3. Socio-Economic Background Information

3.1 General Information

3.1.1 Population

Population is one of the main indicators used to formulate socio-economic conditions. In this section, the population trend is reviewed on the basis of currently available projections.

The population of the Philippines from 1799 to 2000 is shown in Table 3-1. The annual population growth rate was over 2.3% in the 1990's. Population growth rate fluctuated between 2% and 3% in the 20th century. The size of the population increased by ten times through the century. In 2000, the Philippine population stood at 76.5 million; there has not been a new population census since that time. Current population by regions projected by POPCOM is shown in Table 3-2. It is estimated that 84.2 million persons are living in the Philippines. In The Port Master Plan, national population in 2005 is predicted as 84,214,747, almost the same as the POPCOM projection. NCR, Region III and Region IV have large populations accounting for 38.6% of the total population in 2005.

Table 3-1 Population of the Philippines from 1799 to 2000

Year	Population	Average annual rate of increase (in percent)	Source of data
1799	1,502,574	-	Fr. Buzeta
1800	1,561,251	3.91	Fr. Zuniga
1812	1,933,331	1.80	Cedulas
1819	2,106,230	1.23	Cedulas
1829	2,593,287	2.10	Church
1840	3,096,031	1.62	Local officials
1850	3,857,424	2.22	Fr. Buzeta
1858	4,290,381	1.34	Bowring
1870	4,712,006	0.78	Guia de Manila
1877	5,567,685	2.41	Census
1887	5,984,727	0.72	Census
1896	6,261,339	0.50	Prof. Plehn's estimate based on census records
1903	7,635,426	2.87	Census
1918	10,314,310	2.03	Census
1939	16,000,303	2.11	Census
1948	19,234,182	2.07	Census
1960	27,087,685	2.89	Census
1970	36,684,486	3.08	Census
1975	42,070,660	2.78	Census
1980	48,098,460	2.71	Census
1990	60,703,206	2.35	Census
1995	68,616,536	2.32	Census
2000	76,504,077	2.36	Census

(Source) NSO 2005

Table 3-2 Projected Current Population by Region (based on 1995 Census)

Region	2005
Philippines	84,241,341
N.C.R.	11,240,743
C.A.R.	1,560,881
I - ILOCOS REGION	4,491,391
II - CAGAYAN VALLEY	3,087,489
III - CENTRAL LUZON	8,650,509
IV-A - CALABARZON	10,181,770
IV-B - MIMAROPA	2,474,680
V - BICOL REGION	5,161,017
VI - WESTERN VISAYAS	6,890,447
VII - CENTRAL VISAYAS	6,076,569
VIII - EASTERN VISAYAS	4,136,885
IX - ZAMBOANGA PENINSULA	3,172,131
X - NORTHERN MINDANAO	3,974,199
XI - DAVAO REGION	4,093,552
XII - SOCCSKSARGEN	3,882,944
A.R.M.M.	2,720,683
CARAGA	2,445,620

Source: POPCOM

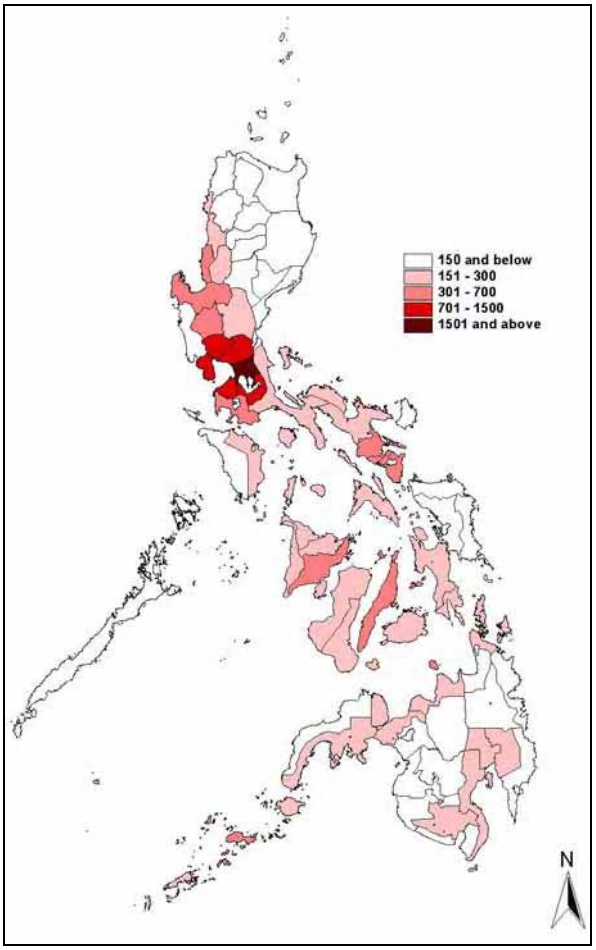


Figure 3-1 Population Density by Region (Source: NSO 2005)

The economic zones that are interconnected by long-distance shipping and RoRo transport system are:

(1) National Capital Region (NCR) and adjacent regions

(2) Palawan

(3) Southern Luzon Region with major population centers of Legaspi, Naga (Region V)

(4) Western Visayas region with major population centers of Iloilo and Bacolod (Region VI)

(5) Central Visayas Region with the principal population center of Cebu City (Region VII)

(6) Eastern Visayas region with principal Population Center of Tacloban (Region VIII)

(7) Zamboanga Peninsula Regions with major Population Center of Ozamiz and Zamboanga Cities (Region XI)

(8) Northern Mindanao region with major population centers of Cagayan de Oro and Iligan Cities (Region X)

(9) Northeastern Mindanao with population centers of Surigao and Butuan Cities.

(10) Other island provinces such as Masbate, Catanduanes, Marinduque and Romblon.

The location and populations are exhibited in Figure 3-2. Population by age and by sex is shown in Table 3-3 and Figure 3-3. The population pyramid of the Philippines can be categorized as expansive.

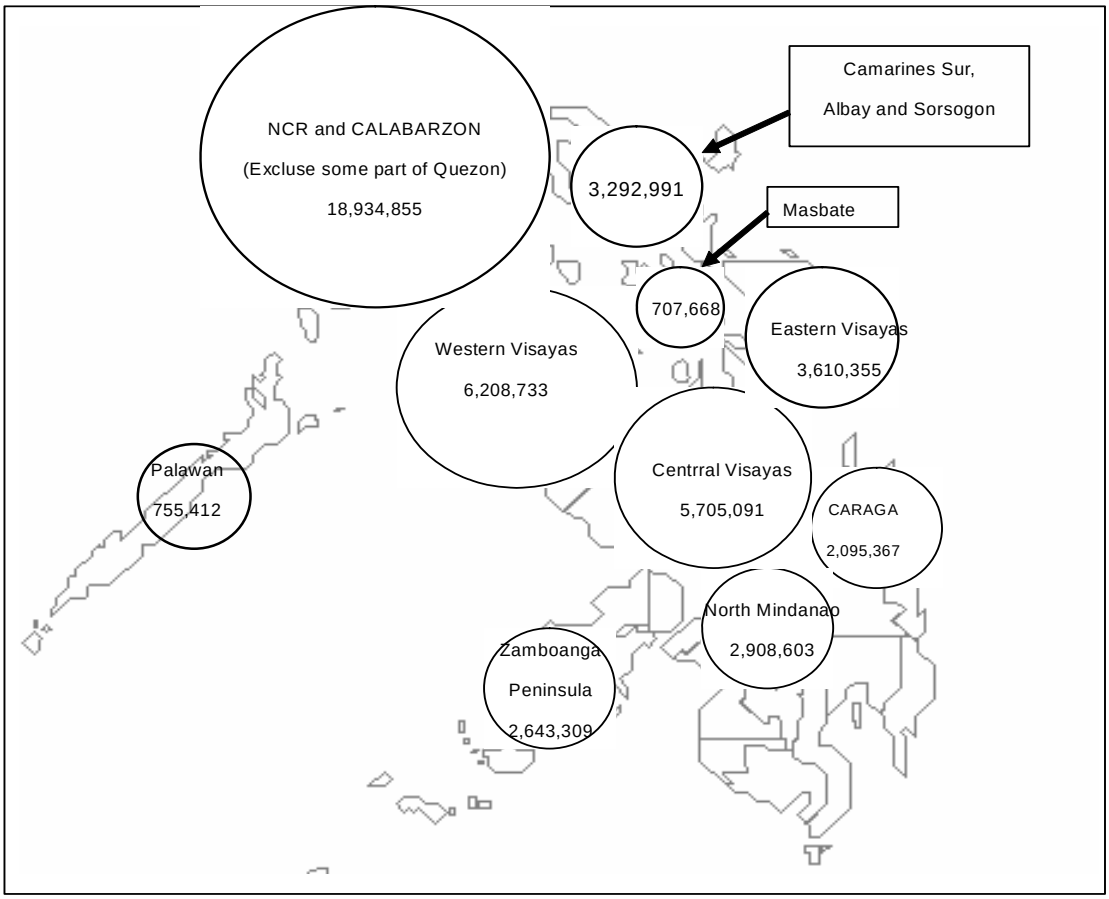


Figure 3-2 Economic Zones and population (Source: NSO 2000, Edited by Study Team)

Table 3-3 Population by Sex and by Age in 2000 (Source: NSO 2005)

Age	Population			Share		
	Total	Male	Female	Total	Male	Female
0-4	9,669,502	4,951,932	4,717,570	(6.5)	6.5	6.2
5-9	9,694,781	4,962,013	4,732,768	(6.5)	6.5	6.2
10-14	8,949,614	4,541,197	4,408,417	(5.9)	5.9	5.8
15-19	8,017,298	4,017,830	3,999,468	(5.3)	5.3	5.2
20-24	7,069,403	3,522,518	3,546,885	(4.6)	4.6	4.6
25-29	6,071,089	3,053,616	3,017,473	(4.0)	4.0	3.9
30-34	5,546,294	2,804,522	2,741,772	(3.7)	3.7	3.6
35-39	4,901,023	2,496,821	2,404,202	(3.3)	3.3	3.1
40-44	4,163,494	2,120,314	2,043,180	(2.8)	2.8	2.7
45-49	3,330,054	1,696,712	1,633,342	(2.2)	2.2	2.1
50-54	2,622,316	1,318,632	1,303,684	(1.7)	1.7	1.7
55-59	1,903,649	943,133	960,516	(1.2)	1.2	1.3
60-64	1,633,150	786,137	847,013	(1.0)	1.0	1.1
65-69	1,138,843	533,469	605,374	(0.7)	0.7	0.8
70-74	797,970	361,614	436,356	(0.5)	0.5	0.6
75-79	505,356	218,622	286,734	(0.3)	0.3	0.4
80+	490,241	195,185	295,056	(0.3)	0.3	0.4

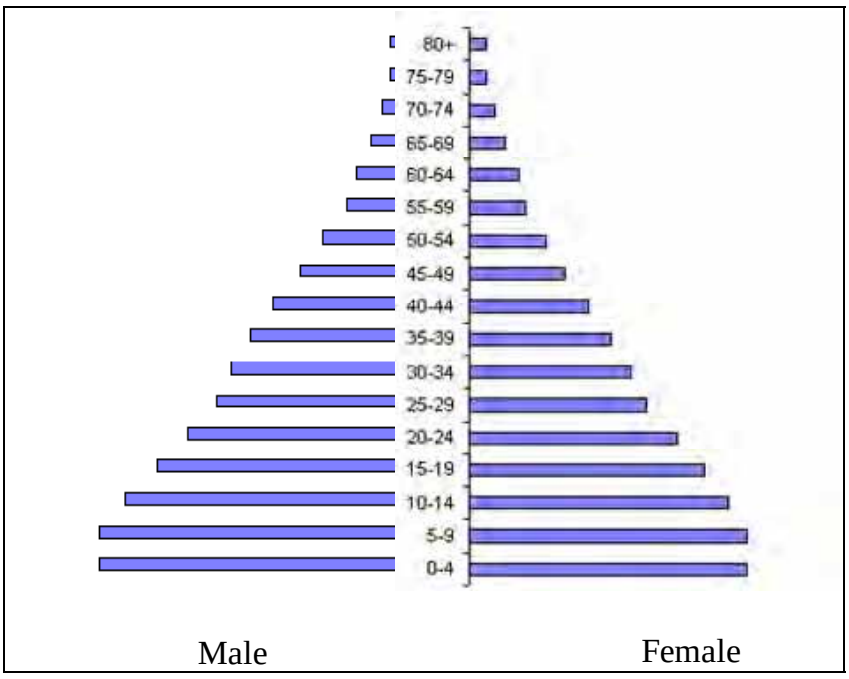


Figure 3-3 Pyramid of Population by Sex and by Age Group in 2000 (Source: NSO 2005)

Population projection done by the Commission on Population Republic of the Philippines is shown in Table 3-4. Population growth ratio is shown in Table 3-5. The population growth rate will decrease although the population will exceed 100 million in 2015. In the Port Master Plan of 2004, the national population in 2015 is projected at 99,007,576, 4% increase over the previous projection. Comparing population of 2015 with that of 2005, annual growth rate is 1.9%. Region by region, growth of N.C.R. is 1.25%, lower than the national average. Growth rates of other regions are around the average or above it.

Table 3-4 Projected Population by Region and by Five-Calendar Year: 2000-2020

Region/Province	2000	2005	2010	2015	2020
Philippines	76,946	85,258	94,012	102,965	111,783
N.C.R.	9,969	10,787	11,552	12,221	12,776
C.A.R.	1,372	1,527	1,694	1,869	2,044
I - Ilocos	4,221	4,682	5,174	5,674	6,161
II - Cagayan Valley	2,828	3,085	3,365	3,651	3,923
III - Central Luzon	8,258	9,195	10,159	11,123	12,061
IV-A - Calabarzon	9,423	10,655	11,905	13,143	14,370
IV-B - Mimaropa	2,315	2,649	3,018	3,417	3,831
V - Bicol	4,712	5,189	5,712	6,278	6,864
VI - Western Visayas	6,238	6,877	7,578	8,318	9,055
VII - Central Visayas	5,740	6,358	7,029	7,741	8,456
VIII - Eastern Visayas	3,629	4,021	4,447	4,912	5,406
IX - Zamboanga Peninsula	3,110	3,446	3,809	4,197	4,590
X - Northern Mindanao	3,526	3,920	4,349	4,799	5,249
XI - Davao	3,698	4,020	4,362	4,709	5,042
XII - Soccsksargen	3,245	3,648	4,080	4,524	4,962
XIII - Caraga	2,106	2,318	2,550	2,800	3,049
ARMM	2,555	2,880	3,229	3,588	2,945

Source: National Statistics Office, 2000 Census-based Population Projection in collaboration with the Inter-Agency Working Group on Population Projections

Table 3-5 Projected Annual Population Growth Rates by Region and by Five-Calendar Year

Region/Province	2000-2005	2005-2010	2010-2015	2015-2020
Philippines	2.05	1.95	1.82	1.64
N.C.R.	1.58	1.37	1.13	0.89
C.A.R.	2.13	2.08	1.97	1.79
I - Ilocos	2.08	2.00	1.85	1.65
II - Cagayan Valley	1.74	1.73	1.63	1.44
III - Central Luzon	2.15	2.00	1.81	1.62
IV-A - Calabarzon	2.46	2.22	1.98	1.78
IV-B - Mimaropa	2.70	2.61	2.48	2.29
V - Bicol	1.93	1.92	1.89	1.78
VI - Western Visayas	1.95	1.94	1.86	1.70
VII - Central Visayas	2.04	2.01	1.93	1.77
VIII - Eastern Visayas	2.05	2.01	1.99	1.92
IX - Zamboanga Peninsula	2.06	2.00	1.94	1.79
X - Northern Mindanao	2.12	2.07	1.97	1.79
XI - Davao	1.67	1.63	1.53	1.37
XII - Soccsksargen	2.34	2.24	2.06	1.85
XIII - Caraga	1.92	1.90	1.87	1.71
ARMM	2.40	2.29	2.11	1.90

Source: National Statistics Office, 2000 Census-based Population Projection in collaboration with the Inter-Agency Working Group on Population Projections

3.1.2 Geography/Natural Conditions

1) Geographic Locations

The Philippines is comprised 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, are 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 three major mountain ranges in the area are the Sierra Madre, Central Cordillera and the Caraballo Mountains. The Southern portion of Luzon has a dominantly volcanic topography with ridges and valleys of gentle slopes and generally accordant drainage. Active volcanoes including Pinatubo, Taal, Mayon, Iriga and Bulusan are found in Luzon.

The Visayas region has a severe dissection of topography due to its exposure to typhoons from the Pacific torrential rains. This group of islands is characterized by mountains and hills (where peaks reach 900 meters), river basins, flood plains, plateaus and valleys.

Mindanao has diverse structural elements and different forms of physiographic development including fault block mountains, volcanic peaks, uplifted plateaus, low flat basins, a notable fault zone which cuts through Luzon and Visayas, fissure flow masses and incised valleys and canyons. This island group has five major ranges, i.e., the Eastern or Pacific Cordillera which is made of two mountain systems with a series of ranges in each system; the Bukidnon-Davao range, which is a complex series of ranges that extends for some 400 kilometers from Diwata Point in the north to the southern tip of the Saranggani Peninsula. The Bukidnon-Lanao Plateau lies in the northern part of Mindanao.

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. Of these, 16 are considered as major river basins, with at least 990 sq. km. of basin area each. These comprise the Laoag, Cagayan, Pampanga, Agno, Pasig-Laguna de Bay, Bicol and Abulug river basins in Luzon; the Agusan, Tagum-Libuganon, Tagoloan, Agus, Davao, Cagayan de Oro and Buayan river basins in Mindanao; the Amnay-Patrick and Ilog Hilabangan river basins in Negros Island. The principal river basins cover a total land area of about 200 thousand sq. km. which is 66.6% of the total land area of the archipelago. The 20 major river basins cover a total area of 111, 269 sq. km. equal to 37.1% of the total land area of the country.

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 °C. The coolest month falls in January at a mean annual temperature of 25.5°C while the warmest month occurs in May at a mean annual temperature of 28.3 °C. Altitude rather than latitude is the dominant factor in temperature variation, thus, Baguio which is located at an elevation of 1,500 m above sea level has a mean annual temperature of about 18 °C.

The two main seasons are the NE monsoon season from October to April and the SW monsoon season from May to September. Monsoon refers both to the season and the dominant wind. The area north of 10 deg. north enjoys spells of settled weather with high temperatures in April under the influence of the "SE Trade Wind" from the West Pacific.

Typhoons are tropical revolving storms with wind speeds of 64 knots or more. Typhoons are the greatest hazards in these waters when they cross the area from the Western part of the Pacific. An average of nine typhoons is reported each year and most of these occur from July to December. They are rare from January to March. The violence of these storms varies greatly with time and place. Rapid developments may occur along the path and cause severe hazards at sea and havoc on land.

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.

The main variations are caused by the degree of exposure to the monsoon winds and the topography of the hinterland. Stations near high grounds experience the highest rainfall intensity coupled with onshore winds.

Records show that some areas have several very wet months and relatively few dry months. Other regions, particularly in the South, have minimal respite from tropical downpours. Heavy rainfalls of about 25 cm in one day are not uncommon at several points along the coast, and even heavier falls are registered on-land. Generally, the rainfall distribution pattern are categorized as follows:

-**Category 1**: Very pronounced wet and dry season. Wet during the months from June to November and dry from December to May. Affected areas include the western part of Luzon, Mindoro, Palawan, Panay and Negros.

-Category 2: No pronounced dry season but with very pronounced high rainfall intensity covering the period from December to February. These occur in Albay, Camarines Norte, Camarines Sur, eastern part of Quezon, Samar, Leyte and Mindanao. Coconut plantation is plentiful in these areas.

-Category 3: Intermediate type with no pronounced high rainfall intensity and relatively short dry season lasting from 1 to 3 months. Areas affected by this category include the western part of Cagayan Valley, eastern part of the Cordilleras. Southern Quezon, Masbate, Romblon, Northeastern Panay, Eastern Negros, Central and Southern Cebu, Eastern Palawan and Northern Mindanao. These are the rice producing areas.

-Category 4: Uniformly distributed rainfall. The areas affected by this category include Batanes, Northeastern Luzon, Southwestern Part of Camarines Norte, Western Parts of Western Leyte, Northern Cebu, Bohol and most of the Central, Eastern and Southern parts of Mindanao. These are corn producing areas.

Severe flooding occurs in the path of typhoons, though the worst effect may be confined to a narrow belt. Many of the heavier falls occur during violent thunderstorm.

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. Elsewhere, the tide has a large diurnal component and the range is mostly 1.0 to 1.5 m. The tide at major ports ranges from 1.0 to about 2.0 m.

The main current around the archipelago flows towards the north along the Pacific Ocean at a speed from 2 to 4 knots and towards the south along the South China Sea at a speed from 1 to 2 knots.

Southwest wave direction occurs in summer while northeast wave direction is predominant in winter.

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.

Tsunami is a seismic generated sea waves. When the progress is constricted by bottom configuration of shoreline, the height of the wave increases rapidly which can cause considerable destruction to shore installations.

3.1.3 Economic Growth

Gross Domestic Product by sector and by year is shown in Table 3-6. GDP annual growth rate is shown in Table 3-7. Actual GDP annual growth rate from 2001 to2005 is 4.1% which is larger than the GDP annual growth ratio projected in Master Plan 2004. GDP in 2015 is projected using GDP 2009 and GDP 2024 data adopted from the Port Master Plan 2004. Comparing annual GDP growth rate by sector, actual agriculture, fishery and forestry sector and service sector's growth rates are larger than projected. On the other hand, actual industry sector's growth ratio is smaller than that projected.

Table 3-6 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

Table 3-7 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

Gross Domestic Product and Gross Regional Domestic Product in 2004 and 2005 are shown in Table 3-8. NCR is the biggest region and its share is more than 30%. Region 4A, 3, 6 and 7 follow NCR.

Table 3-8 Gross Regional Domestic Product 2004 and 2005

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

1) Production and consumption of Palay (Paddy) and Rice

The production of Palay in Region VI-A, V, Visayas and some Mindanao are shown in Table 3-9. The total production of the whole Philippines and the population of each province are also indicated in the table.

Table 3-9 Palay Production by Province

Unit : ton

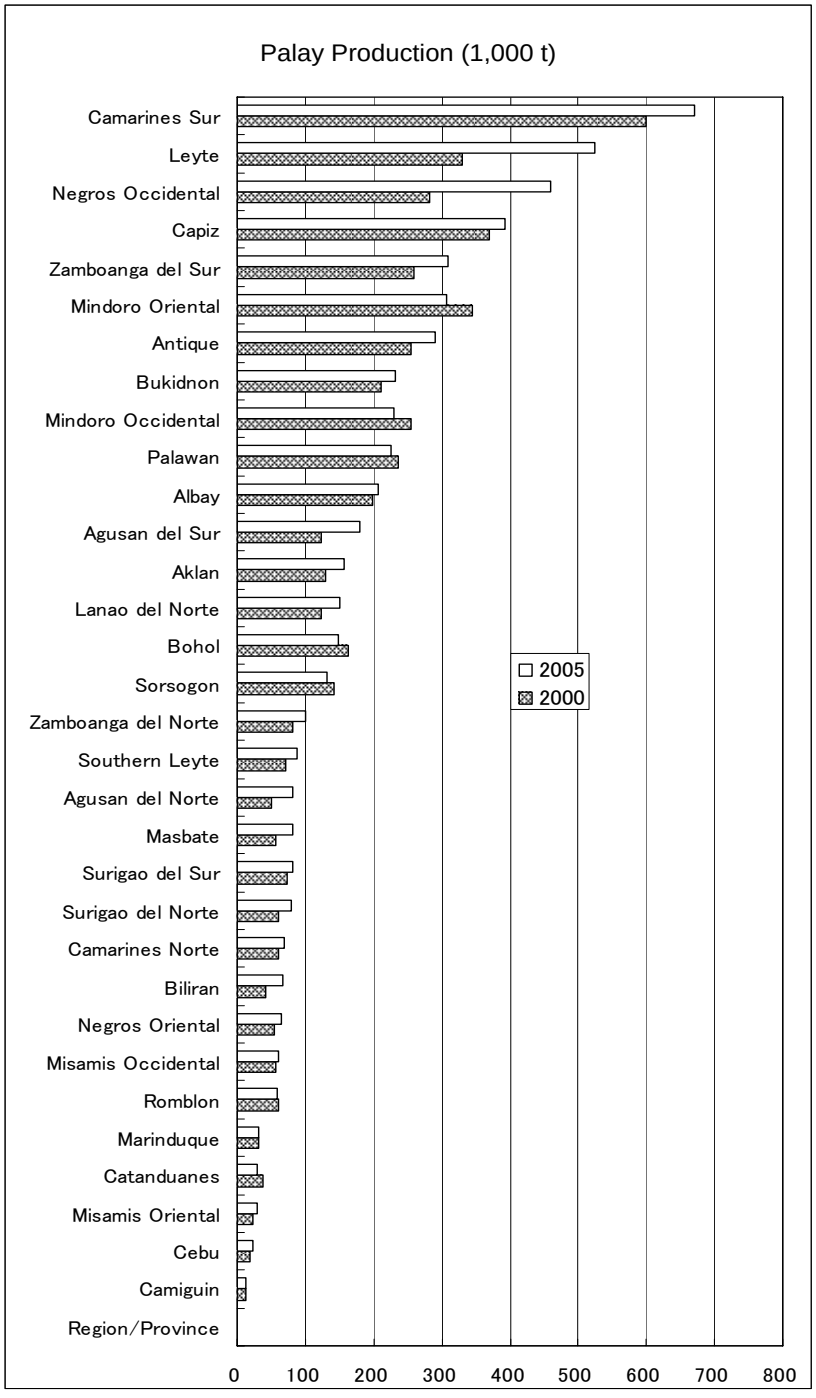
Region/Province	Population	2000	2001	2002	2003	2004	2005
Philippines	84,241,341	12,389,412	12,954,870	13,270,663	13,499,884	14,496,784	14,603,005
REGION IV-B (MIMAROPA)		**758,719**	**745,969**	**799,627**	**818,182**	**799,768**	**785,309**
Marinduque	217,392	37,888	42,700	43,180	40,172	35,110	30,262
Mindoro Occidental	380,250	236,355	211,555	248,570	269,890	238,041	226,495
Mindoro Oriental	681,818	254,167	256,834	265,549	254,972	255,747	289,782
Palawan	755,412	198,325	203,774	210,568	216,214	236,785	207,528
Romblon	264,357	31,984	31,106	31,760	36,934	34,085	31,242
REGION V (BICOL REGION)	4,674,855	**672,293**	**697,287**	**756,808**	**761,048**	**943,214**	**981,918**
Albay	1,090,907	124,062	104,001	131,895	131,882	155,700	179,467
Camarines Norte	458,840	41,256	46,965	43,389	40,060	59,307	66,379
Camarines Sur	1,551,549	330,966	347,725	386,160	381,039	501,343	524,625
Catanduanes	215,356	22,001	24,809	22,533	29,958	28,720	29,932
Masbate	707,668	72,831	74,067	68,239	83,369	93,029	81,112
Sorsogon	650,535	81,177	99,720	104,592	94,740	105,115	100,403
REGION VI (WESTERN VISAYAS)		**1,563,663**	**1,547,730**	**1,691,796**	**1,726,172**	**1,889,467**	**1,753,944**
Aklan	451,314	123,929	123,866	126,468	131,480	156,325	150,432
Antique	471,088	211,368	200,514	221,969	217,054	214,088	232,336
Capiz	654,156	258,486	259,428	281,597	297,521	305,716	309,209
Guimaras	141,450						
Iloilo	1,559,182	599,293	635,914	736,123	729,368	829,027	670,300
Negros Occidental	2,136,647	370,587	328,008	325,639	350,749	384,311	391,667
REGION VII (CENTRAL VISAYAS)		**212,877**	**222,742**	**215,875**	**190,636**	**226,028**	**206,239**
Bohol	1,137,268	142,871	148,945	144,781	116,286	150,526	132,631
Cebu	2,377,588	13,292	14,813	15,599	14,190	14,907	13,302
Negros Oriental	1,130,088	56,714	58,984	55,495	60,160	60,595	60,306
Siquijor	81,598						
REGION VIII (EASTERN VISAYAS)		**386,168**	**422,473**	**463,079**	**507,960**	**545,923**	**605,630**
Biliran	140,274	53,375	54,415	55,672	56,256	57,885	64,538
Leyte	375,822	282,160	306,713	346,821	387,326	417,048	458,641
Southern Leyte	1,592,336	50,633	61,345	60,586	64,378	70,990	82,451
Northern Samar	500,639						
Southern Leyte	360,160						
Samar	641,124						
REGION IX (ZAMBOANGA PENINSULA)		**414,965**	**403,119**	**353,095**	**368,789**	**379,708**	**394,452**
Zamboanga del Norte	823,130	70,803	69,444	80,270	75,759	81,332	88,256
Zamboanga del Sur	1,333,456	344,162	333,675	272,825	293,030	298,376	306,196
Zamboanga Sibugay							
Zamboanga City							
REGION X (NORTHERN MINDANAO)		**499,605**	**531,776**	**532,508**	**489,872**	**465,872**	**459,010**
Bukidnon	1,060,265	255,820	240,690	252,983	227,957	216,842	228,871
Camiguin	74,232	2,135	1,831	1,532	1,692	1,735	1,582
Lanao del Norte	473,062	163,326	208,504	203,628	188,147	167,120	147,553
Misamis Occidental	486,723	59,734	60,836	52,381	51,417	57,784	58,692
Misamis Oriental	664,338	18,590	19,915	21,984	20,659	22,391	22,312
CARAGA ADMINISTRATIVE REGION		**308,066**	**336,365**	**327,070**	**344,706**	**351,629**	**385,963**
Agusan del Norte	285,570	56,956	78,873	77,692	74,647	83,765	82,215
Agusan del Sur	559,294	130,430	134,875	127,725	127,556	134,266	155,744
Surigao del Norte	481,416	60,327	65,699	64,584	73,927	67,629	69,395
Surigao del Sur	501,808	60,353	56,918	57,069	68,576	65,969	78,609

Source: NSO and DA web site

In 2005 the total production of palay was 14,496,784 tons. Figure 3-4 is drawn to illustrate the volumes of palay production in 2000 and 2005 by provinces. Camarines Sur is the most rice rich province followed by Leyte, Negros Occidental, Capiz, Zamboanga del Sur, Mindoro Oriental, Antique and so on.

The Philippines has been importing rice these years. In 2005, the volume of rice import was 478,477 tons while export volume was 11,600 tons, and a net volume of 466,877 tons was consumed in the local market. Thus, a total of 14,963,661tons of rice was consumed locally. It should be noted that play is unhulled rice and when it loses the weight a little bit. However, since the import

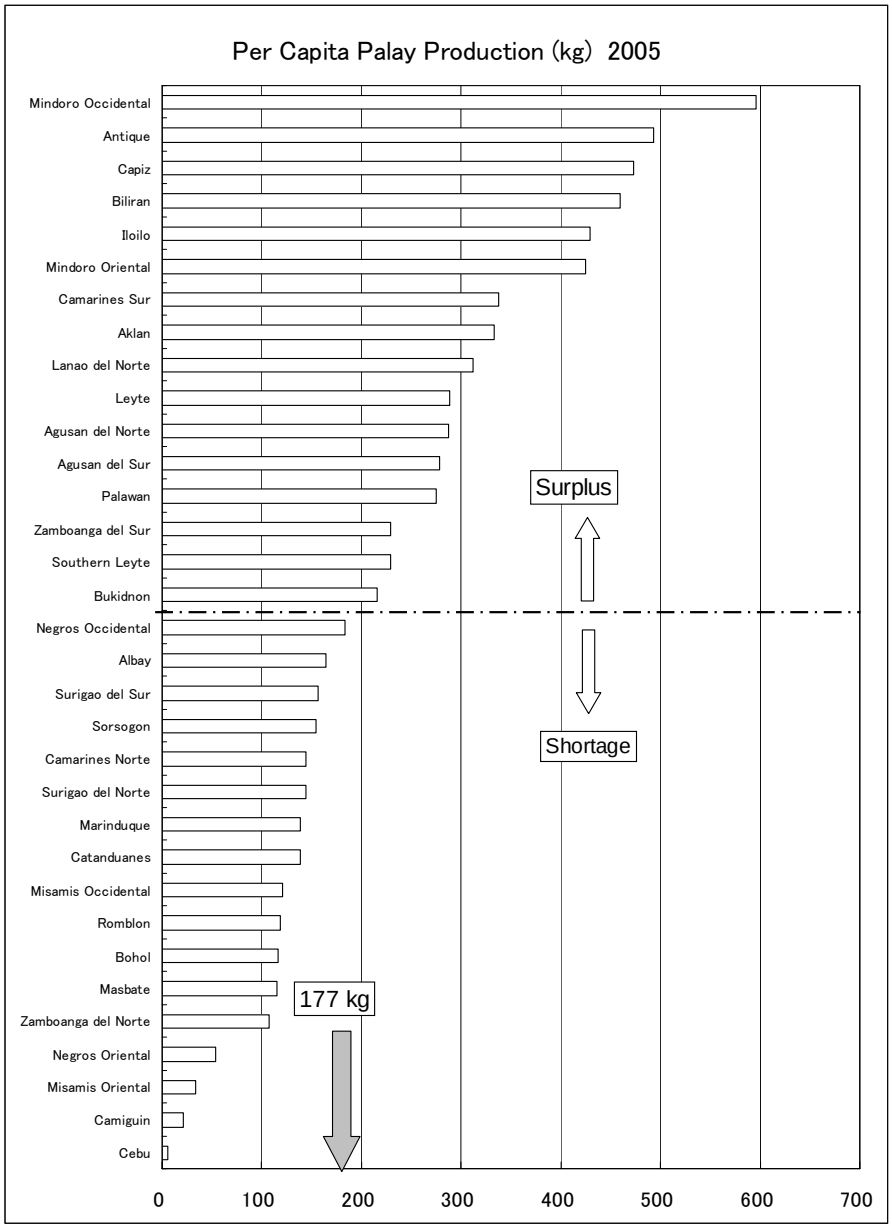
volume is very nominal portion (only 3%), it was assumed that the total of local palay production and net rice import is the total palay consumption.



Source: DA Web site, Edited by Study Team

Figure 3-4 Palay production by provinces

The estimated population of the Philippines in 2005 is 84,241,341. Therefore, it is assumed that the per capita consumption of palay was 177 kg. Rice is also used for processed food and it is expected to be larger in those provinces which have food industries. However, to assess if a province has surplus or shortage of rice, the per capita consumption of 177 kg is employed. Figure 3-5 shows the per capita palay production by province. Those provinces were assessed to have surplus if the per capita production is larger than 177 kg and otherwise assessed to have shortage.



Source: DA Web site

Figure 3-5 Per Capita Play Production by Province

The provinces having surplus are located in Mindoro Is. (Mindoro Occidental and Oriental provinces), Panay Is. (Antique, Capiz, Iloilo, and Aklan provinces), Leyte and Biliran Islands. Camarines Sur (Bicol), Palawan and some provinces in Mindanao Island. Those provinces that have shortage of Play are such island that Cebu, Masbate, Bohol, Romblon, Catanduanes and Marinduque. Camarines Norte, Sorsogon, Albay provinces in Bicol Region are also short of rice.

Most of the provinces in Northern and Central Luzon, i.e. CAR and Regions I, II and III, are also rich in rice and they supply rice to NCR and its southern neighborhood. However, the production is not large enough to meet the demand (see Table 3-10). There are many food industries in NCR and its vicinity and the rice consumption must to be larger than national average. Thus, it seems very likely that those provinces having shortage of rice such as Bicol, Bohol and Cebu are provided rice from those provinces other than North and Central Luzon regions such as Panay Island or by import.

Table 3-10 Palay Production and Consumption of Provinces in Northern and Central Luzon

	Population 1,000	Per Capita kg	Production 1,000 ton	Consumption 1000 ton
NCR	11,241	177.0	354	1,990
CAR	1,561	177.0	-	276
Ilocos	4,491	177.0	1,383	795
Cagayan Valley	3,087	177.0	1,849	546
Central Luzon	8,650	177.0	2,546	1,531
Calabarzon	10,182	177.0	392	1,802
Total	39,212		6,524	6,941

Source: DA Web Site, Edited by Study Team

2) Production and consumption of Corn

Philippine is producing almost enough volume of cone to meet the demand. The export and import volumes of corn are very small with a net import volume of about 1,000 ton. Thus it seems that production and consumption are balanced. The corn production of the provinces in Visayas regions and neighborhood is shown in Table 3-11. Total corn production of whole Philippines and the population of the provinces are also indicated in the table.

A total of 5,252,160 tons of corn was produced in the Philippines in 2005. The corn production in 2000 and 2005 by province is drawn in Figure 3-6 for the provinces in Visayas Regions and the neighborhood. Bukidnon Province (Central Mindanao) produced the largest volume (650,000 ton) of corn, followed by Lanao del Norte (183,000 ton, North Mindanao), Zamboanga del Sur (127,000ton Western Mindanao), Cebu (107,000 ton). The productions of other provinces are less than 100,000 tons.

Since the production and consumption is balanced, it seems that the whole volume of 5,253,160 tons of corn produced in 2005 was consumed locally and thus per capita corn consumption is estimated to be 62.4kg.

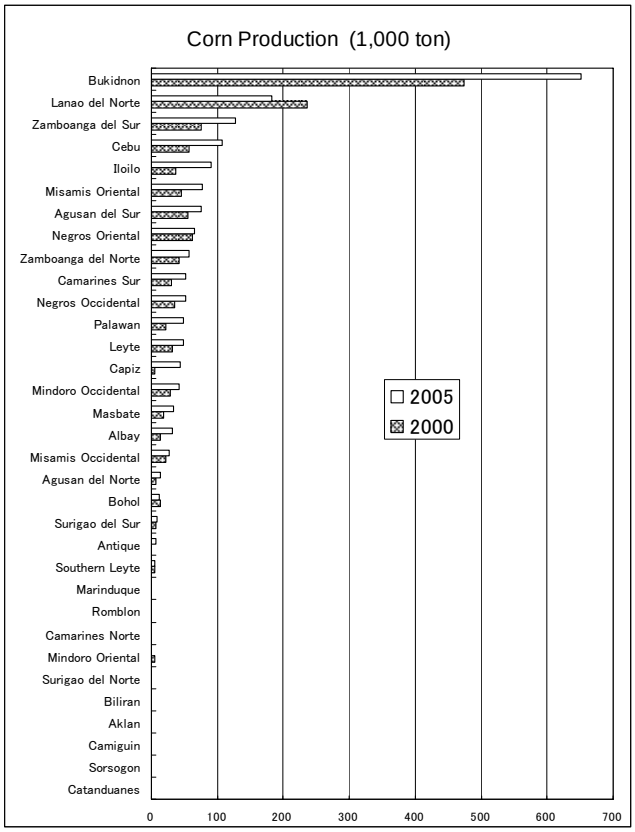
Table 3-11 Corn Production in the Philippines

Unit : ton

Region/Province	Population	2000	2001	2002	2003	2004	2005
Philippines	84,241,341	4,511,104	4,525,012	4,319,262	4,615,625	5,413,386	5,253,160
REGION IV-B (MIMAROPA)	2,299,229	**56,526**	**58,755**	**62,005**	**59,359**	**67,564**	**94,161**
Marinduque	217,392	1,035	1,172	1,217	1,246	1,283	1,216
Mindoro Occidental	380,250	27,647	28,182	29,680	28,425	31,184	42,634
Mindoro Oriental	681,818	4,334	4,056	3,846	1,007	742	804
Palawan	755,412	22,479	24,649	26,627	27,998	33,586	48,626
Romblon	264,357	1,031	696	635	683	769	881
REGION V (BICOL REGION)	4,674,855	**62,787**	**62,842**	**73,963**	**66,361**	**81,285**	**118,115**
Albay	1,090,907	13,323	14,467	17,318	16,440	18,553	31,629
Camarines Norte	458,840	186	251	433	376	560	813
Camarines Sur	1,551,549	29,850	26,996	36,180	27,807	29,219	52,243
Catanduanes	215,356	103	101	121	136	121	165
Masbate	707,668	19,177	20,755	19,560	21,265	32,309	32,848
Sorsogon	650,535	148	272	351	337	523	417
REGION VI (WESTERN VISAYAS)	5,413,837	**79,570**	**74,853**	**86,627**	**127,886**	**136,992**	**192,717**
Aklan	451,314	245	209	286	218	189	622
Antique	471,088	2,451	2,649	947	219	3,414	7,144
Capiz	654,156	5,456	6,374	8,539	16,033	20,501	43,159
	141,450						
Iloilo	1,559,182	36,506	30,410	40,190	69,867	66,730	89,843
Negros Occidental	2,136,647	34,912	35,211	36,665	41,549	46,158	51,949
REGION VII (CENTRAL VISAYAS)		**132,234**	**149,304**	**161,333**	**186,474**	**177,093**	**184,129**
Bohol	1,137,268	12,783	16,158	15,548	13,130	13,831	11,690
Cebu	2,377,588	57,538	72,794	85,619	102,799	102,280	107,139
Negros Oriental	113,088	61,913	60,352	60,166	70,545	60,982	65,300
Siquijor	81,598						
REGION VIII (EASTERN VISAYAS)	3,610,355	**36,719**	**37,622**	**39,578**	**41,599**	**49,284**	**54,893**
Biliran	140,274	695	693	710	716	740	747
Leyte	375,822	31,435	32,347	34,309	36,358	43,357	48,354
Southern Leyte	1,592,336	4,589	4,582	4,559	4,525	5,187	5,792
	500,639						
	360,160						
	641,124						
REGION IX (ZAMBOANGA PENINSULA)	2,156,586	**118,344**	**128,973**	**101,522**	**141,429**	**158,639**	**183,829**
Zamboanga del Norte	823,130	42,183	38,677	40,077	51,102	43,530	56,593
Zamboanga del Sur	1,333,456	76,161	90,296	61,445	90,327	115,109	127,236
REGION X (NORTHERN MINDANAO)	2,758,620	**777,828**	**798,733**	**701,211**	**817,182**	**927,689**	**938,227**
Bukidnon	1,060,265	474,277	459,016	386,134	497,273	608,024	651,136
Camiguin	74,232	555	464	587	601	568	609
Lanao del Norte	473,062	235,494	265,968	231,566	226,449	219,405	182,597
Misamis Occidental	486,723	22,481	22,555	18,970	27,380	27,530	26,146
Misamis Oriental	664,338	45,021	50,730	63,954	65,479	72,162	77,739
CARAGA ADMINISTRATIVE REGION	1,828,088	**70,959**	**67,747**	**68,043**	**74,545**	**95,260**	**98,595**
Agusan del Norte	285,570	6,700	7,410	7,542	14,334	16,353	13,645
Agusan del Sur	559,294	55,767	51,730	52,810	50,707	68,400	75,582
Surigao del Norte	481,416	1,025	554	506	432	668	753
Surigao del Sur	501,808	7,467	8,053	7,185	9,072	9,839	8,615

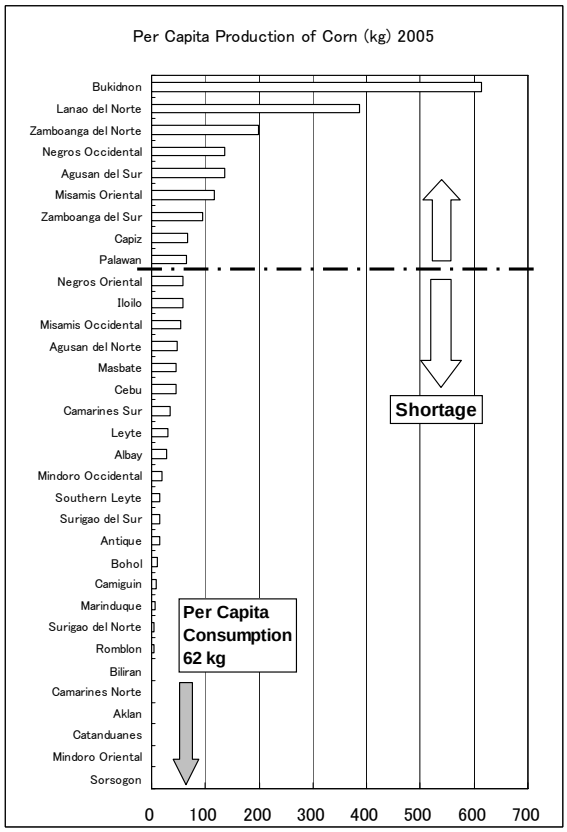
Source: DA Web Site, Edited by Study Team

Only six (6) provinces have surplus: four in Mindanao Island, Bukidnon, Lanao del Norte, Zamboanga del Norte, Agusan del Norte, Misamis Oriental, Zamboanga del Sur, and two (2) provinces, Negros Occidental and Palawan, while many provinces in Bicol (Masbate, Catanduanes) and Central and Eastern Visayas Regions have shortage.



Source: DA Web site, Edited by Study Team

Figure 3-6 Production Volume of Corn



Source: DA Web Site, Edited by Study Team

Figure 3-7 Per Capita Corn Production

The volume of corn production (1.9 million tons, in 2005) in Northern and Central Luzon (CAR, Regions I, II and III) is not large enough to meet the demand of 2.5million tons (see Table 3-12). Thus, corns are supplied from corn production zones in North Mindanao to those provinces in Central and Eastern Visayas, and Bicol Regions. There is no direct inter-island shipping service between Mindanao and Bicol Regions. Thus, it seems that corn is transported either by following two routes: a. Mindanao to NCR by inter-island shipping and then from NCR to Bicol Region overland, or b. Mindanao to NCR by Inter-island shipping and another inter-island shipping from NCR to Bicol.

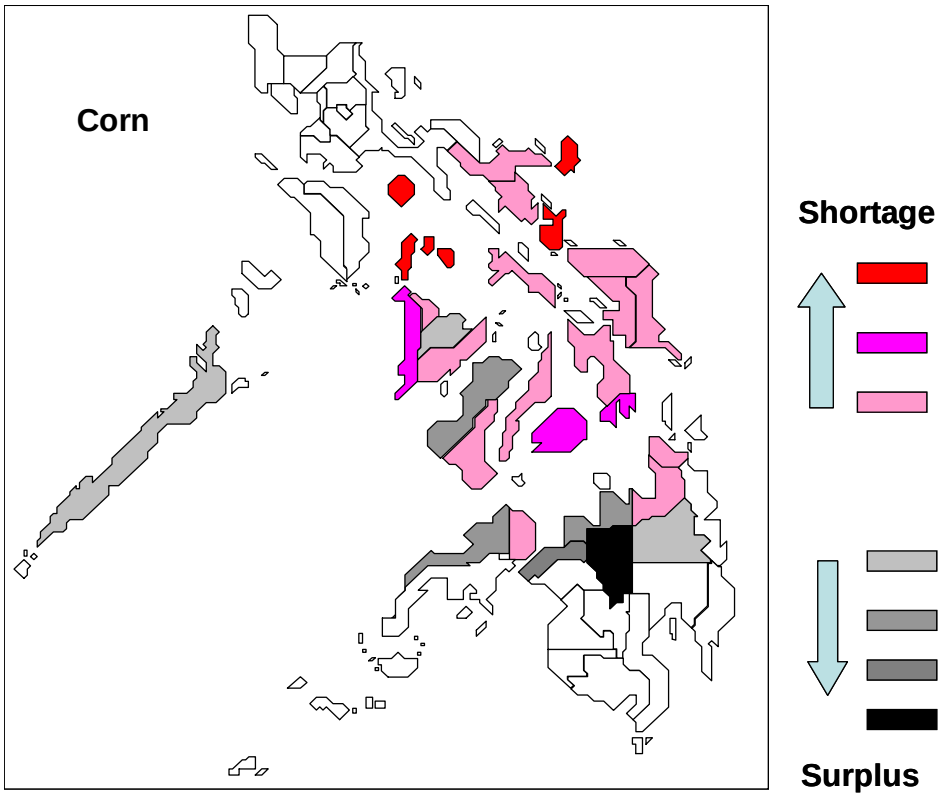
Since corn is also used as the material for processed food and those industrial provinces tend to consume more than other provinces. It is likely that per capita corn consumption in those regions that have few food industries is smaller than in industrial provinces. Therefore, it may be more realistic to assume that per capita consumption of corn in unprocessed form is about 30 kg or half of the above estimated volume.

Table 3-12 Corn Production and Consumption in North and Central Luzon, NCR and its Neighborhood

Province	Population 1000	Per Capita kg	Production 1,000 t	Consumption 1,000 t
NCR	11,241	62.4		701.4
CAR	1,561	62.4	160.1	97.4
Ilocos	4,682	62.4	320.2	292.2
Cagayan Valley	3,085	62.4	1,219.4	192.5
Central Luzon	9,195	62.4	182.8	573.8
Calabarzon	10,655	62.4	53.4	664.9
		Total	1,936	2,522

Source: DA Web Site, Edited by Study Team

The distribution of the production and consumption provinces of Corn is illustrated in Figure 3-8.



Source: Study Team, Edited from DA and NSO data

Figure 3-8 Corn Producing and Consuming Provinces

3) Production and consumption of Sugar

Sugar cane production by province from 2000 and 2005 is shown in Table 3-13. The total production of sugar cane has been 21 million to 25 million tons. Though sugar canes are widely grown over the country, only few provinces are rich in Sugar. The production in Western Visayas Region accounts for 57%, followed by North Mindanao Region (12.5%) and Central Visayas Region (9.1%).

Table 3-13 Sugar Cane Production by Region

REGION/PROVINCE	2000	2001	2002	2003	2004	2005	2005 Share
PHILIPPINES	**21,223,438**	**21,708,722**	**21,417,288**	**23,978,373**	**25,579,214**	**22,917,674**	100%
CAR	475	475	475	480	478	9,315	0.0%
REGION I (ILOCOS REGION)	11,794	10,155	9,258	18,293	18,789	18,534	0.1%
REGION II (CAGAYAN VALLEY)	111,374	151,196	157,757	246,888	332,237	222,029	1.0%
REGION III (CENTRAL LUZON)	1,557,413	1,454,907	1,531,829	1,427,670	1,368,585	1,202,298	5.2%
REGION IV-A (CALABARZON)	1,806,791	2,003,688	1,925,462	1,657,150	1,915,046	1,765,611	7.7%
REGION IV-B (MIMAROPA)	-	-	-	-	-	-	
REGION V (BICOL REGION)	239,029	244,014	218,609	317,333	363,174	284,065	1.2%
REGION VI (WESTERN VISAYAS)	11,465,136	11,739,638	11,130,645	12,755,236	13,714,827	13,072,226	57.0%
REGION VII (CENTRAL VISAYAS)	2,067,245	2,097,792	1,977,635	2,271,373	2,444,124	2,079,900	9.1%
REGION VIII (EASTERN VISAYAS)	523,360	564,340	443,400	559,886	557,990	499,595	2.2%
REGION IX (ZAMBOANGA PEN.)	251	772	638	601	642	609	0.0%
REGION X (NORTHERN MINDANAO)	1,931,933	1,765,352	2,643,022	3,165,902	3,583,496	2,875,321	12.5%
REGION XI (DAVAO REGION)	534,598	495,571	544,962	531,162	594,260	358,907	1.6%
REGION XII (SOCCSKSARGEN)	973,973	1,167,331	802,264	964,968	611,087	495,563	2.2%
CARAGA	40	63	31	30	32	21	0.0%
ARMM	28	13,427	31,301	61,401	74,446	33,681	0.1%

Source: 2007 Bureau of Agricultural Statistics

Among provinces, Negros Occidental Province, Negros Island in Western Visayas Region, produces about a half of national production, while Bukidnon, North Mindanao Regin, produces 12.5%. The total of the productions of these two provinces, Batanagas Province, CALABARZON in Region IV-A,and Negros Oriental, Negros Is. in Central Visayas account for 80% of the national sugar cane production.

Table 3-14 Major Provinces of Sugar Cane Production

REGION/PROVINCE	2005	Share
Philippine	22,917,674	100.0%
Negros Occidental	11,487,560	50.1%
Bukidnon	2,868,411	12.5%
Batangas	1,742,202	7.6%
Negros Oriental	1,667,806	7.3%
Iloilo	880,872	3.8%
Pampanga	721,171	3.1%
Capiz	643,049	2.8%
Leyte	499,564	2.2%
Tarlac	477,772	2.1%
Cebu	412,094	1.8%
Other provice	1,517,173	6.6%

Souece: 2007 Bureau of Agricultural Statistics

In 2004, the Philippines exported 167,420 tons of Sugar and 220,670 tns of Molassess. The production of one ton sugar requires 11 tons of sugar cane. It is also assumed that the production of 1 ton of molassess requires 11 tons. A total of 4.3 million tons of sugar cane was used to produce 220,670 tons of sugar thaw was exported in 2004.

In 2004, the total amount of sugar cane prodiuction was 25.6 million tons. Subtracting 4.3 million tons for export, it is estimated that 21.3 million tons of sugar cane was consumed for domestic use. This volume of sugar cane is equivalent to 1.94 million tons of sugar, which corresponds to 23 kg per person.

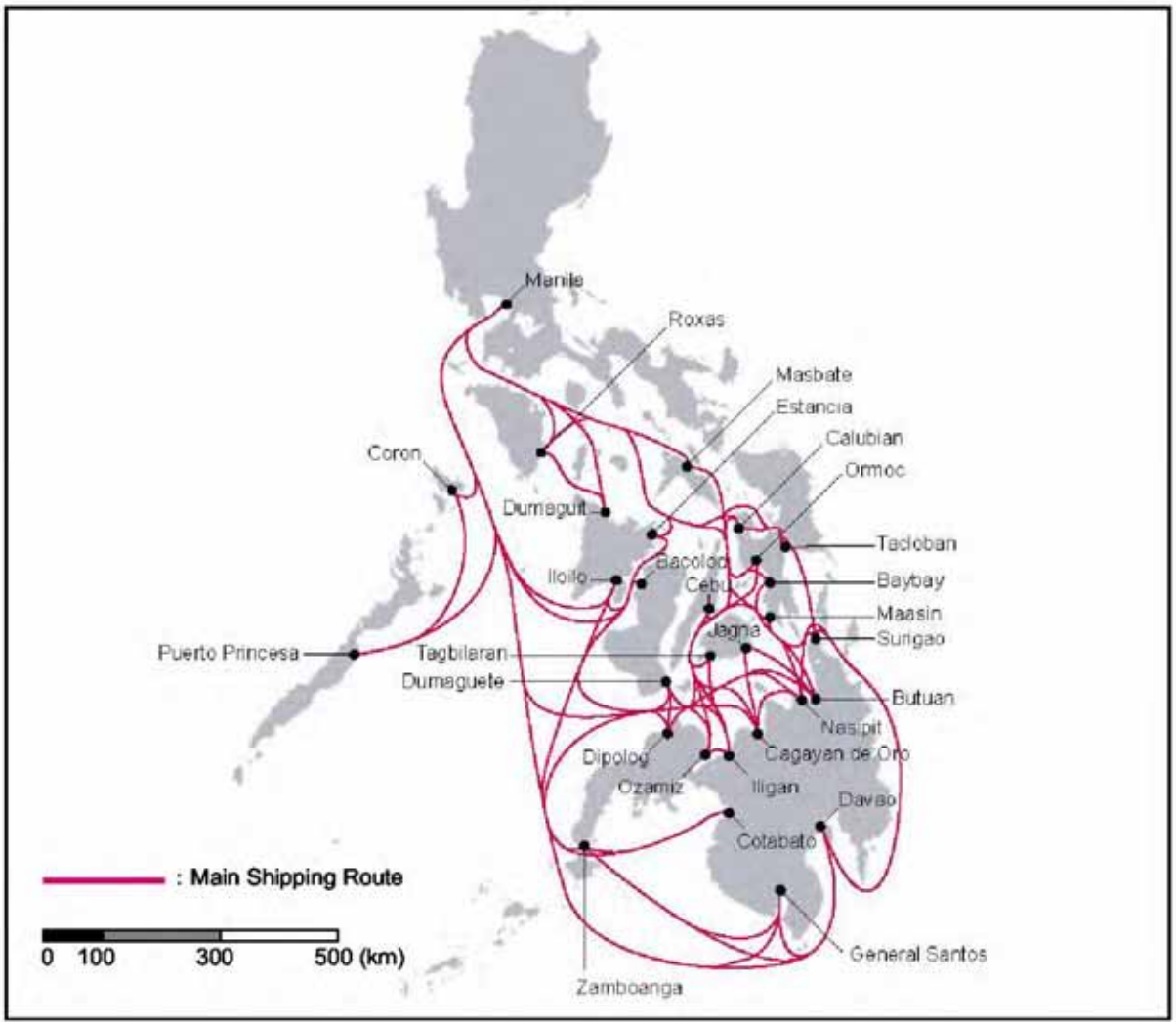
3.2 Transport System in the Philippines

3.2.1 Shipping

1) Long-distance shipping (Liner shipping service)

The principal sea routes 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 3-9).

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 JICA-MARINA 2006

Figure 3-9 Long-distance Shipping Routes

Table 3-15 Liner Shipping Service Routes, Frequency and Other Characteristics

From	To	Number of Shipping Line	GRT	Pax Capa.	Frrequency per week	Travel Time Hr	Fare (Eco.) Pesos/Pax
Manila	Iloilo	3	5908-11638	1538-2624	11	19-27	985-999
	Bacolod	2	6090-11638	1873-2624	11	18-22	999
	Cebu	2	9,466-19,207	1938-3443	9	20-21	900-910
	Dumaguete	3	3768-11638	1000-2624	9	20-34	1516-1550
	Cagayan	3	9466-11638	1938-3259	7	27-44	1321-1450
	Davao	2	6090-19207	1938-2246	4	41-58	1320-1831
	Gen. Santos	1	10722-19207	1938-'2246	3	41-49	1831
	Zamboanga	2	5908-19207	1938-2246	3	27-53	1661-1996
	Butuan	2	6090-11638	1812-2624	3	34-42	1420-1571
	Iligan	2	5908-11638	1538-2624	3	38-40	1706-1721
	Ozamis	2	5908-11405	1538-2624	3	45-46	1706-1721
	Coron	2	5908-9184	1638-1812	2	11-12	1590-1605
	P. Princesa	2	5098-9184	1538-1812	2	23-25	1500-1516
	Masbate	1	1497-33521	518-1794	2	22-23	
	Tagbilaran	2	3786-11638	1125-2624	2	28-31	1516-1550
	Surigao	2	6090-9184	1812-2072	2	34-42	1320-1616
	Cotabato	2	5908-10722	1538-1938	2	39-46	1320-1876
	Dipolog	2	5908-11638	1538-2624	2	42-54	1626-1661
	Roxas	1	5,909	1,538	1	12	999
	Estancia	1	7,977	2,145	1	20	999
	Tacloban	1	1,098	748	1	34	
Cebu	Butuan	1			3	10	
	Naval	1	996	702	2	9	
	Cagayan	1	7,928	1,938	2	10	
	Palompon	1	996	702	1	7	
	Ormoc	1	3,351	1,794	1	5	
	Masbate	1	996	702	1	12	
	Surigao	1			1	8	
	Iligan	1	3,787	1,125	1	11	
	Nasipit	1	9,466	3,259	1	8	
	Ozamis	1	3,768	1,000	1	8	
	Zamboanga	1	13,527	3,443	1	14	859
	Tacloban	1	1,098	748	1	14	
Iloilo	Bacolod	1	6,090	1873-2072	3	2	
	Zamboanga	1	7,977	2,145	2	25-16	1203
	Estancia	1	7,977	2,145	1	7	
	Cagayan	1	6,090	2,072	1	14	1383
	Iligan	1	5,909	1,538	1	25	1383
	Ozamis	1	5,909	1,538	1	18	1383
	Dipolog	1	5,909	1,538	1	15	1383
Cagayan	Iligan	1	6,090	2,072	1	3	1383
	Bacolod	1	6,090	2,072	1	17	1383
	Jagna	1	7,928	1,938	1	5	
	Nasipit	1	9,466	3,259	1	5	
Zamboanga	Gen. Santos	1	13,527	3,443	1	12	
	Davao	1	13,527	3,443	1	17	909
	Cotabato	1	7,977	2,145	1	9	740
Masbate	Calubian	1	1,497	518	1	7	
	Ormoc	1	3,351	1,794	1	12	
Dumaguete	Ozamis	1	3,768	1,000	1	5	561
Dipolog	Tagbilaran	1	3,787	1,125	1	6	
	Iligan	1	3,787	1,125	1	7	
	Roxas	1	5,909	1,538	1	19	1383
Maasinj	Baybay	1	1,497	518	1	3	
	Surigao	1	1,497	518	1	4	
Roxas	Ozamis	1	5,909	1,538	1	27	1383
Davao	Gen. Santos	1	13,527	3,443	1	8	1450
	Surigao	1					
Iligan	Roxas	1	5,909	1,538	1	31	1383
	Bacolod	1	5,909	1,538	1	12	1383
	Ozamis	1	5,909	1,538	1	2	
P. Princesa	Coron	1	5,909	1,538	1	12	1288
Baybay	Calubian	1	1,497	518	1	6	
Butuan	Jagna	1			1	7	

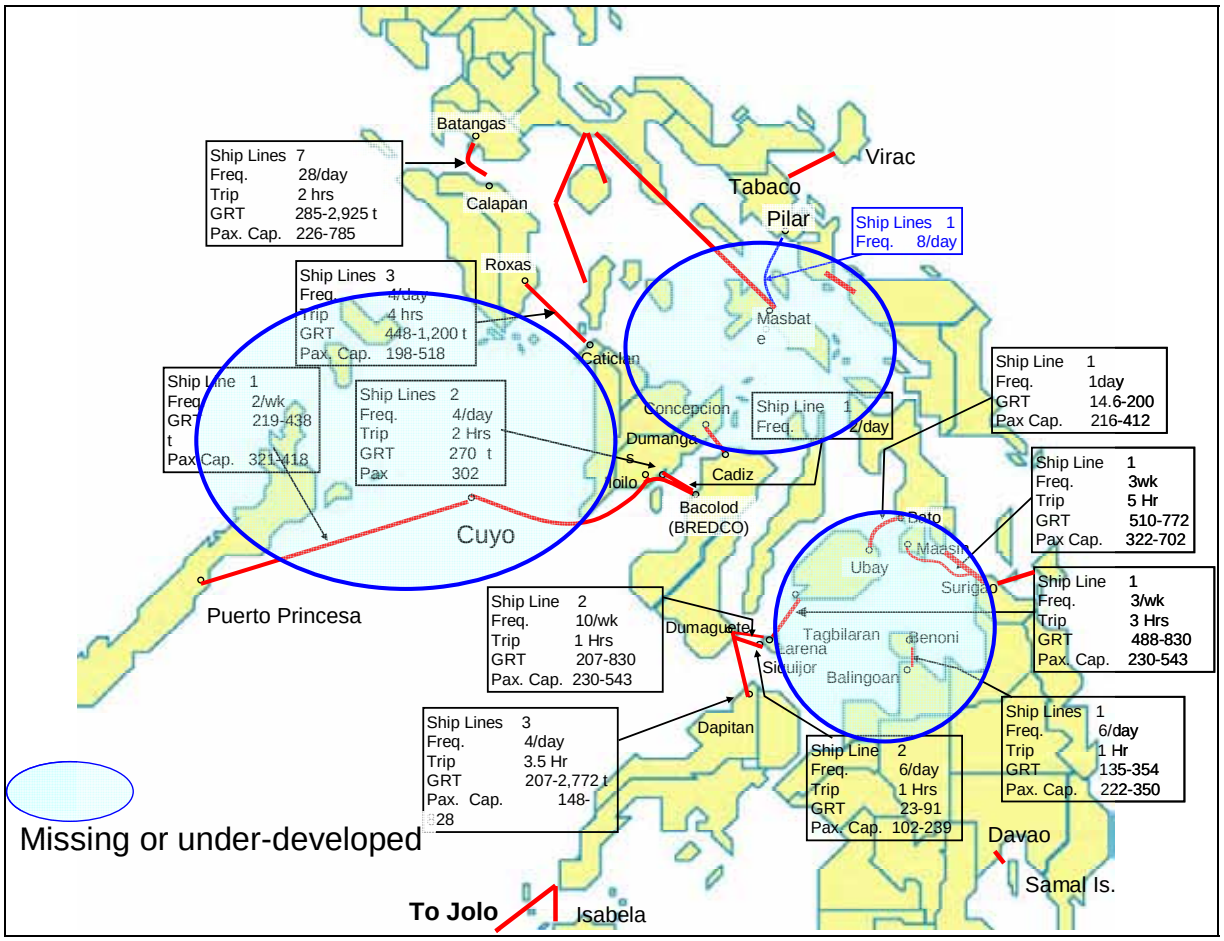
Source: Interview to Major Long-distance Shipping Lines

2) Short-distance shipping

i) RoRo ferry service

RoRo ferry service routes cover almost all the major islands. Figure 3-10 shows the RoRo ferry service links other than Cebu Island that are currently operational. It should be noted that Figure 3-10 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.

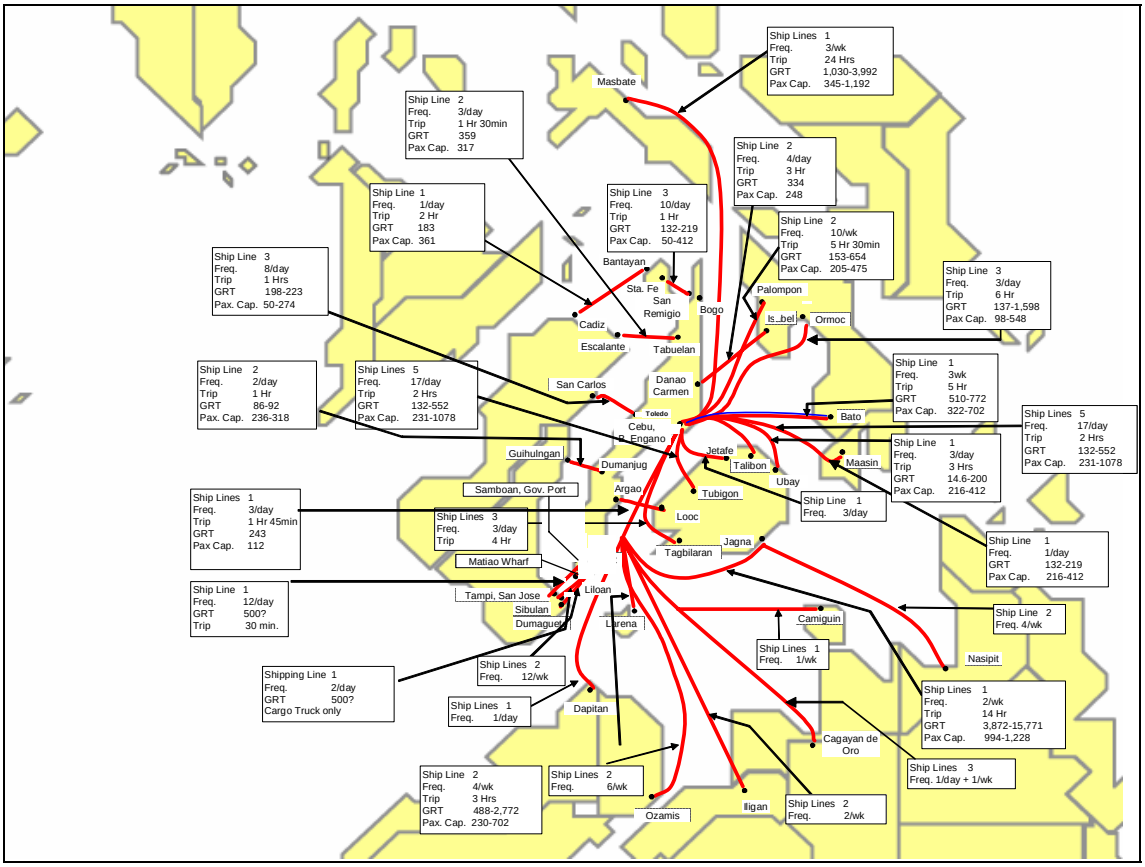
In the figure, red lines indicate RoRo ferry links, while blue line indicate fast craft service links. Characteristic values are also indicated in the figure: the number of shipping lines operating in the link, service frequency, travel time, size of ships and passenger capacities.



Source: Study Team

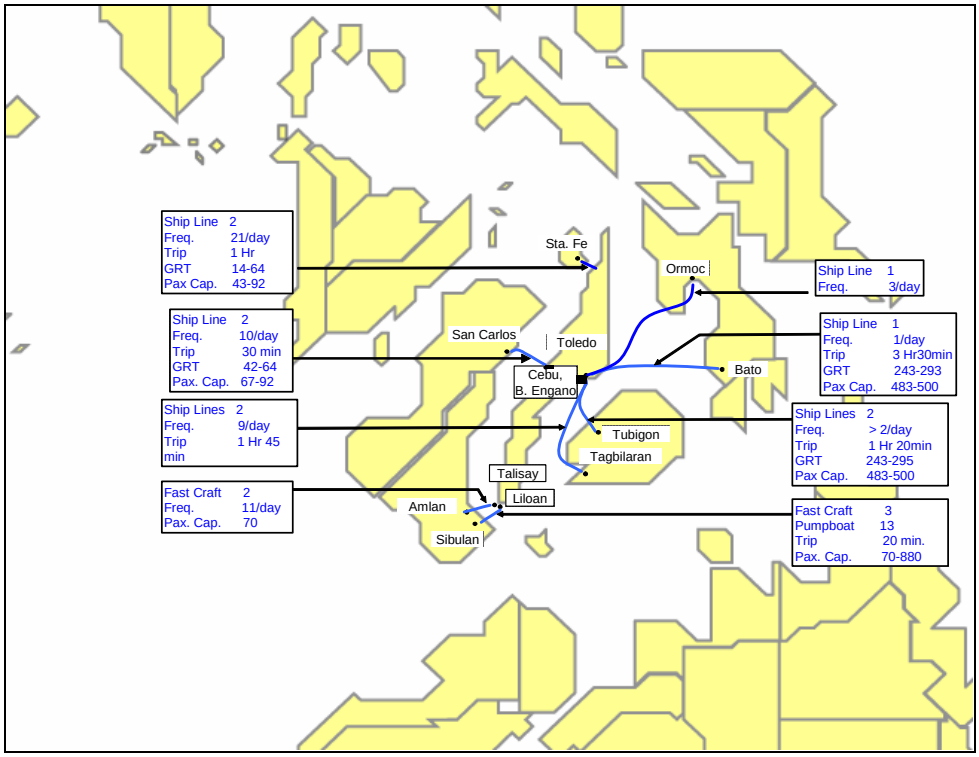
Figure 3-10 Existing RoRo ferry service links (Excluding Cebu Island)

Figure 3-11 is drawn in the same manner to indicate the present status of RoRo ferry service of those links connected to Cebu Island, while Figure 3-12 shows fast ferry service. Those characteristic quantities shown in these figures are summarized in Table 3-16.



Source: Study Team

Figure 3-11 Existing RoRo ferry service links (connecting Cebu Island)



Source: Study Team

Figure 3-12 Existing fast craft service links (Connecting Cebu Island)

Table 3-16 Existing Short-Distance RoRo Ferry Service Links

	Ferry Link			Shipping Line	GRT	Pax Capa.	Type	Frrequency per day	Travel Time Hr	Travel Time Minute
1	Lipata,	Surigao	Liloan, S. Leyte	3 Shipping Lines	222-472	198-758	Pax/cargo	4	3	30
2	Batangas		Calapan	7 Shipping Lines	285-2,925	226-785	Pax/Cargo	28	2	
3	Roxas	Mindoro	Caticlan	3 Shipping Lines	448-1200	198-518	Pax/Cargo	4	4	
4	Iloilo City		Bacolod (BREDCO	2 Shipping Lines	267	302		4	2	
5	Dumangas		Bacolod	Jomaling Shipping				2		
6	Dumaguete -		Dapitan	3 Shipping Lines	207-2772	148-828	Pax/cargo	4	3	30
7	Cebu		Masbate	Trans-Asia Shipping Lines Inc.	1,030-3,992	345-1,192	Pax/Cargo	3/wk	24	30
8	Tubigon	Bohol	Cebu	5 shipping Lines	132-552	231-1078	Pax/RoRo	17	2	
9	Cebu		Tagbilaran	3 Shipping Lines				3	4	
10	Cebu		Camiguin	Super Shattle Ferry				1/wk		
11	Mandaue,	Cebu -	Jagna, Bohol	Carlos A. Gothong Lines, Inc.	3,872-15,771	994-1,228	Pax/Cargo	2/wk	14	
12	Balingoan	Misamis	Benoni	Asian Marine Transport Corporation	135-354	222-350	Pax/RoRo	6	1	
13	Argao	Cebu	Loon	Sunline Shipping Corporation	243	112	Pax/RoRo	3	1	45
14	Cebu		Dumaguete	2 Shipping Lines			Pax/Cargpo	1+ 5/wk		
15	Cebu		Dapitan	Cokalion Shipping				1		
16	Cebu		Ozamiz	2 Shipping Lines				6/wk		
17	Cebu		CDO	3 Shipping Lines				2+1/wk		
18	Cebu		Iligan	2 Shipping Lines				2/wk		
19	Cebu		Nasipit	2 Shipping Lines				4/wk		
20	Toledo		San Carlos	3 Shipping Lines	198-223	50-274	Pax/Cargo	8	1	10
21	P. Engano		Getafe	Lite Shipping				3		
22	Talibon	Bohol	Cebu	Island Shipping Incorporated	132-219	216-412	Pax/RoRo	1	?	
23	Ubay	Bohol	Cebu	Casiano Obligado	14.6-200	69-183	Pax/RoRo	1	3	30
24	Ubay	Bohol	Mandaue	Casiano Obligado	14.6-200	69-183	Pax/RoRo	2	3	30
25	Ubay	Bohol	Bato	Casiano Obligado	14.6-200	69-183	Pax/RoRo	1		
26	Cebu	City	Maasin	Cokaliong Shipping Lines, Inc.	510-2,772	322-702	Pax/Cargo	5/wk	5	
27	Cebu		Surigao	Cokalion Shipping				5/wk		
28	Cebu		Maasin	Cokalion Shipping				5/wk		
29	Surigao		Maasin	Cokalion Shipping				2/wk		
30	Dumanhug,	Cebu	Guihulngan	PAR Transport Development Corporation	85-92	236-318	Pax/Cargo	2	1	30
31	Argao		Loon	Lite Shipping				3		
32	Iloilo City -		Buenavista, Guimaras	Neptune Transport Corporation	5.7-24	28-51	Pax/cargo			
33	Cebu		Iloilo	2 Shipping Lines				1+ 3/wk		
35	Cebu City		Palompon	2 Shippinlg Lines	153-654	205-475	Pax/Cargo	10/wk	5	30
36	Escalante,		Tabuelan,	E. B. Aznar Shipping Corporation	359.12	317	Pax/Cargo	3	1	30
37	Tabuelan		Escalante	A.S. Express			Pax/Cargo	3	1	30
38	San Remigio	Cebu	Sta. Fe	3 Shipping Lines	132-219	50-412	Pax/RoRo	10	1	
39	Cebu	City	Ormoc, Leyte	3 Shipping Lines	137-1598	98-548	Pax/Cargo	2	6	
40	Cebu	City	Bato	Southern Pacific Transport Corporation	190-231	204-212	Pax/Cargo	2	6	30
41	Danao	Cebu	Isabel	2 Shippinlg Lines	334.04	248	Pax/Cargo	4	3	
42	Cadiz		Bantayan Is	Island Shipping Corporation	182.7	361	Pax/Cargpo	1	2	
43	Iloilo City		Puerto Princesa City	Milagrosa - J Shipping Corporation	219-438	321-418	Pax/cargo	2/wk		
44	Tagbilaran	Bohol	Larena	FJP Lines, Inc.	488-830	230-543	Pax/RoRo	0.5	3	
45	Cebu -		Larena	2 Shipping Lines	489-2,772	230-702	Pax/Cargo	4/wk	3	30
46	Dumaguete		Larena	2 Shipping Lines	207-830	148-543	Pax/cargo	10/wk	1	
47	Dumaguete		Siquijor	2 Shipping Lines	23-91	102-239	Pax/cargo	6	1	30
48	Dumaguete		Sindangan	Cokalion Shipping				1/wk		
49	Isabela,	Basilan	Zamboanga City	Basilan Lines Shipping, Inc.	391	500	Pax/cargo	2	1	
50	Lamitan,	Basilan	Zamboanga City	Aleson Shipping Lines, Inc.	235	218	Pax/cargo	1	1	15
51	Cebu		Poro Camotes	A.S. Express			Pax/Cargo	1	4	
53	Mandaue	Cebu	Manila	Carlos A. Gothong Lines, Inc.	3,872-15,771	994-1,228	Pax/Cargo	1	22	
54	Cebu		Manila	Super ferry				6/wk		
55	Cebu	Cebu	Iligan	George and Peter Lines, Inc.	694-1,110	553-828	Pax/Cargo	1/wk		
56	Mandaue	Cebu	Iligan	Carlos A. Gothong Lines, Inc.	3,872-15,771	994-1,228	Pax/Cargo	3/wk	8-9	
57	Cebu		Ozamis	Trans-Asia Shipping Lines Inc.	1,030-3,992	345-1,192	Pax/Cargo	2/wk	24	
58	Mandaue		Ozamis	Carlos A. Gothong Lines, Inc.	3872-15,439	994-1,228	Pax/Cargo	3/wk	8	30
59	Cebu		Plaridel, Misamis	FJP Lines, Inc.	489-830	230-548	Pax/Cargo	3/wk	10	30
60	Cebu -		Surigao	Cokaliong Shipping Lines, Inc.	510-2,772	322-702	Pax/Cargo	6/wk	9	30
61	Cebu		Sindangan, Zanbo N	Cokaliong Shipping Lines, Inc.	510-2,772	322-702	Pax/Cargo	1-2/wk	15	
62	Cebu		Dumaguete	Super ferry				1/wk		
63	Cebu		Dumaguete	Cokalion Shipping				1/wk		
64	Cebu		Zamboanga	George and Peter Lines, Inc.	652-1,110	553-828	Pax/Cargo	1/wk	24	
65	Cebu		Dipolog	Super ferry				1/wk		
66	Cebu		GS	Super ferry				1/wk		
67	Cebu		Davao	Super ferry				1/wk		

ii) Fast Craft Service

9 Fast Craft Service Routes are now being operated as is shown in the Table 3-17. The most competitive route is the Batangas/Calapan Route, where 8 shipping lines are struggling for survival. Next is Roxas/Caticlan Route. In the Batangas/Calapan Route, 2 major lines are competing by voyage time and frequency. Both lines are maintaining 8 voyages every day (voyage time is 2 hours).

Table 3-17 Fast Craft Service Recapitulation

Route (between)		Line	GRT	Pax/Capa	Ship Type	Frequency	Voyage Time	
							Hr	Minutes
Dumaguete	Dapitan	1	72/175	12/144	Passenger	4	4	45
Dumaguete	Dapitan	1	207/490	148/348	Pax/Cargo	2	2	30
Dumaguete	Dapitan	1	510/2,772	322/702	Pax/Cargo	1	1	
Dumaguete	Dapitan	1	694/1,110	553/828	Pax/Cargo	1	1	30
Roxs	Caticlan	3	1018/1200/	474/518/	Pax/Cargo	2	2	
	(Mindoro)		448	198				
Masbate	Pilar	1				8	8	
Dumaguete	Dapitan	2	1,174/694	458/553	Pax/Cargo	1	1	
						1	1	
Dumangas	Bacolod	1	285/574	226/390	Pax/Cargo	2		
Batangas	Calapan	8	449	332	Pax/Cargo	8	2	
						8	2	
						7		45
						3	2	
						2	2	
						2	2	
						3	2	
						2	2	

Remarks: Extraction from the Hand Book
Passenger Terminal Fee: No Passenger Terminal
Arrastre Fee (Car Attending Fee): PP 100
Car Freight: PP 2,100/unit
Passage Fee: 210/passenger

Typical regular service route by Fast Craft is between Batangas and Calapan. Deployed ship is MV Supercat 2, built in 1989 and GRT is 449 tons.

Schedule of Trip is;

Departure		Arrival	
Batangas	06:00	Calapan	06:45
Calapan	07:15	Batangas	08:00
Batangas	08:15	Calapan	09:00
Calapan	09:30	Batangas	10:15
Batangas	10:30	Calapan	11:15
Calapan	11:45	Batangas	12:30
Batangas	12:45	Calapan	13:30
Calapan	14:15	Batangas	15:00
Batangas	15:30	Calapan	16:15
Calapan	17:00	Batangas	17:45
Batangas	18:00	Calapan	18:45

Voyage time is exactly 45 minutes one-way. Port staying time, however, varies from 15 minutes to 30 minutes depending on the flow of passengers.

3) Information Obtained from Shipping Lines and Shipbuilding Firms

i) Shipping Lines

1. Montenegro Shipping Lines, INC. (refer to Region IV)

Date: 2006-9-6 10:20 - 12:00

Interview with: Mr. Vicente C. Montenegro, General Manager

· Framework of the Line

-Head Office: Batangas PMO 2nd floor
-Branch Office: Batangas City, Lucena City, Masbate City, Bacolod City, Caticlan -Malay Aklan, Dumaguete City (6 branches with representatives)
-Agents: Other than 6 branches, agents are contracted with agency fee of 4% of gross earning.
-Company employee: about 1,000 men (about 80% is crew)

· Business Outline

-The parity of Cargo earning and Passenger earning: approximately 50/50
-Total earning per year: about US$ 2.5 million (¥ 300 million)
-100% of Cargo is car loading. About 50% is jeepney. One of the standard cargoes is rice produced in Mindoro, which is packed in 50 kg gunny bags. Generally, those bags are transported 200 bags as one lot, thus cargo unit of rice is 10 tons.
-No stevedore charge is necessary because all trucks roll on and out by themselves.
-Passenger: 90% is independent passenger. Group tour is 10%.

· vessel P/L

Earning	Disbursement
Cargo (as per tariff)	Vessel amortization (PP 5 million for all ships)
Passenger (as per tariff)	Bunker charge (about 85 % of total cost)
	Port charge (about PP 300 per call)
	Agent fee (4% of gross earning)
	Over head (about 10% of total cost)

· Company's financial position

-Financially, Montenegro is in a difficult position mainly because of the skyrocketing bunker charge. The company is scarcely breaking even.

· Handling of reefer cargo

-Usually, the line's ships are not ready for accepting temperature controlled cargo, but can such cargo using motor generators temporarily equipped onboard ships when requested in advance.

· Competitors

-Starlite Ferry
-Philharbor

· Interest to RRTS Project

-All executives are well aware of the project.
-Their preference is to concentrate all efforts to the betterment of the existing routes, not to increase the numbers of routes. "Don't develop new routes. Concentrate to improve the existing routes."

· Desirable Standard RORO vessel size

-Passengers capacity: 300, Cargo capacity: 25 JEU (jeepney equivalent unit)

2. Sulpicio Lines, INC.

Date : 2006-9-21 10:30 - 11:30

Interview with: Mr. Eusebio S. Go, Executive Vice President

· Outline

-Sulpicio is one of the four long distance shipping lines.

· Container Handling Gantry Crane and Machinery

-Only Manila is equipped with gantry cranes and shipping lines, both long distance and short distance, are suffering from slow handling operation of containers. It is hoped that every regional hub port located at main islands and regions will be equipped with sufficient container handling machinery.

· Schedule Maintaining

-The first and most important responsibility of liner service is to maintain the published sailing schedule. Especially for passengers the accuracy of sailing schedule forms the basis for their choice.

· Precautions for Sailing Safety

-To keep passenger numbers within the authorized passenger capacity is a must. Passenger list should be accurate.

· Importance of City Office

-Major jobs of the City Office are ticketing and schedule advertisement. Many enquiries are answered by the City Office.

3. Philharbor Ferries and Port Services, Inc.

Date : 2006-9-22 13:30 -14:30

Interview with : Mr. Francis C. Carlos

· Ship types deployed and preference

-Although almost all ships now deployed are rather old (for the years build, refer to Philharbor Fleet details), the company is enjoying the good operation result of MV Maharlika Cuatro, a Catamaran ferry built in 1993. The line is interested in Catamaran ships.

· Adjustable RoRo lumps

-Regarding the difference between a fixed lump and a movable (or adjustable) lump, Mr. Carlos pointed out the fact that San Miguel Company’s dedicated berth in Cebu is equipped with an adjustable lump. It was established many years ago (maybe around early 1970s), and has been fairly maintained for a long time without any trouble.

· Container Cargo Outlook

-Container cargo will greatly increase in the future if key ports are equipped with RoRo lumps and container handling equipment. Many of the existing lumps need improving and renewing works.

· About RRTS

-All concerned in the waterfront industry are looking forward to the realization of the Project. The number of qualified shipping lines, however, will be limited because of the difficult financial position of the domestic shipping lines.

· Necessity of Fair Competition

-Fair competition among competing lines is necessary to ensure prosperity of Philippine domestic shipping world. At present, newcomers sometimes wage rate-wars to drive companies out of business.
-In this connection, reliable and fair control by the central and a regional government are needed.

ii) Shipping Yard

1. Colorado Shipyard Corporation

Date : 2006-9-19 10:30 - 11:30

Interview with : Mr. Arther J. C. Uy, Managing Director

· Historical Background/Outline of the Yard

-The company originally engaged in road construction works under the wing of the US Army, beginning in 1945. Shipping yard business is comparatively new. Thus, the company is basically a civil construction company.
-The company is a family enterprise; Mother-President, brothers-Directors.
-The yard has 3 slipways and there is a plan to expand the shipbuilding capacity. Land of the expansion area has already been purchased.

· Importance of welder

-The most important part of modern shipbuilding is welding. The level of ships built solely depends on the skill of welders. All Philippine welders now working, without exception, are originally trained at Tsuneishi Heavy Industries (Cebu).
-There are 2 welder training institutes (Subic and Cavite) run by UNITOL, a Norwegian company

· 65 meter Type RoRo designed by German Consultant HDW

-One project to build 65 meter RoRo is under way. The ship is almost the same size as the 65 meter RoRo proposed by All Japan Small Ship Builders Association for JICA study, except it is catamaran type.
-Head office of HDW is in Keel, Germany. Estimated building cost is said to be around US$ 4 million per vessel.

2. Keppel Cebu

Date: 2006-9-19 15:00 - 16:00

Interview with : Mr. Seng Ah Peng, Commercial Marketing Manager

· Keppel Shipyard

-Keppel Shipyard is Singapore Capital company. In the Philippines, Keppel Cebu is the second largest yard next to Tsuneishi. The company has 2 yards other than Cebu. Those yards are: Batangas and Subic.

· Effect of the standardization of RoRo ships

-It is very clear that the effect of standardizing ships' type and build them in series would have substantial implications for maintenance and parts costs.

· Tsuneishi welders' level is very high

-The Philippine shipyards owe a lot to Tsuneishi. It is not good to snatch welders from Tsuneishi by paying higher wages. We require a plan to educate Filipino welders using our own program.

· About RRTS

-All concerned in the waterfront business are well aware of the Project. From the viewpoint of a shipper, increasing the numbers of service routes is not desirable. Rather, we'd appreciate improvements to RoRo operation, such as increasing the frequency and quality of ships deployed.

· Information of Major Shipping Lines preparing for RRTS

-One of the leading lines is said to be preparing for RRTS by uniting some small lines to establish a new company that can qualify as a new operator of RRTS. Once the project becomes reality, a quite limited number of shipping lines will be selected as operators. Many small and middle size shipping lines will be eliminated.

· Price of Small RoRo

-The price of ships is basically linked to the amount of steel used. Thus, it is difficult to determine the cost only by looking at a blue print.

3. Tsuneishi Heavy Industries (Cebu) INC.

Date: 2006-9-20 08:30 - 09:30

Interview with : Mr. Kenji Kawano, President

· Nature of Tsuneishi (Cebu)

-The yard is the largest yard in the country. The configuration of shares: 80%- Kanbara and 20%-Allois, Spanish Capital. The yard next to Tsuneishi is owned and being operated by Allois. They are building fast crafts.
-Tsuneishi yard is specialized for big scale ships, both facility-wise and marketing-wise and this policy will be maintained for the years to come. Regarding the building of small size ships, Japanese yards are not adequate nowadays. They are fully booked: Japanese yards will not be able to respond to ship building demand until around 2010.

· Welder training at Tsuneishi

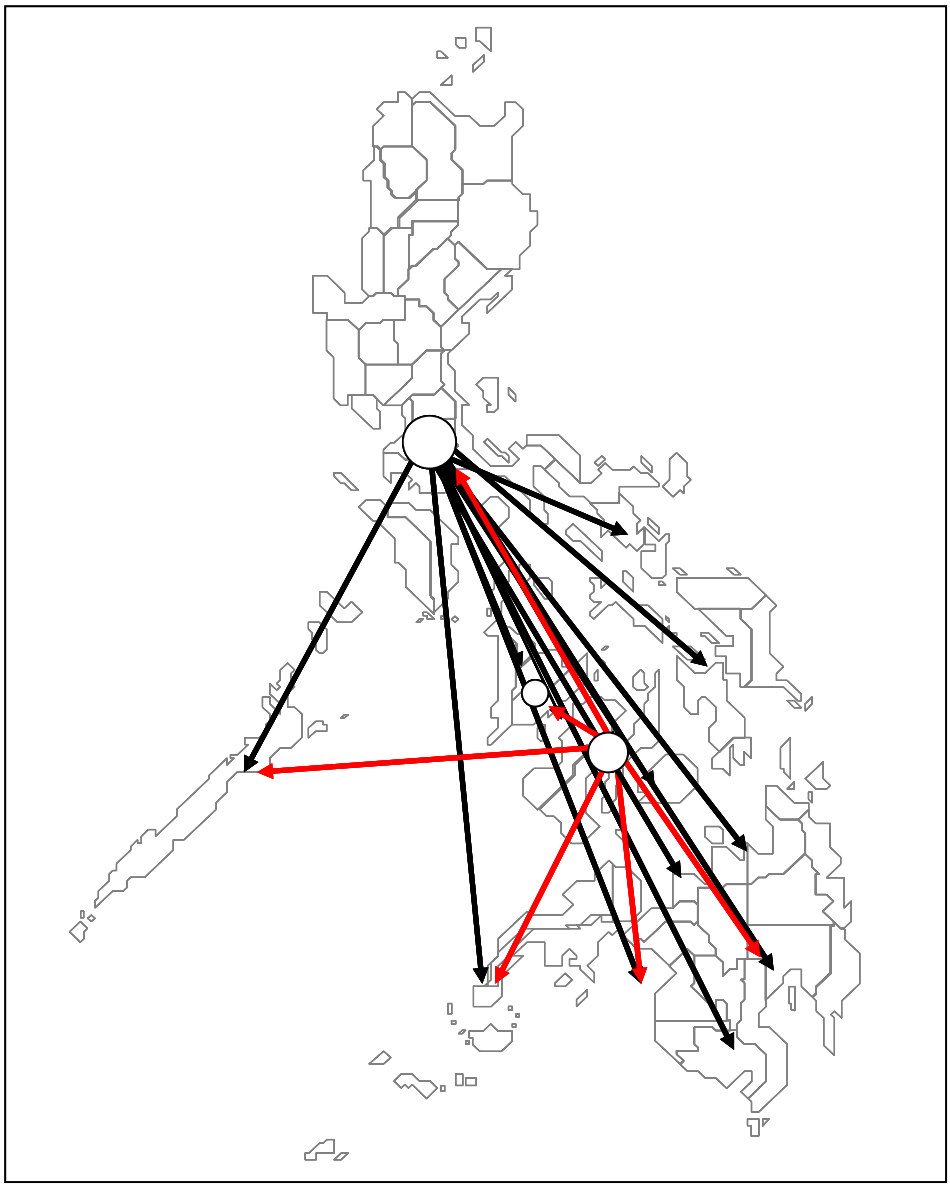
-It is true that all welders now working at shipyards in the Philippines were trained here at Tsuneishi. We are not happy that they have been lured away but we have no way to combat this problem. Recently, we have been approached frequently by Mainland China or Middle Est. countries in search of trained welders.

· RRTS is a spring board for Philippine yards

-Building ships for RRTS will be the best springboard for the growth of the Philippine shipping industry. The shipbuilding industry worldwide is enjoying a boom period and all yards are full with long backlogs. It will be not until 2010 when any yard can accept building orders for RRTS ships. There will be no other options for RRTS Project but to encourage Philippine yards to cope with the difficulties of brushing up shipbuilding skills as well as facilities.

3.2.2 Air Transport

Five airlines are serving domestic air links connecting major cities. Table 3-18 is the list of the air links and operating features. Basically, air links formulate a star (hub-spoke) shape: Manila, Cebu are the principal hubs (See Figure 3-13). 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 one or two flights a day.



Source: Study Team

Figure 3-13 Existing Air routes

Table 3-18 Air Routes, Service Frequency and Seat Capacity

Origin	Destination	Airline	Frequency per Week	Seat Capacity per flight	Per week Seat Capacity	Per week Seat Capacity
Angeles	Boracay via Manila	SEAIR	4	32	128	6,656
	Boracay via Manila	SEAIR	3	32	96	4,992
	Busuanga via Manila	SEAIR	4	17	68	3,536
Bacolod	Davao via Cebu	Cebu Pacific	7	150	1,050	54,600
	Gen. Santos via Cebu	Air Philippines	14	118	1,652	85,904
	Puerto Princesa via Cebu	Air Philippines	8	118	944	49,088
Busuanga	Boracay	SEAIR	1	17	17	884
	El Nido	SEAIR	2	34	68	3,536
	Puerto Princesa	SEAIR	2	34	68	3,536
Cebu	Angeles	SEAIR	3	32	96	4,992
	Bacolod	Air Philippines	7	118	826	42,952
		Cebu Pacific	7	150	1,050	54,600
	Boracay	SEAIR	10	96	960	49,920
	Cagayan de Oro	Asian Spirit	7	19	133	6,916
	Camiguin	SEAIR	3	17	51	2,652
	Caticlan	Asian Spirit	7	32	224	11,648
	Clark	Cebu Pacific	7	150	1,050	54,600
	Cotabato	SEAIR	1	17	17	884
	Davao	Air Philippines	7	118	826	42,952
		Cebu Pacific	19	150	2,850	148,200
	Gen. Santos	Air Philippines	7	118	826	42,952
	Iloilo	Air Philippines	7	118	826	42,952
	Puerto Princesa	Air Philippines	4	118	472	24,544
	Siargao via Surigao	Asian Spirit	3	19	57	2,964
	Surigao	Asian Spirit	3	19	57	2,964
	Tandag	Asian Spirit	3	19	57	2,964
	Zamboanga	Cebu Pacific	4	150	600	31,200
Davao	Bacolod via Cebu	Air Philippines	14	118	1,652	85,904
	Iloilo via Cebu	Air Philippines	14	118	1,652	85,904
	Puerto Princesa via Cebu	Air Philippines	8	118	944	49,088
	Zamboanga	Cebu Pacific	3	150	450	23,400
Iloilo	Gen. Santos via Cebu	Air Philippines	14	118	1,652	85,904
	Puerto Princesa via Cebu	Air Philippines	8	118	944	49,088
	Cebu	Cebu Pacific	7	150	1,050	54,600
	Davao via Cebu	Cebu Pacific	7	150	1,050	54,600
Manila	Bacolod	Cebu Pacific	21	150	3,150	163,800
		PAL	28	141	3,948	205,296
	Baguio	Asian Spirit	4	79	316	16,432
	Baler	SEAIR	2	34	68	3,536
	Boracay	SEAIR	67	34	2,278	118,456
	Busuanga	SEAIR	27	34	918	47,736
	Cagayan de Oro	Cebu Pacific	21	150	3,150	163,800
		PAL	28	150	4,200	218,400
	Cebu	Air Philippines	7	118	826	42,952
		Cebu Pacific	61	150	9,150	475,800
		PAL	56	150	8,400	436,800
	Cotabato	Cebu Pacific	4	150	600	31,200
		PAL	7	276	1,932	100,464
	Davao	Air Philippines	7	118	826	42,952
		Asian Spirit	3	100	300	15,600
		Cebu Pacific	28	150	4,200	218,400
		PAL	28	278	7,784	404,768
Manial	Davao via Cebu	Air Philippines	14	118	1,652	85,904
(Continuation)	Dipolog	Cebu Pacific	3	150	450	23,400
	Dapitan	PAL	7	138	966	50,232
	Dumaguete	Air Philippines	12	118	1,416	73,632
		Cebu Pacific	7	150	1,050	54,600
	El Nido	SEAIR	2	34	68	3,536
	Gen. Santos via Cebu	Air Philippines	7	118	826	42,952
	Gen. Santos	Cebu Pacific	7	150	1,050	54,600
		PAL	7	271	1,897	98,644

Source: Department of Tourism

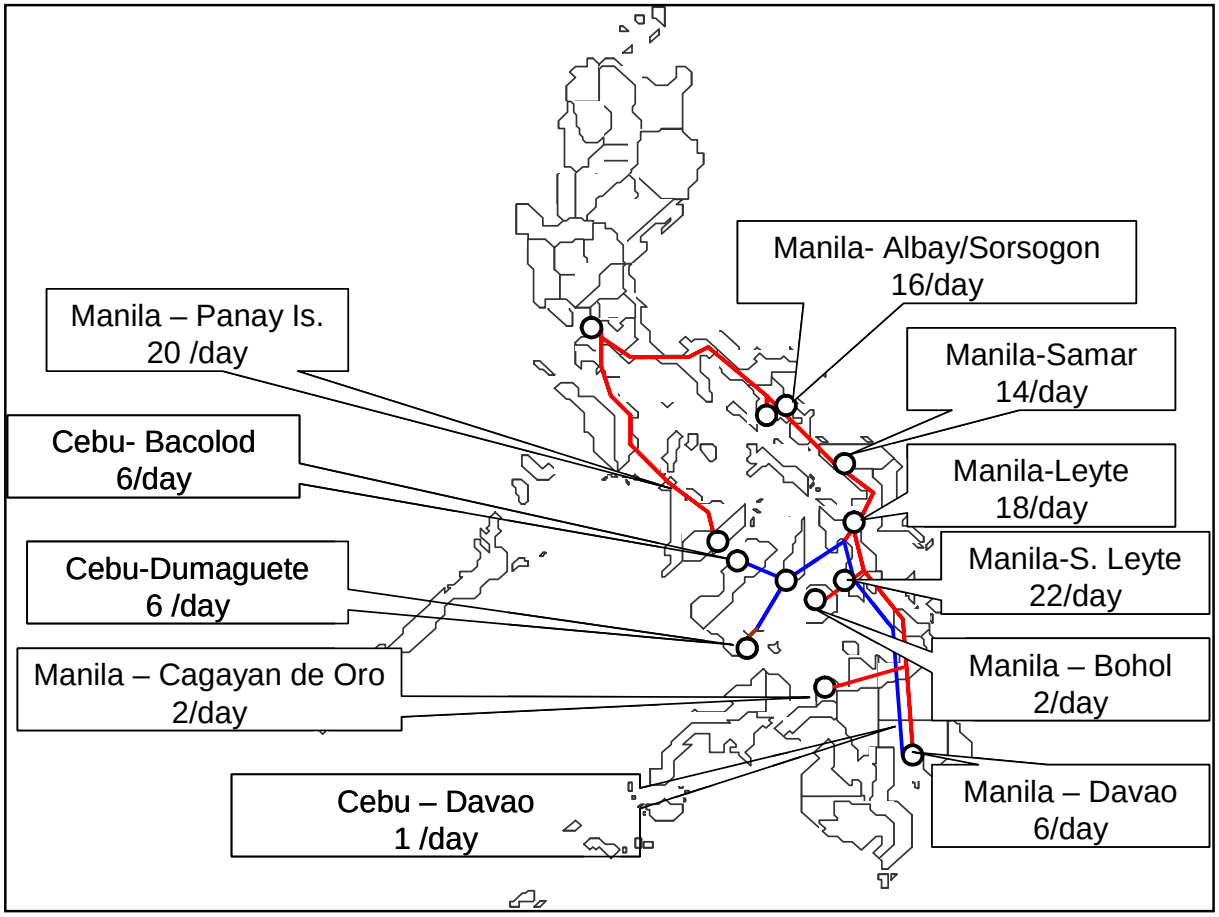
Origin	Destination	Airline	Frequency per Week	Seat Capacity per flight	Per week Seat Capacity	Per week Seat Capacity
	Iloilo	Air Philippines	19	118	2,242	116,584
		Cebu Pacific	21	150	3,150	163,800
		PAL	28	147	4,116	214,032
	Kalibo	Cebu Pacific	14	150	2,100	109,200
		PAL	21	146	3,066	159,432
	Laoag	Cebu Pacific	3	150	450	23,400
		PAL	4	138	552	28,704
	Legazpi	Air Philippines	3	118	354	18,408
		Cebu Pacific	7	150	1,050	54,600
		PAL	7	138	966	50,232
	Masbate	Asian Spirit	5	70	350	18,200
	Naga	PAL	5	138	690	35,880
	Pagadian	Asian Spirit	3	100	300	15,600
	Puerto Princesa	Air Philippines	7	118	826	42,952
		Cebu Pacific	7	150	1,050	54,600
		PAL	7	214	1,498	77,896
	Roxas	Cebu Pacific	4	150	600	31,200
		PAL	7	138	966	50,232
	San Fernando	Asian Spirit	2	38	76	3,952
	San Jose	Asian Spirit	7	60	420	21,840
	Surigao	Asian Spirit	4	100	400	20,800
	Tacloban	Cebu Pacific	21	150	3,150	163,800
		PAL	14	150	2,100	109,200
	Tagbilaran	Cebu Pacific	14	150	2,100	109,200
		PAL	14	207	2,898	150,696
	Taytay	SEAIR	7	17	119	6,188
	Tuguegarao	Air Philippines	4	118	472	24,544
	Virac	Asian Spirit	3	100	300	15,600
	Zamboanga	Air Philippines	7	118	826	42,952
		Cebu Pacific	7	150	1,050	54,600
		PAL	14	138	1,932	100,464
Puerto Princesa	El Nido	SEAIR	2	34	68	3,536
Puerto Princesa	Cuyo	SEAIR	1	17	17	884
Surigao	Siargao	Asian Spirit	3	19	57	2,964
Total			990	10,610	126,195	6,562,140

Source: Study Team

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 to various destinations are shown in Figure 3-14.

The long-distance buses going to Pilar (Sorsogon) and Ormoc (Leyte) have connections with fast craft service to Masbate and Cebu, respectively. Thus, buses are the major clients of RoRo ferry service and sometimes RoRo ferries are operated by affiliated companies of Bus operators.



Source: Study Team

Figure 3-14 Long-Distance Bus Service

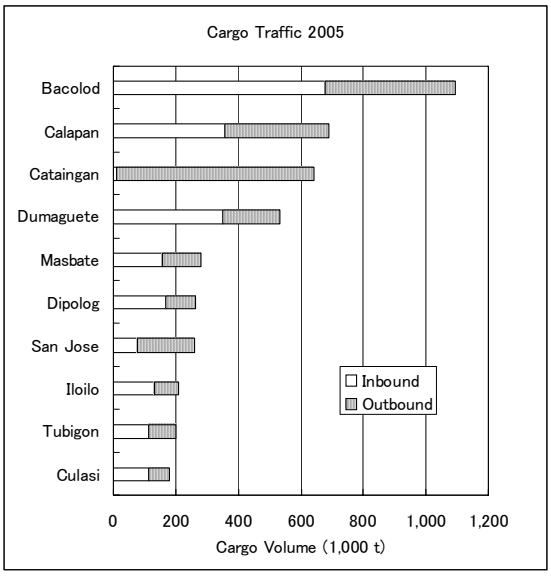
3.3 Present Situation of Short-Distance Ferry Services

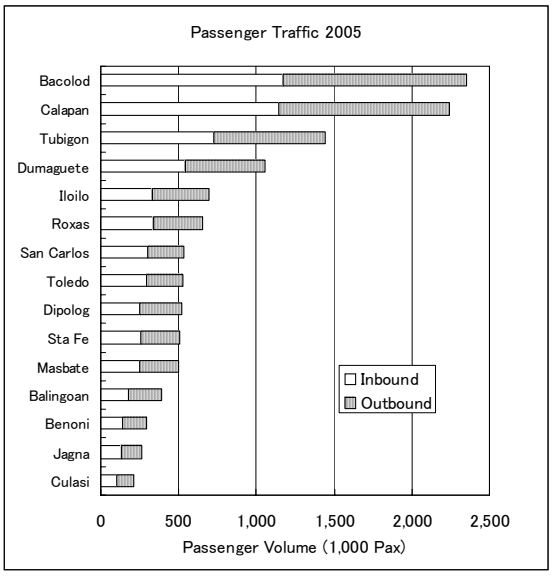
3.3.1 Cargo Passenger Traffic at RoRo Ports

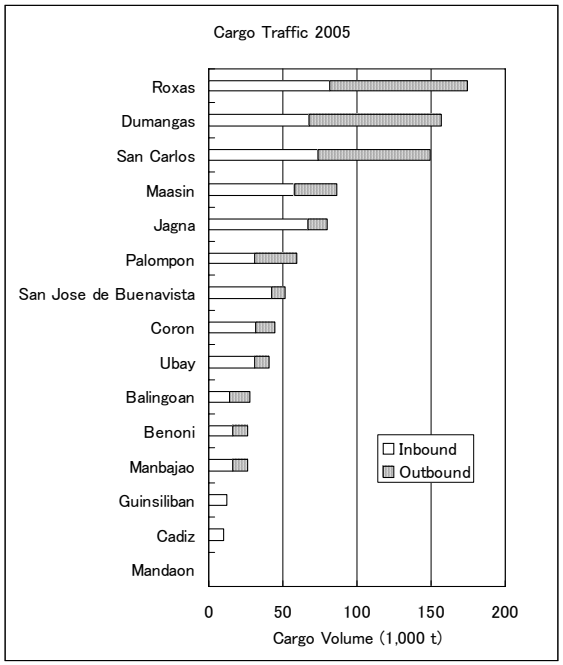
Field survey has been carried out at those RoRo ports along Strong Nautical Highways and other nautical highway routes proposed by DOTC (see Figure 2-8). The cargo and passenger traffic volumes recorded in 2005 are shown in Figure 3-15.

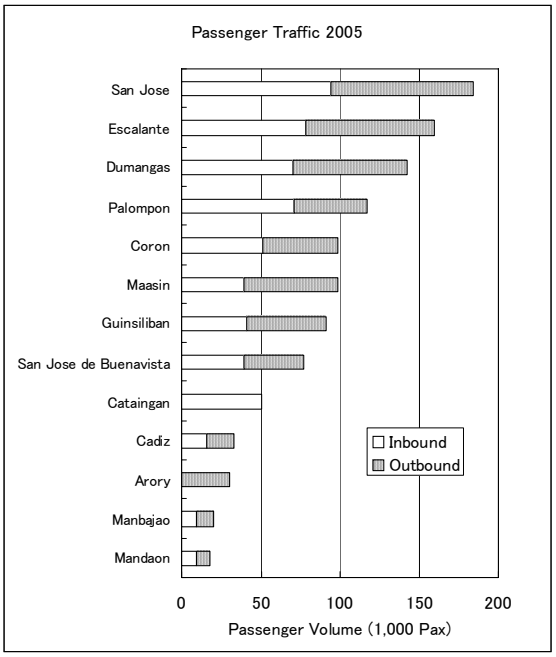
It is seen in Figure 3-15 that, while cargo and passenger traffic volumes exceeded 500,000 tons/passengers at some major RoRo ports such as Bacolod, Calapan, traffic volumes were less than 200,000 tons/passengers or less at many other ports. It should also be noted that no daily RoRo ferry services are available at these ports where the traffic volumes were less than 100,000 tons/passengers.

The major commodities handled at RoRo ports are summarized in Table 3-19. At most of the ports, agricultural and stock firm and fishery products were the major commodities. Construction materials and bottled cargoes are also seen at many ports.









Source: Study Team

Figure 3-15 Cargo and Passenger Traffic at RoRo Ports (2005)

Table 3-19 Major Commodities handled

Port	Commodities handled			
	Inbound		Outbound	
Balud	Fruits and Vegetables		Dried Fish	Live stock
Coron	Rice General Coommodoties Vegetables and Fruits	Construction Material Diesel Gasoline, Kerosene	Fresh Fish Scrap material	Agricultural Products Other cargoes
Culasi	Cement Bottles water Tabacoproducts	Steel products Fertilizer	Sugar Marine Products Empty Bottles	Scrap material General Cargo
Dumangas	Sugar		Flour Rice	Corn
San Jose de Buenavista	Cement	Fertilizer	Rice	Sugar
Iloilo	Cement Soya Beans Steel Products	Bottled Cargo Rice	Bottled Cargo	
Bacolod	Cement Transport Equipment General Cargo	Fertlizer Palay, Rice	Sugar Transport equipment General Cargo	Bottled Cargo Metal scrap
San Carlos	Cement Transport equipmwent	Fertilizer General Cargo	Transport Equipmemt general Cargo	Fertilizer
Dapitan	General Cargo Fertilizer Bottled Cargo	Sugar Cement	Lumber Containerized Rubber General Cargo	Charcoal Empty Bottles
Dumaguete	General Cargo Corn Rice	Animal Feeds	Sugar RGC Transport Equipment	Copra Empty Bottles
Toledo Ubay	Fruits and Vegetables Construction Materials Feeds General Marchandise	General Marchandise Fertilizer	Rolling stock Rice Cassava Copra	Livestock Mangoes
Manbajao	Cement Crude Minerals Gen. Cargo	Palay, Rice Bottled Cargo	Lumber Bottled Cargo Transport Equipment	General Cargo Fruits and Vegetables
Maasin	Cement General Cargo Rice	Bottled Cargo(SMC) Feeds	Copra Empty Bottles	
Escalante	Cement Transport Equipment	General Cargoes	Sugar Molasses	Transport Equipment Mechine electric Equipment
Cadiz	Fish/Fish Preparation Daily Products(Egg)	General Cargoes	General Cargo Sugar	Fish/Fish Preparation Fruit Vegetables
Palompon	Cement General Cargo	Feeds	Copra Charcoal	General Cargoes
San Remigio	Eggs Empty Bottles		Feeds Bolttled cargoes	Groceries
Kawayan	Fruit	Aqua marine	Copra	
Cataingan	Coke Full(Bottled Cargo) Vegetables and Fruits Copra	Fresh eggs Various Cargoes	Copra Indian Mangoes Coke Empty Bottles	Fresh Fish Dried Fish
Arory	Groceroes Cement Copra	Rice Beer/Soft drink	Sea Foods	
Mandaon	Sugar Salt	Mango	Vegetables Rice	Fish Dried Fish
Roxas(Mindoro)			Rice Lansones Ranbutan	Calamansi Fish Products

Source: Interview Survey by Study Team

1) Import and export commodities of the Philippines

Table 3-20 shows the list of the major import commodities of the Philippines in 2004 in the order of the net volume of import. The table does not include the trade volume at Cebu Port, (import; 2.4 million tons and export 1.9 million tons), which is under separate administration of CPA.

Table 3-20 Major Import Commodities

Unit: ton

	Commodity 2004	Import Total	Export Total	Net Import
1	Ref. Petroleum & Prod.	13,140,103	756,626	12,383,477
2	Mineral Fuel	7,462,861	130,841	7,332,020
3	Other General Cargo	10,303,876	6,577,131	3,726,745
4	Crude Petroleum	3,334,504	487,232	2,847,272
5	Iron & Steel	2,423,410	103,853	2,319,557
6	Wheat	2,142,897	0	2,142,897
7	Chemicals	1,764,492	339,696	1,424,796
8	Animal Feeds	881,928	226,026	655,902
9	Palay & Rice	567,030	475	566,555
10	Fertilizer	861,207	348,543	512,664
11	Paper & Pulp	359,541	6,529	353,012
12	Manufactures of Metal	283,415	35,223	248,192
13	Textile Fiber	198,218	3,503	194,715
14	Mach. & Elect. Equipt.	206,700	26,348	180,352
15	Logs	146,367	978	145,389
16	Plywood & Veneer	111,638	11,883	99,755
17	Dairy Products	70,006	9,877	60,129
18	Transport Equipment	72,102	13,747	58,355
19	Live animals	55,614	428	55,186
20	Textile & Garment Prod.	34,781	1,420	33,361
21	Furniture	38,260	14,152	24,108
22	Tobacco & Manufactures	7,334	467	6,867
23	Corn	1,771	689	1,082
24	Bottled Cargo	2,063	1,007	1,056
	Total	51,107,319	22,520,639	28,586,680

Source: PPA Statistics 2004

As seen in Table 3-20, petroleum products account for the largest share in the import: petroleum product; net import of 12.3 million tons, crude petroleum; 7.3 million tons. Other general cargo accounts for the second largest share: 3.7 million tons of net import. The net import of Iron & Steel, Wheat and Chemicals exceeded one million tons, while those of Animal Feed, Palay & Rice and Fertilizer exceeded exceed 500,000 tons. It should be noted that the import and export of corn is nominal amount. It is, thus, recognized that the Philippines provide corn for itself.

Major export commodities are listed in Table 3-21. Fruit, Ores and Cement are the three principal export commodities: the net export of fruit was 2.2 million tons and 1.8 millions of cement was exported. Coconut oil (net export 950,000 tons), Sugar and Molasses (a total net export of 400,000 tons) are also major export commodities. While quite large volumes of Metalliferous Ores and Crude Minerals are exported, the imported volumes of these are also quite large. This is because there are large processing industries of iron ore that import raw iron ore and re-export processed ore.

The net export volumes of Lumber, Copra, and Fish & Fish Products were 300,000 tons to 40,000 tons.

Table 3-21 Major Export Commodities

Unit ton

Commodity 2004	Import Total	Export Total	Balance Exp.-Imp.
Fruits & Vegetables	435,869	2,592,690	2,156,821
Metaliferous Ores/Scrap	4,737,465	6,473,520	1,736,055
Cement	379	1,334,709	1,334,330
Coconut Oil	2,977	949,350	946,373
Molasses	13,250	233,920	220,670
Sugar	47,388	214,808	167,420
Crude Minerals	1,261,616	1,380,136	118,520
Lumber	44,225	83,155	38,930
Copra	36,521	72,515	35,994
Fish & Fish Prep.	57,511	84,204	26,693
Abaca	0	4,958	4,958

Source: PPA Statistics, Edited by Study Team

Above discussion is summarized as follows:

-Major import commodities are Wheat Rice, Chemicals, Fertilizer, Animal Feeds as well as Petroleum Products.

-Corn is self supplied and all the production is consumed domestically.

2) Nationwide Commodity Flow

PPA publishes Annual Statistical Report every year, which covers statistics of Cargo, passenger, ship calls, dimensions of calling ships, ship service time and commodities handled. In addition to port-by-port statistics, compiled statistics by PMO is also published. In general, the jurisdictions PMO's are delineated by political boundary, i.e. Regions. The jurisdiction of PMO fairly well corresponds to Regions as shown in Table 3-22. Therefore, origins and destinations of various commodities of nationwide maritime transport can be figured out on the basis of the commodity statistics by PMO.

Table 3-22 Jurisdiction of PPA PMO vs. Political Boundary

PPA PMO	Region	Graterr Region
San Fernando	CAR, Region I, II	Northern Luzon
Limay	Region III	Central Luzon
North Harbor (Manila)	NCR	NCR
MICT		
South Harbor (Manila)		
Batangas	Reg. IV -A	Southern Luzon
Calapan	Region IV-B, Mindoro	
Puerto Princesa	Region IV-B, Palawan	
Legaspi	Gegion V, Bicol	
Iloilo	Region VI, Panay	Western Visayas
Pulpandan	Region VI, Negros Occidental	
Tagbilaran	Region VII, Bohol	Central Visayas
Dumaguete	Region VII, Negros Oriental	
Tacloban	Region VIII, Leyte, Samar	Eastern Visayas
Ozamiz	Region X, Misamis Occidental	North west Mindanao
Iligan	Region X, Lanao del Norte	North Mindanao
Cagayan de Oro	Region X, Misamis Oriental	
Nasipit	CARAGA, Agusan del Norte	Northeast Mindanao
Surigao	CARAGA, Surigao del Norte & Sur	
Davao	Region XI, Davao Or. Sur, Composta Valley	South Mindanao
General Santos	Region XII, G.. Santos, Salangani, South Cotaba	
Cotabato	Maguindanao, , Cotabato City, ARMM	Western Mindanao,
Zamboanga	Region IX, Zxamboanag Peninsula	

Source: Study Team

Commodities of international and domestic trade by PMO are shown in Appendix I-3-3-1. The volumes handled within a PMO include all the ports in the jurisdiction of the PMO, namely, Base Port, Terminal Port, Other Government Port and Private Port.

In general, the following commodities are major commodities at many PMO:

Petroleum Products, Crude Petroleum, Crude Mineral, Transport Equipment, Wheat, Fertilizer, Animal Feed, Cement, Palay & Rice, Chemicals, Sugar, Other general Cargo, Fruit & Vegetable, Copra, Live Animals and Iron & Steel. Among these commodities, Petroleum Products and Crude Petroleum are shipped in liquid bulk carriers. There is an established service routes between oil refineries to the ports all over the country. This logistic serve system seems to remain unchanged in the future. Therefore, these two commodities will not be potential cargo for RoRo transport.

Transport Equipment is the primary commodities for RoRo transport. Currently in the domestic trade, Cement, Wheat, Fertilizer, Animal Feed, Cement, Palay & Rice and Sugar are generally handled as bagged cargos and transported in the forms of either break bulk or container cargoes. Cement and Wheat are also transported in bulk ship for some shipping routes. Other General Cargo, Fruit & Vegetable, Live Animals and Iron & Steel are transported as either break bulk or container cargoes. Copra is shipped by bulk except for shipment of small amount. In general, long-distance RoRo ferries handled those bagged cargoes in containers, while short-distance RoRo ferries handle the same in the form of break bulk cargos.

With a purpose of analyzing the commodity flow, in particular within Bicol, Visayas and Northern Mindanao Regions, the inbound and outbound volumes of those break bulk commodities that would be transported by RoRo ferries are summarized by PMO as shown in Table 3-23. It should be noted that the table does not include the statistics of CPA and total inbound volume does not equal to the total volume of outbound. The detailed origin and destination tables by commodity are shown in Appendix 3-3-2

In Table 3-23, negative values denote the net outbound or loaded volumes, while positive values denote the net inbound or unloaded volumes. Thus, the origins and destinations of each commodity are identified. For some commodities, the origins are obvious. The following are the brief explanation of commodity flow is observed in Table 3-23:

-Cemenet : North Mindanao, i.e., Cagayan de Oro and Iligan, provinces are supplying cement to all other regions. Major destinations are Visayas Regions

-Corn: As the same as Cement, North Mindanao is the origin and Visayas Regions are destinations.

-Palay and Rice : Major origins of Palay and Rice are Panay and Mindoro Islands. Palawan Island is also shipping Palay. Since the Philippines are short of Rice, rice is imported at the major ports over the country. The inbound volume at Mindanao is small because of the rice import. Though Albay and Sorsogon province are short of rice, PMO Legaspi is supplying rice to other ports. This is because rice is imported at Legaspi Port, which is PPA Base Port in Bicol Region, and PMO Legaspi covers island provinces, Catanduanes and Masbate.

Table 3-23 Net Inbound and Outbound Volume Major Commodity of Domestic Shipping

Unit 1,000 ton

PMO and Region covered 2004	Cement	Corn	Palay & Rice	Sugar	Fertilizer	Animal Feed	Bottled Cargo	Other Ger Cargo	Iron & Steel	Transp. Equip.	Wheat	Fish & Products	Live Animal	Chemi-cals	Fruit & Vegita.
San Fernando (CAR, Reg. I,II)	-0	0	0	0	22	0	0	-1	0	-0	0	0	0	0	0
Limay(Reg III)	0	0	0	0	0	-556	0	3	-1	0	-572	0	0	-33	0
North Harbor (Manila)	43	10	-10	159	10	12	-25	-544	-64	-9	-1	28	20	20	49
MICT (Manila)	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
South Harbor (Manila)	-6	32	9	144	32	-40	-41	-393	1,370	-15	591	17	1	64	14
Batangas	55	3	25	72	29	17	-113	107	-5	-225	-42	-0	1	53	44
Calapan(Mindoro)	33	0	-77	1	14	1	3	1	1	7	0	-0	-1	0	-2
Puerto Princesa(Palawan)	83	-3	-14	12	12	5	61	72	14	9	3	-32	-5	0	2
Legaspi(Bicol)	148	5	-8	78	50	7	89	-32	0	-46	8	-1	-0	-0	0
Iloilo(Panay)	504	50	-174	-93	71	-3	328	316	98	47	-39	12	-8	22	5
Pulpandan(Negros Occ)	284	34	93	-531	80	71	-81	472	51	56	31	3	-1	-60	20
Dumaguete(Negros Or.)	154	43	35	-161	23	45	37	90	11	19	11	8	-3	-4	1
Tgbilaran(Bohol)	109	10	13	15	24	65	28	127	20	35	9	3	-5	6	8
Tacloban(Leyte, Samar)	378	13	103	19	-543	105	75	168	39	9	40	1	0	-50	9
Ozamiz (Misamis Occ.)	59	-4	9	10	24	18	44	138	12	-75	11	-8	-1	3	-18
Iligan (Lanao del Norte)	-312	-24	6	3	-1	-115	-11	29	10	78	6	-40	-54	2	-113
Cagayan de Oro (Misamis Or.)	-483	-228	8	-63	94	-11	-35	166	37	13	-12	-1	-36	-33	-129
Nasipit(Agusan del norte)	1	-10	-0	3	1	5	81	143	9	49	10	-0	-0	0	-150
Surigao(Surigao del Norte, Sur)	-65	0	9	5	1	11	5	43	12	28	4	0	-4	2	-10
Davao	17	-94	6	2	102	11	30	616	89	38	-0	13	-5	80	-301
General Santos	2	-184	0	-1	50	-21	24	230	14	6	6	-40	-54	2	-113
Cotabato	-1	-35	-1	-1	-1	-0	-2	-3	0	0	0	5	0	3	0
Zamboanga	140	8	1	17	9	10	45	133	23	20	4	-83	0	2	7

Note: "+" denoyes Inbound > Outbound while "-" denortes Inbound < Outbound

Source: PPA Statistics, Edited by Study Team

-Sugar : Negros and Panay Islands are the origins. The outbound volume of sugar is largest at Negros. The inbound volume is the largest at NCR.

-Fertilizer : A large fertilizer factory, PHILPHOS, is located in Leyte. Fertilizers are shipped everywhere in the Philippines as well as to the market overseas. The inbound volumes are large in Mindanao and Western and Central Visayas.

-Animal Feeds : A large volume of Animal Feed is imported at a private port under PPA-PMO Limay and shipped to domestic markets. Aside from import, Animal Feeds is also manufactured in North Mindanao Region. As seen in Table 3-23, Iligan and Cagayan de Oro are also major origins. The inbound volumes are large in Visayas Regions, where agribusiness is flourishing. It is observed that inbound volumes at Luzon Regions including Bicol Region are rather small. This implies that substantial volumes of animal feeds are transported overland to these Regions.

-Bottled Cargo : The principal origin is NCR. Negros and North Mindanao also ship a little volume. It is observed that large volumes are unloaded in Visayas Regions. Though the Table does not include, Cebu must be one of the origin Regions since San Miguel Corporation has its factory.

-Other General Cargo : Other General cargoes include industrial products and processed food. NCR is the principal origin, while other regions are destinations. Though the Table does not indicate, Cebu must be another origin of Other General Cargoes because it is observed that inbound volume of Other General cargoes are substantial at those port in Bohol, Negros and Leyte Islands.

-Iron & Steel : This commodity includes reinforcing steel bars and metallic construction materials. It seems that principal international ports, such as Manila and Cebu, and industrial provinces are the origins of this commodity. It is obvious in the Table that NCR is the only supply Region, while all other regions are destinations.

-Transport Equipment : The volumes indicated in Table 3-23 is the net volumes, and basically, the volume denote the Transport Equipment delivered as merchandise rather than those carrying passengers or cargoes. Therefore, NCR is the largest supply Region. The unloading volume is also large at PMO Batangas. This implies that vehicles also delivered as merchandise via Western Strong Nautical Highway. It is seen that merchandise vehicles are also shipped to Legaspi and Ozamiz.

-The number of new motor vehicle registration is increasing every year. This is true especially in Visayas Regions, where the annual increase rate is about 10% over the past three years. There is assembling factory of motorcycles in Cebu. Cebu must be another origin of Transport Equipment (New vehicles).

-Wheat : A large volume of wheat is imported at a private grain terminal in Bataan Peninsula, which is under PPA-PMO Limay jurisdiction, and then shipped to the grain terminal in Metro Manila, many of those are located on the bank of Pasig River. Wheat is also imported at some ports in Batangas, Iloilo, Iligan, Cagayan de Oro, etc. PMO These ports are the origins of wheat transportation. The inbound volume of Bicol Region (PMO Legaspi) seems to be smaller than other Visayas Regions. This implies that substantial volume of wheat is transported overland to Bicol via Pan-Philippine Highway. The “Inter-regional Freight and Passenger Flow Survey 2004” indicate that 277,000 tons of cereals were transported from NCR to Bicol (excluding Masbate) by land.

-Fish and Fish Products : Origin Regions of Fish and Fish Products are Palawan, Southern Mindanao (General Santos), and Western Mindanao (Zamboanga) Regions. The larges volume is unloaded in NCR. In other Regions, the volumes handled are rather small. In general, Visayas Regions are rich in marine products and local production may meet the local consumption.

-Live Animals : Cagayan de Oro and General Santos are supplying largest volume of Live Animals. The unloading volume at NCR is the largest. Live Animals are unloaded at various Regions, but the volumes are quite small. Large volumes of Animal Feeds are unloaded in Visayas Regions. This implies that stock farming is prosperous in these Regions.

-Fruit and Vegetable: Southern Mindanao is the principal Origin of Fruits and Vegetables. Largest volume is unloaded at NCR. Fruit and Vegetables are also unloaded in Visayas Regions though the volumes are comparatively small.

3) Inter-regional Freight and Passenger Flow

"Inter-regional Freight and Passenger Flow Survey, 2004" shows the freight and passenger flow for 12 categories of commodities and passengers between 24 zones of the Philippines by Air, Water, Road and Rail modes. The survey utilized the statistical data of ports, airports and rail in 2002, while it carried out road side interview survey for road transport in 2004. Interview surveys were conducted for 3 consecutive days at each survey point during the period from July to September in 2004.

The results have some discrepancies from the statistics of PPA: the total volume of freight for example. The annual freight and passenger flow were estimated based on the three-day interview surveys. The weight of freight of road transport was not as precise as water mode, because there was no standard conversion method from bags or carton boxes to freight tons. Thus, while the survey provides very useful information to recognize commodity and passenger flow within the existing transport system, the traffic volumes need counter check with other information.

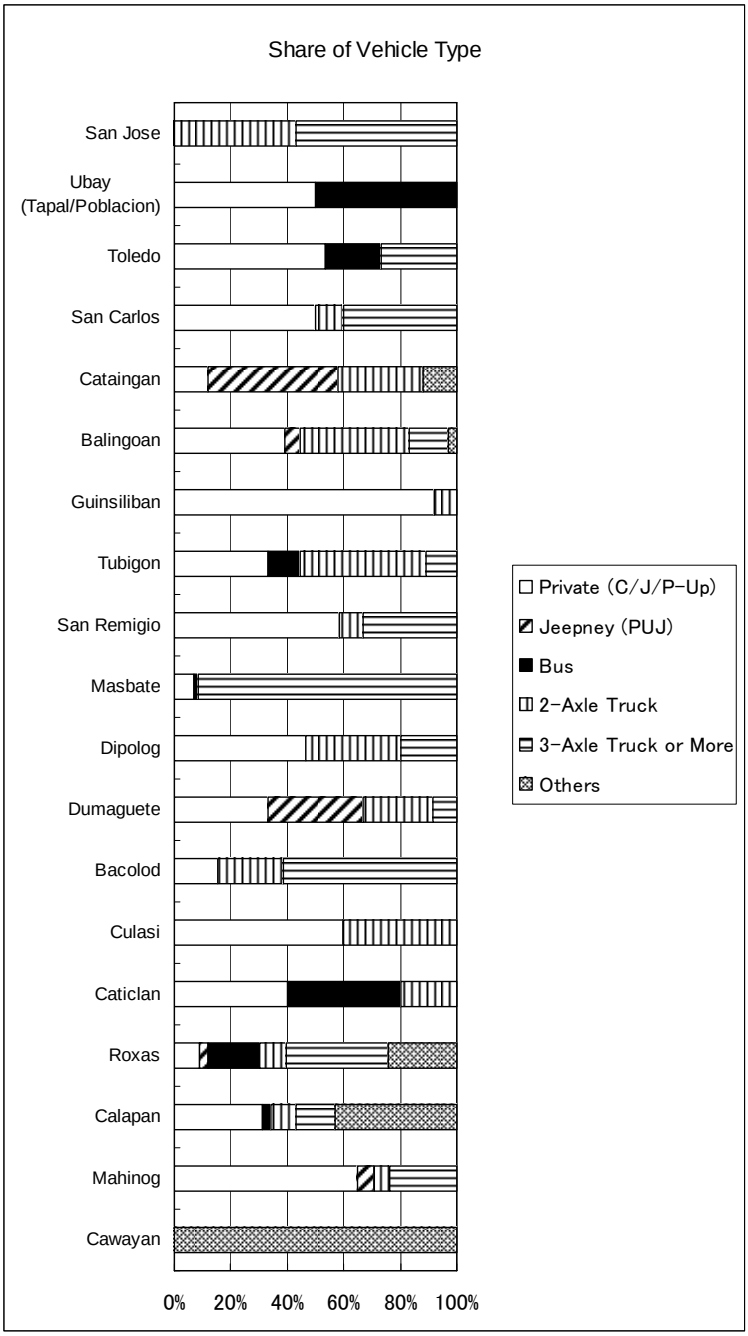
It should be also noted that the freight and passenger flow of water mode shows the situation before the Roxas - Caticlan link of the Western Nautical Highway was not yet operational.

The results of the survey are shown in Appendix 3-3-3

3.3.2 Composition of RoRo Ferry Users

PPA has just introduced a new format for statistics of RoRo ports to record the number of vehicles by type as well as cargo volumes in terms of weights. However, only a few ports have prepared the statistical report using the new format. Since no comprehensive data are available at present, the composition of the users of RoRo ferries are compared based on the field survey conducted by the study Team. Since the survey was carried out only one day per port, the figures might deviate from the annual average.

During the survey, vehicles were classified into six (6) types; Private car (Passenger cars, Sport Utility Vehicles and Jeeps), Public Utility Jeeps, Buses, Two-axle trucks, Three or more axle trucks and Others (Motorcycles and tricycles). As seen in Figure 3-16, the composition of the users varies from port to port. In general, trucks (two axle and 3-axles) are the major users. At Ubay, Caticlan, Roxas (Mindoro), buses encompass a large portion, while Motorcycles and tricycles encompass substantial portion at Roxas (Mindoro), Calapan and Catania Ports. It should be noted that in most of the RoRo ports, private cars take quite a large share. This indicates that RoRo ferry service generates travel by private cars, because without RoRo ferry service there would not be such a large volume of traffic of private cars.

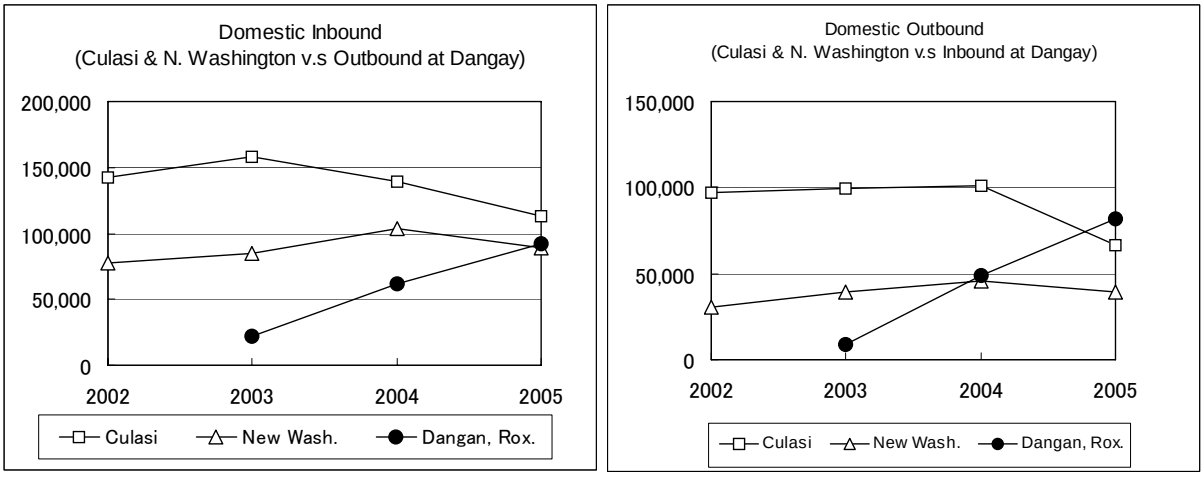


Source: Study Team

Figure 3-16 Origin and Destination of Car Drivers and Passengers

3.3.3 Impact of RoRo Ferry Service on Traditional Transport Service

The Strong Republic Nautical Highways has been functional 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.



Source: PPA statistics

Figure 3-17 Comparison of the Chronological Variation of Cargo Traffic Volume among Culasi, New Washington and Caticlan Ports

As observed in Figure 3-17, 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.

The primary reason why the shift to Caticlan Port occurred must be the service frequency: at Culasi and New Washington Ports, the regular long-distance ferry service is only weekly, while daily (3 - 4 trips a day) service is available at Caticlan Port. In addition, the travel time between Manila and Panay can be shorter by the new RoRo service than direct service, which takes 12 hours.

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 3-24 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 3-24) 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.

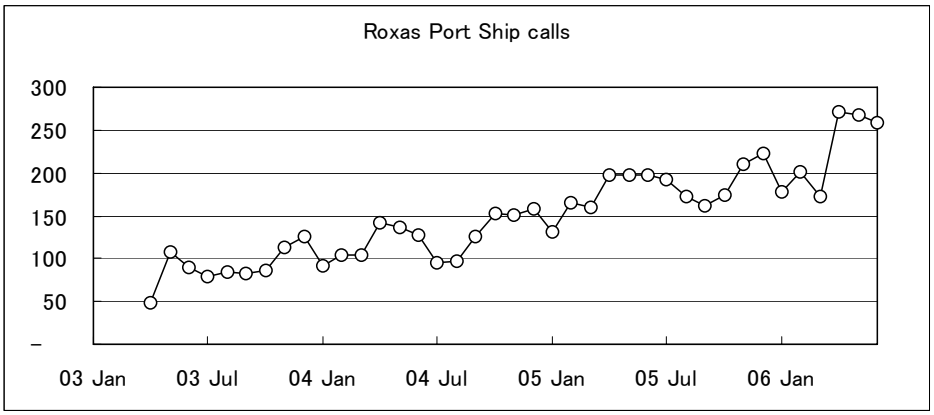
Table 3-24 Origin and Destination of Passengers and Cars

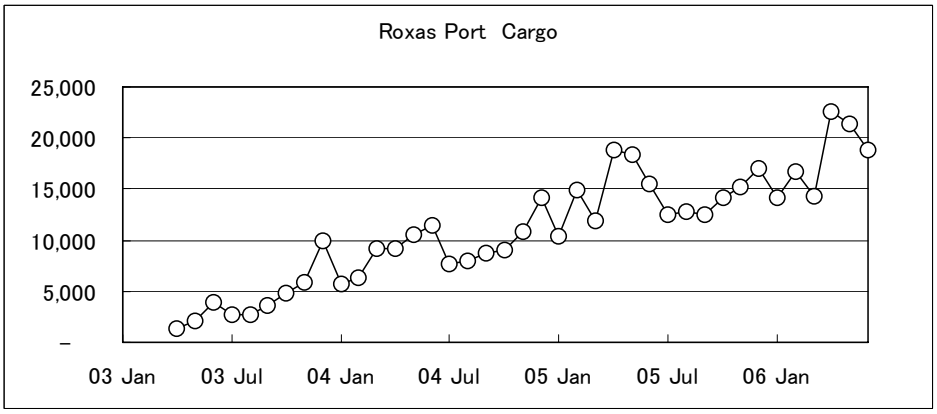
	Passenger				Driver			
Port	Sample	Travel route	Fregency	Share	Sample	Travel route	Fregency	Share
Calapan	45	Mindoro-Luzon	45	100.0%	34	Mindoro	30	88.2%
						Panay	4	11.8%
Roxas	59	Manila-Panay	32	54.2%	33	Luzon-Panay	21	63.6%
		Mindoro-Romblon	13	22.0%		Mindoro -Romblon	5	15.2%
		Mindoro-Panay	8	13.6%		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%				

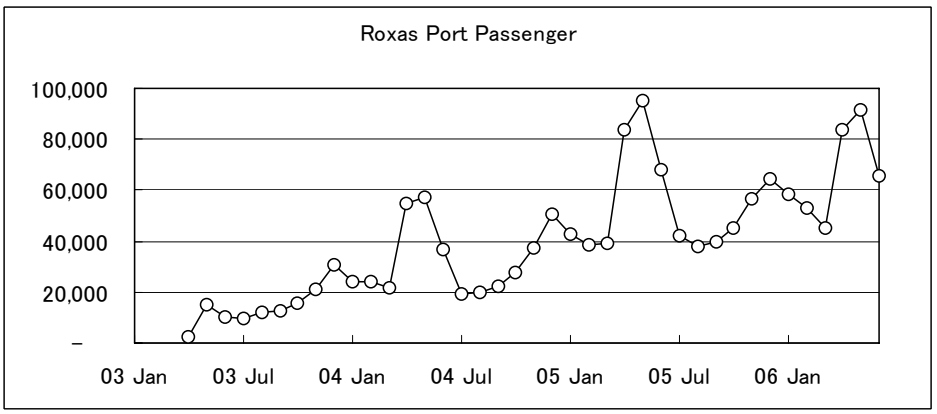
Source: Study Team, Interview Survey

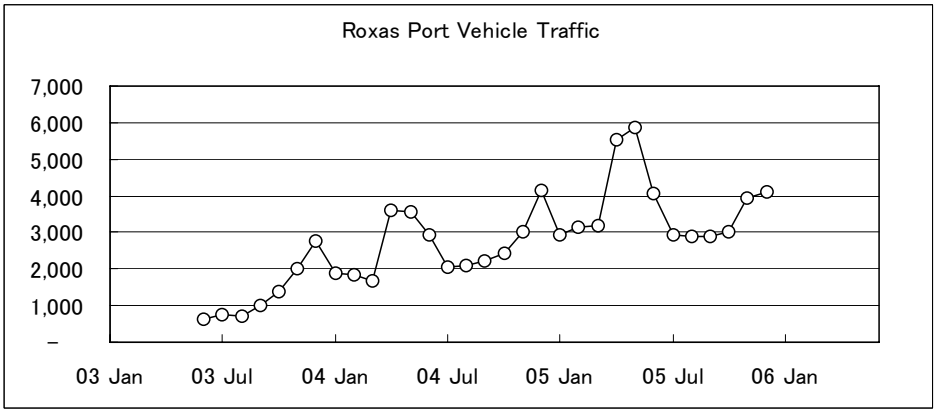
3.3.5 Increased Demand for RoRo Service

Figure 3-18 shows the increases in ship calls, Cargo traffic, Passenger traffic and vehicle traffic at Roxas (Mindoro) Port after the start of RoRo ferry operation to Caticlan. With seasonal fluctuation, the traffic has been steadily growing. However, the growth is very gradual. As often observed, it takes some time for the clients to appreciate the new RoRo ferry service.









Source: PPA statistics

Figure 3-18 Traffic growth after the Start of RoRo Service at Roxas (Mindoro) Port

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.

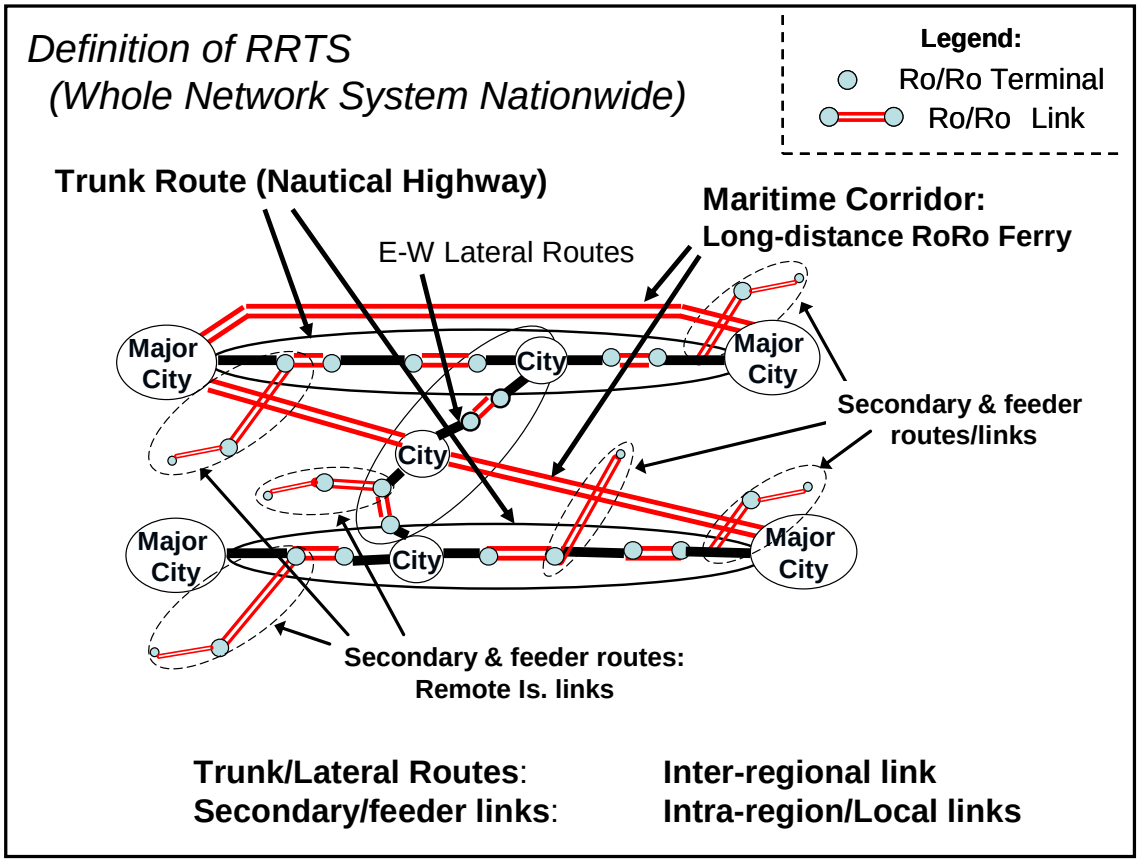


Figure 4-1 Road RoRo Terminal System (Source: Study Team)

As indicated in Figure 4-1, those RRTS routes which have RoRo Ports in Major Corridors are called "Trunk RRTS Routes", while those routes which use RoRo ports to enhance passenger/cargo mobility are called "Complementary RRTS Routes". Hereinafter, a connection between a pair of RoRo terminals is called a "RoRo Link".

In accordance with the definition given above, the Trunk RRTS Routes are the three RRTS routes connecting Mindanao and Luzon Islands via Visayas Islands that are included in the MTPDP 2004-2010.:

-Western Corridor (Strong Republic Nautical Highway)

-Central Corridor

-Eastern Corridor (Pan-Philippine Highway Route and its extension)

The Complementary RRTS Routes are: those RRTS routes connecting between Trunk RRTS Routes mentioned above or interconnecting the regional population centers mentioned in Section 3.1.1 (See Figure 3-2). Those five routes proposed by DOTC (See Figure 2-8) could be the potential candidates for the Complementary RRTS Routes.

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)

-Compilation of data and information (Socioeconomic, natural and environmental conditions

-Review and analysis of policies and RRTS development plans

-Data collection and review of the conditions of candidate RRTS routes

-Demand forecast for the candidate RRTS routes

-Identification of RRTS routes

· **Phase 2**

To select RORO terminals including access roads to be improved for the identified RRTS routes

-Collect data on Roads and candidate RoRo terminals along the identified RRTS routes

-Review and analysis of policies and development plans of candidate RoRo terminals

-Preliminary evaluation of social and environmental considerations of candidate RoRo terminals

-Selection of RoRo terminals for the feasibility study

· **Phase 3**

To conduct feasibility study of the development project on each selected terminal

-Natural and environment survey (as needed) of the selected terminals

-Basic design of selected terminals

-Cost estimation of the development project of the selected terminals

-Economic and financial feasibility analysis of the selected terminals

-Recommendation of implementation scheme

-Port management and operation in consideration of port security

The above mentioned study approach is schematically shown in Figure 4-2. This Draft Final Report covers the output of the Phase 3 work.

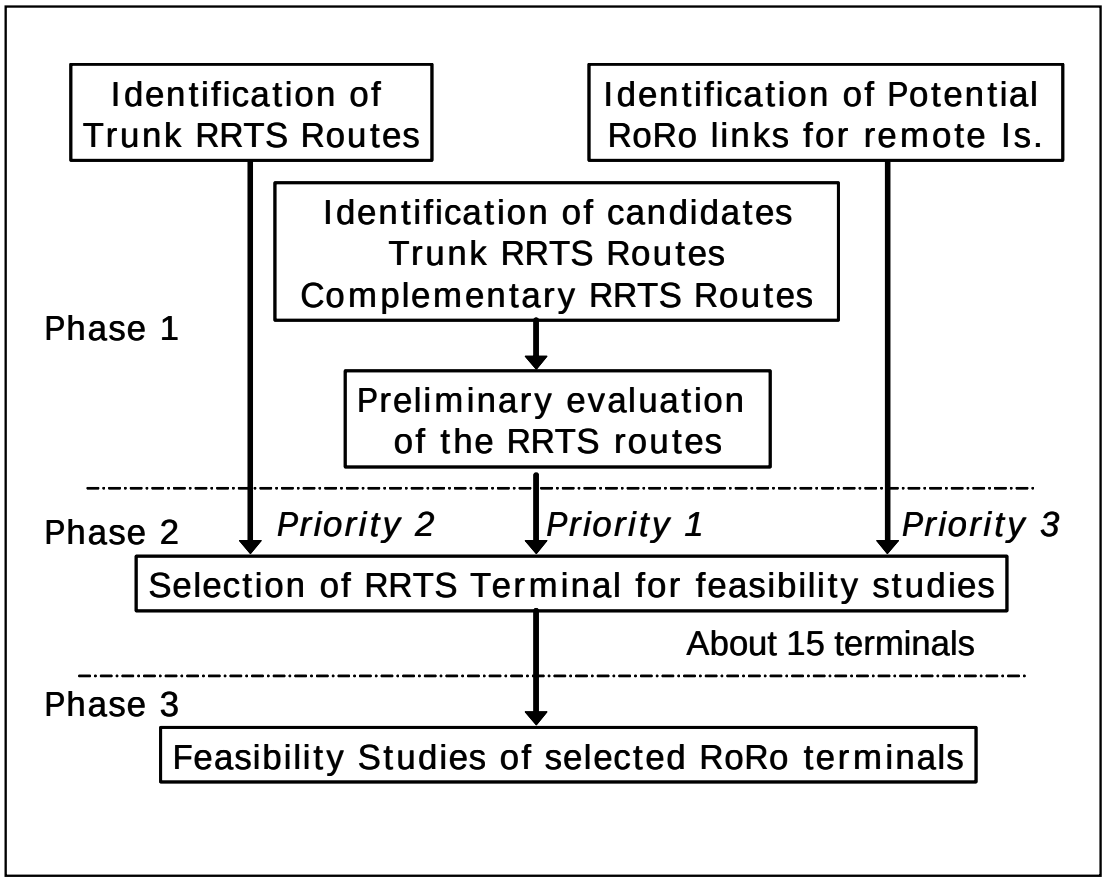


Figure 4-2 Study Approach (Source: Study Team)

The most important task in the Phase 1 stage is the identification of the candidate RRTS routes for evaluation. The criteria employed and detailed process of identification is explained in Chapter 6.

4.3 Output of the study

The final output of this study is the Feasibility Study Report of about 15 RoRo terminals. Basically, these 15 RoRo terminals for the feasibility study shall be chosen among the RoRo terminals along the priority RRTS routes chosen through the evaluation. However, in case that the number of RoRo Terminals that require development and improvement is less than 15, RoRo terminals along the Trunk RRTS Routes or RoRo terminals among the RRTS links connecting remote islands will also be considered (See Figure 4-2).

5. Premises of the Study

5.1 Shipping

5.1.1 Procurement of RoRo Ships and Funding Scheme

The promotion of RoRo ferry service will require more RoRo ships and the procurement of RoRo ships is a vital element of RRTS development. The Domestic Shipping Development Plan, DOTC-JICA, 2005 pointed out the procurement of secondhand RoRo ships will become more difficult than before, because of the availability of RoRo ships in the world markets. To cope with this situation, the report recommended the establishment of Ship Leasing Corporation under the National Development Company to help the domestic shipping lines.

In accordance with the recommendation of the study, 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 Capacity Building Shipbuilding Sector

RRTS is a good occasion to foster the shipbuilding industry in the Philippines. As already seen, the two fore-runners of the industry, i.e. Tsuneishi, Keppel are mostly specialized in building bigger ships and they are not in a position to accept the offer of RRTS RoRo ships.

Hanjin is also looking at those 2 major shipbuilders.

There are many minor shipbuilders such as Colorado in Cebu. It is necessary to interview those small scale shipbuilders and determine the financial conditions for RRTS realization.

For the shipbuilding industry in any country, education and training of welder is vital. For the RRTS Project to be successful, high quality ships are needed. And to build RoRo ships of high quality, the industry has to have many skillful welders.

The central government and the nationwide association of shipbuilding yards should sit down at the table to discuss the matter of establishing schools/classes for training welders.

5.1.3 Standardization of RoRo Ships

1) Standard Size and Specifications

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.

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	

2) Size of RoRo Ships Operating in Batangas Port

Batangas Phase I Port Terminal is one among the many Fast Crafts and RoRo terminals being administered by the Philippine Ports Authority nationwide. It is located some 120 km south of Metro Manila. The Port which currently .caters to some 15,000 passengers daily accommodates many types and sizes of RoRo and Fast Craft Vessels and is considered as one among the successful accomplishments infrastructure port development projects of the Philippine Government. As such, for purposes of establishing the size of RoRo vessels to be adopted for the proposed RRTS Project, Batangas Port was considered as a case study for various reasons as mentioned above. Table 5-2 hereunder shows the various sizes of RoRo vessels which have/had been operating in Batangas Port.

Table 5-2 RORO Ships Operating in Batangas Port

No.	Name of RoRo Vessel	Shipping Compamy/ Operator	GRT (tons)	Loa (m)	Lpp (m)	B (m)	Draft Min. (m)	Draft Max. (m)
1	Maria Erlinda	Montenegro Shipping	490.00	50.0	44.3	13.2	2.39	2.77
2	Maria Isabel	Montenegro Shipping	836.05	49.7	43.8	13.2	2.25	2.55
3	Maria Helena	Montenegro Shipping	1,022.12	48.0	43.9	12.1	2.26	2.90
4	Maria Sophia	Montenegro Shipping	269.10	37.3	31.3	10.0	1.50	2.20
5	Maria Angela	Montenegro Shipping	371.53	39.7	35.2	10.5	1.89	2.35
6	Maria Gloria	Montenegro Shipping	274.47	41.2	37.4	11.0	1.70	2.90
7	Maria Josefa	Montenegro Shipping	267.47	42.3	37.2	11.0	1.50	2.20
8	St. Kristopher	Viva Shipping	716.47	75.0	69.0	(14.0)	2.80	3.20
9	San Miguel De Elijan	Viva Shipping	314.21	38.5	37.0	(10.5)	1.96	2.66
10	Penafrancia-4	Viva Shipping	1,287.36	75.0	69.6	(14.0)	2.80	3.20
11	Penafrancia-6	Viva Shipping	277.78	51.5	45.0	(13.2)	1.60	2.30
12	Penafrancia-3	Viva Shipping	1,257.10	69.0	62.4	(14.0)	2.80	3.20
13	Penafrancia-5	Viva Shipping	710.27	46.8	42.2	(12.1)	2.70	3.10
14	Sta. Maria	Viva Shipping	742.36	46.3	42.0	(12.1)	2.65	3.05
15	Viva San Jose	Viva Shipping	364.16	38.2	33.3	(10.0)	1.50	2.20
16	Maria Queen	Viva Shipping	436.87	51.7	48.0	(13.2)	2.86	3.56
17	Starlite Ferry I	Starlite Ferry	574.02	41.0	38.4	(11.0)	2.00	2.70
18	StarliteNautica	Starlite Ferry	284.60	41.5	36.5	(11.0)	1.40	2.30
19	Starlite Pacific	Starlite Ferry	498.26	48.8	44.5	(12.1)	1.80	2.40
20	Starlite Odyssey	Starlite Ferry	177.97	30.0	26.2	(10.0)	1.20	2.00
21	Lady of Manaoag II	Jomarias International	486.65	NA	NA	NA	NA	NA
22	Princess Colleen	Shipshape Ferry	757.32	64.5	61.0	(14.0)	2.70	3.10
23	Princess Camille	Shipshape Ferry	350.00	39.5	35.0	(10.5)	2.00	2.70
24	Ace-1	Manila Ace Shipping	336.72	NA	NA	NA	NA	NA

( ): Assumption

3) Size of RORO Vessels to be Adopted for the RRTS Study

Based on the fact as shown in Table 5-1 and Table 5-2, the standard size of RoRo vessels to be adopted for the RRTS Study shall be as follows:

-Small vessels ranging from 300 to 600 GRT which appear in most cases fall under Category Type-V 500 GRT. Thus **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.

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. For example, in case of travel from Batangas – Calapan and Roxas – Caticlan, fares are as follows;

Table 5-3 Passenger Fare (Effective April 1, 2006)

Link(distance) / Category	Batangas – Calapanvice versa (24NM) :RATE	Roxas –Caticlanvice versa (46NM) :RATE
Regular	P160.00	P330.00
Student Fare	P136.00	P280.00
Senior Citizen	P128.00	P264.00
Children Fare	P 80.00	P165.00

Table 5-4 Approved Rolling Cargo Rate for Lane Meter Category of Vehicles*

Link(distance) / Category	Batangas – Calapanvice versa (24NM) :RATE	Roxas –Caticlanvice versa (46NM) :RATE
Bicycles	P200.00	P400.00
Bicycles with side car	P300.00	P600.00
Motorcycles/MCs with sidecars	P600.00	P1,200.00
Up to 3.9 m	P1,200.00	P2,400.00
4.0 – 4.9 m	P1,400.00	P2,800.00
5.0 – 5.9 m	P1,700.00	P3,400.00
6.0 – 6.9 m	P1,990.00	P3,980.00
7.0 – 7.9 m	P2,250.00	P4,500.00
8.0 – 8.9 m	P2,550.00	P5,100.00
9.0 – 9.9 m	P2,850.00	P5,700.00
10.0 – 10.9 m	P3,100.00	P6,200.00
11.0 – 11.9 m	P3,400.00	P6,800.00
12.0 – 12.9 m	P3,700.00	P7,400.00
13.0 – 13.9 m	P4,000.00	P8,000.00
14.0 – 14.9 m	P4,290.00	P8,580.00
20 footer container with tractor	P6,300.00	P12,400.00
40 footer container with tractor	P10,500.00	P21,000.00
HEAVY EQUIPMENT		
Small	P18,000.00	P36,000.00
Medium	P20,000.00	P40,000.00
Large	P22,000.00	P44,000.00

Effective September 1, 2006
*Rates will apply based on actual overall length of vehicle including any protruding cargo
*Rates include one driver fare

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. Existing road condition is shown in Figure 5-1.

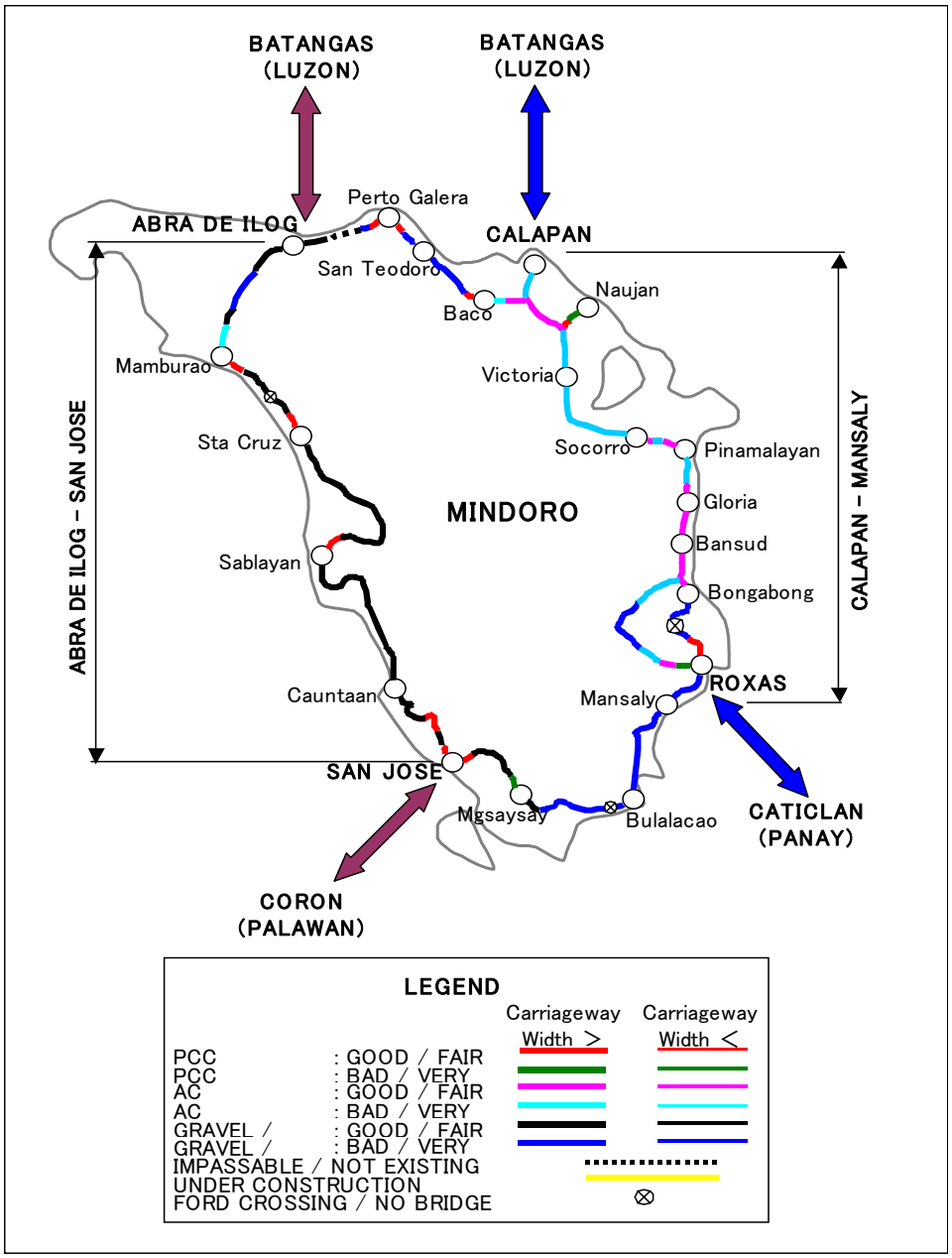


Figure 5-1 Existing Road Condition of Mindoro Island

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 and the contents of these projects as shown in Table 5-5.

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

Section	Calapan – Mansalay	Ongoing
DPWH Program	Financing Strategy DPWH SONA Project	
Financing	Local Fund	
Project Name	Mindoro East Coast Road Mindoro Oriental	

Section	Calapan – Mansalay	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	IBRD Assisted Phase II, Asset Preservation Sub-Component (LTPBMC Projects)	
Project Name	Mindoro East Coast Road Package, Calapan – Socorro Road, Socorro – Bongabon Road	

Section	Calapan – Mansalay	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Project Name	Road Upgrading "Mindoro East Coast Road, Bongabon-Roxas 24.9km, Roxas-Mansalay 13.6km"	

Section	Calapan – Mansalay	Planed
DPWH Program	Financing Strategy DPWH SONA Project	
Financing		
Project Name	Improvement of RORO Access Road, From National Highway to Roxas and Calapan Ports	

Consequently the Western Rote in Mindoro Island is sufficient for RRTS.

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.

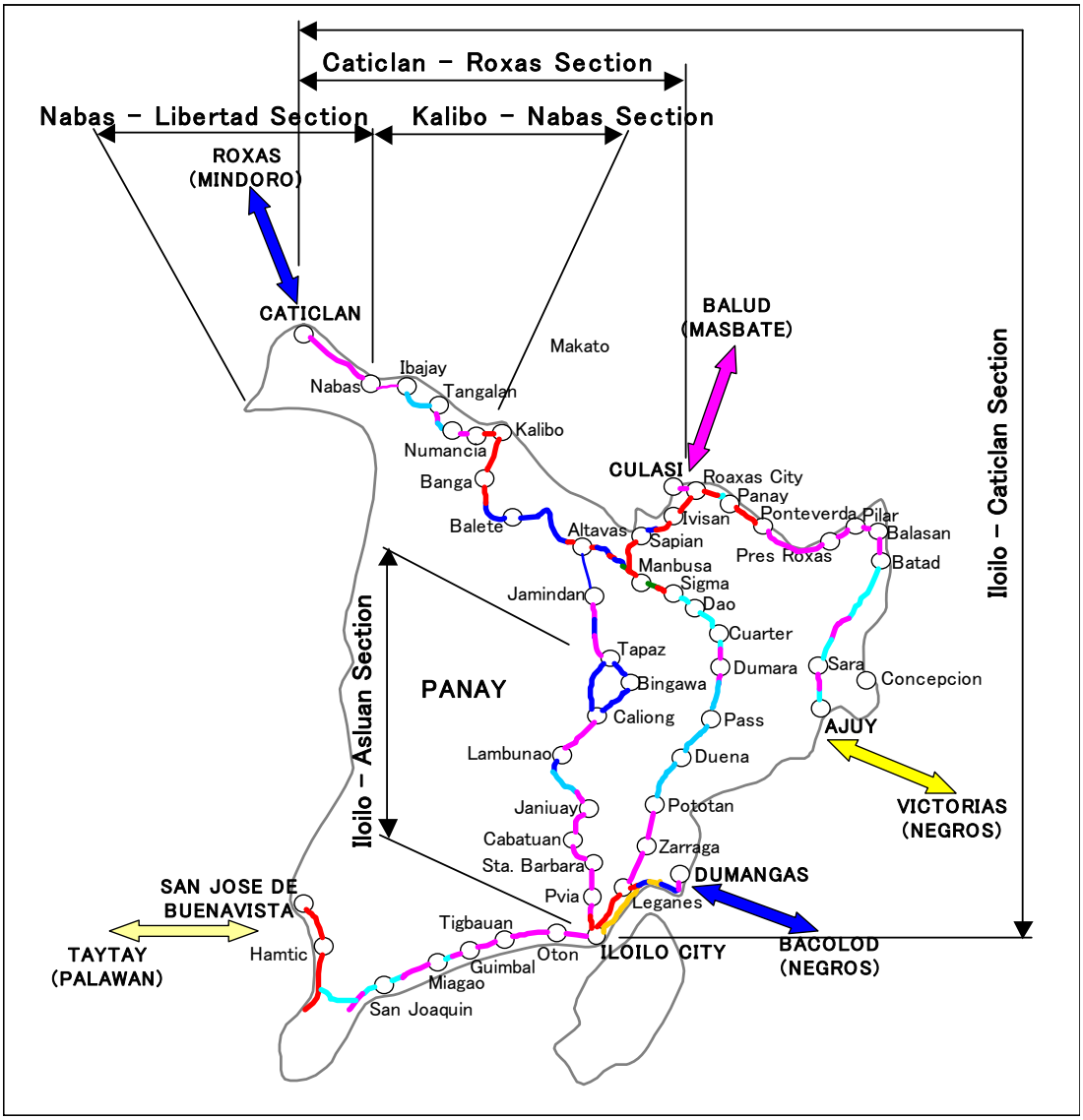


Figure 5-2 Existing Road Condition of Panay Island

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 5-6.

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

Section	Kalibo - Nabas	Ongoing
Financing	ADB Assisted 6th Road Project	
Project Name	Kalibo-Nabas Road (Rehab. 42.0km)	

Section	Iloilo - Asluan	Ongoing
Financing	ADB Assisted 6th Road Project	
Project Name	Iloilo-Asluan Road (Rehab. 81.85km)"	

Section	Nabas - Libertad	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Future Packages, Panay Island Roxas Network Development Project	
Project Name	Nabas-Libertad Road, Aklan 48.7km	

Section	Caticlan - Roxas	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	IBRD-Assisted Phase , Asset Preservation Sub-Component (LTPBMC Projects)	
Project Name	Panay Island Package Caticlan-Kalibo-Roxas Road	

Section	Iloilo - Caticlan	Planed
DPWH Program	Financing Strategy DPWH SONA Projects, Western Nautical Highways	
Project Name	Iloilo City-Caticlan Highway (Iloilo-Ivisan-Caticlan) 60.0km	

Consequently the Western Rote in Panay Island is sufficient for RRTS.

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. Existing road condition is shown in Figure 5-3.

Distance from Bacolod to Dumaguete and Siaton of each alternative are as shown in Table 5-7, however road condition of alternative 1 is bad because this route through to mountain aria and alternative 2 and 3 are good condition.

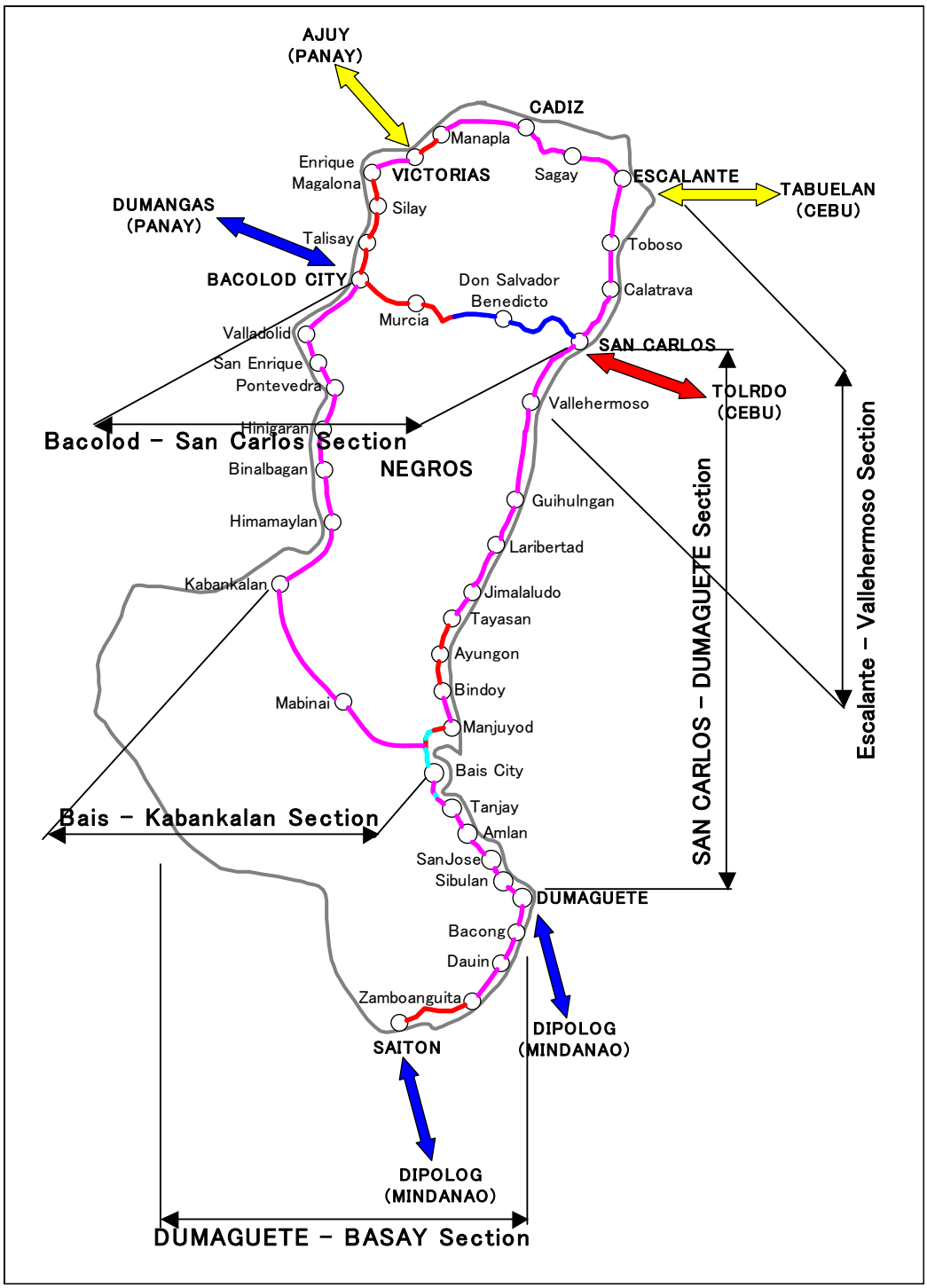


Figure 5-3 Existing Road Condition of Negros Island

Table 5-7 Distance from Bacolod to Siaton (Based on JICA Master Plan 1999)

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 5-8.

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

Section	Dumaguete - Basay	Ongoing
Financing	ADB Assisted 6th Road Project	
Project Name	Dumaguete-Siaton-Basay Road, 123.2km	

Section	Bais - Kabankalan	Planed
DPWH Program	Financing Strategy DPWH SONA Projects, Other Roads Along Western Nautical Highway	
Project Name	Bais-Kabankalan Road, 20.0km	

Section	San carlos - Dumaguete	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Other Priority Road Projects	
Project Name	San Carlos-Dumaguete Road, 44.0km	

Section	Bacolod - San Carlos	Planed
DPWH Program	Financing Strategy DPWH SONA Projects, Other Roads Along Western Nautical Highway	
Project Name	Bacolod-Kabankaian Road, NRIMP 2, 16.0km	

Section	Bacolod - San Carlos	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Other Priority Road Projects	
Project Name	Bacolod-Murcia-Don Dalvador-Benedicto-San Carlos Road, 82.0km	

Section	Escalante - Vallehermoso	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Asset Preservation Sub-Component (LTPBMC Projects)	
Project Name	Negros Island Package, Escalante-Vallehermoso Road	

Consequently the Western Rote in Negros Island is sufficient for RRTS.

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. Existing road condition is shown in Figure 5-4.

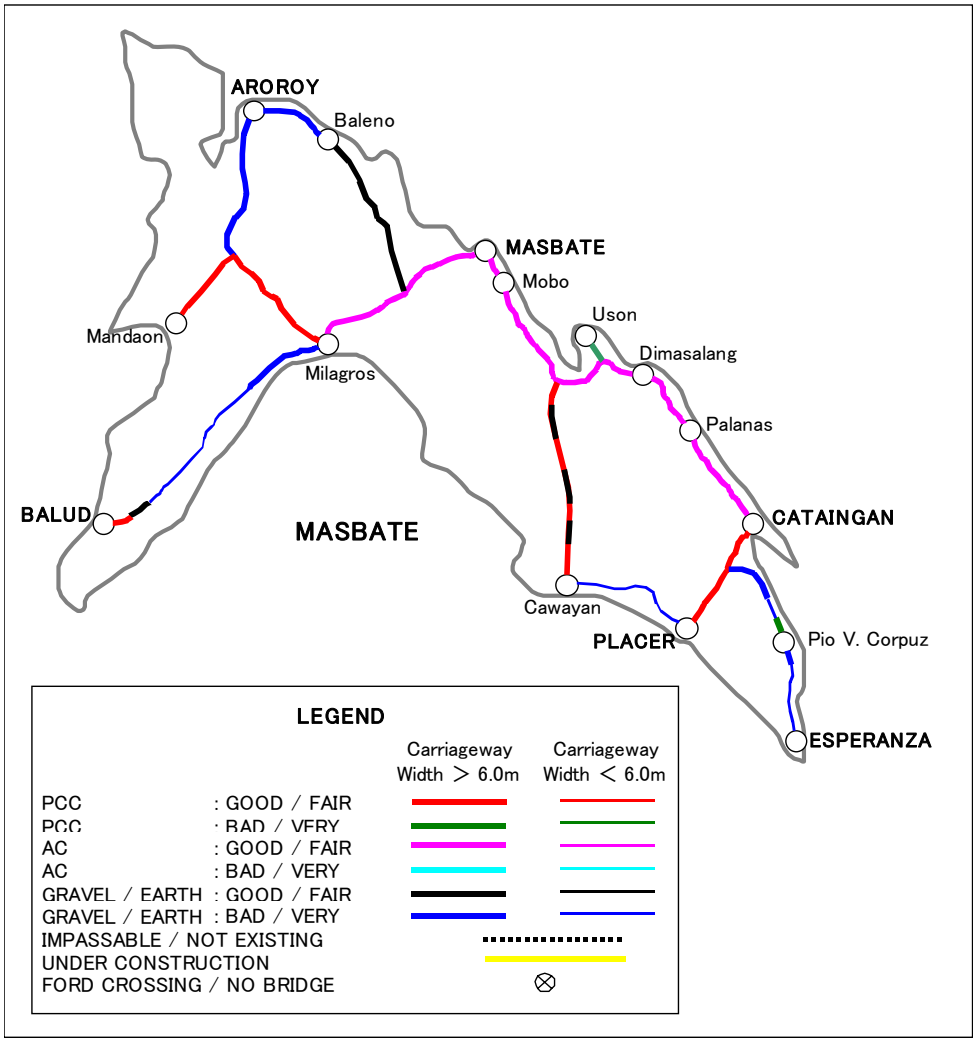


Figure 5-4 Existing Road Condition of Masbate Island

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. Following pictures are Cataingan – Esperanza section of municipality road.

Regarding the road projects by DPWH, there are not planed except port access road as shown in Table 5-9.

Figure 5-5 Existing Road Condition of Cataingan – Esperanza Section (municipality road)

Table 5-9 The Road Project in the Route of Masbate Island by DPWH

DPWH Program	Medium-Term Public Investment Program 2005-2010
Financing	Other Priority Road Projects, Financing Strategy DPWH SONA Projects
Project Name	Central Nautical Highways: Placer-Masbate-Lagta-Belenp-Aroroy Highway (project length = 18.0km)

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. Existing road condition is shown in Figure 5-6.

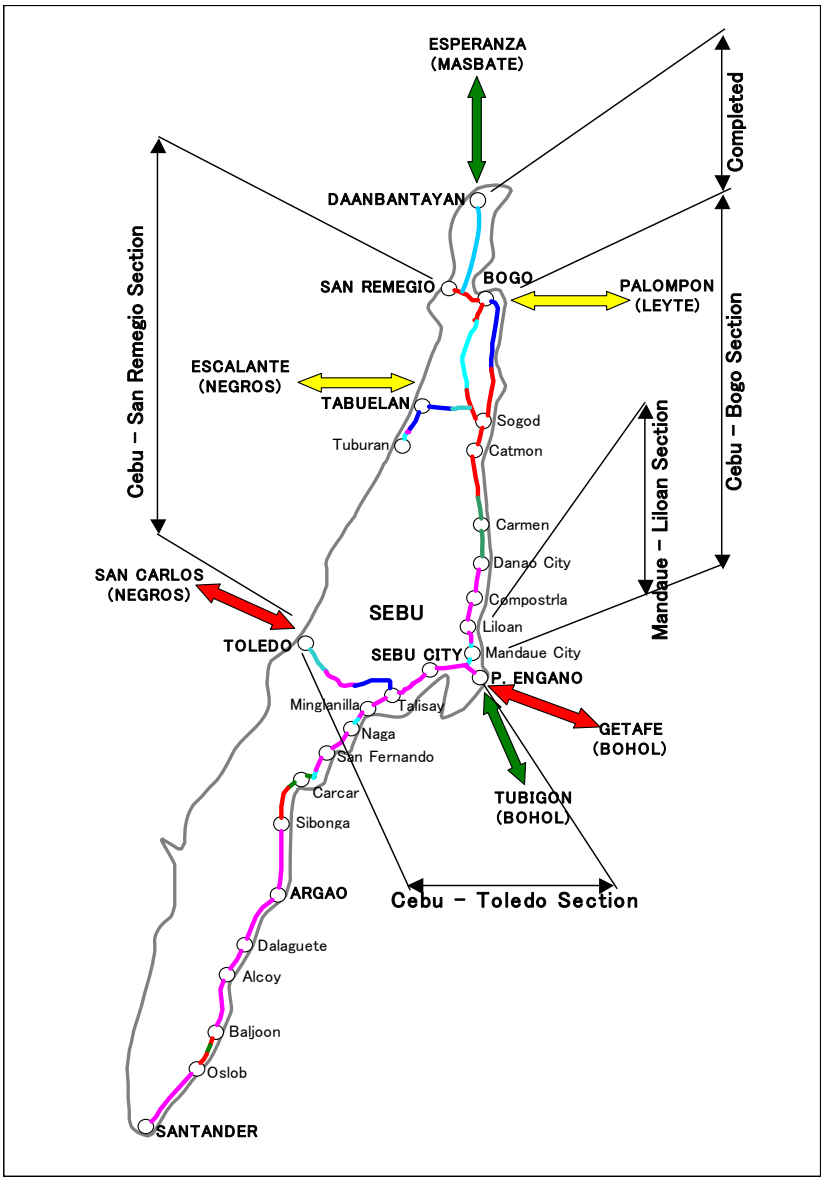


Figure 5-6 Existing Road Condition of Cebu Island

Moreover, the road projects are planed in Bogo - Cebu section by DPWH and the contents of these projects as shown in Table 5-10.

Table 5-10 The Road Project in the Route of Cebu Island by DPWH

Section	Cebu - Toledo Section	Ongoing
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	22nd JBIC Arterial Road Links Development Project, Phase III	
Project Name	Cebu South Road, (Rehab. 31.2km, 3 Bridges) Talisay Jct.-Toledo Section	

Section	Mandaue - Liloan	Ongoing
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	25th Yen JBIC Arterial Road Links Development Project, PhaseVI	
Project Name	Cebu North Coastal Road Project (Mandaue-Consolacion-Liloan Section)	

Section	Cebu - Bogo Section	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010 Other Priority Road Projects	
Project Name	Cebu-Bogo Road, 106km	

Section	Cebu - San Remigio	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Tourism Road	
Project Name	Toledo-Tabuelan-San Remigio Road 68.2km	

Some portion of Daanbantayan – Bogo section should be improved, however consequently the Central Rote in Cebu Island is sufficient for RRTS.

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. Existing road conditions are shown in Figure 5-7.

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 5-11.

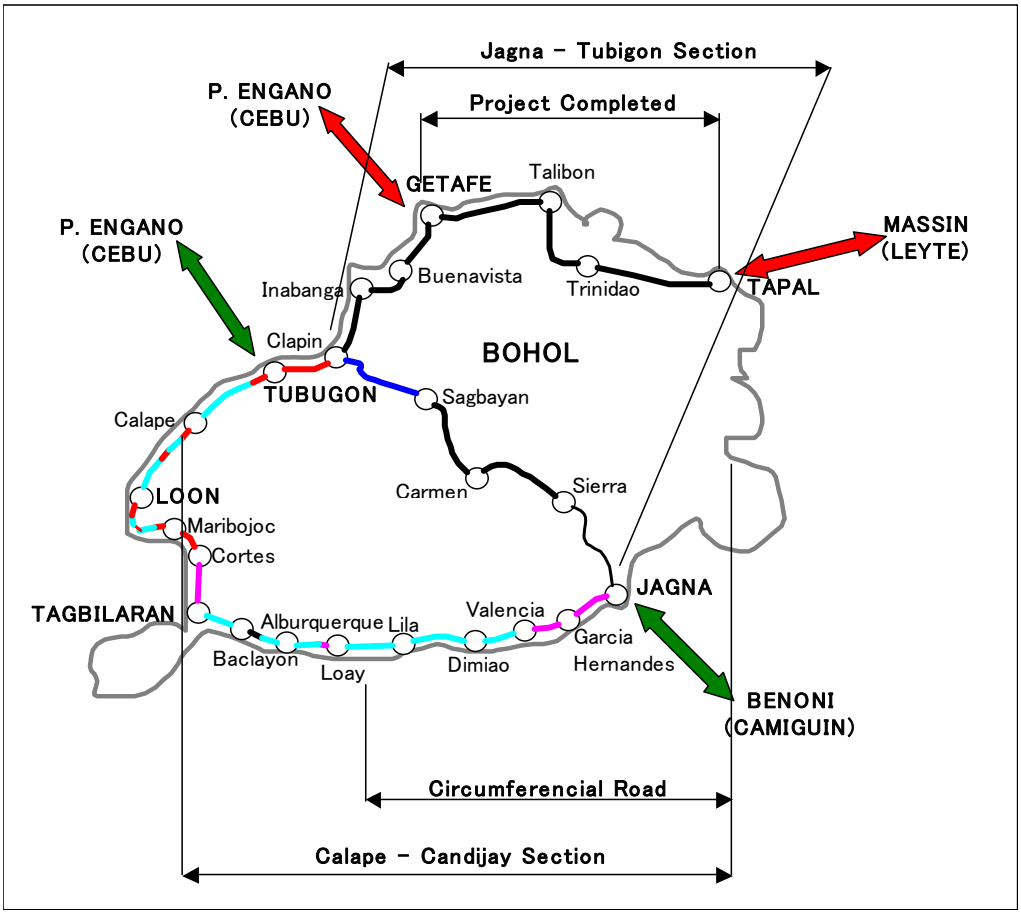


Figure 5-7 Existing Road Condition of Bohol Island

Table 5-11 The Road Project in the Route of Bohol Island by DPWH

Section	Calape – Tagbilaran City - Valencia	Ongoing
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	23rd Yen JBIC Arterial Road Links Development Project, PhaseⅣ	
Project Name	Bohol Circumferential Road, Phase Ⅱ	

Section	Candijay – Jagna – Valencia	Ongoing
DPWH Program	Medium-Term Public Investment Program 2005-2010 National Road Improvement Management Project	
Financing	23rd Yen JBIC Arterial Road Links Development Project, PhaseⅣ	
Project Name	Bohol Circumferential Road, Phase Ⅱ	

Section	Jagna – Sierra – Bullones – Clarin – Tubigon	Planed
DPWH Program	SONA Projects	
Project Name	70km	

Consequently the Central Rote in Bohol Island is sufficient for RRTS.

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, and 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.

The road conditions of Samar and Leyte Island are shown in Figure 5-8.

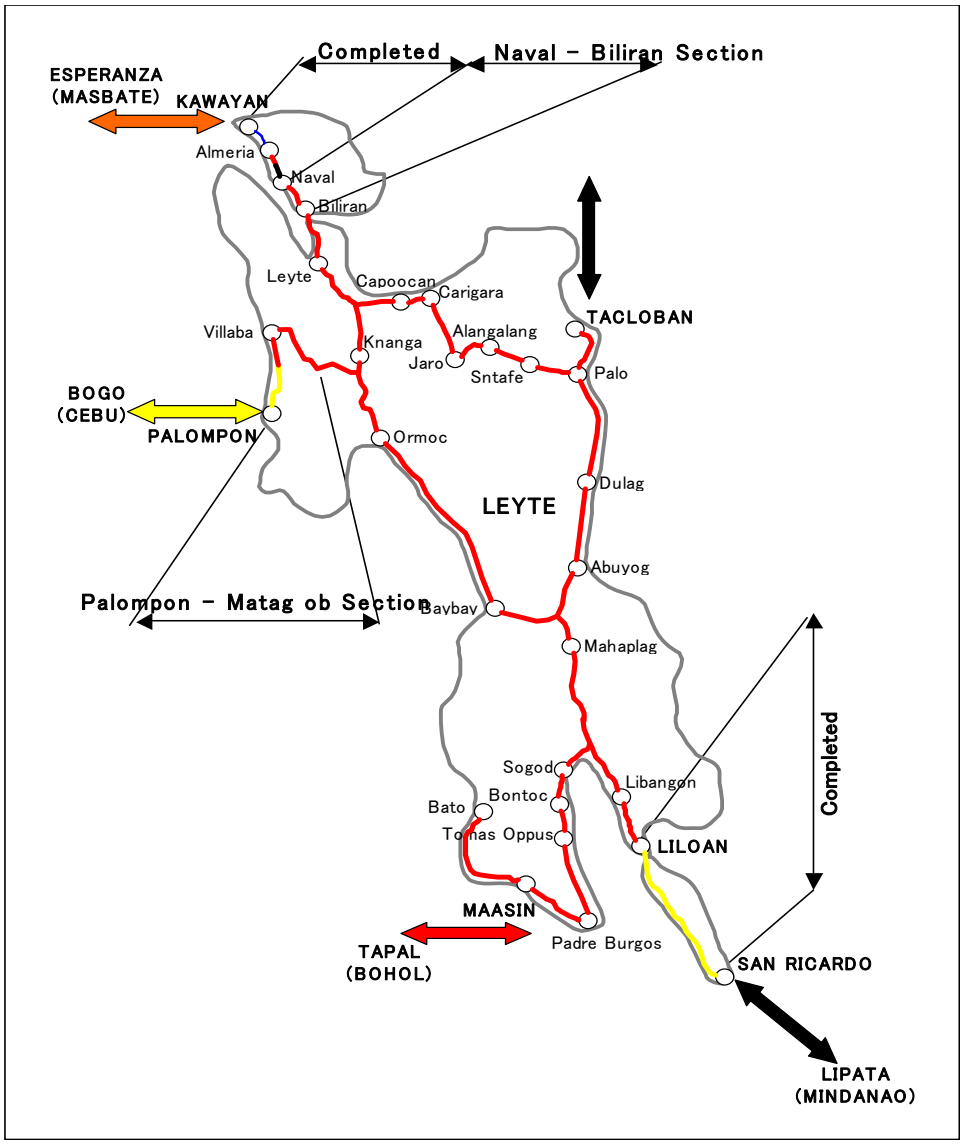


Figure 5-8 Existing Road Condition of Leyte Island

Moreover, the road projects are planed in Leyte Island by DPWH and the contents of these projects as shown in Table 5-12.

Table 5-12 The Road Project in the Route of Leyte Island by DPWH

Section	Naval - Biliran	Ongoing
DPWH Program	SONA Project	
Project Name	Naval-Biliran Highway (26km)	

Section	Palompon - Matagob	Planed
DPWH Program	Medium-Term Public Investment Program 2005-2010, Arterial Road Links Development Project, Phase VIII	
Project Name	Sto Rosario-Matang-ob-Palompon Road 23.0km	

Consequently the Central Rote in Bohol Island is sufficient for RRTS.

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. Existing road conditions refer to the Western Route of Figure 5-3. The road projects are planed in this section by DPWH and the contents of these projects as shown in Table 5-8. Consequently the West-East Rote 1 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 Figure 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 Tapal port. Distance from Getafe to Tapal is approx. 40 km and existing road condition of this section is shown in Figure 5-7 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 Massin port that located southeast of Leyte Island to the Eastern Route of Pan Philippine Highway at Sogod Leyte Island. Existing road condition is shown in East-West Route. 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.

i) Panay Island

Panay – Leyte Route in Panay Island links northern Culasi port and northeast Ajuy port. Distance from Culasi to Ajuy is approx. 100 km and existing road condition of this section is shown in Figure 5-2 of Western Route. 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 5-6 in Western Route.

Consequently the road condition of Panay Island in 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. Existing road condition is shown in Figure 5-4 in the aforesaid Central Route and following picture.

Figure 5-9 Existing Road Condition of Masbate – Aroroy Section

Figure 5-10 Existing Road Condition of Milagros – Balud Section

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, DPWH standards should be adopted for highways on RRTS 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 as shown in Table 5-13 has been referred to. The said standards are usually being adopted for a two (2) lane road in rural areas wherein the design standards are determined from the traffic volume in the opening year.

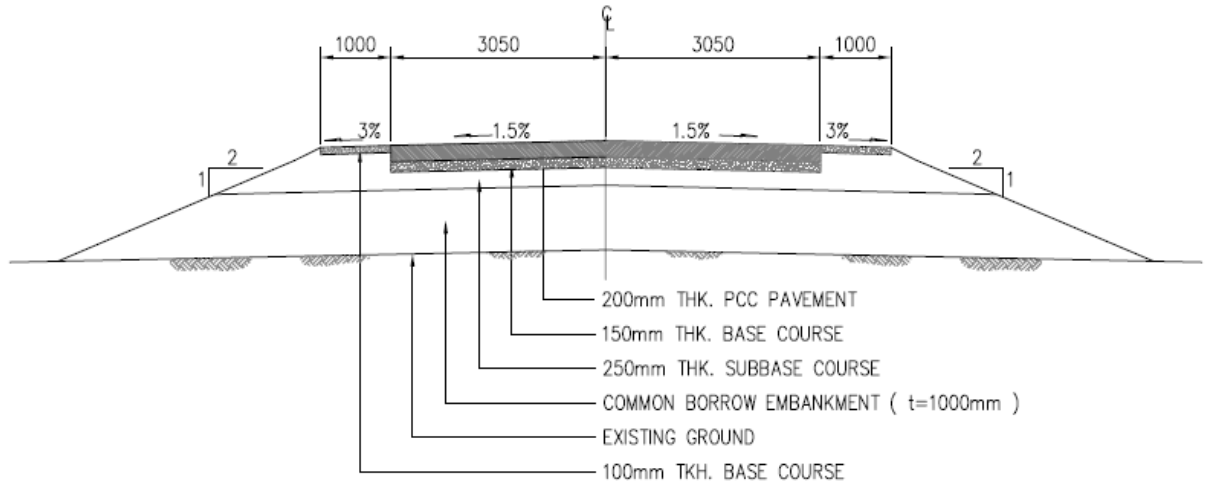
Table 5-13 Minimum Design Standard of Philippine Highway

AVERAGE DAILY TRAFFIC (ADT) ON OPENING	UNDER 200	200 - 400	400 - 1000		1000 - 20000		MORE THAN 2000	
			MINIMUM	DESIRABLE	MINIMUM	DESIRABLE	MINIMUM	DESIRABLE
DESIGN SPEED (km/hr)								
Flat Topography	60.0	70.0	70.0	90.0	80.0	95.0	90.0	100.0
Rolling Topography	40.0	50.0	60.0	80.0	60.0	80.0	70.0	90.0
Mountainous Topography	30.0	40.0	40.0	50.0	50.0	60.0	60.0	70.0
RADIUS (meter)								
Flat Topography	120.0	160.0	160.0	280.0	220.0	320.0	260.0	350.0
Rolling Topography	55.0	85.0	120.0	220.0	120.0	220.0	160.0	280.0
Mountainous Topography	30.0	50.0	50.0	80.0	80.0	120.0	180.0	160.0
GRADE (Percent)								
Flat Topography	6.0	6.0	5.0	3.0	4.0	3.0	4.0	3.0
Rolling Topography	8.0	7.0	6.0	5.0	5.0	5.0	5.0	4.0
Mountainous Topography	10.0	9.0	8.0	6.0	7.0	6.0	7.0	5.0
ROAD WIDTH								
Pavement Width (m)	4.0	5.5,6.0	6.1		6.7		6.7	7.3
Shoulder Width (m)	0.5	1.0	1.5	2.0	2.5	3.0	3.0	
Right-of-Way Width (m)	20.0	30.0	30.0		30.0	30.0	60.0	
Superelevation (m/m)	0.10 (max.)		0.10 (max.)		0.10 (max.)		0.10 (max.)	
NON-PASSING SIGHT DISTANCE (meter)								
Flat Topography	70.0	90.0	90.0	135.0	115.0	150.0	135.0	160.0
Rolling Topography	40.0	60.0	70.0	115.0	70.0	115.0	90.0	135.0
Mountainous Topography	40.0	40.0	40.0	60.0	60.0	70.0	70.0	90.0
PASSING SIGHT DISTANCE (meter)								
Flat Topography	420.0	490.0	490.0	615.0	560.0	645.0	615.0	675.0
Rolling Topography	270.0	350.0	420.0	560.0	420.0	560.0	490.0	615.0
Mountainous Topography	190.0	270.0	270.0	350.0	360.0	420.0	420.0	490.0
TYPE OF SURFACING	Grave, Crushed Gravel or Crushed Stone bit preservative treatment single or double bit. Surface treatment, bituminous macadam pavement		Bituminous Macadam Pavement, Dense or Open graded Plan mix surface course, bituminous concrete surface course		Bituminous Concrete surface Course		Bituminous Concrete Surface Course, Portland Cement Concete Pavement	

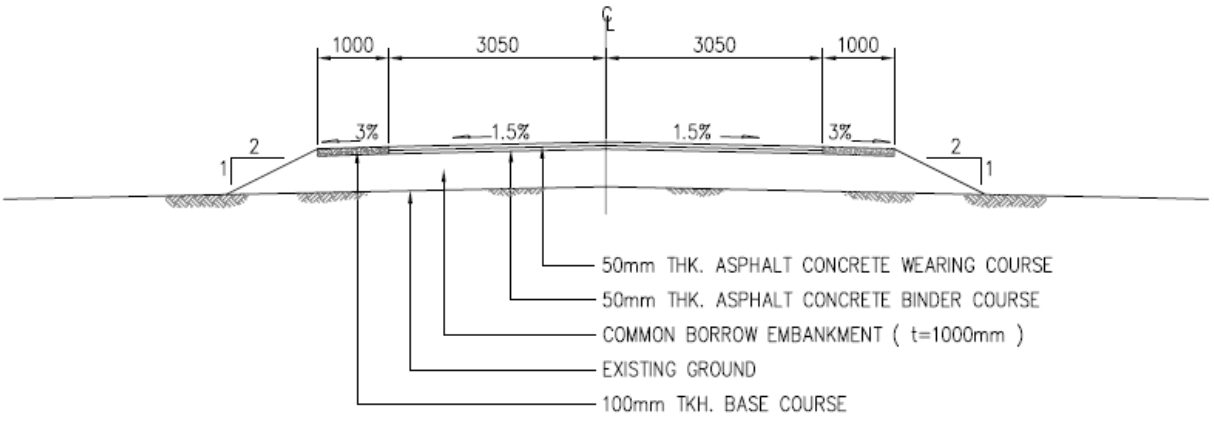
2) Proposed Improvement Options/Alternatives

Considering the above mentioned design consideration, the proposed improvement options adopted consist of Portland Concrete Cement (PCC) and Asphalt Concrete (AC) 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).

The standard typical road cross-section, typical cross section for two lanes single span bridge and drainage structures adopted are illustrated in Figure 5-11 to Figure 5-13.

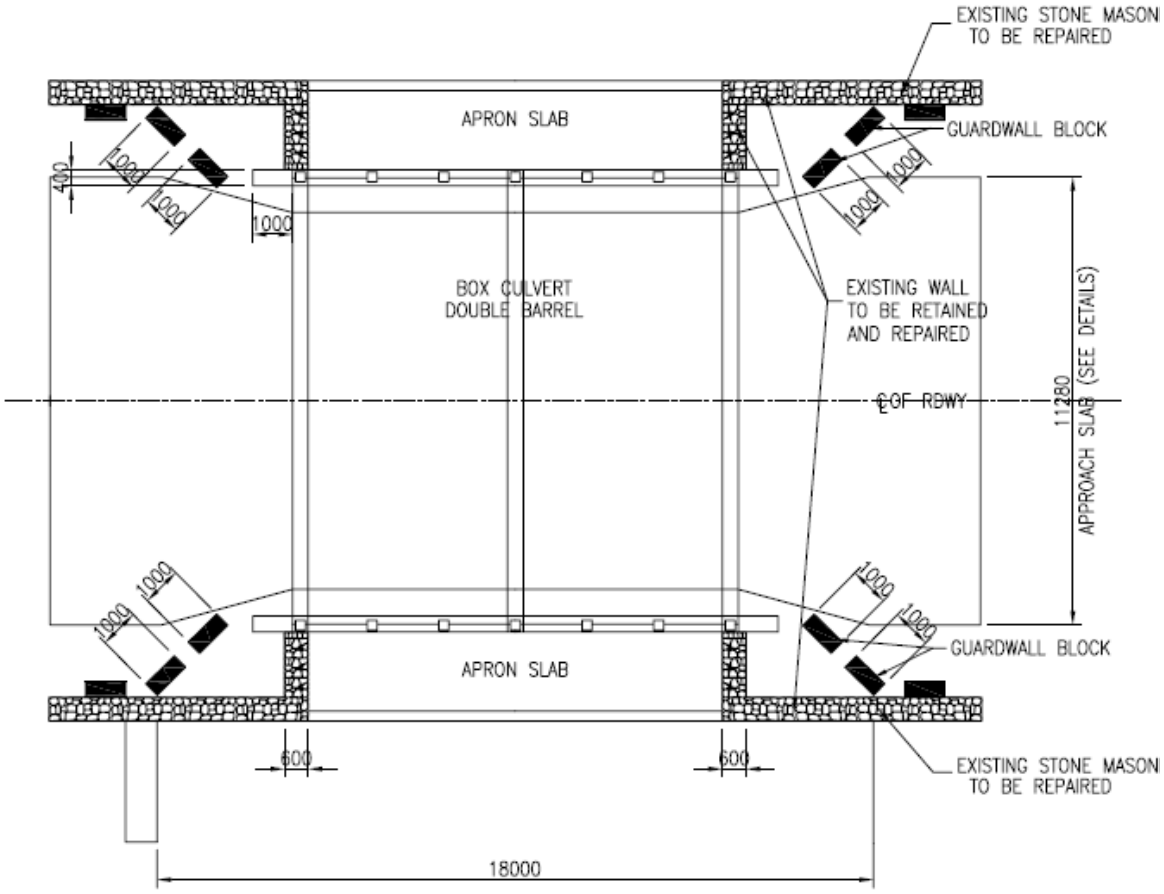


TYPE 1 - PORTLAND CONRETE CEMENT PAVEMENT (PCCP)

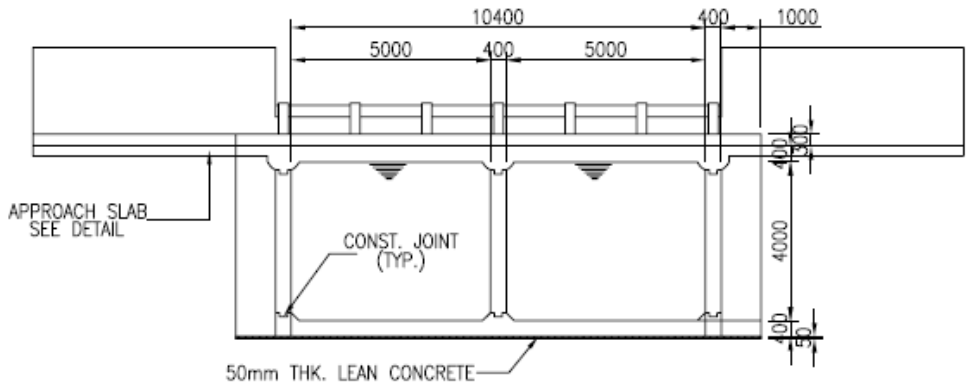


TYPE 3 - ASPHALT CONCRETE PAVEMENT (ACP)

Figure 5-11 Typical Roadway Cross-Section



KEY PLAN



SECTIONAL ELEVATION

Figure 5-12 Typical Cross Section of Reinforced Concrete Box Culvert (RCBC)

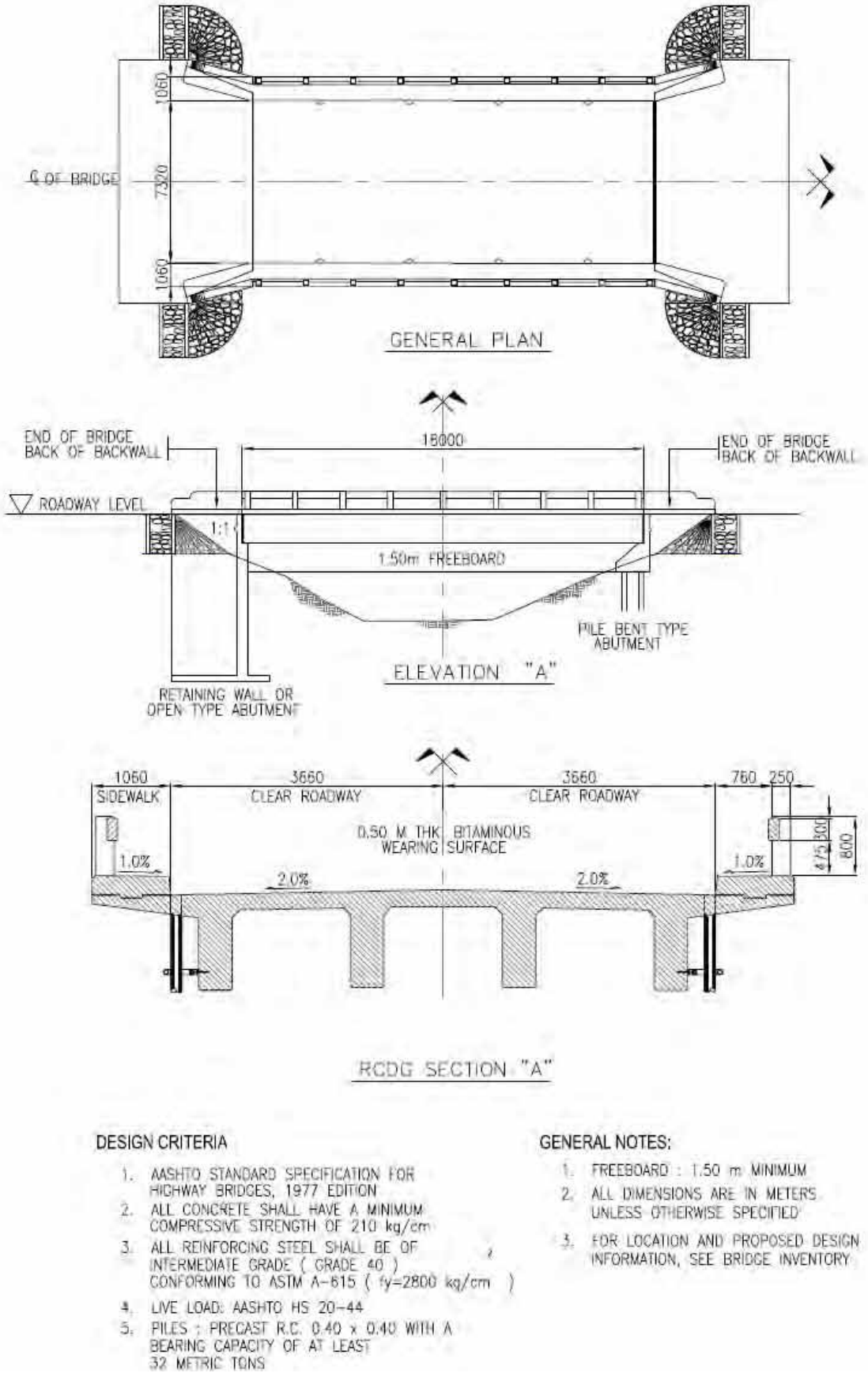


Figure 5-13 Typical Cross Section of Two Lane Single-Span Bridge (RCDG)

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 is comprised of the two main elements of construction costs, the direct and indirect costs.

The three (3) main components of the direct cost consist of the equipment, materials and labor. The indirect cost, on the other hand, refers to the costs incurred by the contractor and not directly related to the production of each work item. This consists of overhead expenses, profit, value added tax, premium bonds, insurance, etc.

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.

A contingent cost amounting to 10% of the items was also included in the project cost. This covers any minor works or variation works, which were not included in the estimates.

Road Right-of-Way Cost, as maybe required, is also a part of the project cost.

The costs of detailed design and construction supervision were estimated at 4% to 8% of the project cost.

The details of the cost breakdown indicating the quantities and unit prices of individual items and also the other cost components are presented in the respective project road profiles.

In this study the road condition of almost all candidate routes is good except the Central Route and Panay-Sorsogon Route on Masbate Island.

Cataingan-Esperanza section of Central Route in Masbate Island is not paved and very rough; length of the section is approximately 30 km.

Some bridges are in fair and good condition, therefore the total cost of this section is estimated for only earth works. Estimated construction cost for this road section is as follows.

-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

Balud-Milagros section of Panay-Sorsogon Route 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 in good condition, therefore the total cost of this section is estimated for only earth works. Estimated construction cost for this road section is as follows.

-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

Table 5-14 Typical Road Construction Unit Price Analysis

DESCRIPTION: PORTLAND CEMENT CONCRETE PAVEMENT (200mm thk. REINFORCED) **DIRECT COST** **3,578.59** P/cu.m.

	PRICE COMPONENT	UNIT	QTY	RENTAL RATES	TOTAL
A) EQUIPMENT					
1	-Concrete Batch Plant 50 cu.m./hr	P/hr	1	1,300.00	1,300.00
1	-Wheel Loader, 1.53 cu.m.	P/hr	1	900.00	900.00
1	-Concrete Paver Finisher		1	1,300.00	1,300.00
2	-Water Tank Truck, 500 to 600 U.S.G.	P/hr	2	1,000.00	2,000.00
1	-Formrail Set		1	200.00	200.00
2	-Concrete Cutters	P/hr	2	60.00	120.00
1	-Pick-up	P/hr	1	300.00	300.00
4	-Transit Mixers, 5 cu.m. cap.	P/hr	4	1,200.00	4,800.00
1	Ancillary Equipt., testing equipment, minor tools, etc. (10% of above)	P/hr			1,092.00
	Sub-total A	P/hr			12,012.00
B) LABOR					
1	-Plant Foreman	P/hr	1	60.00	60.00
1	-Site Foreman	P/hr	1	60.00	60.00
2	-Laboratory Technician	P/hr	2	50.00	100.00
10	-Skilled Laborer	P/hr	10	50.00	500.00
20	-Unskilled Laborers	P/hr	20	40.00	800.00
	Sub-total B	P/hr			1,520.00
	TOTAL A + B	P/hr			13,532.00
C) OUTPUT	27.00 cu.m./ hr				
	13,532.00 P/hr / 27.00 cu.m./ hr	P/cu.m.			501.19
D) MATERIALS					
	Cement				
	0.38 T/cu.m. X 3,900.00 P/T	P/cu.m.			1,493.70
	Fine Aggregate				
	0.70 T/cu.m. X 300.00 P/T	P/cu.m.			210.00
	Coarse Aggregate				
	1.30 T/cu.m. X 400.00 P/T	P/cu.m.			520.00
	Water				
	0.30 cu.m./cu.m. X 100.00 P/cu.m.	P/cu.m.			30.00
	Rebars				
	8.88 Kg./cu.m. X 35.00 P/Kg.	P/cu.m.			310.80
	Incidentals, (sealant, curing compound, etc. 20% of above				512.90
	TOTAL D	P/cu.m.			3,077.40
E) DIRECT COST		P/cu.m.			3,578.59

Table 5-15 Typical Bridge Construction Cost Analysis

LENGTH - 100 M **PCCP CW = 6.10 M ; SW = 2.00 M**

PAY ITEM DESCRIPTION	UNIT	QUANTITY	DIRECT COST		TAXES		FINANCIAL COST	
			UNIT COST	AMOUNT	UNIT COST	AMOUNT	UNIT COST	AMOUNT
EARTHWORKS								
Embankment (from Borrow Materials)	cu.m.	20,000.00	500.00	10,000,000.00	65.00	1,300,000.00	565.00	11,300,000.00
Subgrade Preparation (Common Materials)	sq.m	1,000.00	30.00	30,000.00	3.90	3,900.00	33.90	33,900.00
SUB-BASE AND BASE COURSE								
Aggregate Subbase Course	cu.m.	200.00	700.00	140,000.00	91.00	18,200.00	791.00	158,200.00
SURFACE COURSES								
PCCP 150 mm thick	sq.m.	300.00	700.00	210,000.00	91.00	27,300.00	791.00	237,300.00
PCCP 200 mm thick	sq.m.	500.00	800.00	400,000.00	104.00	52,000.00	904.00	452,000.00
BRIDGE CONSTRUCTION								
Removal of Existing Bridge (L=39.0m)	l.s.	1.00	500,000.00	500,000.00	65,000.00	65,000.00	565,000.00	565,000.00
Bridge Excavation (ANWL)	cu.m.	5,000.00	200.00	1,000,000.00	26.00	130,000.00	226.00	1,130,000.00
Bridge Excavation (BNWL)	cu.m.	4,000.00	250.00	1,000,000.00	32.50	130,000.00	282.50	1,130,000.00
Reinforcing Steel Bars, Grade 40	kg	60,000.00	35.00	2,100,000.00	4.55	273,000.00	39.55	2,373,000.00
Reinforcing Steel Bars, Grade 60	kg	250,000.00	35.00	8,750,000.00	4.55	1,137,500.00	39.55	9,887,500.00
Structural Concrete, Class "AA" - 28 Mpa	cu.m.	400.00	5,500.00	2,200,000.00	715.00	286,000.00	6,215.00	2,486,000.00
Structural Concrete, Class "A" - 21 Mpa	cu.m.	1,500.00	5,500.00	8,250,000.00	715.00	1,072,500.00	6,215.00	9,322,500.00
Grouted Riprap, Class "A"	cu.m.	500.00	2,000.00	1,000,000.00	260.00	130,000.00	2,260.00	1,130,000.00
Painting of Railings and Wingwall	sq.m	150.00	250.00	37,500.00	32.50	4,875.00	282.50	42,375.00
PVC Drain Pipes	each	6.00	100.00	600.00	13.00	78.00	113.00	678.00
DRAINAGE AND SLOPE PROTECTION								
PVC Drain Pipes	each	200.00	100.00	20,000.00	13.00	2,600.00	113.00	22,600.00
Rubble Mound	cu.m.	350.00	1,500.00	525,000.00	195.00	68,250.00	1,695.00	593,250.00
Rubble Concrete (SSP-1 / SSP-2 / SSP-3 / SSP-4)	cu.m.	1,200.00	4,000.00	4,800,000.00	520.00	624,000.00	4,520.00	5,424,000.00
MISCELLANEOUS STRUCTURES								
Kilometer Post	each	1.00	3,500.00	3,500.00	455.00	455.00	3,955.00	3,955.00
Warning Sign	each	2.00	4,000.00	8,000.00	520.00	1,040.00	4,520.00	9,040.00
Regulatory Sign	each	2.00	5,000.00	10,000.00	650.00	1,300.00	5,650.00	11,300.00
Informatory Sign	each	2.00	30,000.00	60,000.00	3,900.00	7,800.00	33,900.00	67,800.00
Pavement Marking (White)	sq.m.	6.00	800.00	4,800.00	104.00	624.00	904.00	5,424.00
Pavement Marking (Yellow)	sq.m.	12.00	850.00	10,200.00	110.50	1,326.00	960.50	11,526.00
BASIC CONSTRUCTION COST (BCC)				41,059,600.00		5,337,748.00		46,397,348.00
MINOR WORK (5 % OF BCC)				2,052,980.00		266,887.40		2,319,867.40
CONTINGENCIES (5% OF BCC)				2,052,980.00		266,887.40		2,319,867.40
PROJECT CONSTRUCTION COST (PCC)				45,165,560.00		5,871,522.80		51,037,082.80

5.2.4 Financing Scheme of Highways

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 5-17 - Summary Inventory of Existing RoRo Ports. The detailed inventory including photos is attached in Appendix I-5-3-1.

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

-Current observations

-Soil investigations (Boring), and

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

The surveys are described in Table 5-16 hereunder.

The survey works were subcontracted to a registered local firm with specialty in these fields of expertise. The survey results are compiled in Appendix I-5-3-2.

Table 5-16 Surveys on Natural Conditions at Potential Sites

	Name of Candidate Port	Province	Topo/Hydro Survey	Current Observat'n	Soil Investigat'n	IEE Checklist
1)	San Antonio/Pilar	Sorsogon	x	x	x	x
2)	Caticlan/Tabon	Aklan/Panay	x	x	x	x
3)	Dumangas	Iloilo/Panay	x	x	x	x
4)	Culasi/Ajuy	Iloilo/Panay	x		x	x
5)	San Jose de Buenavista	Antique/Panay	x			x
6)	Victorias	Negros Occ.				x
7)	Kawayan	Biliran	x	x	x	x
8)	Naval	Biliran				x
9)	Daanbantayan	Cebu	x	x	x	x
10)	Bogo	Cebu	x		x	x
11)	Tabuelan	Cebu	x		x	x
12)	Toledo	Cebu	x		x	x
13)	P. Engano	Cebu	x		x	x
14)	Getafe	Bohol	x		x	x
15)	Ubay	Bohol	x		x	x
16)	Tapal	Bohol	x			x
17)	Esperanza	Masbate	x	x	x	x
18)	Balud	Masbate	x	x	x	x
19)	Taytay	Palawan	x	x	x	x
20)	Benoni	Camiguin				x
21)	Balingoan	Agusan Nor./ Mindanao				x
		Total	(17)	(8)	(15)	(21)

Table 5-17 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 lsd.	-5m~	3	Well functioning port. PPA plans addt'l pier/ramp by expansion of existing due to congestion.		Expansion
	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.		
	Liloan	PPA	Lipata	Operational	Well sheltered	-4m~	1	Well functioning port.		
	San Ricardo	PPA	Lipata	None	Waves	-4m~	1	Existing is damaged. PPA plans a new RoRo port as an alternative to Liloan.		New Port
	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 lsd.	Shallow	None	Causeay only. PPA constructs pier/ramp.		
	Naval	PPA	Esperanza	None	Behind lsd.	-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.		
	Calapan	PPA	Batangas	Operational	Waves	-4m~	7	Well functioning port.		
	Roxas	PPA	Caticlan	Operational	Waves	-3m~	1	Constructed as an alternative to Bulalacao.		
	Caticlan	LGU/PPA	Roxas	Operational	Behind ld., 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		
	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.		
	Bacolod	BREDCO	Iloilo/Dumangas	Operational	Well shelterd	Capable	Capable	Well functioning port.		
	Dumaguete	PPA	Dapitan	Operational	Well shelterd	-7m~	1	Well functioning port.		
	Siaton	PPA	Dapitan	None	Sheltered beach	Shallow		PPA plans a new RoRo port as an alternative to Dumaguete.		New Port
	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
	Masbate	PPA	San Antonio	Operational	Well sheltered	-9m~	3	Well functioning port.		
	Cataingan	LGU		None	Well sheltered	-4m~	None	Existing feeder port with pier and reclaimed area. No RoRo function.		
	Esperanza	PPA	Naval/Daanbantayan	None	Open to SW	Reef		To make it as a RoRo port, causeway, reclamation, pier/ramp and breakwater required.	x	
	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.		
	Cebu	CPA	Tubigon	Operational	Well sheltered	Deep	Capable	Well functioning port.		
	Tubigon	PPA	Cebu	Operational	Sheltered	-5m~	2	Well functioning port.	x	
	Jagna	PPA	Benoni/Mambajao	Operational	Sheltered	-3m~	1	Well functioning port that can accommodate large passenger vessels.	x	
	Mambajao	PPA	Jagna	None	Open to North	-3m~	1	Poor/damaged facilities.	x	
	Benoni	PPA	Jagna/Balingoan	Operational	Sheltered	NA	2	RoRo functioning with minimum facilities.		
	Guinsiliban	PPA	Balingoan	Operational	Open to South	NA	1	Poor/damaged facilities.	x	
	Nasipit	PPA	Jagna	Operational	Well sheltered	Capable	NA	Well functioning port.		
	Balingoan	PPA	Benoni/Guinsiliban	Operational	Well sheltered	-3m~	2	Well functioning port.		
	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.		

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

1) General

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.

2) Standard Size of RoRo Vessels

Based on Paragraph 5.1.3, 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 **2,000 GRT** for relatively longer distance such as the Taytay –Coron- San Jose Route.

3) Water Depth

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

· **< BasicFacilities >**

4) Navigation Aids

As mentioned earlier, to enhance safety of operation at sea, the proposed terminals will be provided with navigation aids facility as follows:

-Light Beacon

A light beacon will be installed at the tip of the mooring structure for the safe navigation of the vessels towards the berthing facility particularly during night time operations.

-Buoy Markers

All the ports are located in the offing at sufficient depths to allow the safe maneuvering of

vessels and to avoid the accumulation of silts to avert costly maintenance dredging. However, some terminals such as Taytay needs to be provided with lighted buoy markers to identify the existence of shallow depths at certain locations along the vicinity of the navigation channel for safety of access in both day and night time operations.

5) Berthing and Mooring Structures

The Mediterranean style of mooring RORO vessel is being practiced in most ports countrywide. However, based on information from concerned shipping operators, for stability purposes and to avert any possible over turning during loading and discharging operations of cargos this berthing practice is being made with the propeller operating while the vessel is docked head on.

The significant increase in fuel cost however, has made the operation not only extremely expensive but that the stability of the vessels against current forces and the incidence of possible overturning during loading and unloading operations could not also be guaranteed.

Based on the foregoing considerations, the proposed terminals are provided with berthing and mooring structures equipped with appropriate rubber fenders and mooring bitts to safely anchor the vessels against current acting on the ship side during discharging/loading operations.

Two types of berthing/mooring structures have been planned. One is the pier type 15m wide for Taytay and Toledo to cater for both RORO and general cargo ships. The other is the breasting and mooring dolphin type to cater for dedicated 500 GRT RORO vessels.

6) RoRo Ramp

For the entrance/exit of vehicles to and from the RORO vessel, the berthing facility are provided with two sets of fixed type RORO ramp to be constructed of RC deck structure on steel pipe pile substructure. In accordance with PPA design standard, the ramp size is 9m wide x 12m long with a slope not exceeding 10%. The frontages of the ramps will be provided with v type rubber fenders for protection.

One ramp will cater for astern mode of berthing while the other will cater for bow mode of berthing. The ramp elevations were determined based on the tidal ranges as well as the length of the ramp and deck elevations of the vessel at astern and bow berthing positions with due considerations to PPA standard for the ramp slope not exceeding 10%.

7) Vehicle Holding Area

A vehicle holding area is provided immediately behind the berthing structure for the convenience of the port users. To ensure orderliness, the holding area will be provided with pavement markings. For durability and ease of maintenance, the holding space will be provided with interlocking blocks type of pavement..

8) Parking Area

As shown on the layout plan, parking spaces are provided outside the terminal operations area for public use. Similar to the vehicle holding area, the parking area will be provided with interlocking blocks type of pavement to ensure durability and ease of maintenance and pavement markings for parking orderliness.

9) Causeway

Terminals to be developed in the offing are connected onshore by a causeway. This causeway will be constructed of fill materials and stone revetment for slope protection. The causeway

will be provided with a two lane concrete paved access for vehicular traffic including sidewalks for pedestrians.

As appropriate, drain pipes or openings of adequate size will be provided along certain sections of the causeway for water circulation.

10) Breakwater

Most of the RoRo ports are located in coves well protected from severe wave actions. A breakwater facility is provided for those prone to monsoon wave actions either from the southwest or northeast direction such as Caticlan, Esperanza and Balud, to enhance the safety of vessels moored along the berthing facility.

As shown, the breakwater will be constructed of stones with plain concrete block crown.

11) Access Road

The RORO terminal will be connected to the existing highway by a two-lane concrete access road to be included as part of the proposed development.

· **<RoRo Service Facilities>**

12) Passenger Terminal Building

Each RORO terminal is provided with a passenger terminal building with a capacity based on the estimated number of passengers to board the vessel plus a certain allowance for the provision of other amenities relative to the operation of the terminal building. The passenger building will be provided with an X-ray machine for security purposes, fully air-conditioned waiting area, comfort rooms, information center, public address system, among others. Only departing passengers with valid tickets are allowed to enter the terminal building.

13) Boarding / De-Boarding Stairway

The current mode of loading / unloading of cargoes simultaneously with the boarding / de-boarding of passengers are causing unsafe and chaotic operations. It is therefore desirable to separate these two modes of operation for orderliness and safety of passengers.

For this to be undertaken, 2 units of manually operated movable boarding / de-boarding stairways will be provided for the sole use of oncoming / departing passengers. The stairway will be provided with a manually operated hydraulic device for adjusting the ramp slope of the boarding stairway to the boarding platform elevation of the RORO vessel.

14) Ticketing Booth

As shown on the layout plan, each RORO terminal is provided with a small building to house the ticketing booths. This building is located outside the terminal operations area so that only passengers who have purchased tickets are allowed to enter the Terminal Operations premises through the control gate.

15) Public Address System

As part of the guide procedure for terminal operations, each RORO terminal will be provided with a public address system so that departing passengers and vehicles could be fully informed of the boarding time and any other development that may occur in connection with the voyage.

16) Vendor Terminal Facility

Observations of RORO terminal operations nationwide reveal the presence of many vendors inside the terminal operations premises causing chaotic and unsafe operations and security risks. Totally disallowing vendors inside the port will likewise cause unwarranted social problems.

In order to remedy the situation, each RORO terminal will be provided with a vendor facility outside the operations premises to restrict the entry of vendors into the terminal operations area. The facility will comprise of a 1 story building with compartments of 4 to 6 sqm. each.

· **<Basic Utilities>**

17) Water Supply

The insufficiency and/or lack of potable water in almost all the ports visited nationwide necessitate the inclusion of the development of potable water supply system for the proposed RORO terminals. Water will be tapped from the city/town mains if supply is sufficient. If not, other sources will be tapped including the development of deep wells. As part of the water supply system, the terminal will be provided with an underground reservoir for the storage of sufficient quantity of water, good for about a week operation. A part of the stored water will be pumped to an elevated water tank for distribution to all building facilities inside the terminal premises including the requirements of the RORO vessels should it be needed.

18) Electrical Supply

Basically, electrical supply should be provided by the concerned agencies such as MERALCO in the case of Metro Manila. Based on the reconnaissance survey conducted for the proposed RORO Ports, except possibly for Taytay, power requirements could be provided by the electrical agency concerned. In the absence of electrical supply, the standby generator to be provided as part of the development of the Project could be used temporarily until such time that the concerned agency could provide the required power requirements.

19) Standby Generator

Due to the occurrence of frequent brownouts countrywide, the PPA has made it mandatory to provide a 400 KVA standby generator to all RORO ports under its administration. With this in consideration, a standby generator will be provided at the power house building for each of the RORO terminal under consideration.

20) Fuel Supply

Several alternative means are available for the supply of fuel to RORO vessels. These include the construction of fuel storage tanks as part of the development of the Project, supply of fuel by bunker boats or by trolley trucks by the private sector. When the requirement however is large, the standard practice is for the terminal operator to tapped concerned fuel supply companies such as Petron, Shell or Caltex to provide the necessary investment to supply these services on franchise basis at no cost to the RORO Port Terminal. In this case, in exchange for the franchise, the Terminal Operator is normally compensated per liter of fuel supplied to the vessels. It is therefore suggested that this arrangement be made with the concerned fuel supply companies.

21) Sanitation

In previous development, septic tank(s) were the primary means of treating raw sewage brought about by the operation of the port. The system, however, was improved and the Environment Management Bureau (EMB) of the DENR has mandated the installation of a sewage treatment plant in

lieu of the septic tank for raw sewage treatment. As such a sewage treatment facility is included as part of the proposed development. To reduce on piping cost, the facility is located as close as possible to the shore with due consideration to the overall aesthetics of the terminal.

22) Outdoor/Indoor Lightings

To ensure safe operations particularly during night time, each RoRo terminal are provided with sufficient outdoor lightings including high mast floodlights, single/double arm street lights and dome lights.

Provisions of lightings for the Terminal are made on the following basis:

-Illumination level for open yard: 30 lux

-Illumination level for medium to heavy traffic for street lightings: 20 lux

-Illumination level inside buildings: Ave. 300 to 500 lux

· **<Security Measures>**

23) Perimeter Fence / Gate

The operations area of the RORO terminal comprising of the vehicle holding area and passenger terminal building will be provided with security fence to totally segregate them from the facilities for public use. In order to implement this scheme, only departing vehicles and passengers with valid tickets are allowed to enter the terminal operations area.

Two control gates are provided. One is for passengers entering the passenger terminal building and the other is for vehicles entering the vehicles holding area. The control gates will be provided each with ticket/security check officers. This mode of practice will not only enhance security inside the operations area but would also greatly improve safety of cargo handling operations and orderliness.

24) Administration Building

The administration building will be housing the concerned government authorities such as the PPA or CPA in administering the operation of the Terminal either by itself or through the private sector. Since this facility will be servicing the needs of the general public, it is best that it be located outside the terminal operations premises to enhance security and to maintain smooth operations and orderliness inside the terminal operations premises.

25) X-Ray Machine

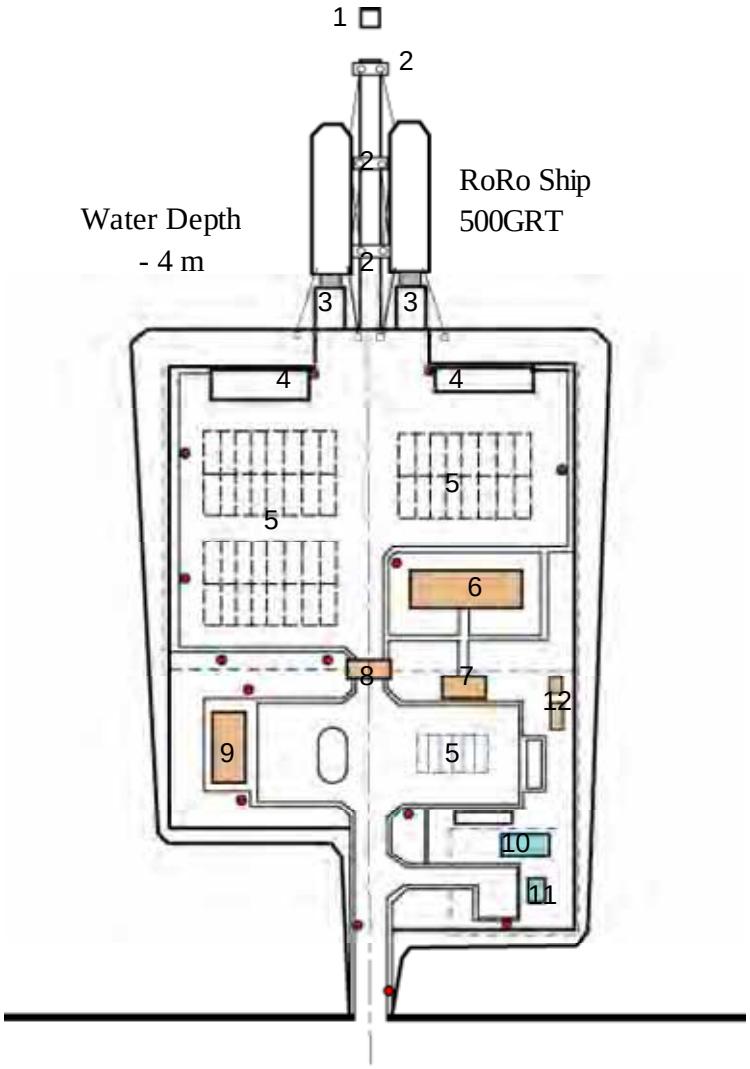
Terrorism incidence which is borderless is occurring worldwide. To avert possible terrorism incidences, the luggage / baggage of departing passengers should be scanned by an X-ray equipment prior to entrance in the waiting area of the passenger terminal building. This will avert any possible smuggling of weapons of mass destructions thereby enhancing the security of the riding public.

26) Weigh Bridge

Unlike the general cargo vessel, RoRo vessel has a flat bottom which rather makes them more unstable. Thus, loading over-loaded trucks onto RoRo vessels is extremely unsafe during sea travel. In order to keep control over the over-loaded trucks, a weigh bridge (a truck scale) unit shall be installed at each port. The unit of thin type can be installed on the flat parking area after the main gate.

Figure 5-14 shows a Model Layout Plan for the proposed RoRo Terminal under the

RRTS Study based on the standardization scenario which provides all the basic facilities needed to enhance services.



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 5-14 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 5-15 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.

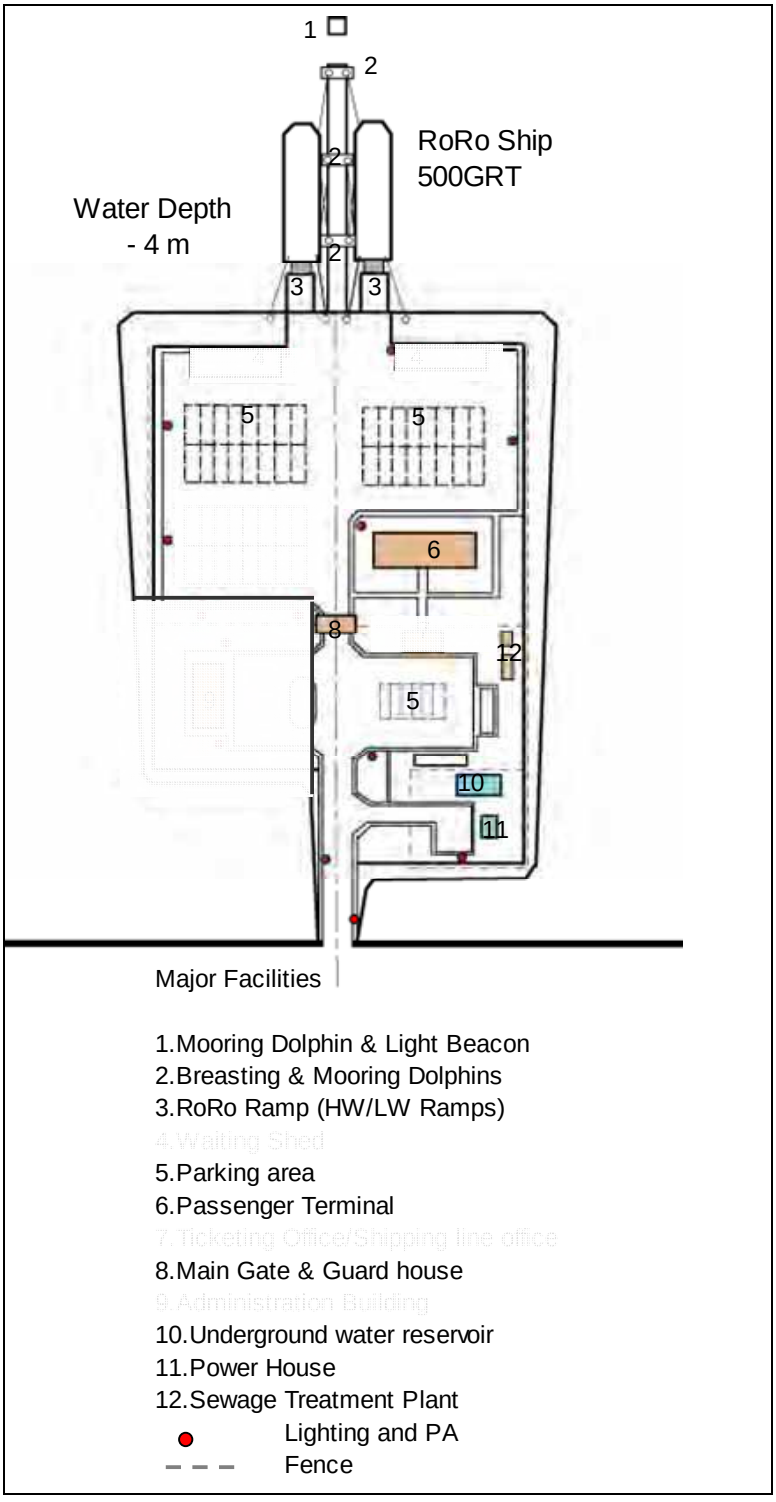


Figure 5-15 Model Layout Plan for RoRo Terminal (Reference)

5.3.3 Unit Cost Adopted for the Construction of RoRo Terminals

1) Indicative Unit Cost

Table 5-18 hereunder shows the PPA Indicative Unit Prices for Port Structures which was adopted for the cost estimation of the proposed development.

Table 5-18 PPA Indicative Prices for Port Structures

INDICATIVE UNIT PRICES FOR PORT STRUCTURES

as of October 2006

DESCRIPTION	UNIT	UNIT PRICE (Php)		
4. MOORING SYSTEM (Supply and Install)				
a.) Mooring Bollard (T- head, 100T)	set	200,000.00	~	350,000.00
b.) Mooring Bollard (T- head, 75T)	set	210,000.00	~	250,000.00
c.) Mooring Bollard (T-head, 70T)	set	196,000.00	~	210,000.00
d.) Mooring Bollard (T - head, 50T)	set	100,000.00	~	120,000.00
e.) Mooring Bollard (T-head, 35T)	set	70,000.00	~	90,000.00
f.) Mooring Bollard (T-head, 30T)	set	65,000.00	~	80,000.00
g.) Mooring Bollard (T-head, 25T)	set	60,000.00	~	70,000.00
h.) Mooring Bollard (T-head, 15T)	set	35,000.00	~	50,000.00
i.) Mooring Cleat (std. 15T)	set	25,000.00	~	35,000.00
5. FENDERING SYSTEM (Supply and install)				
a.) V-type Rubber Fender				
a.1.) Rubber Fender (V 200 x 2000 mm)	set	80,000.00	~	90,000.00
a.2.) Rubber Fender (V 300 x 1500 mm)	set	85,000.00	~	95,000.00
a.3.) Rubber Fender (V 300 x 2000 mm)	set	95,000.00	~	105,000.00
a.4.) Rubber Fender (V 400 x 1500 mm)	set	120,000.00	~	145,000.00
a.5.) Rubber Fender (V 400 x 2000 mm)	set	130,000.00	~	155,000.00
a.6.) Rubber Fender (V 500 x 1500 mm)	set	150,000.00	~	180,000.00
a.7.) Rubber Fender (V 600 x 1500 mm)	set	180,000.00	~	190,000.00
a.8.) Rubber Fender (V 500 x 2000 mm)	set	200,000.00	~	250,000.00
b.) Element type				
b.7.) 2V-Element Fender (H400 x L1000)	set	450,000.00	~	520,000.00
b.8.) 4V-Element Fender (H800 x L1000)	set	500,000.00	~	570,000.00
b.9.) Hyper Omega Fender (L2000)	set	750,000.00	~	850,000.00
c.) Cylindrical -Type Rubber Fender				
c.1.) C- 600 x 300 x 1.0m	set	250,000.00	~	360,000.00
c.2.) C- 600 x 300 x 1.5m	set	350,000.00	~	420,000.00
c.3.) C- 700 x 350 x 1.0m	set	300,000.00	~	420,000.00
c 4.) C- 700 x 350 x 1.5m	set	400,000.00	~	470,000.00
c.5.) C- 800 x 400 x 1.0m	set	350,000.00	~	420,000.00
c.6.) C- 800 x 400 x 1.5m	set	400,000.00	~	470,000.00
c.7.) C- 1000 x 500 x 1.0m	set	700,000.00	~	820,000.00
d.) Used Tire Fenders				
d.1.) Truck tires (1-piece)	set	3,500.00	~	6,000.00
d.2.) Truck tires (2-pieces)	set	6,000.00	~	8,000.00
d.3.) Truck tires (3-pieces)	set	8,000.00	~	12,000.00
d.4.) Tractor tires (1-piece)	set	15,000.00	~	27,000.00
e.) Rubbing timber with sliced truck tire cover	set	10,000.00	~	15,000.00
6. ROCK CAUSEWAY	**sq.m.**	**25,000.00**	**~**	**30,000.00**
Width = 6 to 9 meters				
Depth = -3 to -5				
a.) 2,000~3,000 kg/pc rocks	cu.m.	4,000.00	~	7,000.00
b.) 500~1,000 kg/pc rocks	cu.m.	3,000.00	~	5,000.00
c.) 50~300 kg/pc rocks	cu.m.	1,500.00	~	3,000.00
d.) Gravel Base Course (200 mm thk)	cu.m.	1,000.00	~	1,500.00
e.) R.C. Curb (standard)	l.m.	2,500.00	~	5,000.00
f.) Concrete Pavement (200 mm thk)	sq.m.	1,000.00	~	2,000.00

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INDICATIVE UNIT PRICES FOR PORT STRUCTURES

as of October 2006

DESCRIPTION	UNIT	UNIT PRICE (Php)		
7. RECLAMATION / SHORE PROTECTION	**sq.m.**	**12,000.00**	**~**	**25,000.00**
Depth = -3 to -5				
a.) R.C. Bulkhead	l.m.	100,000.00	~	175,000.00
a.1.) Armour rocks (3,000~4,000 kg/pc)	cu.m.	4,000.00	~	7,000.00
a.2.) Underlayer rocks (500~1,000 kg/pc)	cu.m.	3,000.00	~	5,000.00
a.3.) Core rocks (50~300 kg/pc)	cu.m.	1,500.00	~	3,000.00
a.4.) Geotextile fabric	sq.m.	300.00	~	600.00
b.) Back-up Area	sq.m.	5,000.00	~	10,000.00
b.1.) Sand and gravel Fill	cu.m.	700.00	~	1,000.00
b.2.) Granular Fill (Selected)	cu.m.	500.00	~	800.00
b.3.) Sub-base Course	cu.m.	600.00	~	750.00
b.4.) Base Course	cu.m.	900.00	~	1,500.00
b.5.) Concrete Pavement (200mm thk.)	sq.m.	1,000.00	~	2,000.00
b.6.) Asphalt Pavement	sq.m.	900.00	~	1,500.00
b.7.) Paving Blocks	sq.m.	2,500.00	~	3,500.00
b.8.) Cement Treated Base Course	cu.m.	1,200.00	~	1,800.00
b.9.) Sand Levelling Course	cu.m.	600.00	~	900.00
b.10.) Graded Crushed Stone	cu.m.	600.00	~	1,200.00
c.) Breakwater (Depth = -5 to 15 meters)	l.m.	1,000,000.00	~	1,700,000.00
c.1.) Armour rocks (3,000~5,000 kg/pc)	cu.m.	5,000.00	~	7,500.00
c.2.) Armour rocks (1,000~2,000 kg/pc)	cu.m.	4,500.00	~	6,500.00
c.3.) Underlayer rocks (500~1,000 kg/pc)	cu.m.	2,500.00	~	5,000.00
d.) Dredging (excavation down to design to depth)	cu.m.	200.00	~	600.00
e.) Concrete Blocks	cu.m.	4,000.00	~	8,000.00
f.) Rubble Concrete	cu.m.	3,000.00	~	5,000.00
g.) Reinforcing Bars	kg.	50.00	~	70.00
h.) Structural Steel Works	kg.	100.00	~	150.00
8. SHEET PILE WALL				
a.) Steel Sheet Pile Wall (hor. Length)	l.m.	300,000.00	~	700,000.00
a.1.) Materials	m.t.	80,000.00	~	100,000.00
a.2.) Driving	l.m.	1,500.00	~	2,500.00
b.) R.C./ PSC Sheet Pile Wall (hor. Length)	l.m.	300,000.00	~	600,000.00
b.1.) Materials (Concrete 4,000 psi)	l.m.	7,000.00	~	12,000.00
b.2.) Driving	l.m.	1,500.00	~	2,500.00
c.) Anchorage				
c.1.) Anchor Tie- Rod	set	50,000.00	~	250,000.00
c.2.) Anchor Blocks	no.	7,000.00	~	10,000.00
d.) Retaining Wall (hor. Length)excluding sheet piles	l.m.	20,000.00	~	40,000.00
d.1.) Concrete (3,500 psi)	cu.m.	6,000.00	~	10,000.00
d.2.) Steel Reinforcement	kg.	50.00	~	80.00
9. RECONSTRUCTION OF R.C. DECK	**sq.m.**	**30,000.00**	**~**	**40,000.00**
a.) Build -up existing R.C. Piles	l.m.	4,000.00	~	8,000.00
b.) Concrete (3,500 psi)	cu.m.	7,000.00	~	10,000.00
c.) Steel Reinforcement	Kg.	50.00	~	70.00
10. BUILDINGS				
a.) Warehouse	sq.m.	10,000.00	~	30,000.00
b.) Passenger Terminal Office	sq.m.	20,000.00	~	35,000.00
c.) Administration Building	sq.m.	30,000.00	~	40,000.00

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INDICATIVE UNIT PRICES FOR PORT STRUCTURES

as of October 2006

DESCRIPTION	UNIT	UNIT PRICE (Php)		
11. FENCES				
a.) CHB Fence (std. 3 mtr. high)with reinforcement and columns	l.m.	4,000.00	~	6,000.00
b.) Interlink Wire Fence (std. 3 mtr. high)	l.m.	3,000.00	~	4,000.00
c.) Excavation/backfill and Disposal	cu.m.	250.00	~	350.00
d.) Backfill and Compaction	cu.m.	150.00	~	300.00
12. MISCELLANEOUS				
a.) Port Lighting System	%	3.00	~	5.00
b.) Drainage / Sewarage System	%	2.00	~	5.00
c.) Construction Breasting Dolphin on RC/PSC Piles	unit-set	750,000.00	~	1,500,000.00
d.) Timber fender with sliced truck tire		20,000.00	~	35,000.00
e.) Construction Joint on Pavement	l.m.	800.00	~	1,500.00

Prepared by: Estimating and Tendering Section / Detailed Engineering Division / PDD

2) Cost Estimates

Based on Table 5-18 and the prevailing market situations, the following unit cost were adopted for this study effort.

Table 5-19 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	
9-5	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.

Pursuant to the 12 September 2002 Presidential Management Staff Memorandum Containing the Chief Executive's commitments and directives, and in consonance with the Authority's initiative to reduce logistics cost in the transport of goods and cargoes, the scheduled increases in domestic port charges (Usage and Wharfage) for the Years 2003, 2004 & 2005, under the PPA Memorandum Circular No.06-2001 dated 18 January 2001, are by the PPA Memorandum Circular No.11-2004 dated 26 March 2004 suspended indefinitely until further advice. Outline of these port tariff items are as follows;

i) Charges on Vessels

· Usage fee

-It is a charge on vessels engaged in domestic trade in accordance with their GRT.

ii) Charges on Cargoes

· Wharfage

-It is the amount assessed against cargoes for the use of the sea, wharves/piers or any other port facility and is paid by the shipper or consignee, as the case may be.

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.