		Opeartional		4/day	1	
		Siaton[2]	Negros Or.	PPA	Dapitan	New	None	Fund requested	-	None	
		Dapitan	Zamboanga del Norte	PPA	Dumaguete/Siaton		Opeartional		4/day	2	
4	Negros Southern Leyte SRNH	San Carlos	Negros Occ.	PPA	Toledo		Opeartional		8/day	3	
		Toledo	Cebu	CPA	San Carlos	Improve.	Opeartional		8/day	1	**2**
		Pt. Engano	Cebu	CPA	Getafe	Improve.	Opeartional		3/day	1	**2**
		Getafe	Bohol	PPA	Pt. Engano	Improve.	Opeartional		3/day	1	**2**
		Ubay	Bohol	PPA	Bato/Maasin	Improve.	Opeartional		2/day	2	**2**
		Bato	Leyte	Private	Ubay		Opeartional				
		Maasin[3]	Southern Leyte	PPA	Ubay		To and from Cebu	SONA		1	
5	Panay Leyte SRN	**Culasi, Ajuy**	Iloilo	Private/CPA	Victorias		None		-	None	**2**
		Cadiz	Negros Occ.	LGU			None		-	None	
		Escalante	Negros Occ.	LGU	Tabuelan		RoRo Opeartional		3/day	2	
		Tabuelan	Cebu	Private/CPA	Escalante		RoRo Opeartional		3/day	1	**2**
		Bogo	Cebu	CPA/LGU	Palompon		None		-	2	**2**
		Palompon	Leyte						-	1	
6	Panay Masbate SRNH	**Balud**	Masbate	LGU	Culasi, Roxas	New	None		-	None	**1**
		Aroroy[2,3]	Masbate	PPA	San Antonio		None	SONA,Fund Reqtd	-	None	
7	Batangas Palawa SRNH	San Jose[2]	Mindoro	PPA	Coron/Taytay		From Batangas	Fund requested	-	1	
		Coron	Palawan	PPA	San Jose/Taytay				-		
		Taytay[2]	Palwan	PPA	Coron	New	None	Fund requested	-		**1**
8	Iloilo Palawan SRNH	San Jose de Buenavista	Aklan	PPA	Cuyo/Taytay		None		-	1	
		Cuyo	Palawan	PPA	Taytay/S. Jose de B. Vista				-	1	

Legend

1	RoRo Terminals along the RRTS Trunk and Complementary Routes
2	PPA 8 ports under evaluation of NEDA for Funding

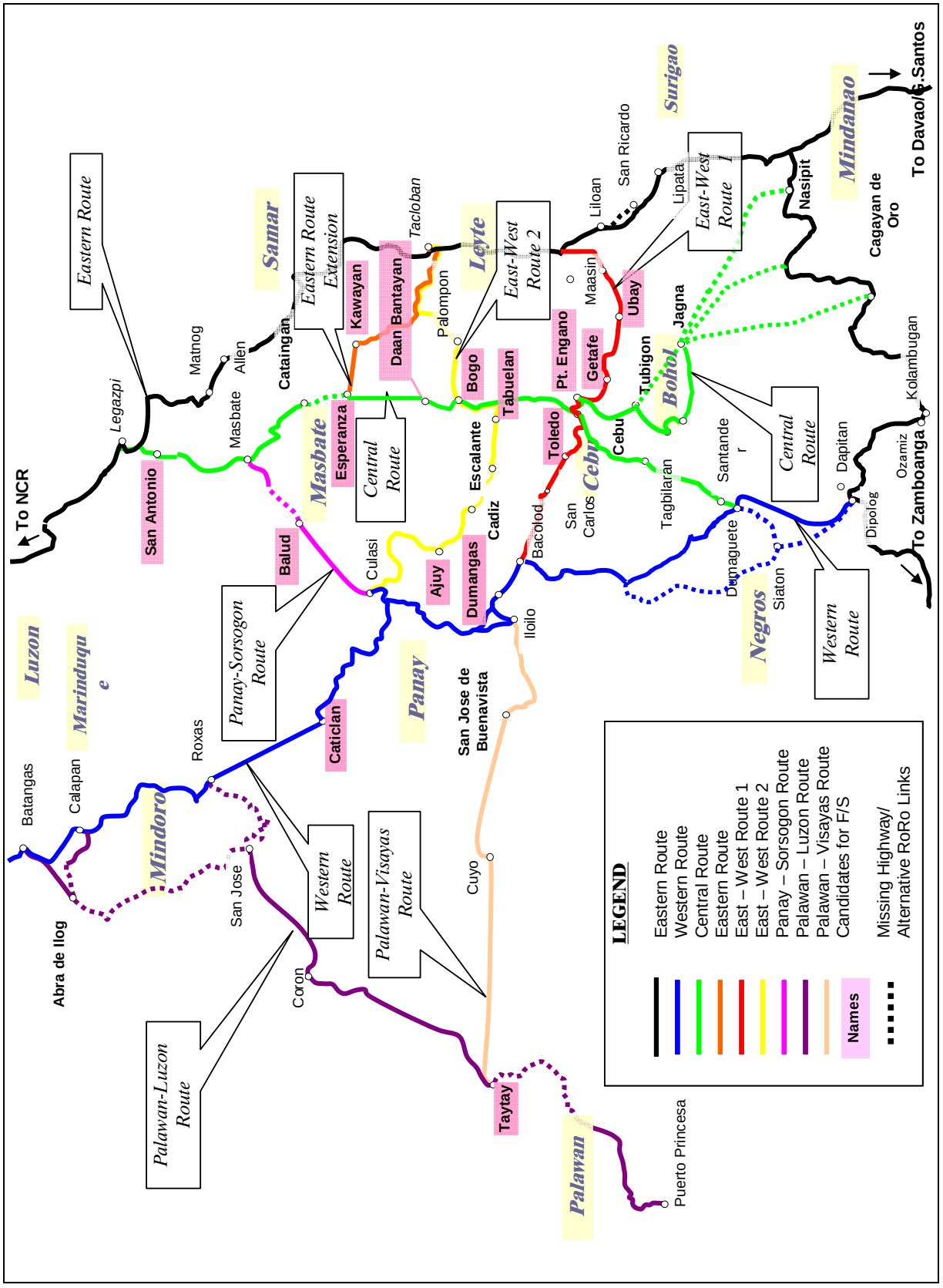


Figure 7-1 Proposed RRTS Routes

8. Traffic Forecast

8.1 Methodology of forecast

The National Port Master Plan forecasted the cargo and passenger traffic at RoRo ports over the country for the year of 2009 and 2014. The annual traffic growth rates over the period from 2005 up to 2015 have been estimated on the basis of the traffic forecasts given in the Port Master Plan.

The traffic volumes along the selected SRNH routes have been estimated in the following manner:

- Estimation of the cargo and passenger traffic volumes in 2005

  For the existing SRNH routes, the traffic volumes in 2005 were determined based on the port statistics.

  For the new SRNH routes, the potential traffic volumes that would occur in 2005 have been estimated on the basis of the results of the "Inter-regional Freight and Passenger Flow Survey, 2004", the PPA Statistics of commodities and the Statistics of DA on agricultural production.

- The traffic growth rate at a RoRo link has been estimated as the average of the traffic growth rates of the two regions that the RoRo link interconnects.
- The cargo and passenger traffic volumes of each RoRo link have been estimated with the assumption that they will grow at the constant growth rates calculated above over the period from 2005 to 2015.

8.2 Results of Traffic forecast

The results of cargo and passenger traffic forecasts are summarized in Table 8-1 and Table 8-2, respectively.

The cargo forecast volumes shown in Table 8-1 are the weight in terms of Transport Equipment. The numbers of units of the four types have been further estimated from the traffic volumes in weight and in the light of the composition observed at the existing RoRo ports.

Table 8-1 Future RORO Cargo Volume in 2015

Route	Link	Cargo 2005 (tons)	Region 1	Region 2	Average Growth Ratio	Cargo 2015 (tons)
Eastern Trunk Route	Matnog- Allen	1,772,017	5	8	6.65%	3,373,467
Eastern Trunk Route	Liloan, San Ricardo- Lipata	366,110	8	13	5.86%	647,039
Eastern Route Extension	San Andres - Masbate	21,840	5	5	6.77%	42,048
Eastern Route Extension	Esperanza - Kawayan	97,500	5	8	6.65%	185,615
Central Trunk Route	Pilar, San Antonio – Masbate	161,700	5	5	6.77%	311,317
Central Trunk Route	Esperanza – Daanbantayan	157,900	5	7	6.43%	294,319
Central Trunk Route	Cebu - Tubigon	105,860	7	7	6.08%	191,015
Central Trunk Route	Janga - Balingoan	214,415	7	10	5.69%	372,725
Central Trunk Route	Benoni, Guinsiliban - Balingoan	22,756	10	10	5.29%	38,104
Western Trunk Route	Batangas – Calapan	651,779	4.1	4.2	4.98%	1,059,154
Western Trunk Route	Roxas – Caticlan	163,061	4.2	6	7.58%	338,426
Western Trunk Route	Iloilo, Dumangas - Bacolod	190,442	6	6	10.53%	518,280
Western Trunk Route	Dumaguete, Siaton - Dapitan	132,296	7	9	7.66%	276,623
East – West 1	San Carlos - Toledo	114,285	6	7	8.31%	253,790
East – West 1	Pt. Engano - Getafe	114,285	7	7	6.08%	206,217
East – West 1	Ubay - Maasin	155,235	7	8	6.31%	286,106
East – West 1	San Ricardo - Lipata	366,110	8	13	5.86%	647,039
East – West 2	Ajuy – Cadiz, Victorias	74,300	6	6	10.53%	202,204
East – West 2	Escalante - Tabuelan	152,336	6	7	8.31%	338,289
East – West 2	Bogo - Palompon	114,400	7	8	6.31%	210,845
Panay - Sorsogon	Culasi - Balud	62,000	6	5	8.65%	142,131
Palawan - Luzon	San Jose - Coron - Taytay	147,400	4.2	4.2	4.62%	231,550
Palawan - Visayas	San Jose de Buenavista - Cuyo - Taytay	142,500	6	4.2	7.58%	295,752

Table 8-2 Future RORO Passenger Numbers in 2015

Route	Link	Passenger 2005 (persons)	Region 1	Region 2	Average Growth Ratio	Passenger 2015 (persons)
Eastern Trunk Route	Matnog- Allen	1,594,887	5	8	6.37%	2,957,478
Eastern Trunk Route	Liloan, San Ricardo- Lipata	435,499	8	13	5.86%	769,309
Eastern Route Extension	San Andres - Masbate	85,127	5	5	7.04%	168,085
Eastern Route Extension	Esperanza - Kawayan	104,300	5	8	6.37%	193,409
Central Trunk Route	Pilar, San Antonio – Masbate	360,600	5	5	7.04%	712,011
Central Trunk Route	Esperanza – Daanbantayan	206,600	5	7	5.25%	344,465
Central Trunk Route	Cebu - Tubigon	1,444,945	7	7	3.45%	2,028,412
Central Trunk Route	Janga - Balingoan	118,800	7	10	2.49%	151,852
Central Trunk Route	Benoni, Guinsiliban - Balingoan	386,287	10	10	1.52%	449,186
Western Trunk Route	Batangas – Calapan	1,123,086	4.1	4.2	4.81%	1,796,554
Western Trunk Route	Roxas – Caticlan	652,769	4.2	6	4.64%	1,026,903
Western Trunk Route	Iloilo, Dumangas - Bacolod	220,320	6	6	4.63%	346,431
Western Trunk Route	Dumaguete, Siaton - Dapitan	519,308	7	9	4.50%	806,469
East – West 1	San Carlos - Toledo	265,266	6	7	4.04%	394,171
East – West 1	Pt. Engano - Getafe	164,427	7	7	3.45%	230,822
East – West 1	Ubay - Maasin	137,925	7	8	4.58%	215,736
East – West 1	San Ricardo - Lipata	435,499	8	13	5.86%	769,309
East – West 2	Ajuy – Cadiz, Victorias	131,400	6	6	4.63%	206,613
East – West 2	Escalante - Tabuelan	159,860	6	7	4.04%	237,544
East – West 2	Bogo - Palompon	149,857	7	8	4.58%	234,399
Panay - Sorsogon	Culasi - Balud	74,700	6	5	5.84%	131,708
Palawan - Luzon	San Jose - Coron - Taytay	121,000	4.2	4.2	4.64%	190,442
Palawan - Visayas	San Jose de Buenavista – Cuyo - Taytay	71,500	6	4.2	4.64%	112,480

9. Present Situation of Management and Operation of RoRo Terminals

9.1 General

This chapter describes all aspects relating to the efficiency of the port. “Efficiency” is directly related not only port charge / port procedure / port operation but also safety and security.

9.1.1 Present Situation

1) Philippine Ports Authority (PPA)

The Philippine Ports Authority was originally created by virtue of Presidential Decree (PD) No. 505 on July 1974. PPA then, was limited to the exercise of broad supervisory and regulatory powers because of the need for the agency to assume responsibility for the smooth running of ports districts in the country. Presidential Decree No. 857, otherwise known as the revised charter of the PPA was issued on December 23, 1975. This broaden the powers and functions of PPA into an agency responsible for integrating, planning, developing, operating and maintaining all national ports as well as regulating and controlling all private ports.

2) Cebu Ports Authority (CPA)

The Cebu Ports Authority was created by Republic Act No. 7621, revolved from PPA in 1992 as part of the government policy of decentralization. The territorial jurisdiction of the authority includes all seas, lakes, rivers and all other navigable inland waterways within Cebu Province, including Cebu City and all highly urbanized cities which may be created thereafter.

PPA and CPA are placed under the administrative supervision of the Department of Transportation and Communications (DOTC) for program and policy coordination. Both are likewise tasked to develop and rehabilitate ports included in their respective port system.

9.1.2 Definition of Roll-on /Roll Off (RoRo)

1) Executive Order (E.O.) 170

Executive Order 170 promotes private sector participation and investment in the development and operation of the Road Roll-on/Roll-off Terminals System. The policy of the Government of the Philippines is to reduce the cost of inter-island transportation through the establishment of an efficient and cost effective RRTS as a vital component of the Government’s agro-fisheries modernization and food security programs the objectives of which are to raise the income of farmers and fishermen. This will also serve to enhance tourism, transportation and commerce throughout the archipelago.

2) Executive Order (E.O.) 170-A

Executive Order 170-A is an amended version of E.O 170 which expands the coverage of RoRo Terminal System. From the distance of fifty (50) nautical miles the amendment expands the coverage of the RRTS to include long-haul RoRo vessels so as to further support the agri-fisheries modernization and food security programs of the Government and to reduce the cost of inter-island transportation.

3) Executive Order (E.O.) 170-B

Executive Order 170-B encouraged further expansion of the country’s Road RoRo

Terminal System (RRTS) and reduction of transport cost through the increase in the number of RoRo capable ports and conversion of more private non-commercial ports operations to private commercial port operations.

9.1.3 Port Characteristics by Management Type

1) PPA Port System

PPA directly manages 114 ports, which consist of 21 "base ports" and 93 "terminal ports" as of February 2005. Ports directly managed by PPA (i.e. planned, invested, maintained, etc.) are called "PPA port system". It should be noted that, according to PPA officials, PPA port system does not mean the ports under PPA's jurisdiction but indicates the priority of the investment of PPA. PPA has collected port statistical data not only on ports under its port system but also LGU ports as well as private ports.

The PPA sets and collects its own revenues, and does not receive funding from the national government, and is required by fiat to declare 50% of its net income as dividends to the government. Its ports handle domestic and foreign cargo (containerized and bulk) and passengers; and some of its ports have been modified to cater to RoRo operations.

The private sector can develop its own port after getting clearance from the port authority as well as the Bureau of Lands. The private port developer will have a limited period contract with the port authority on the development/operation of a private port. Normally, the period is 25 years, after which the port will be transferred to the port authority.

There are two kinds of private ports: private non-commercial ports and private commercial ports. While the former is utilized solely by the owner of the port, the latter is utilized openly to the public. In other words, the cargo handled at the private commercial port is not limited to the usage of the private owner of the port.

9.2 Port Charges

Port charges include charges on vessels, cargoes, storage etc. Charges on vessels are based on the gross registered tonnage, while charges on cargoes are based on metric tons whether it is a break bulk or containerized cargoes. Government owned - ports offer a free day storage period. Beyond the free-day storage period the government-owned ports will charge cargoes on a daily basis based on metric tons.

The income generated from port charges will be used by the port authority for improvement, maintenance and development of new ports.

9.2.1 Present Situation

At present port charges are collected by PPA, CPA, RPMA, LGUs and other private commercial ports in the country.

9.2.2 Charge of RoRo

Based on the E.O. 170, RoRo charges are as follows:

-A terminal fee levied by the RoRo terminal operator on vehicles and passengers for the use of the terminals.

-A passage fee levied by the RoRo vessel operator on self-powered vehicles based on lane-meter;

-A passage fee levied by the RoRo vessel operator on passengers; and

-A berthing fee levied by the RoRo terminal operator on the RoRo vessel for mooring or berthing at the RoRo terminal.

Table 9-1 presents the RoRo terminal fee for vehicles while vessel berthing /dockage fee is the same as the PPA port. Passengers Terminal Fee varies from port to port since passenger terminal buildings are managed by private operators. Normally a minimal fee is collected from passengers for the use of the passenger terminal building.

Table 9-1 RoRo Terminal Fee for Vehicles

Vehicle Type	Lane Meter	Denomination (Php)	Color
Type 1	1 - 3	56.00	Blue
Type 2	>3 - 5	112.00	Yellow
Type 3	>5 - 7	224.00	Pink
Type 4	>7- Up	448.00	Green

The denominations stated in the above table are inclusive of twelve percent (12%) Value Added Tax (VAT).

9.2.3 Comparison of Port Tariff

Comparison of PPA port tariffs with the port of Tokyo and Nagoya (Japan) is made in the following section.

A 1,000 GRT domestic RORO vessel with 5-hour berthing term is used for the calculation. Usage in Japanese ports is classified by berthing hour while tariff in the Philippines is calculation on a daily basis. Based on the port tariff of each port shown in Table 9-2 and Table 9-3. Usage fees in the Philippines are less than Japanese ports.

Table 9-2 Comparison of Philippines and Japanese Port Tariffs

Type of Charge	Unit	Philippine Latest (Php)	Tokyo, Japan (Php/GRT*)	Nagoya, Japan (Php/GRT*)
Usage Fee at Gov				
<6GRT				
6GRT to 100GRT	Per day	61.00		
>100GRT	Per GRT Per Day	0.60		
	Less than 1 hour		1.48	
	Less than 2 hour		2.92	
	2 to 12 hour		4.02	4.22
	12 to 24 hour		6.70	7.14

* Apr 2007 (1 JPY = 0.40 PHP = 0.0084 USD)

Table 9-3 General Observation of Port Procedures (5 hours)

Port Name	Usage
Philippines:	**PHP 0.60 x 1 day x 1,000 GRT = PHP 600**
Tokyo:	PHP 4.02 x 1,000GRT = PHP 4,020
Nagoya:	PHP 4.22 x 1,000GRT = PHP 4,220

9.2.4 Proposal of Port Tariff

In setting a strategic port tariff, it is important to consider not only the economic activities in the hinterland but also how best to control the cargo handling operations in the port. Compared with the tariffs of major foreign ports, port tariff in the Philippines for domestic vessels is extremely low. For that reason, some domestic vessels occupy a berth/anchorage for an excessive length of time to carry out repairs or perform maintenance. In a "first come - first serve" policy, vessels should move out after completing loading / unloading operations so that other vessels may utilize the berth.

1) Shortening unit of the port tariff (from daily basis to hourly basis)

Unit of the tariff should be changed from daily basis to hourly basis, especially dockage at berth/anchorage and usage fee. The reduced berthing cost will give shipping companies an incentive to leave the berth in the minimum time.

2) Necessity of appropriate port tariffs

In the domestic tariff comparison with foreign ports, domestic port tariff in the Philippines, especially usage fee, is set extremely low, therefore minor ports which handle only domestic cargoes cannot be financially independent. It often happens that a port authority/public port development body cannot repair/maintain its own port facilities immediately. Therefore, these ports cannot attract any private investors.

Appropriate tariff setting (increasing domestic port tariffs) should be implemented so that those ports can be financially independent, at least to the extent that they could maintain their facilities and possibly attract private operators.

9.3 Port Procedures in Collecting Fees

Port procedures in collecting fees in using RRTS is very essential to all users (i.e., passengers, vehicle owners/drivers, shipping lines) to guide and encourage them to use the system. Better and orderly management of RRTS will have a positive socio-economic impact and boost tourism in the countryside.

9.3.1 Present Situation

The Study Team visited some of the major RoRo terminals in the country to find out the present situation of RoRo operations. During the visit, the Study Team observed some port procedures on how port operators implemented the RRTS. Presents the general observations of the port procedures for RRTS users while flow charts of procedures are presented in Figure 9-1 to Figure 9-3.

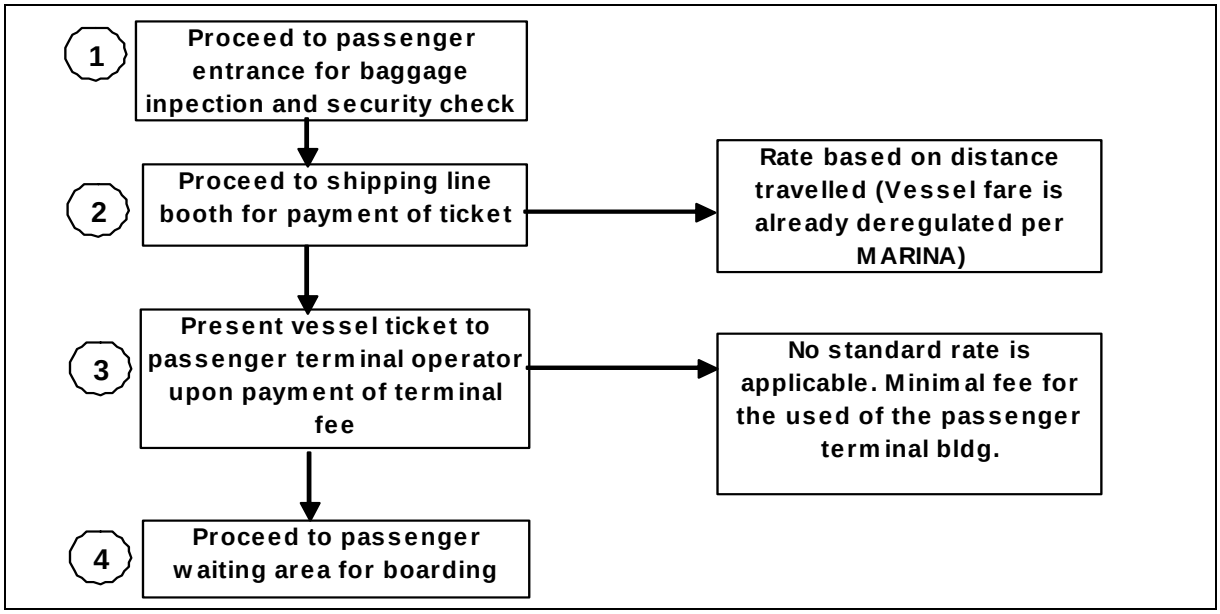
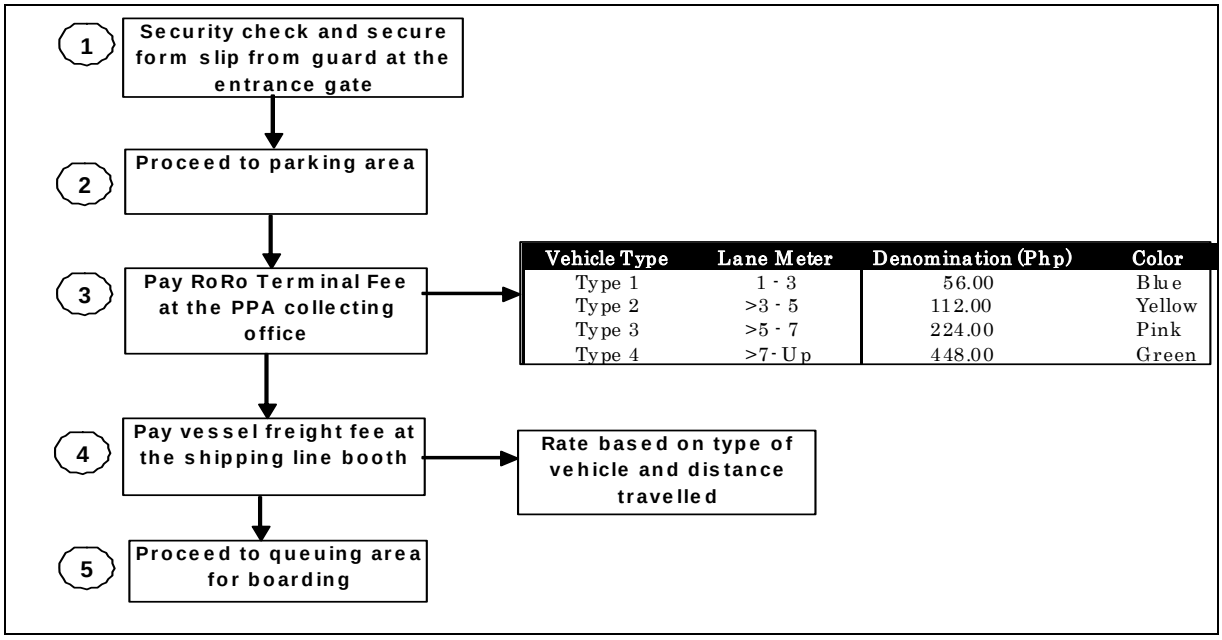


Figure 9-1 Steps/Procedures for RoRo Passengers upon Entering the Passenger Terminal



Vehicle Type	Lane Meter	Denomination (Php)	Color
Type 1	1 - 3	56.00	Blue
Type 2	>3 - 5	112.00	Yellow
Type 3	>5 - 7	224.00	Pink
Type 4	>7- Up	448.00	Green

Figure 9-2 Steps/Procedures for RoRo Vehicle Owners/Drivers upon Entering the Port Terminal

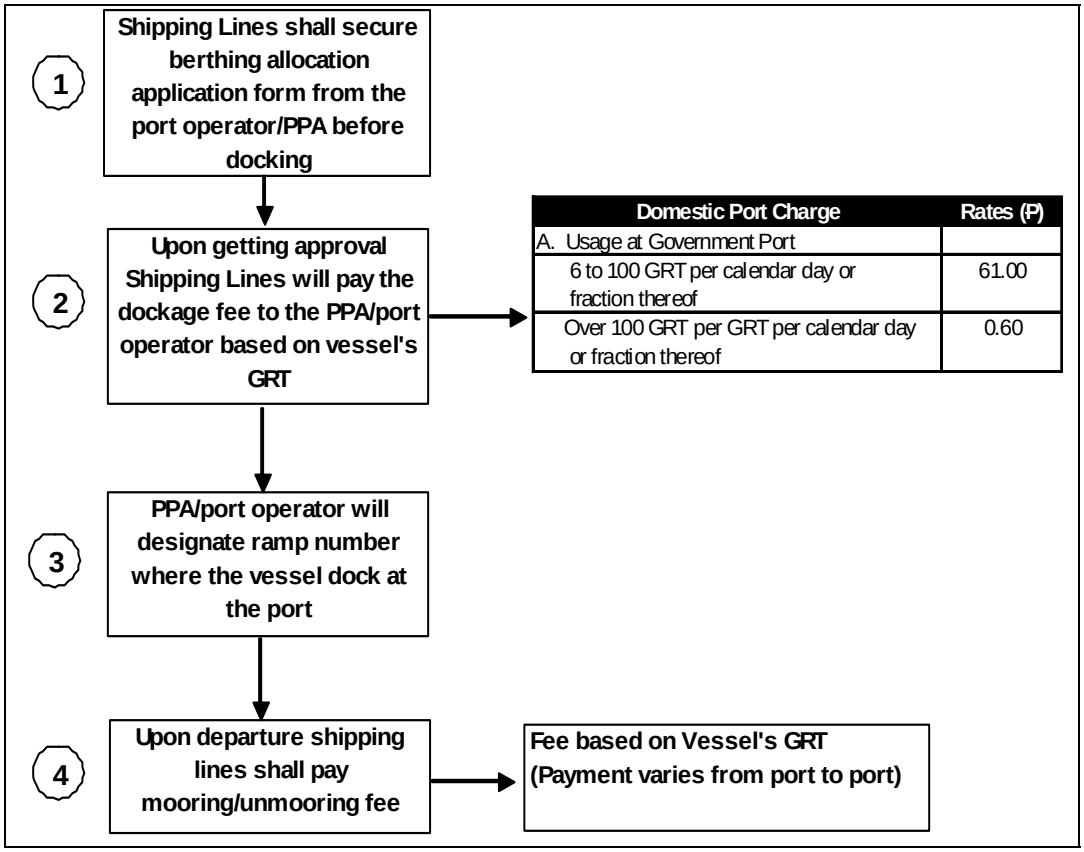


Figure 9-3 Steps/Procedures for RoRo Vessels upon Berthing

9.3.2 Comparison of Port Procedure in Collecting Fees

Comparison of port procedures with the port of Uno (Japan) is made in the following section.

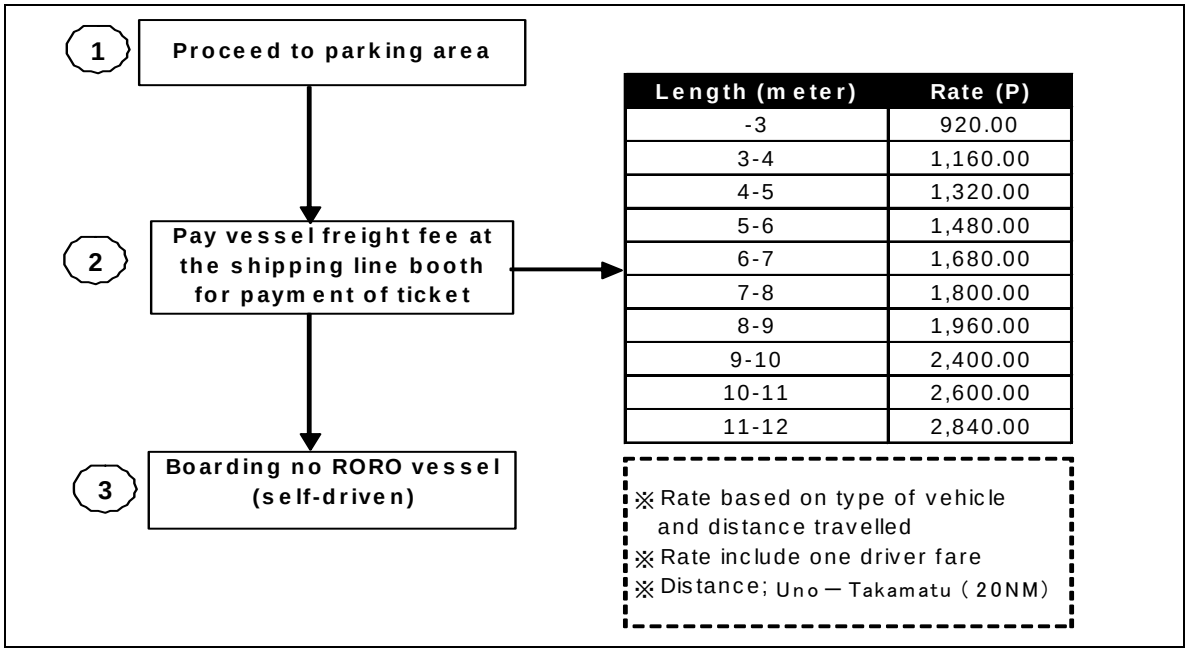


Figure 9-4 Steps/Procedures for RoRo Vehicle Owners/Drivers upon Entering system on the Port of Uno (Japan)

In Japan, payment for RORO vehicles is made only once. A driver pays passenger fare and terminal fee to the vessel line. The vessel line will pay the terminal fee in a lump sum to the port management body.

9.3.3 Proposal on Port Procedure

Similar to the Japanese RORO port system, the fee collection procedure should be changed from a two payment system to a one payment only system. This would simplify procedures for port users.

9.4 Port Operations

The provision and operation of port services such as cargo handling, pilotage, tug assistance, mooring/unmooring and even the management of passenger terminals are always undertaken by the private contractors licensed by PPA. The selection of private contractors is done through a public bidding. This is the commitment of PPA to private sector's involvement. Through privatization of basic services it can maintain the daily operations and even improve the services they provided to stay longer in the chosen business. This will also attract more investors to participate basic port services and even encourage private sector to develop ports.

9.4.1 Present Situation

At present PPA has subcontracted the cargo handling, stevedoring, mooring/unmooring and operations of the passenger terminal building to the private sector. The term used by PPA on these services is called the Cargo Handling Operator. The Cargo Handling Operator will perform all services based on the contract stipulated therein. For a new Cargo Handling Operator the PPA will have a two-year provisionary agreement in which it observes the performance of the new operator. In case PPA is not satisfied with the service performance of the existing operator they can take-over the services.

9.4.2 Cargo Handling Operator Contract System

Based on Administrative Order No.1 – 2001 of PPA, they prepared a guideline for the issuance of probationary and long-term contracts for expired and expiring cargo handling contracts. The rationale is to enhance and provide a "heal and build" policy between stakeholders of the economy and the government. To help achieve this goal PPA will support existing cargo handling operators with serious plans and commitments to invest and improve the quality of services in the ports.

The objectives of this guidelines are: to encourage existing cargo handling operators willing and prepared to invest in providing quality services in the ports; to grant two-year probationary contracts to existing qualified holders of expired contract and those expiring within the next two-years, subject to prescribed requirements and PPA approval; and to ensure that only qualified and efficient cargo handling operators may be issued long term contract of not more than ten (10) years after a 2-year probationary contract. The term of such contracts shall depend on the port traffic, equipment requirements and investment commitment for the port.

9.5 Security Measures for Port Facilities

9.5.1 Present Situation

During the Study Team's visit in some of the major RoRo ports in the country, it was observed that the security system in most ports is not as sophisticated as other countries although most of the base ports and some of the terminal ports of the PPA are equipped with x-ray machines and walk-thru detector. A purely visual inspection, on the other hand, is performed in the case of cargo and

rolling cargo.

At Local Government Units (LGU) and privately run RoRo terminals the security measures consist of manual checking such as inspection of bags, body frisking, etc. For cargoes and rolling cargoes, only a visual inspection is carried out.

According to interviews with the PPA Security Office, implementation of the International Ship and Port Facility Security (ISPS) code is being undertaken at most of their base ports and some of their major terminal ports.

The most sophisticated RoRo terminal in the country is located in Eva Macapagal Terminal in the South Harbor of the Port of Manila which is equipped with CCTV cameras in all terminal locations. The terminal is also equipped with two x-ray machines with walk-through detector and a K-9 dogs. In addition, the terminal has a hand-held device that can check whether passengers are in possession of gun powder. In connection with the above security measures, before the passengers proceed to the pre-departure area their picture will be taken and cross-referenced with a computer security database of the country's most notorious criminals. The picture taking will take only a few seconds and the computer can immediately match the picture of the passenger with the pictures of the criminals stored in the database. In addition, roaming guards are visible inside the terminal to ensure security measures are complied with and to check passengers' movements inside the terminal.

9.5.2 Impact of Security Facilities

The impact of the security facilities inside the RoRo terminals is to minimize sea accident during sailing time. The port operator cannot compromise if accident happened. Data gathered from the PPA after installing and implementing security facilities revealed that they often confiscated bladed weapons, such as knife, bolo, etc., dangerous drugs as well as flammable materials. According to the PPA Head-Office Security Department their major accomplishment was the confiscation of a significant volume of marijuana in Lipata RoRo Terminal in Surigao from a foreign national.

9.5.3 Proposal on Security Measures for Port Facilities

1) Security

Security checks of vehicles are not strictly carried out. However, it is thought that weapons such as guns are often brought in by vehicle. Accordingly, security at entrance should be strengthened. In the case of car model identification, security guard needs to confirm contents and the bottom of a vehicle by visual observation.

Installation of a surveillance camera is extremely effective. At the time of installation, the port administrator erects a sign to make passengers aware that surveillance is being carried out.

2) Safety

Crew members assisting in boarding procedures should always wear helmets and work clothes. Overloaded vehicles often go on board. It the vessel is subject to severe swaying, a vehicle may roll over. At the entrance gate, closer inspection needs to be carried out to ensure that overloaded vehicles are not permitted to board.

9.6 Private Sector Participation

9.6.1 General Philosophy in Promoting Private Sector Participation

Private Sector Participation (PSP) in developing ports was implemented by Philippine Ports Authority (PPA) a long time ago but only a few investors have shown interest due to a lack of

government support and policies. In its charter, however, PPA is mandated to privatize basic port operations such as cargo handling operation, passenger terminal management and operation and other related services.

1) Executive Order No. 170

Executive Order (EO) No. 170 encouraged Privatization of Public Ports. In the said EO the PPA and Cebu Ports Authority (CPA) was instructed to establish and construct RoRo Terminals through Private Sector Participation. The PPA and the CPA likewise take concrete steps to privatize state-owned Road RoRo terminals to attract investment in the Roll-On Roll-Off Terminal System (RRTS). The EO also encourages Local Government Units (LGUs) to form joint ventures with private investors.

2) PPA Charter

Based on PPA Administrative Order (AO) No.06-95, PPA had encouraged private investor to develop ports. This AO liberalized regulations on private ports construction, development and operation with the compliance of PPA guidelines.

9.6.2 Present Condition of Public-Private Participation

PPA encouraged private sector involvement through the Public-Private Participation (PPP) as partners in developing ports. A Build-Operate-Transfer (BOT) Law and the Joint Venture (JV) schemes to expedite the provision of port infrastructure and services where dynamically needed. The PPA has a 25-year Port Development Plan that is updated by its Port Districts which incorporate the current Five-Year Medium Term Public Investment Program and the BOT and a JV projects. This is in line with the Philippine Government policy thrust to encourage foreign and local investments, tourism development, decentralization of government responsibilities and functions and concerns for safety and environmental protection.

9.6.3 General Principles and Basic Requirements for Private Sector Participation (PSP)

PPA Department Order No. 2003-16 is the implementation of E.O. 170 in promoting Private Sector Participation and Investment in the Development and Operation of the RRTS. The general principle of PSP is to encourage private involvement to invest in ports development in the Philippines to boost the local economy and create more jobs.