REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

RURAL INFRASTRUCTURE FUND PROJECT

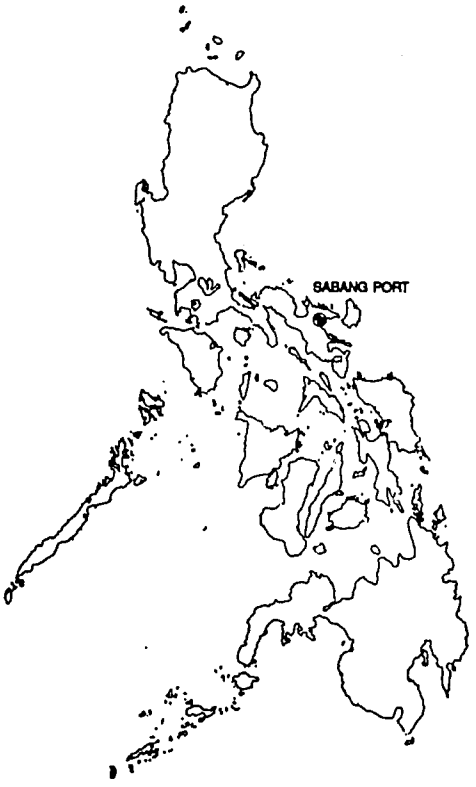
(AID PROJECT NO. 492-0420)

FEASIBILITY REPORT

THE PORT OF

SABANG

JULY 1990



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I.
SUMMARY

I. SUMMARY

A. INTRODUCTION

Sabang Port is a river port located on the south bank of the Lagonoy River near the river mouth. Sabang Port is in the Barangay of Sabang, Municipality of San Jose on the Island of Luzon. The existing Port of Sabang has been operating since Spanish times. Figures 1-1 and 1-2 locate and detail the port site.

B. EXISTING PORT

The existing port facility consists of a wharf stairlanding and a berth slip. It is surrounded by numerous bodegas, offices, stores and restaurants. Plate 1-1 shows aerial photographs of the port site and vicinity.

C. ECONOMIC OVERVIEW

Due to the development of a national highway system the role of the Port of Sabang had declined until recent years. As part of the Lagonoy Gulf interactive trading network, Sabang is now a principal passenger and cargo distribution center.

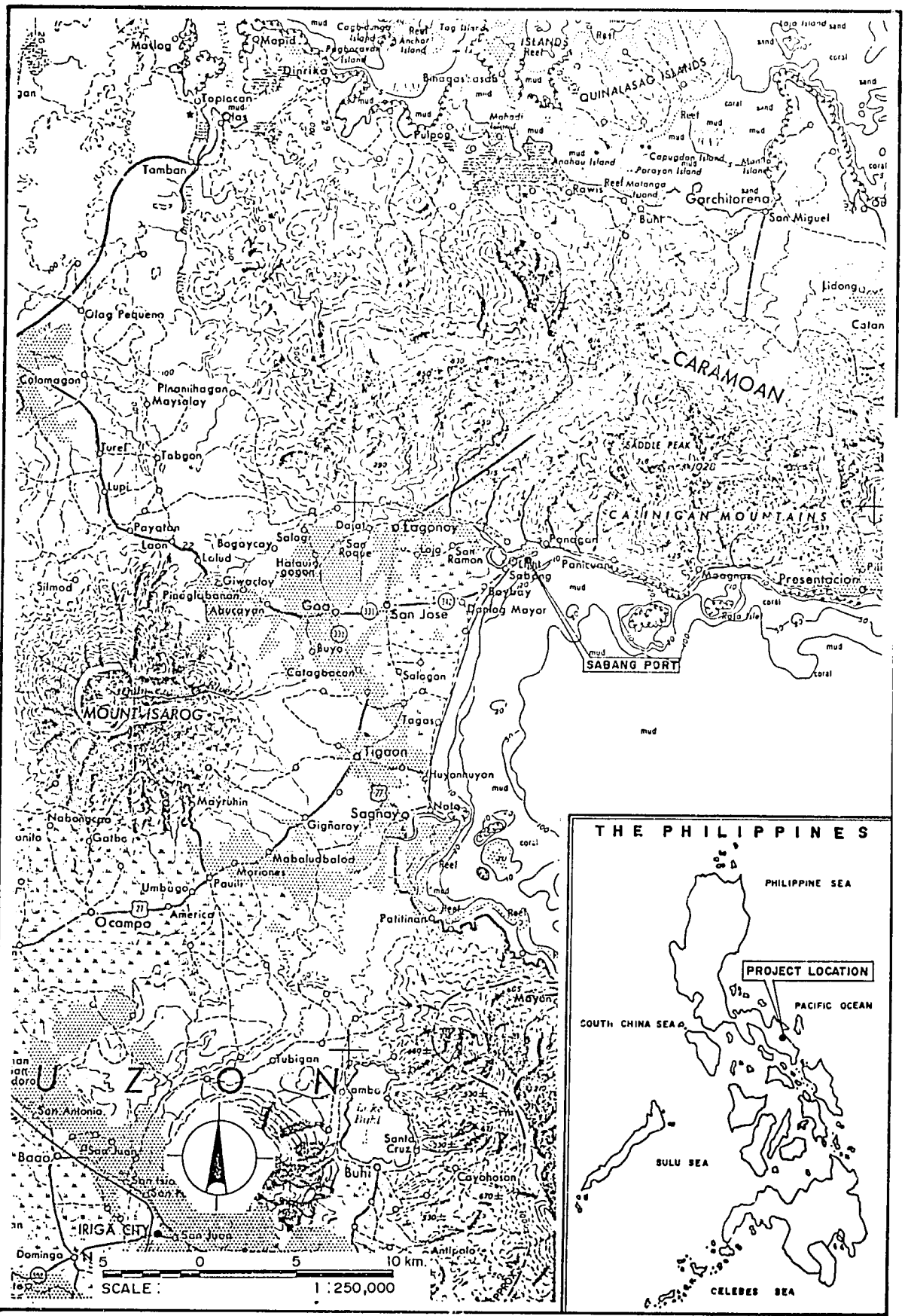
D. PROPOSED PORT SUB-PROJECT

The proposed port sub-project will consist of a 100-meter extension of the existing wharf stairlanding, two additional berth slips, three passenger gangway platforms, a passenger/cargo shed and paving. The shed will include provisions for concessions, personal hygiene and a small office. The area shoreward of the stairlanding would be concrete paved.

E. COST CONSIDERATIONS

The construction cost estimate for the proposed facility is approximately P. 4,927,000.

The cost of maintenance for the first year is estimated to be 2% of the initial investment, not including the daily maintenance of the toilets and the office. Maintenance costs are assumed to increase 8.5% annually.



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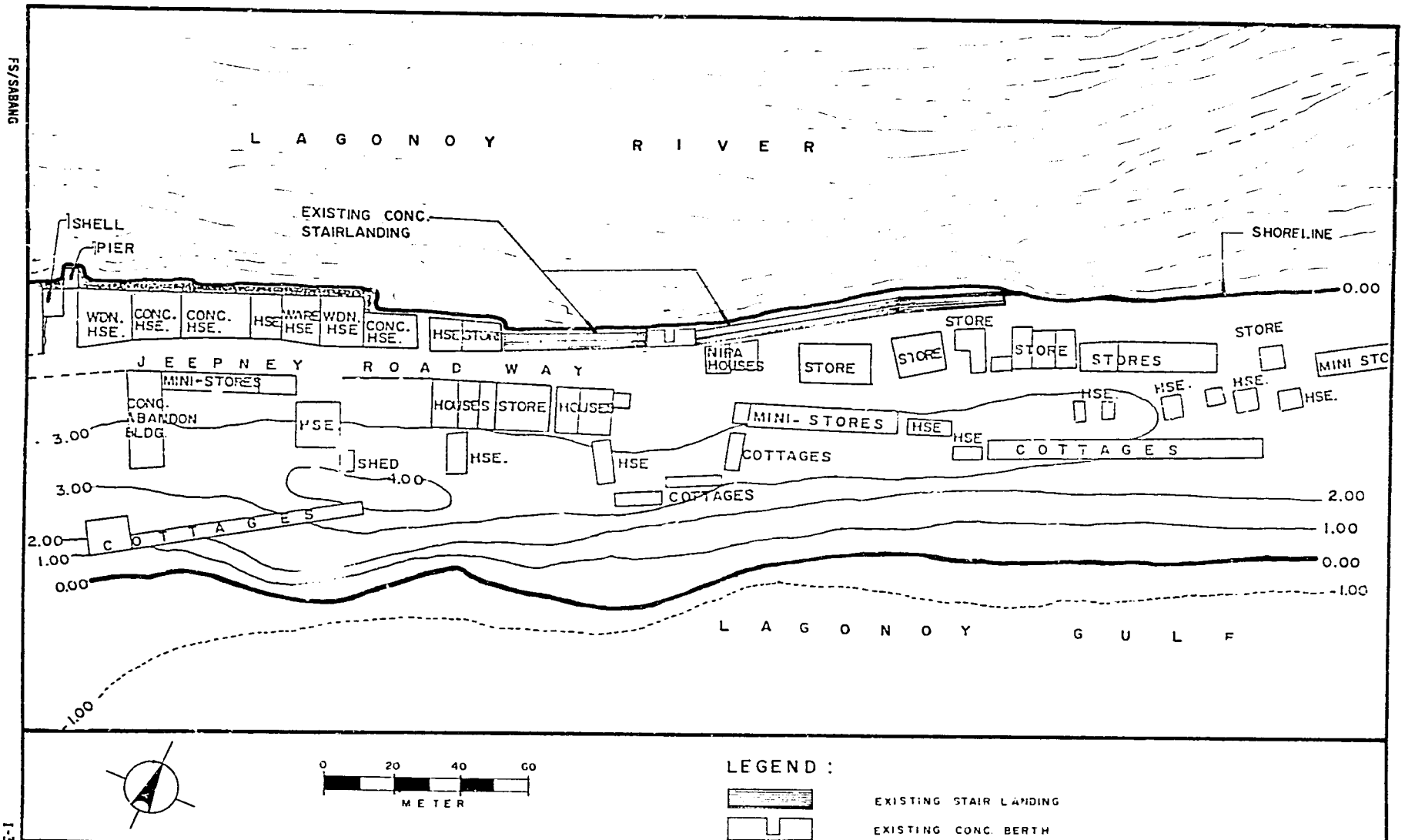
LOCATION MAP - SABANG PORT

FIGURE 1-1



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AREA MAP - SABANG PORT

FIGURE 1-2

F. SOCIAL SOUNDNESS

Although the social impacts will not be as pronounced as they would be for a new port, extending the existing wharf stairlanding and providing the new passenger/cargo shed is a socially desirable undertaking. Improving the port will facilitate the trade of low-income merchants and local residents resulting in increased incomes and easier social interactions. No significant population migration is foreseen and there are no vulnerable cultural minorities in the area.

G. ECONOMIC EVALUATION

The proposed development program for the Port of Sabang is economically feasible at an EIRR of 24.46%.

Therefore, the Consultant proposes constructing the proposed development of Sabang at an estimated economic cost of P. 5,025,000 and a financial cost of P. 5,917,000.

H. ENVIRONMENTAL EVALUATION

No dredging or other major construction activities are being proposed in this sub-project. Therefore, significant disruption of the physical environment will not occur. The proposed construction activities will not impact any previously undisturbed areas and are expected to have minimal impact on the ecology of the port area. No corals, mangrove or nipa swamp, or forest communities will be directly or indirectly affected. The area where the proposed port improvements will be constructed has been subjected to disturbances in the past and is unlikely to harbor archeological or cultural significant features.

PHOTO 1: SAND SPIT BETWEEN LAGONOY GULF, TO NORTHEAST; SABANG PORT VISIBLE AT LEFT CENTER

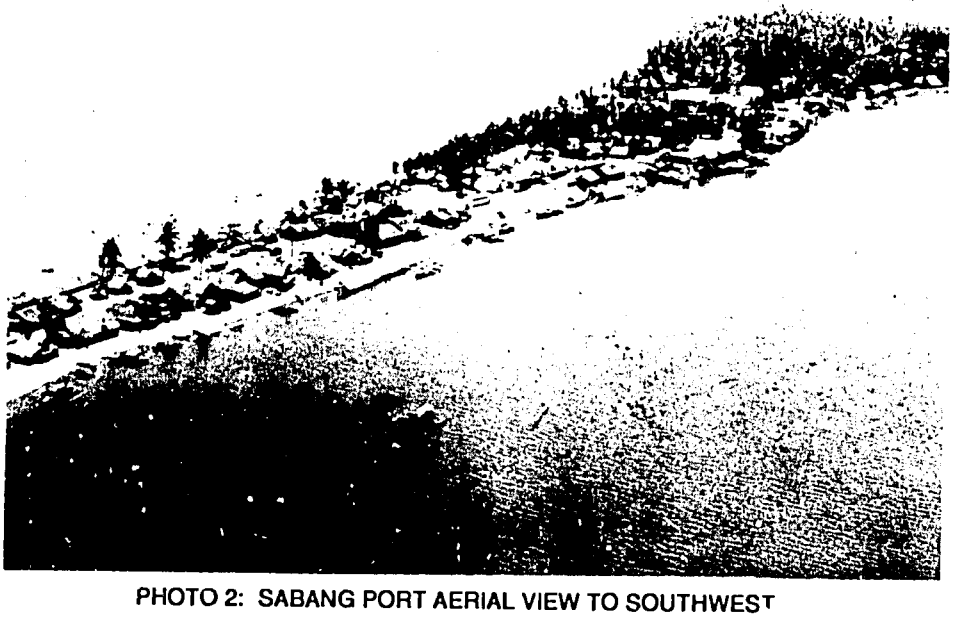

PHOTO 2: SABANG PORT AERIAL VIEW TO SOUTHWEST

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420	PLATE 1-1
REPRESENTATIVE VIEWS OF THE SUB-PROJECT AREA	

FS/SABANG

II.
ECONOMIC OVERVIEW

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II. ECONOMIC OVERVIEW

A. PROFILE OF PROVINCE AND HINTERLAND

The proposed feeder port improvement is located at Barangay Sabang in San Jose Municipality. Sabang is one of twenty-nine barangays comprising the Municipality of San Jose. San Jose is one of the thirty-five municipalities of the Province of Camarines Sur.

The Port of Sabang is located at Latitude 13°43.41' N and Longitude 123°34.71' E, just upstream from where the Sabang River empties into the Lagonoy Gulf. Sabang is one port within an interactive Lagonoy Gulf network that also includes the Ports of Sagnay (Nato), Presentacion, Caramoan (Guijalo), San Andres (Cab Cab), and Tobaco as well as the numerous other smaller communities along the coast of the Caramoan Peninsula (Figure 2-1).

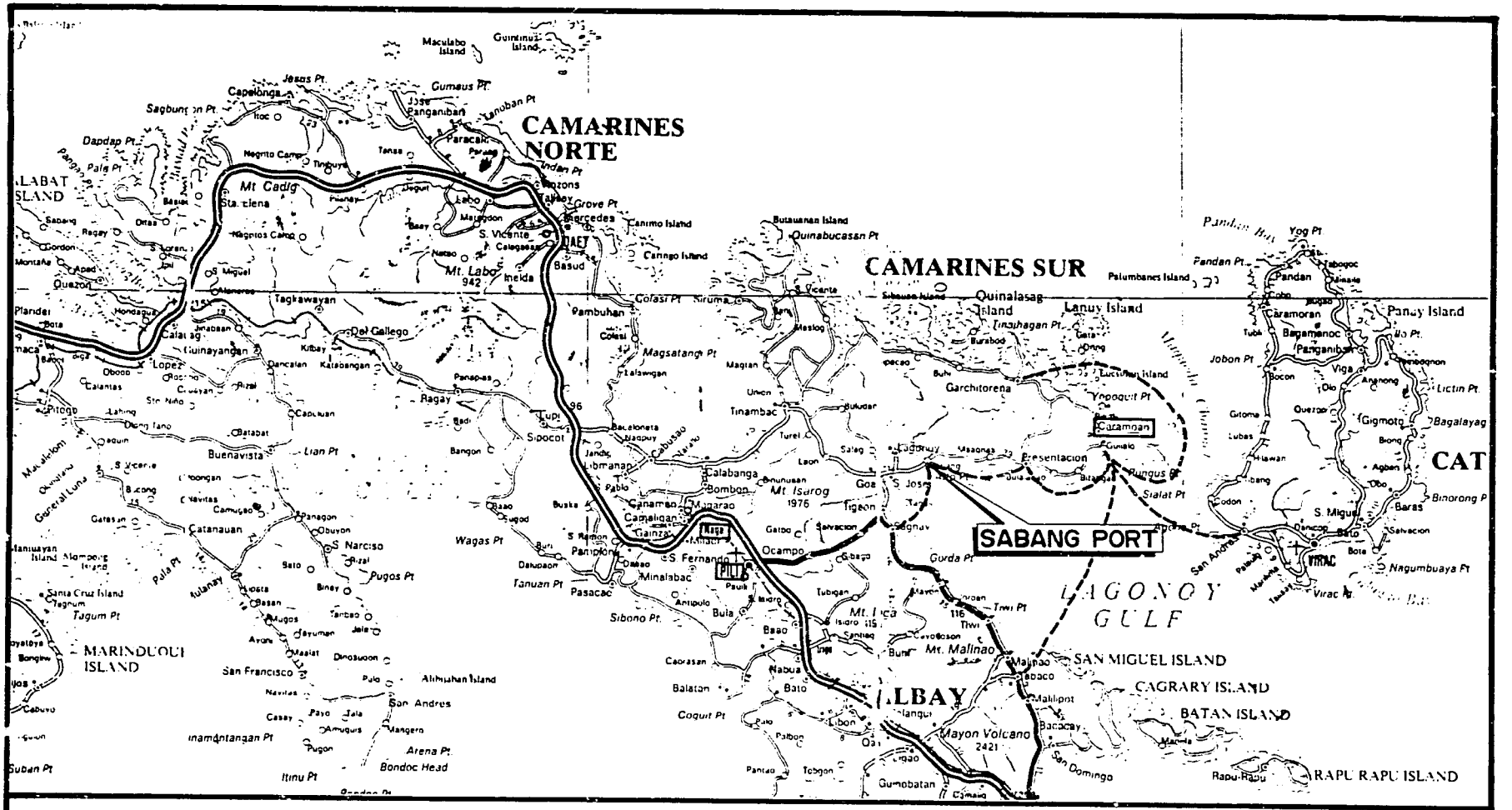
Due to forest denudation and the development of a national highway system, the **importance** of the Port of Sabang declined until recent years. In Spanish times Sabang was a major export center, attested today by bodega ruins and a still-functioning lighthouse. Sabang is now the principal passenger and small quantity cargo distribution port for many of the principal ports on the Lagonoy Gulf. Sabang is also in direct competition with Sagnay Port.

The principal advantage of Sabang Port over that of Sagnay is that the stairlanding at Sabang is accessible to medium and larger bancas during low tides while those at Sagnay are not. In addition, Sabang is perceived as being closer to Presentacion and Caramoan than is Sagnay. Finally, the adjacent Municipality of Goa is currently the preferred destination for buyers and visitors not going on to Pili or Naga. In the recent past, this preference was shared by the Municipality of Tigaon and the Port of Sagnay.

The **future role** of Sabang Port will continue to be important to the Lagonoy Gulf. This is particularly true with respect to Catanduanes and the coastal communities of the Caramoan Peninsula despite the scheduled completion of a new highway connecting Caramoan with Naga and Pili.

Future development includes the likely reforestation of Mount Isarog and the Caramoan Peninsula, the mining of marble and mineral deposits in the Municipality of Lagonoy and the probable development of other mineral prospects on the Caramoan Peninsula.

The **existing facility** consists of a 153-meter seawall with stairs and a relatively small shed suitable for passengers. The surrounding facilities include numerous private bodegas, booking offices, waiting rooms, sari sari stores and restaurants. Many



LEGEND :

BANCA ROUTE

0 20 40 60 80 Km

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LAGONOY GULF CARGO & PASSENGER NETWORK

FIGURE 2-1

FS/SABANG

bancas, by choice or circumstance, tie up to the river bank after setting out stern anchors. When this is done, the discharge of passengers and cargos over a narrow bow gangplank is slow and laborious.

River siltation is a problem although the impact is limited. The relatively constant flow of the Lagonoy River generally maintains a minimum channel depth of about one meter throughout the year.

The **zone of influence** for Sabang Port includes the Municipalities of San Jose, Goa and Lagonoy with a combined population in excess of 115,000. The total hinterland extends west to the cities of Naga and Pili and outward to the whole of the Lagonoy Gulf north and east of Tobaco as well as the island Province of Catanduanes (Figure 2-1).

Sabang is the principal coastal barangay in the Municipality of San Jose. San Jose is comprised of twenty-nine barangays with a total **population** in excess of 28,500 including 360 families dependent upon fishing for their livelihood. The adjacent Municipality of Lagonoy has a population of about 42,000 including 3,600 families dependent upon fishing for their livelihood. Consequently, Lagonoy is a more important source of fish for the larger Municipality of Goa and the cities of Naga and Pili than Sabang.

B. TRANSPORT SYSTEM PROFILE

Sabang Port is linked to San Jose Municipality by a concrete road constructed after World War II. The last two kilometers consists of a sand and gravel road through the port area proper.

There is frequent daily bus and jeepney service between San Jose Municipality and Sabang Port. San Jose is linked to Goa, the principal municipality in the district; Pili, the provincial capital; and Naga, the principal city in the province by concrete roads constructed to national highway standards.

These roads are in relatively good condition as far as Pili although there are some areas requiring immediate attention. The national highway north of Naga is in serious disrepair.

In addition, Philippine National Railways and Philippine Airlines maintain daily scheduled services between Naga and Manila.

C. SOCIO-ECONOMIC CHARACTERISTICS OF THE ZONE OF INFLUENCE

The people of San Jose Municipality are primarily farmers. The zone of influence also includes the Caramoan Peninsula from which many fishermen, merchants and farmers come to trade at the port.

Camarines Sur is a predominantly (76%) rural province. Residents are overwhelmingly Bicolano, but include 4% Tagalogs. With a median family income of P. 21,771 in 1985, the province is about average for the Philippines. The main source of income is agriculture-related for over half of Camarines Sur families (54%), compared with 48% for Region V (Bicol) and 38% for the Philippines as a whole. As shown in Table 2-1, the poor are small farmers, while the rich are non-agricultural wage earners or recipients of remittances from abroad.

TABLE 2-1

FAMILIES BY MAIN SOURCE OF INCOME AND TOTAL FAMILY INCOME FOR CAMARINES SUR

Main Source Of Income	Total	Family Income (Pesos) Under 10K	10K-14K	15K-19K	20K-29K	30K-39K	40K-59K	60K & Over
		Percent of Families						
Agricultural Wages/Salaries	13.8	27.4	17.3	10.8	3.0	5.0	0.0	0.0
Non-Agricultural Wages/Salaries	21.6	8.9	25.6	18.3	26.2	32.3	24.6	41.3
Agricultural Entrepreneurial	40.1	44.7	41.8	51.8	39.5	14.9	29.5	11.9
Non-Agricultural Entrepreneurial	8.9	4.7	8.1	2.1	16.3	17.4	29.5	4.6
Other	15.6	14.3	7.2	17.0	15.0	30.4	16.4	42.2
	100%	100%	100%	100%	100%	100%	100%	100%
Total Families (Thousands)	206.5	49.9	52.5	35.0	39.2	14.5	5.5	9.9

SOURCE: National Census & Statistics Office. 1987. 1985 Family Income and Expenditures Survey, Vol. II. Manila: NCSO.

The educational level in Camarines Sur falls below the Philippine average. In 1980, five out of six residents (85%) were literate but just over one-fourth (27%) entered high school. For the Philippines as a whole, one-third (33%) entered high school. Employment in Camarines Sur was only slightly below the Philippine average and was considerably higher for men (80%) than for women (15%). Three-fourths (76%) of the men and one-fifth (21%) of the women who were employed worked in agriculture.

Most families (58% urban and 55% rural) owned the land where they lived. Five out of eight (62%) urban homes and 15% of rural homes had electricity. The piped water supply was far below Philippine standards. Only 32% of urban homes (compared with 58% for the Philippines) and 11% of rural homes (compared with 15%) obtained drinking water from a faucet. Almost three-fourths (72%) of urban households and 91% of rural households cooked with charcoal or wood. Seven out of ten urban homes (71%) and 58% of rural homes had radios.

In 1980, there were 2,303 farms in San Jose Municipality. Almost all were small farms. Only 5% (compared with 17% for Camarines Sur) were over five hectares. Over half (56% versus 50% for Camarines Sur) were fully owned, 15% were partially owned, and only 12% (compared with 34% for Camarines Sur) were share cropped. Thus, the major population served by the port is small farmers and rural residents.

III.
PORT THROUGHPUT

III. PORT THROUGHPUT

A. INTRODUCTION

The proposed feeder port sub-project site was surveyed on four levels between February and May of 1990. An initial reconnaissance survey in February was followed by a environmental "flyover" survey in April and by economic and final engineering surveys in May (Exhibits 1 through 3).

Appendix B displays the data base used to forecast port throughput. This data was initiated during an early reconnaissance survey, expanded from secondary sources and subsequently finalized after a more task-specific economic survey (Exhibits 4 through 9).

The aforementioned surveys, data and projections form the basis for the economic evaluations of all proposed feeder port sub-projects.

B. THROUGHPUT FORECAST

Existing throughput were developed from an comprehensive network analysis of all of the principal ports of the Gulf of Lagonoy. Input and output for the network ports of Sabang, Sagnay (Nato), Presentacion, Caramoan (Guijalo), San Andres (Cab Cab) and Tobaco were determined through individual surveys (Exhibit 9).

The Port of Sabang is one of the most important passenger and distribution centers on the Lagonoy Gulf. All of the coastal communities on the Caramoan Peninsula as far as Garchitorena on the Philippine Sea are serviced by merchants from Naga and Pili through the Ports of Sabang and Sagnay (Nato).

1. Fish Traffic

Fishermen were surveyed to determine the fish landed from "marginal" (inner coastal) activities and "deep sea" activities.

In the absence of definitive fish stock estimates or other positive indications of surplus fish stocks, fish landings are not projected to increase over the forecast period.

2. Cargo Traffic

i. Rice, Bagged Cargos and Bottled Cargos

Rice, bagged cargos and bottled cargos are derived from the Consultant's survey and subsequent network analysis.

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Current rice consumption is close to current rice demand and is therefore, relatively, income inelastic. This condition of general income inelasticity has been applied to other bagged and bottled cargos as current per capita bottled consumptions are already quite high.

In any case, rice, bagged cargos and bottled cargos have been collectively projected to increase with the population increase of 1.77% per year protected for Camarines Sur (Exhibit 4).

ii. Fuel, Consumables and Others

Fuel movements are derived from the Consultant's survey and subsequent network analysis.

Consumables, representing all manner of consumer goods, vegetables and fruits were derived from the Consultant's survey and subsequent network analysis. This category is not entirely consistent from one port to another due to substantial differences in the manner in which cargos are recalled or recorded. Where indicated, a subtotal of consumable cargo volumes has been provided for later spoilage benefit savings calculations.

Others is a residual category reserved for cargos that do not easily fit into the other aforementioned categories. Two typical examples are ice and abaca.

In all events, throughput has been projected to increase at the same rate as the projected increase of 4.27% per year, which represents a population income demand increase formula the same as that required to project jeepney travel demand (Section 3 and Exhibit 6).

iii. Cargo Allocations

Where definitive origin/destination data was deficient, cargos were allocated to the network in proportion to the surveyed passenger distribution (Exhibit 9).

3. Passenger Traffic

Growth in passenger traffic is based on the macro-economic analysis of household expenditures on transportation.

The formula used is:

$$T = P + I*E$$

Where:

T: Annual growth rate for passenger travel.

P: Annual growth rate of population for the province.

I: Annual growth rate of income per capita for the province.

E: Elasticity of passenger travel demand to change in income per capita.

The growth rates and demand elasticity mentioned above (T, P and I), for each province and for different transport modes are shown in Exhibits 4, 5 and 6.

The elasticity of passenger travel demand to change in income per capita for banca travel is assumed to be the same as that for jeepney travel as determined by previous DPWH studies (Exhibit 6).

The estimated annual growth rate for passenger travel through Sabang Port is 4.27%.

4. Vessel Throughput

Daily vessel throughputs were determined by survey and represent effective vessel throughputs except during periods of inclement (bad) weather.

Vessels have not been projected to increase in capacity over the forecast period and vessel throughput increases are taken as being the same as the projected increase in banca passenger travel demand unless otherwise noted.

Table 3-1 displays the throughput projections described above for passengers and cargos as well as general vessel and port projections.

TABLE 3-1

SABANG PORT THROUGHPUT PROJECTIONS

COMMODITY	1989/90 SURVEY	1992 PROJECTED	2001 PROJECTED	2011 PROJECTED
FISH (i) (tons per year)				
1 Offshore	0	0	0	0
2 Marginal	540	540	540	540
3 Ipon	0	0	0	0
4 Bangus	0	0	0	0
5 Transhipped	0	0	0	0
Total:	540	540	540	540
% of 1992:	100%	100%	100%	100%
CARGO (tons per year)				
1 Rice (ii)	2,014	2,086	2,486	2,963
2 Consumables (iii)	1,368	1,725	5,503	17,552
3 Bagged Cargos (ii)	3,916	4,056	4,834	5,761
4 Bottled Cargoes (ii)	5,047	5,227	6,230	7,425
5 Fuel & Oils (iii)	608	767	2,446	7,801
6 Others (iii)	723	912	2,908	9,277
Total:	13,676	14,773	24,406	50,778
% of 1992:	93%	100%	165%	344%
PASSENGERS (per year)				
1 Local	30,400	33,052	50,210	76,275
2 Regional	273,600	297,464	451,886	686,471
3 Inter-Island	0	0	0	0
(iv) Total:	304,000	330,516	502,096	762,746
% of 1992:	92%	100%	152%	231%
VESSELS (per day)				
1 Scheduled Commercial	0	0	0	0
2 And/Or Unscheduled C	35	38	58	88
3 Scheduled Inter-Island	0	0	0	0
4 And/Or Unscheduled I-I	0	0	0	0
(v) Total:	35	38	58	88
% of 1992:	92%	100%	152%	231%

SOURCE: Consultant's surveys.

BASIS:

(i) 540 tons and not projected to increase.

(ii) 10,977 tons projected to increase with population at 1.77% for Camarines Sur (Exhibit 4).

(iii) 2,699 tons projected to increase the same as jeepney travel demand which was determined from the product of population increase, per capita income growth and an income demand elasticity of 0.5 for Camarines Sur (Exhibit 6).

(iv) 304,000 passengers project to increase the same as the rate as jeepney travel demand for Camarines Sur (Exhibit 6).

(v) 35 vessels which are projected to increase at the same rate as jeepney travel demand (Exhibit 6).

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IV.
ENGINEERING DESIGN

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IV. ENGINEERING DESIGN

A. DATA COLLECTION

1. Reconnaissance Survey

A reconnaissance survey for the Port of Sabang was conducted on January 18 and 20, 1990.

The team met on January 18, with the following officials in Legaspi City and in the town of Pili, Camarines Sur before going to the port site:

Mr. Mario R. Talatala	-	DPWH Regional Director, Region V, Legaspi City
Mr. Boamerges Relativo	-	DPWH District Engineer, 2nd Engineering District, Pili, Camarines Sur
Mr. Alfonsito C. Padua	-	Asst. DPWH District Engineer, 2nd Engineering District, Pili, Camarines Sur
Mr. Rolando H. Arroyo	-	Chief Planning and Design Section, 2nd Engineering District, Pili, Camarines Sur
Ms. Ma Nimfa Lee	-	RDC Secretariate, NEDA, Region V, Legaspi City
Ms. Grace T. Imperial	-	Chief Provincial Development Planning and Evaluation Office

On January 20, the team met at the port site with the Mayor of San Jose, Hon. Ceriaco San Jose.

Sabang Port is situated on the south river bank of the Lagonoy River about six kilometers from the town proper of San Jose and sixty kilometers from Naga City, the trade center and capital of the Province of Camarines Sur. The District Engineer for Sabang Port is located in Pili, Camarines Sur.

The team gathered socio-economic data for the Province of Camarines Sur and engineering data for the port. Mayor Ceriaco San Jose furnished a copy of the history of the Port of Sabang. Since Spanish times, Sabang Port has been used to load copra, hemp, rattan and lumber bound for Manila and other countries.

2. Existing Port Facility

The present port facilities consist of a 160-meter long wharf structure with stairlandings and a fifteen-meter berth slip (Figure 4-1). The existing structure has two slight alignment deviations. According to the District Engineer, the alignment

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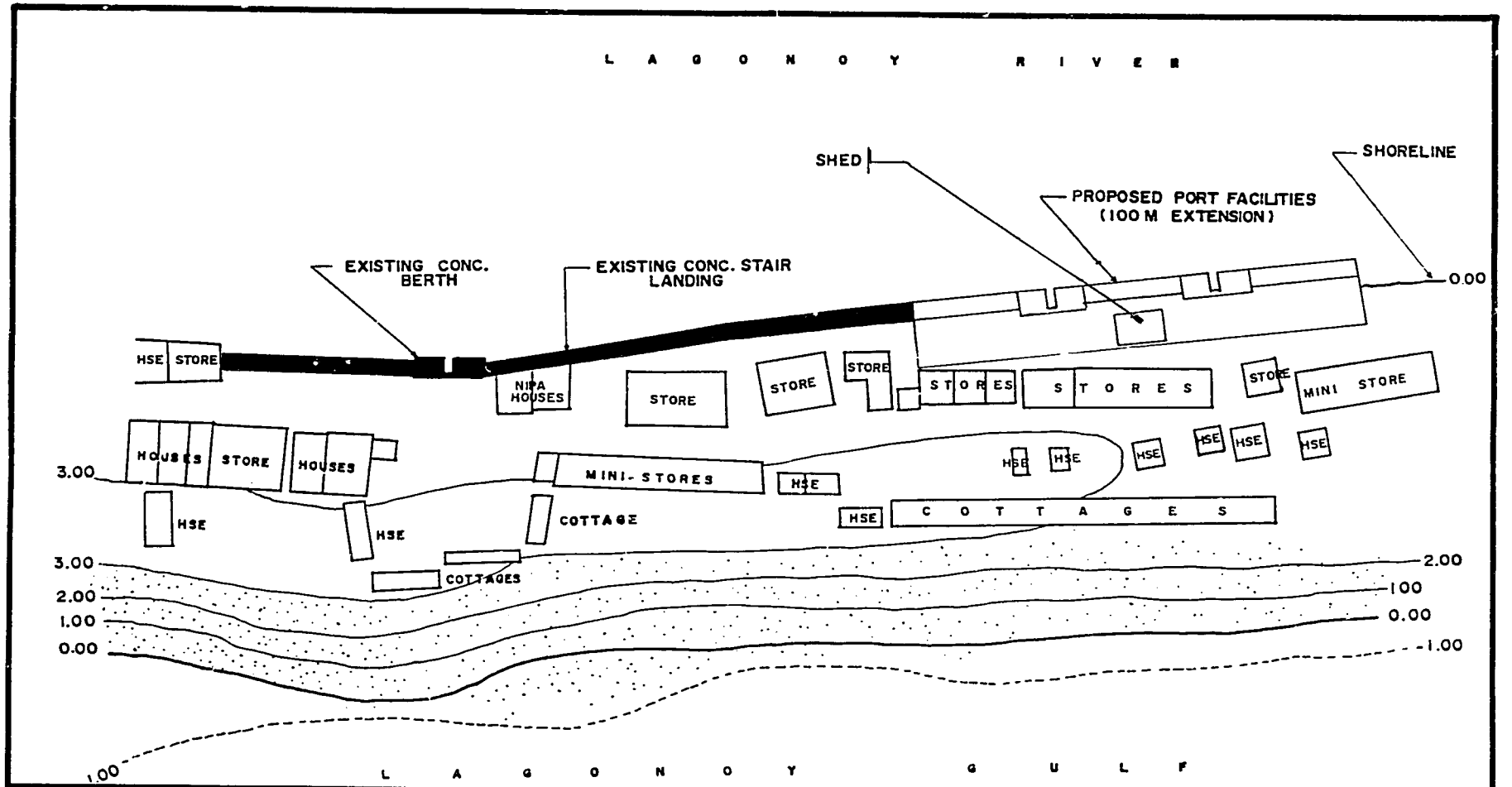


LEGEND:

EXISTING PORT FACILITY

PROPOSED PORT FACILITY

0 10 20 30 40 50
METER

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

DEVELOPMENT PLAN

FIGURE 4-1

FS/SABANG

IV-2

followed the existing river shoreline at the time of construction.

The District Engineer in Pili, Camarines Sur, provided the reconnaissance team with a drawing showing the construction of the existing facility. The wharf consists of a rubble mound causeway having reinforced concrete steps on both sides with a one-meter wide reinforced concrete walkway on top (Figure A-4).

At a third point on the wharf, a berth slip has been built. This structure is intended to allow bancas to berth bow first into an opening in the wharf for easy transfer of passengers and cargo.

The top elevation of the stairlanding wharf is about 2.5 meters above Mean Lower Low Water (MLLW). At the west end of the structure, backfill has been placed against the backside of the steps. Sand fill has been placed up to the level of the second step below the top of the wharf. At the east end of the wall, the newest section of the wharf, no sand has been backfilled against the back steps.

3. Port Operations

During the drier period of the year, (February through April) the depth in the river mouth is limited to about one meter. As a result, the port is mainly used by medium to large motor bancas with a maximum draft of 0.5 meters and a capacity of nine deadweight tons (Table 9-1).

The bancas use three methods of berthing at the port, as shown in Figure A-5 and Plates C-3 and C-4:

- Berthing parallel to the stairlanding wharf
- Beaching on the sand
- Berthing bow first into the berth slip

The disadvantage of beaching large bancas or pumpboats is that passengers who do not want to get their feet wet have to be carried about twenty feet to or from the end of the gangplank. The gangplank consists of a common two by eight plank with small cross planks used as steps nailed to it (Plate C-5, Photo 8). The gangplank is provided by the boat owner who carries it in the banca. The advantage of beaching is that the boat will not be damaged.

The disadvantage of berthing against the stairlanding wharf is that the outrigger or the bow of the boat may receive minor damage from impacting the concrete steps. The advantage is that passenger and cargo transfer takes place via a gangplank from ship to shore. Passengers do not have to be carried. However, since a soft landing is preferred by the boat owner, they continue beaching their boats.

Berthing of the bancas into a berth slip was brought into practice at this port. However, a berth slip perpendicular to the current is subject to siltation and may become useless at low tide. This type of berth could then be used only when water levels in the river are generally high. During high river levels the current is stronger and mooring perpendicular to the current is more difficult. Any errors during berthing at that time may result in the boat being swept downstream and causing damage to the banca or its outriggers.

4. Meteorological and Hydrological Conditions

i. Climate

Climatological data for the Sabang area is not available. But since 1903 readings were taken at Legaspi, about seventy kilometers south-southeast of Sabang. The climate in Sabang can be characterized as tropical with substantial rainfall. A period of less rain in February through April may be considered the dry season. Climatological normals and extremes for the area are provided in Exhibits 13 through 15.

ii. Rainfall

The number of rainy days per month varies from a minimum of fourteen in May to a maximum of twenty-three in December. The average minimum monthly rainfall occurs in April (152 millimeters) and the maximum (484 millimeters) occurs in November. The average annual rainfall in Legaspi is 3,300 millimeters. Local conditions in the Sabang area, such as the position of mountains, may cause more frequent thunderstorm activity and may result in a rainfall increase.

iii. Wind

No wind measurements are taken in Sabang. Readings are taken in Legaspi, to the south, and Daet, a city some seventy-five kilometers to the west. In both cities the predominant wind direction from October to May is from the northeast. During the rest of the year the wind is usually from the south or southwest and light, at about six kilometers per hour. Approximately six typhoons pass within 100 kilometers of the area each year.

During a typhoon winds may become very strong locally and can reach velocities of more than 100 kilometers per hour.

iv. Temperature

There are no statistics of temperature readings available for Sabang, but temperature data are recorded in Legaspi and Daet.

Maximum daily temperatures vary little throughout the year, from an average daily temperature 32° C in May and June to about

29° C in January and February. Daily minimum temperatures average from 22° C in to 24° C in January and February.

v. The River Hydrology

River flow data was obtained from the report "Streamflows and Lake or River Stage" (Volume I) published by the National Water Resources Council (January 1980). A table on page 258 of that report lists river discharge in cubic meters per second at a gauge about three kilometers upstream from the river mouth. The period of record is from 1951 to 1970 (Exhibit 16).

The average daily discharge measured during that period was 2.5 cubic meters per second. Since the port is only one kilometer from the mouth of the river, the water level at the port follows the tidal variation in the Lagonoy Bay very closely.

During very high river floods the water level at the port may be twenty to thirty centimeters higher than in the gulf. However, during the passage of a typhoon when winds blow upstream from the Lagonoy Gulf, the floodwater at the port may reach one meter above normal tidal level or more than two meters above MLLW. Some of the lower areas of the sand spit and the barangay proper may be flooded during these periods.

Shallow river depths during the dry season and the presence of a large sand bank suggests that significant amounts of soil and sand have been deposited into the river. Deforestation in recent years may still allow topsoil runoff from the steep hills in the area.

5. Site Topography and Hydrography

A topographic and hydrographic survey of the existing port facility was conducted by a sub-contractor. The survey included the areas as far south as ten meters offshore the sand spit into the Lagonoy Gulf to as far north as ten meters onshore the north bank of the Lagonoy River. The survey extended from 100 meters west of the port facility to approximately 200 meters east of the mouth of the Lagonoy River, thereby including the entire sand spit. Dredging a navigable channel from the port to Lagonoy Bay is not economical because siltation will soon return the river to its original bottom contours.

The water depth in the navigation areas is only about one-half to one meter at low tide. Although local boatsmen know how to maneuver their boats around the sand banks, navigation during low tide is difficult.

The Barangay of Sabang has been built on a long, narrow sand spit formation. This sand spit, with an average width of fifty meters, separate the Lagonoy Gulf to the south from the Lagonoy river to the north. The sand spit has grown about 500 meters since the 1960s. Growing in a downstream direction, the

spit indicates large sand transport by the river or significant littoral drift in the bay.

6. Availability of Construction Materials

Construction materials such as sand, gravel, rip-rap boulders and armour rocks are abundantly available in the Rangas River about ten km from Sabang Port. Major quarry sites include the Barangay Mampirao and Barangay Calalahan quarries. These two quarry sites are approved as construction material sources based on the results of quality control tests conducted on samples taken from these sites.

Other construction materials such as cement, lumber and reinforcing bars are readily available in Naga City or from Manila.

7. Soil Investigation

The soil investigation program was performed in early May, 1990. It consisted of drilling and sampling in locations of anticipated construction activities. Borehole locations are detailed in Figure A-8.

Five recognizable soil strata were discovered at Sabang. The results of the soil investigation are detailed in Table 4-1. A soil profile is shown in Figure A-9.

As a result of the borehole investigations, the soil at the port site was found to have an ultimate bearing capacity of 240 kilopascals. A factor of safety of 2.5 gives an allowable soil capacity of 96 kilopascals, which is sufficient for the foundation of the proposed stairlanding extension.

8. Seismic Conditions

The Philippines experience earthquakes in all regions. From 1960 to 1965, twenty-four earthquakes of intensities from 5.0 to 6.9 on the Richter Scale were recorded (Figure A-10). The Bicol Region where Sabang Port is located experiences an average of four perceptible shocks per year. Design of any structure in Sabang will take into account earthquake forces as specified in the DPWH guidelines.

TABLE 4-1

SOIL STRATA TYPES

SOIL UNIT	RELATIVE DENSITY	MATERIAL DESCRIPTION	DEPTH OF STRATA
Stratum A	Firm	Medium to Fine SAND	0.0 - 2.0 m
Stratum B	Loose	Coarse to Fine SAND	2.0 - 3.0 m
Stratum C	Firm	Coarse to Fine SAND	3.0 - 8.0 m
Stratum D	Loose	Medium to Fine SAND	8.0 - 9.0 m
Stratum E	Firm	Coarse to Fine SAND	9.0 - 10.0 m

B. PRELIMINARY DESIGN

1. Proposed Facility

The proposed 100-meter new port development (Figures 4-2 and A-11 through A-16) consists of:

- A 100-meter extension of the existing stairlanding wharf with two berth slips, located at the third points.
- An eight- by twelve-meter port building with an open passenger waiting area, a wharfinger's office and comfort rooms
- A 10.5-meter wide concrete paved area behind the entire new wharf at an elevation of 2.0 meters above MLLW
- Three hand-winch operated gangplanks long enough to accomodate for large bancas berthing along side the new stairlanding.

Extending the existing stairlanding wharf by 100 meters is required to accommodate the growing number of bancas that use the port. The wharf will also protect the land behind it from being flooded during high river water levels.

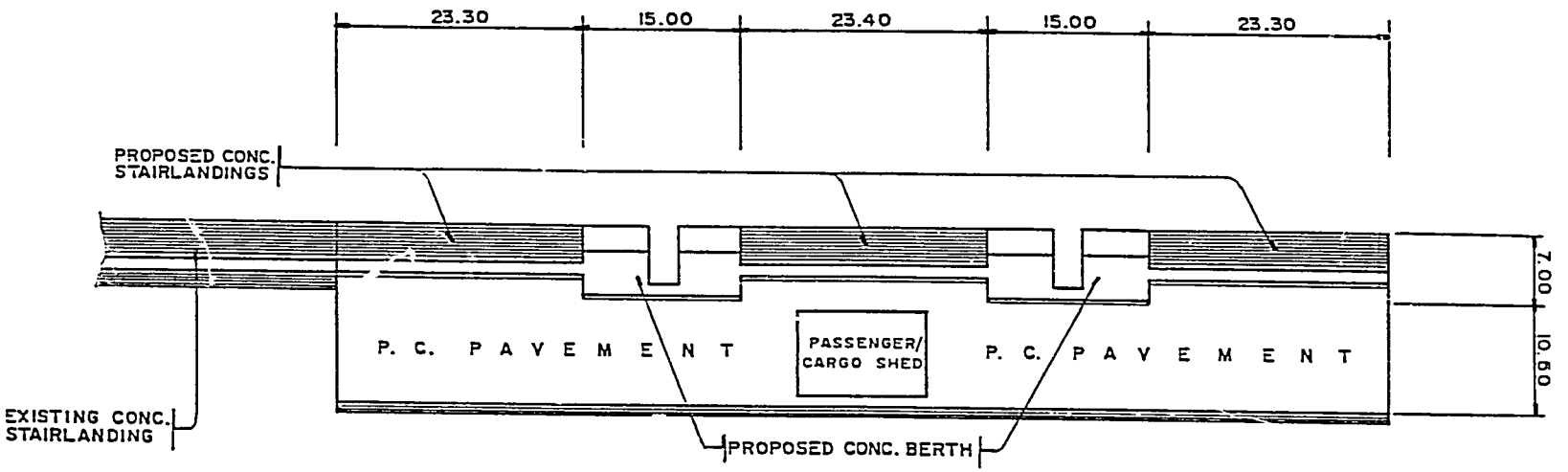
2. Design and Construction

The proposed design of the stairlanding wharf is the same as that of the existing structure. The construction method is also the same as was previously used. Settlements after construction are expected to be so minimal that cracking of

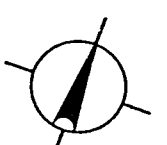
concrete stairs due to differential settlement is considered unlikely.

The stairlanding footing is one meter thick and is founded twenty centimeters below MLLW, or approximately fifty centimeters below the river bottom. Construction of this beam will require building of a cofferdam. A toe beam is required to prevent erosion of sand from under the rock mound.

Sand erosion occuring in front of the beam during high water level is unlikely. The spit sand has been continually deposited during the last several decades and has now reached a point of stability and compaction. River currents are also not expected to vary much because rainfall is more regular than in areas where extreme drought is followed by a monsoon period.



NOTE: LOCATION OF EXISTING STORES & HOUSES NOT SHOWN.



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RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492-0420

PLAN – PROPOSED SABANG PORT FACILITIES

FIGURE 4-2

V.
COST ESTIMATES

V. COST ESTIMATES

A. COST OF PROPOSED PORT FACILITIES

The proposed port facility is shown in Figures A-10 through A-15. The construction cost of the proposed facility is estimated at P. 5,917,000. The cost includes construction of a new 100-meter long wharf stairlanding with two slipways, a landing platform behind the wharf and a port building with a passenger waiting area, comfort rooms and a wharfinger's office.

B. UNIT RATES

The construction costs were determined by applying unit rates to the quantities. Applied unit rates are based on 1990 costs. A summary of unit rates are presented in Exhibit 10. These unit rates were developed from available data of current contracts for construction of ports at various locations in the country. In general, unit rates for port construction may vary from port to port depending on the remoteness of the port.

C. REMOTENESS FACTOR

An evaluation was made by comparing awarded contract unit prices for port sub-projects at various locations throughout the Philippines. Sub-projects on smaller, remote islands far from urban centers (Manila, Cebu, or Davao) or at sites reachable only by water were typically more expensive to construct than similar sub-projects readily accessible by road. Therefore, a remoteness factor has been included in the cost estimate to help quantify the additional, above-normal costs required when constructing a port improvement at a remote location. This factor has been derived for each port sub-project using the appropriate cost data available from other, similar port construction contracts.

Since Sabang Port is accessible by paved roadway from Manila and no above-normal construction costs are anticipated, the remoteness factor for Sabang has been assumed as 1.00.

D. CONTINGENCIES AND OTHER COSTS

A contingency factor of 10% has been taken into account for all port improvement construction. However, adverse construction conditions or unforseen obstacles are more likely for in-water construction than land-based construction. Typically, this extra uncertainty or contingency is reflected in higher unit rates for in-water construction instead of a separate, higher contingency factor. The unit rates presented in Exhibit 10 are derived in keeping with this method.

The following additional costs are tabulated in the manner shown in the Cost Estimate Summary (Table 5-1).

o Contractor's Site-Related Costs:

-	Mobilization and Demobilization	2%
-	Surveying	1%
-	Engineer's Building at site	1%
-	Office supplies, watchman, janitor	1%
-	Site supervision	4%
	Total	9%

Contractor's Overhead and Profit:

-	Contractor's Overhead	10%
-	Contractor's Profit	9%
	Total	19%

E. FINANCIAL AND ECONOMIC COST ESTIMATE

The economic and financial analyses of this sub-project have been made based on the data shown in Table 5-1. The economic cost of construction components typically varies between 70 and 90% of the financial cost. The economic cost at Sabang is 85% of the financial cost.

F. CONSTRUCTION PERIOD

The estimated construction time required for the proposed port improvement is approximately twelve to fourteen months. The stairlanding base beam is the most difficult and costly item to construct. A cofferdam has to be erected around the area to maintain dry working conditions. After the construction of this beam all remaining elements are constructed "in the dry".

G. MAINTENANCE COSTS

Maintenance cost for the proposed port improvement is estimated at 2% of the construction cost for the first year and projected to increase at 8.5% per year. The cost of maintaining the toilets and the office in an operational and clean condition is not included in this cost. These costs are estimated in Chapter VI.

TABLE 5-1 - COST ESTIMATE SUMMARY
THE PORT OF SABANG
(Sheet 1 of 1)

ITEM	DESCRIPTION	UNIT	UNIT COST (Pesos)	QUANTITY	COST COMPONENTS [1000 Pesos (% of Financial Cost.)] FOREIGN	LOCAL	TAXES	ECONOMIC COST (1000 P)	FINANCIAL COST (1000 P)
	I. STAIRLANDING W/ GANGPLANK								
50	Reinforcing Steel	KG	21	60000	567 (45%)	554 (44%)	139 (11%)	1,121	1,260
51	Structural Concrete, Class A	CU.M.	2100	577	497 (41%)	533 (44%)	182 (15%)	1,030	1,212
66	Structural Concrete, Class A (under water)	CU.M.	5300	70	130 (35%)	186 (50%)	56 (15%)	316	372
68	Core Rock for Causeway or Breakwater	CU.M.	260	400	52 (50%)	31 (30%)	21 (20%)	83	104
70	Armor Rock , Small (up to 1 ton)	CU.M.	575	500	144 (50%)	86 (30%)	57 (20%)	230	287
	TOTAL				1,390 (43%)	1,390 (43%)	455 (14%)	2,780	3,235
	II. PORT BUILDING								
81	Open Building	S.M.	3070	100	126 (41%)	135 (44%)	46 (15%)	261	307
82	Comfort Rooms, incl. Walls (no foundation, no roof)	S.M.	1500	24	15 (41%)	16 (44%)	5 (15%)	31	36
	TOTAL				141 (41%)	151 (44%)	51 (15%)	292	343
	III. LANDING PLATFORM								
9	Co..ipacted Fill, Select Material, Borrow	CU.M.	70	1700	56 (47%)	33 (28%)	30 (25%)	89	119
22	Crushed Aggregate Base Course	CU.M.	240	210	26 (52%)	11 (22%)	13 (26%)	37	50
33	Portland Cement Concrete Pavement	SQ.M.	400	1000	200 (50%)	124 (31%)	76 (19%)	324	400
	TOTAL				282 (50%)	168 (30%)	119 (20%)	450	569

NOTE: The minimum area of landing platform required for the port building is 250 square meters.

SUBTOTAL		3,522	4,147
Remoteness Factor :	1.00	0	0
SUBTOTAL		3,522	4,147
Contingencies (10%)		352	415
SUBTOTAL		3,874	4,562
Site Costs (9%)		349	411
SUBTOTAL		4,223	4,972
Overhead & Profit (19%)		802	945
TOTAL COST		5,025	5,917

VI.
SUB-PROJECT EVALUATION

VI. SUB-PROJECT EVALUATION

A. INTRODUCTION

Feeder port sub-projects have to meet certain economic criteria to prove that the necessary investment will be beneficial to the community. All RIF port sub-projects are subject to the following evaluation:

- An economic evaluation with a cut-off of 15% internal rate of return (IRR) for port investments over $500,000

The **economic evaluation** of feeder port sub-projects are analyzed within a "Port Evaluation Model" (Table 6-1). This spreadsheet model permits the easy economic evaluation of improvement proposals and alternatives for the proposed port sub-projects. These alternatives include the additional provision or extension of breakwaters, causeways, seawall, and market/passenger sheds.

The main inputs to the model, drawing on the data discussed earlier are:

- Traffic forecasts (Chapter III)
- Static port vessel capacities (Exhibit 11)
- Optimum vessel capacities (Exhibit 11)
- Representative vessel standby and operating costs (Exhibit 11)
- Value of Passenger Time (Exhibit 6)
- Construction costs for each alternative (Chapter V)

The benefits quantified include vessel operating cost savings, time cost savings, maintenance cost savings as well as reduced handling, spoilage and development benefits. The economic evaluation of this sub-project has been carried out with the following assumptions:

- The sub-project life is assumed to be twenty years.
- For discounting purposes, annual values are assumed to be incurred at the end of each year.
- The opportunity cost of capital is set at 15%.

The benefits not quantified are:

- The expected new revenue opportunity for vessel, passenger, cargo and fish landing fees presented by the proposed improved landing and

passenger/market shed port facilities (Chapter VII)

- o Social benefits and some indirect development benefits

B. SUB-PROJECT BENEFITS

The proposed construction is essentially the improvement and expansion of an existing port. Consequently, social benefits will not be as pronounced as might otherwise be the case.

However, current passenger amenities at Sabang are deficient particularly with respect to international standard loading and unloading gangways. Consequently, the proposed construction includes the provision of three passenger gangway (loading) platforms.

The principal economic benefits will result from passenger and vessel queuing and time savings due to the proposed expansion of the current passenger and cargo landing platform and stairs by 100%.

In addition a new passenger and cargo shed with hygienic and concessionaire facilities is proposed in order to enhance the current role of the port as a major terminus for passengers and cargos around the Lagonoy Gulf.

Direct economic benefits have been estimated as follows:

1. Vessel Turn Around Savings

Vessel turn around savings reflect the reduced times in port due to the provision of a passenger landing platform and landing stairs. The following data and assumptions were used to estimate benefits due to vessel turn around savings:

- o Thirty-five passenger bancas/day (1990)
- o 300 days/year operation
- o One hour/day/vessel saved (two trips/day)
- o P. 24.48/hour of operation per banca (Exhibit 9)
- o 4.27% as the projected annual traffic demand increase for Camarines Sur (Exhibit 6)

Using these data and assumptions, the 1990 benefit due to savings in vessel time would be P. 257,040. This benefit can be projected by using the growth rate formula detailed in T = P + I*E discussed previously in Chapter III. According to this formula, the projected annual vessel demand increase for Sabang is calculated to be 1.0427. Therefore, the benefit in 1992 will be P. 279,000.

2. Passenger Time Savings

Passenger time savings reflect the savings due to the reduced queuing, the installation of additional stairs, gangway and a passenger landing platform. The following data and assumptions were used to estimate benefits due to passenger time savings:

- 304,000 passengers/year
- P. 2.584/hour as the value of passenger time (Exhibit 8)
- 1/2 hours saved per trip
- 4.27% as the projected annual traffic demand increase for Camarines Sur (Exhibit 6)

Using these data and assumptions, the 1990 benefit due to savings in passenger time would be P. 392,800. This is projected to future years by using a traffic demand increase of 1.0427%. Therefore, the benefit in 1992 would be P. 470,800.

3. Handling Cost Savings

Handling cost savings reflect the reduced costs of transfers between bancas, vehicles and/or the passenger/cargo shed due to the construction of a passenger and fish landing platform. Since there is an existing facility already operation, in these benefits were reduced by one half. The following data and assumptions were used to estimate benefits due to handling cost savings.

- 1/2 of 540 tons/year of fish, not increasing
- 1/2 of 10,977 tons/year of rice, bagged and bottled cargos increasing with population at 1.77% per year (Exhibit 4)
- 1/2 of 2,699 tons/year of consumables increasing at 1.0427% per year
- P. 5/ton handled

Using these data and assumptions, the 1990 benefit due to handling cost savings would be P. 35,400. This benefit is projected to total P. 37,000 in 1992.

4. Reduced Spoilage Savings

Again, since there are existing facilities in place, the reduced spoilage savings will reflect one half of the savings due to the reconstruction of the passenger/cargo shed. The following data and assumptions were used:

- 1/2 of 2% of 540 tons of fish per year @ P. 20,000 per ton not increasing
- 1/2 of 1% of 1,368 tons of consumables per year @ P. 40,000 per ton increasing at 1.0427% per year

Using these data and assumptions, the 1990 benefit due to spoilage savings would be P. 381,600. The savings in 1992 would be P. 405,500.

C. SUB-PROJECT COSTS

1. Construction Costs

Sub-project costs are developed and described in detail in Chapter V.

2. Maintenance Costs

Maintenance costs are projected to commence at 2% of original investment costs and to increase thereafter at 8.5% per year until the asset is replaced.

D. ECONOMIC EVALUATION

Table 6-1 presents the results of the economic evaluation. The improvements recommended were the replacement of the currently active passenger/cargo shed, a new protective seawall with passenger landing steps and a new passenger and fish landing platform. In addition, sanitary facilities and concession stalls are proposed for the new passenger and marketing shed.

Benefits and maintenance costs were calculated as described previously.

The results of the analysis for the base case are:

- ent Value (15%) P. 3,357,300
- Ratio 1.67
- 24.46%

E. SENSITIVITY EVALUATION

The proposed programs is found (Table 6-1) to be economically feasible as well as socially and developmentally desirable within the following sensitivity scenarios.

Costs:	+15%	+0%	+15%
Benefits:	-0%	-15%	-15%
Net Present Value (15%)	2430.6	1927.0	1000.2
Benefit/Cost Ratio	1.42	1.38	1.17
EIRR (%)	21.12%	20.61%	17.61%

F. RECOMMENDATION

As the proposed improvement (estimated at under $500,000) has a base EIRR of 24.46%, which is in excess of the minimum 15% requirement, we recommend construction of all of the proposed upgrades: a 100-meter wharf stairlanding with two berth slips, a passenger/cargo shed, three gangways, and paving.

TABLE 6-1

ECONOMIC ANALYSIS (1000 Pesos)

PORT: Sabang LOCATION: San Jose, Camarines Sur

YEAR	VESSEL SAVINGS (1)	PASSENGER SAVINGS (2)	HANDLING SAVINGS (3)	SPOILAGE SAVINGS (4)	MAINTENANCE NET COSTS (5)	PROJECT COSTS (6)	NET BENEFIT STREAM (7)
1991	0.0	0.0	0.0	0.0	0.0	5,025.0	(5,025.0)
1992	270.5	455.7	36.7	395.9	109.0	0.0	1,049.8
1993	277.5	490.8	37.4	403.4	118.3	0.0	1,090.8
1994	284.7	528.7	38.1	411.0	128.4	0.0	1,134.1
1995	292.0	569.5	38.8	418.8	139.3	0.0	1,179.9
1996	299.6	613.4	39.6	426.9	151.1	0.0	1,228.3
1997	307.3	660.7	40.3	435.1	164.0	0.0	1,279.5
1998	315.2	711.7	41.1	443.5	177.9	0.0	1,333.6
1999	323.4	766.6	41.8	452.2	193.0	0.0	1,391.0
2000	331.7	825.7	42.6	461.1	209.4	0.0	1,451.7
2001	340.3	889.4	43.4	470.2	227.2	0.0	1,516.1
2002	349.1	958.0	44.2	479.6	246.5	0.0	1,584.4
2003	358.1	1,031.9	45.1	489.2	267.5	0.0	1,656.8
2004	367.4	1,111.5	45.9	499.0	290.2	0.0	1,733.6
2005	376.9	1,197.2	46.8	509.2	314.9	0.0	1,815.1
2006	386.6	1,289.6	47.7	519.5	341.7	0.0	1,901.7
2007	396.6	1,389.0	48.6	530.2	370.7	0.0	1,993.6
2008	406.8	1,496.2	49.5	541.1	402.2	0.0	2,091.3
2009	417.4	1,611.6	50.4	552.3	436.4	0.0	2,195.2
2010	428.1	1,735.9	51.4	563.7	473.5	0.0	2,305.6
2011	439.2	1,869.8	52.4	575.5	513.8	0.0	2,423.1
TOTAL	6,968.4	20,202.7	881.8	9,577.4	5,275.2	5,025.0	27,330.2

TOTAL BENEFITS: 37,630.4 COSTS: 10,300.2

ALLOCATIONS:

	BENEFITS		BASE COSTS	
	T Pesos	Percent	T Pesos	Percent
Hygienic Facilities	0	0.0%	31	0.9%
Passenger Cargo Shed	9,577	25.5%	486	13.8%
Causeway/stairlanding	27,171	72.2%	2,550	72.4%
Landing Platform	882	2.3%	225	6.4%
Causeway Protection	0	0.0%	230	6.5%

RESULTS:

Net Present Value (15%)	3,357.3	(1000 Pesos)
Benefit Cost Ratio	1.67	
EIRR (%)	24.46%	

SENSITIVITY ANALYSIS:

	Costs:	+15%	+0%	+15%
	Benefits:	+0%	-15%	-15%
Net Present Value (15%)		2,430.6	1,927.0	1,000.2
Benefit Cost Ratio		1.42	1.38	1.17
EIRR (%)		21.12%	20.61%	17.61%

VII.
FINANCIAL ANALYSIS

VII. FINANCIAL ANALYSIS

A. INTRODUCTION

The terms of reference require the study to determine if the proposed sub-project could be sustained by the responsible municipality from revenues generated by the port as a whole. This analysis assumes that the municipality is prepared to assess wharfage, layover, cargo, passenger and concession fees much as are currently undertaken at Caramoan and Sabang itself. Further, it has been assumed that the municipality is prepared to increase such fees proportionate to the projected growth in per capita income until the port becomes self-sustaining.

It should be noted, however, that the assessment and collection of port fees by municipalities is the exception rather than the rule throughout the Philippines.

In any case, it has been assumed that a depreciation fund will be set aside just as soon as revenues exceed maintenance costs. In the case of Sabang this is likely after the tenth year, after which funds equal to 5% of original costs will be deposited. The effective depreciation period is therefore thirty years.

The Financial Analysis is presented in Table 7-1 at the end of this chapter.

B. REVENUES

Vessel wharfage revenues (Table 7-1, Column 1) have been projected by multiplying the number of passenger vessels larger than three DWT by a wharfage fee of P. 20 per day (the fee presently collected in Caramoan) for 300 days per year. This wharfage fee is subsequently increased by the projected annual increase in passenger demand for bancas of 4.27% per year and by the projected annual increase in per capita income of 5.00% per year on the assumption that the market will bear such an increase in wharfage fees (Exhibits 5, 6, and 10).

Vessel layover revenues (Table 7-1, Column 2) have been determined in an identical manner for the balance of sixty days per year (Exhibits 5 and 6).

Cargo fees (Column 3) are assumed applicable to the projected fish landings of 540 tons per year. These are not projected to increase over the life of the analysis due to continuing pressures on available fish stocks and fishermen's incomes. A landing fee of P. 20 per ton, the fee currently assessed in Sabang, is assumed applicable to fish landings. It has also been assumed the market will bear annual fee increases equal to the projected increase in per capita incomes (Exhibit 20).

Arrastre, or stevedore, fees (Column 4) are currently being assessed at Sabang at the rate of P. 20 per ton of handled cargo. Fees are not assessed for non-commercial fish landings. Only about 10% of the fees are normally allocated to a municipality by the longshore unions who generally retain the greater part of any such assessments for the benefit of their own benevolent funds. Fees are projected to increase with the projected increase in per capita incomes (Exhibit 5).

Passenger fees (Column 5) for the proposed improved facilities should be the easiest to collect at a base assessment of P. 0.50 per passenger. Passenger movements in 1989 are estimated at 304,000 per year and should increase at 4.27% per year. Base fee levels are also projected to be increased proportionate to the projected increase in per capita income. Fifty percent of the fees collected are generally retained by longshore unions or port employee benevolent funds as a kind of service commission (Exhibits 5 and 6).

Transit fee (Column 6) opportunities are not apparent at this time for Sabang Port.

Concession fees (Column 7) are estimated at P. 600 per year per square meter for approximately fifty square meters of concession space. Such revenues are projected to increase from the 1989 base year at 5.00% per year or proportionally to the projected increase in per capita net income (Exhibit 5).

C. OPERATING EXPENSES

Maintenance (Column 8) is estimated at 2% of the initial investment costs for the first year. Maintenance costs are assumed to increase 8.5% per year over the life of the asset.

Wages (Column 9) are estimated for six employees at P. 6,000 per year per employee increasing by the projected increase in per capita income (Exhibit 5).

Total expenses (Column 10) are those expenses before any provision for asset replacement. Total revenues (Column 11) are those prospective revenues already described. Net revenues (Column 12) are prospective revenues less prospective operating costs before depreciation.

The net cost recovery factor (Column 13) is the percentage of costs before depreciation recovered from the proposed service fee assessments. Over the forecast period of twenty years, this factor is 358.0% of costs.

Finally, depreciation fund contributions (Column 14) are assessed in this appraisal as 5% of original improvement costs commencing after the initial ten years.

The adjusted net cost recovery factor (Column 15) reflects the application of the depreciation fund contribution charge.

Overall, the port is projected to be able to recover 259% of the costs over the forecast period.

D. CONCLUSION

It is the Consultant's judgement that the proposed sub-project could be maintained by the Municipality of Sabang with minimal support from general revenues provided the municipality assesses the suggested port fees and charges in the manner projected in this analysis.

TABLE 7-1

FINANCIAL ANALYSIS (1000 Pesos)

PORT: Sabang LOCATION: San Jose, Camarines Sur

	REVENUES							OPERATING EXP		SUMMARY RESULTS				DEPRECIATION	
	Vessel Whrfge. (1)	Vessel Layover (2)	Cargo Fees (3)	Arrastre Fees (4)	Psgr. Fees (5)	Transit Fees (6)	Cncssion Fees (7)	Mntnce. (8)	Wages (9)	Total Expenses (10)	Total Revenues (11)	Net Revenues (12)	Cost Rcvry Fctr (13)	Deprec. (14)	Adj. Cost Rcvry Fctr (15)
1992	129.5	25.9	326.1	31.5	36.0	n/a	33.1	89.9	39.7	129.6	582.0	452.3	448.9%	0.0	448.9%
1993	141.7	28.3	343.2	33.9	39.4	n/a	35.0	97.6	41.7	139.3	621.5	482.3	446.3%	0.0	446.3%
1994	155.2	31.0	361.2	36.4	43.2	n/a	36.8	105.9	43.8	149.6	663.8	514.2	443.6%	0.0	443.6%
1995	169.9	34.0	380.2	39.1	47.4	n/a	38.7	114.9	45.9	160.8	709.3	548.4	441.0%	0.0	441.0%
1996	186.0	37.2	400.1	42.0	52.0	n/a	40.8	124.7	48.2	172.9	758.1	585.2	438.5%	0.0	438.5%
1997	203.6	40.7	421.1	45.1	57.0	n/a	42.9	135.2	50.7	185.9	810.5	624.6	436.0%	0.0	436.0%
1998	223.0	44.6	443.2	48.4	62.5	n/a	45.2	146.7	53.2	199.9	866.9	667.0	433.6%	0.0	433.6%
1999	244.1	48.8	466.5	52.1	68.6	n/a	47.5	159.2	55.8	215.1	927.6	712.5	431.3%	0.0	431.3%
2000	267.2	53.4	491.0	56.0	75.2	n/a	50.0	172.8	58.6	231.4	992.9	761.5	429.1%	0.0	429.1%
2001	292.6	58.5	516.8	60.1	82.5	n/a	52.7	187.4	61.6	249.0	1,063.2	814.2	427.0%	0.0	427.0%
2002	320.3	64.1	543.9	64.6	90.4	n/a	55.4	203.4	64.7	268.0	1,138.8	870.8	424.9%	207.3	239.6%
2003	350.7	70.1	572.5	69.5	99.2	n/a	58.3	220.7	67.9	288.5	1,220.3	931.8	422.9%	207.3	246.1%
2004	384.0	76.8	602.5	74.7	108.7	n/a	61.4	239.4	71.3	310.7	1,308.2	997.5	421.1%	207.3	252.6%
2005	420.4	84.1	634.2	80.4	119.2	n/a	64.6	259.8	74.8	334.6	1,402.9	1,068.3	419.3%	207.3	258.9%
2006	460.3	92.1	667.5	86.4	130.8	n/a	68.0	281.8	78.6	360.4	1,505.0	1,144.6	417.6%	207.3	265.1%
2007	503.9	100.8	702.5	92.9	143.4	n/a	71.6	305.8	82.5	388.3	1,615.1	1,226.8	415.9%	207.3	271.2%
2008	551.7	110.3	739.4	100.0	157.2	n/a	75.4	331.8	86.6	418.4	1,734.0	1,315.6	414.4%	207.3	277.1%
2009	604.0	120.8	778.2	107.6	172.4	n/a	79.3	360.0	91.0	451.0	1,862.3	1,411.4	413.0%	207.3	282.9%
2010	661.3	132.3	819.0	115.7	189.1	n/a	83.5	390.6	95.5	486.1	2,000.9	1,514.8	411.6%	207.3	288.6%
2011	724.0	144.8	862.0	124.5	207.4	n/a	87.9	423.8	100.3	524.1	2,150.6	1,626.5	410.4%	207.3	294.1%
Total	6,993.4	1,398.7	11,071.2	1,360.9	1,981.7	0.0	1,128.2	4,351.3	1,312.4	5,663.7	23,934.0	18,270.3	422.6%	2072.5	309.4%

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VIII.
SOCIAL SOUNDNESS ANALYSIS

VIII. SOCIAL SOUNDNESS ANALYSIS

Social soundness analyses evaluate the effect of construction projects from the perspective of the intended beneficiaries, local residents and institutions in the zone of influence. This analysis focused on effects on income, population movements and cultural minorities. In brief, anticipated social benefits are positive.

Sabang is an active trading and passenger port used primarily by small, relatively low-income merchants and local residents. Upgrading the facilities will facilitate their transactions, resulting in both increased incomes and easier social interactions. Merchants using Sabang Port generally deal in small quantities of various retail items such as sugar, salt, tobacco, vegetables and consumables of all kinds. The port is sometimes used by farmers exporting crops such as rice and vegetables. Sabang is also a secondary fishing port for the Municipality of San Jose. However, Lagonoy is the principal source of fish for the adjacent large Municipality of Goa.

Passengers using the port are usually going back and forth between San Jose/Goa and Presentacion, Caramoan, and Cab Cab on the Island Province of Catanduanes, as well as smaller intermediate communities. Most are residents of these other locations coming to Sabang for business or shopping purposes. Non-economic reasons for travel to Sabang which are important to local residents include attending high school and visiting relatives. Though less frequent, medical emergencies represent crisis situations when rapid access is especially important. There are also a few long distance passengers and businessmen travelling between Sabang and Tobaco, via Caramoan.

Sabang is also a major distribution point for some large companies. Coca Cola, for example, uses it as a center for serving Catanduanes. And, some medium-sized wholesalers use Sabang for moderate shipments such as a hundred sacks of rice. There are also some large companies which ship items in Sabang Port. Commodities such as lumber and copra are examples of incoming items shipped by large businesses.

Improvement of Sabang Port will not result in any significant population migration. This is an existing port proposed for upgrading.

There are no vulnerable cultural minorities in the area that might be adversely affected by the proposed construction.

In conclusion, since the proposed construction is improvement of any existing port, social benefits will not be as pronounced as they would be for a new port, but all anticipated social impacts are positive. They will serve primarily middle and lower-class residents of the area rather than any privileged group. Thus, the sub-projects is socially sound.

For further analysis, refer to the Social Soundness Overview included in Appendix D.

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IX.
ENERGY ANALYSIS

IX. ENERGY ANALYSIS

Energy savings derived from these proposed port improvements can be primarily attributed to the economies of consumption and the economies of scale. The economies of consumption result from a faster turn-around time at the improved port. Less time spent at the port allows more time for transit while maintaining the same transportation schedule. Transit at reduced speeds results in more efficient fuel consumption and realized energy savings.

The economies of scale evolve from the use of larger vessels made possible through port improvements. Approximately twice the amount of cargo or passengers can be shipped in a larger vessel at only a 50% increase in energy consumption.

A secondary but important source of energy savings results from the reduced wastage of other perishables, such as ice, when they can be protected in sheds and/or bodegas.

Other probable savings are not significant in the context of single municipal ports.

Representative vessel types were selected on the basis of general applicability to the current and future requirements of all municipal ports surveyed. Exhibit 9 displays vessel types, roles and costs and describes fuel consumption factors per unit of work undertaken. Vessel types are described in Table 9-1. Figure 9-1 shows the average fuel consumption in liters/hour for each vessel type.

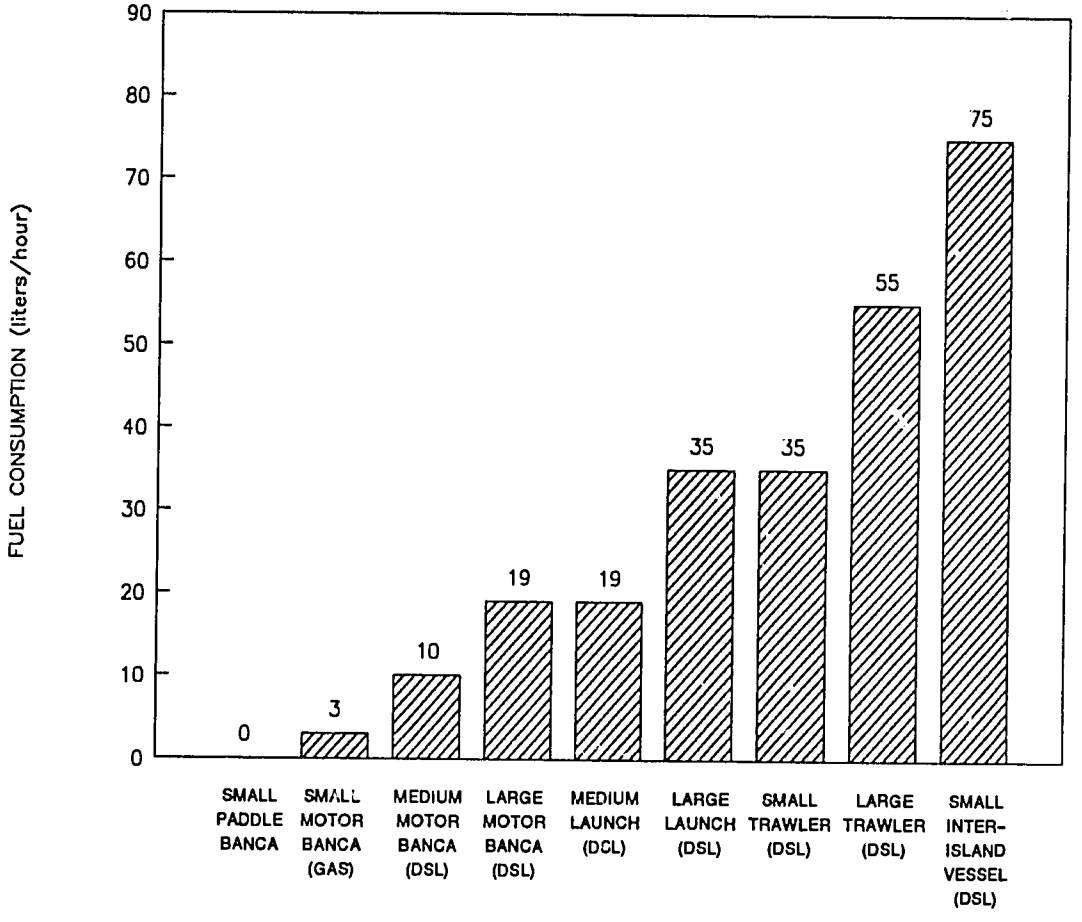
TABLE 9-1

REPRESENTATIVE VESSELS

TYPE OF VESSELS	DESCRIPTION	PRINCIPAL ACTIVITY
Small Paddle Banca	without engines and not usually in excess of 3/4 DWT	subsistence fishing, some passenger and cargo handling as lighterage service
Small Motor Banca	16 HP Briggs and Stratton engines and not usually in excess of 1.5 DWT	fishing, (40 - 60%) transporting passengers (20 - 40%) and cargo (10 - 20%)
Medium Motor Banca	85 HP Fuso 4DR5 diesel engines and of an average displacement of 4 DWT	transporting fish, usually in support of much larger trawlers (40 - 60%) fishing (20 - 40%) and transporting cargo (10 - 20%)
Large Motor Banca	two 85 HP engines or single 165 HP Isuzu engine and of an average displacement of 9 DWT	transporting cargo (40 - 60%), fish (20 - 40%) and passenger (10 - 20%)
Medium Launch	two 85 HP engines or a single 165 HP Isuzu engine and of an average displacement of 10 DWT	transporting passengers (80 - 90%) and cargo (10 - 20%)
Large Launch	two engines totalling about 250 HP and of an average displacement of 20 DWT	transporting passengers (80 - 90%) and cargo (10 - 20%)
Small Trawler	two engines totalling about 250 HP and of an average displacement of 20 DWT	fishing (60 - 80%) and transporting fish (20 - 40%)
Large Trawler	two engines totalling about 300 HP and of an average displacement of 40 DWT	fishing (60 - 80%) and transporting fish (20 - 40%)
Small Inter Island Vessel	two engines totalling about 400 HP and of an average displacement of 80 DWT	transporting passengers (40 - 60%), cargo (20 - 40%) and produce (10 - 20%)

FIGURE 9-1

ASSUMED FUEL CONSUMPTION



(GAS) = Gasoline engine
(DSL) = Diesel engine

X.
ENVIRONMENTAL ASSESSMENT

X. ENVIRONMENTAL ASSESSMENT

A. SUB-PROJECT DESCRIPTION

Improvements proposed for the Sabang Port are described in detail in Chapter IV of this report. Construction involves extension of the existing riverside stair landing and port facilities by 100 meters, and construction of a new storage shed.

No dredging or other construction activities are proposed for the river, beach or offshore environments.

B. EXISTING ENVIRONMENT

1. Physical Environment

The Sabang Port site is located in Camarines Sur Province on a peninsula at the confluence of the Lagonoy River and Lagonoy Gulf on the southeast coast of the island of Luzon. Sabang is a river port approximately 900 meters from the gulf. Direct sea access is limited by the sand spit formed at the river mouth which requires boats to navigate well to the east to enter the gulf.

The shore of both the river and gulf is sandy gravel. No coral reefs were observed anywhere near the port or in the adjacent bay which has a sand and mud bottom. The coastline is exposed to the southwest monsoon and is typical of a shore with major littoral sand supply and transport systems (ie., major river outlet, extensive exposed sand coastline and dune development, and seasonal wave and river action).

2. Biological Environment

The port and community of Sabang lie on the south bank of the Lagonoy River. This bank is well settled and little natural vegetative cover remains. Only low, sparse dune vegetation occupies the eastern end of the peninsula. The north bank of the river across from the port has a fringe of mangroves and several fish ponds. Sand bars occur in the middle of the river between the port and the mangroves. Upland areas on both sides of the river are planted with coconuts. Upstream approximately one kilometer is a large area of mangroves and nipa swamp. No mangroves or nipa swamp vegetation occur in the immediate vicinity of the port. Although fish trap and corral structures were noted across from the port, the river delta upstream still supports extensive mangrove communities.

No forest land remains within six kilometers of the Sabang Port. However, there is relatively undegraded forest on the Calinigan Mountains to the north. Logs were seen on the north

shore of the Lagonoy River but the Port of Sabang is apparently not used as a log loading point.

3. Cultural Environment

Sabang is a small fishing community with some beach resort development located approximately one kilometer east of the city of San Jose. It is comprised of nipa huts located on a unstable peninsula exposed to the southwest monsoon. It is likely that the settlement was once well to the west. Ease of access to the gulf dictated that the village move eastward as the sand spit advanced. No significant cultural resources are known or likely to occur in the construction area which is east of the existing village. The oldest buildings in the area are several warehouses dating from the early 1900's.

C. IMPACT ASSESSMENT

1. Physical Environment

No dredging or other major construction activities are being proposed in this sub-project and significant disruption of the physical environment will not occur. Lengthening the river wall will help stabilize the peninsula and protect the nipa houses and stores which are currently located on a bare sand beach.

2. Biological Environment

The proposed construction activities will not impact any previously undisturbed areas and are expected to have minimal impact on the ecology of the port area. No corals, mangrove or nipa swamp, or forest communities will be directly or indirectly affected. No dredging or other offshore activity are proposed and effects on the marine community are unlikely.

Although logging is apparently occurring in the Calingan Mountains and logs are being shipped from the mouth of the river, these activities do not involve use of the Sabang Port. Sabang is and will remain a fishing port with moderate commercial boat traffic. Proposed improvements will not result in its becoming a logging port.

3. Cultural Environment

The area where the proposed port improvement activities are slated to occur has been subjected to disturbances in the past and is unlikely to harbor archeological material of significance. No monuments or other culturally significant features will be impacted by the sub-project.

4. Social Environment

The community of Sabang is expected to directly benefit from the proposed sub-project. The quality and utility of ancillary structures at the port will be upgraded and the likelihood of damage caused by monsoons will be reduced.

D. ALTERNATIVES TO THE PROPOSED SUB-PROJECT

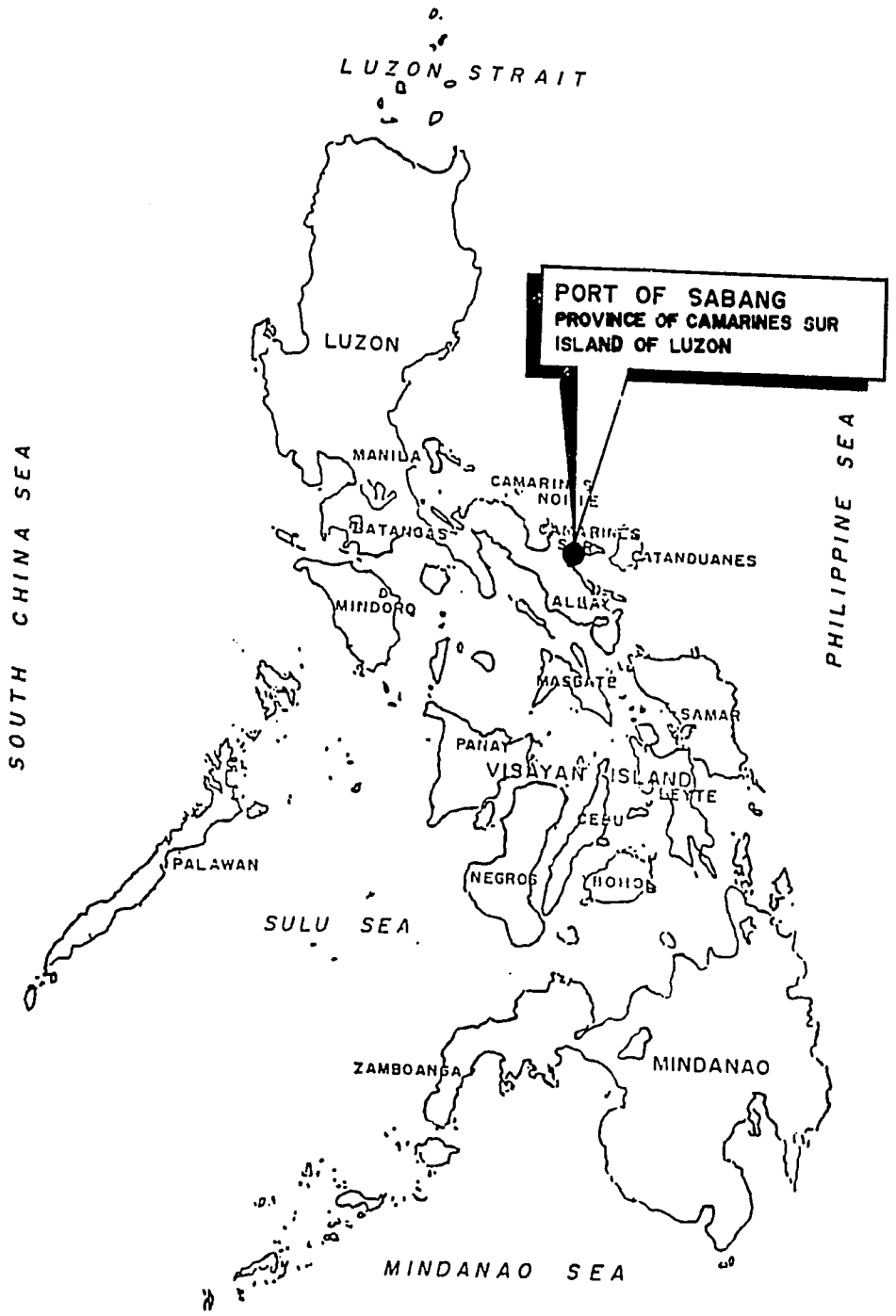
1. No Action Alternative

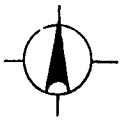
The no action alternative would not improve the quality of the existing facilities or repair damage caused by previous southwest monsoons. Existing damage would likely be further increased by subsequent storms possibly resulting in the port becoming unusable and houses being lost. Consequently, the no action alternative is considered unacceptable.

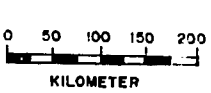
2. Alternative Construction Action

No alternative construction activities were identified which would serve as viable action alternatives to the proposed sub-project.

APPENDIX A
FIGURES







LEGEND:

● STUDY PORT

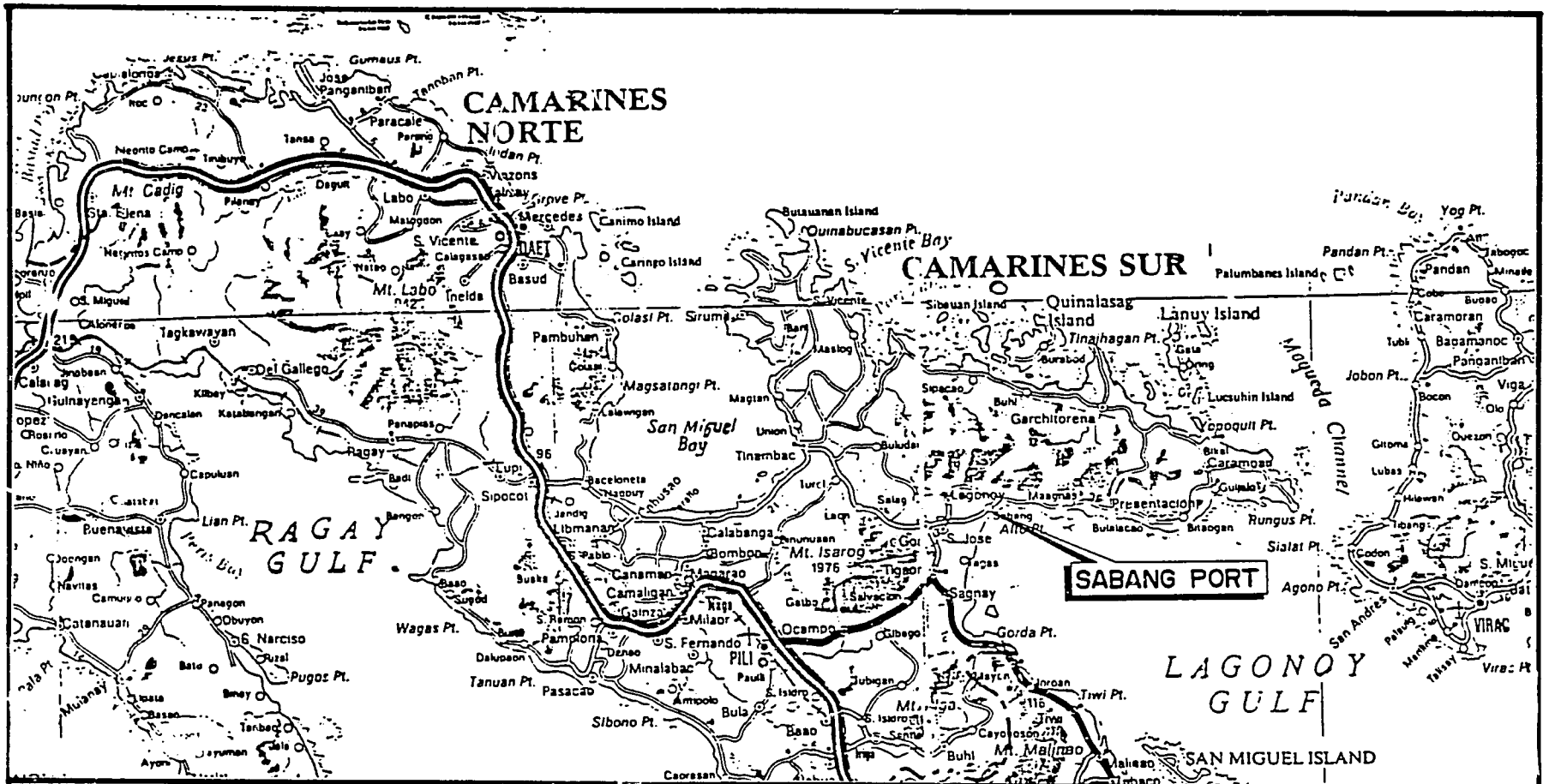
RAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492-0420

KEY MAP

FIGURE A-1

61

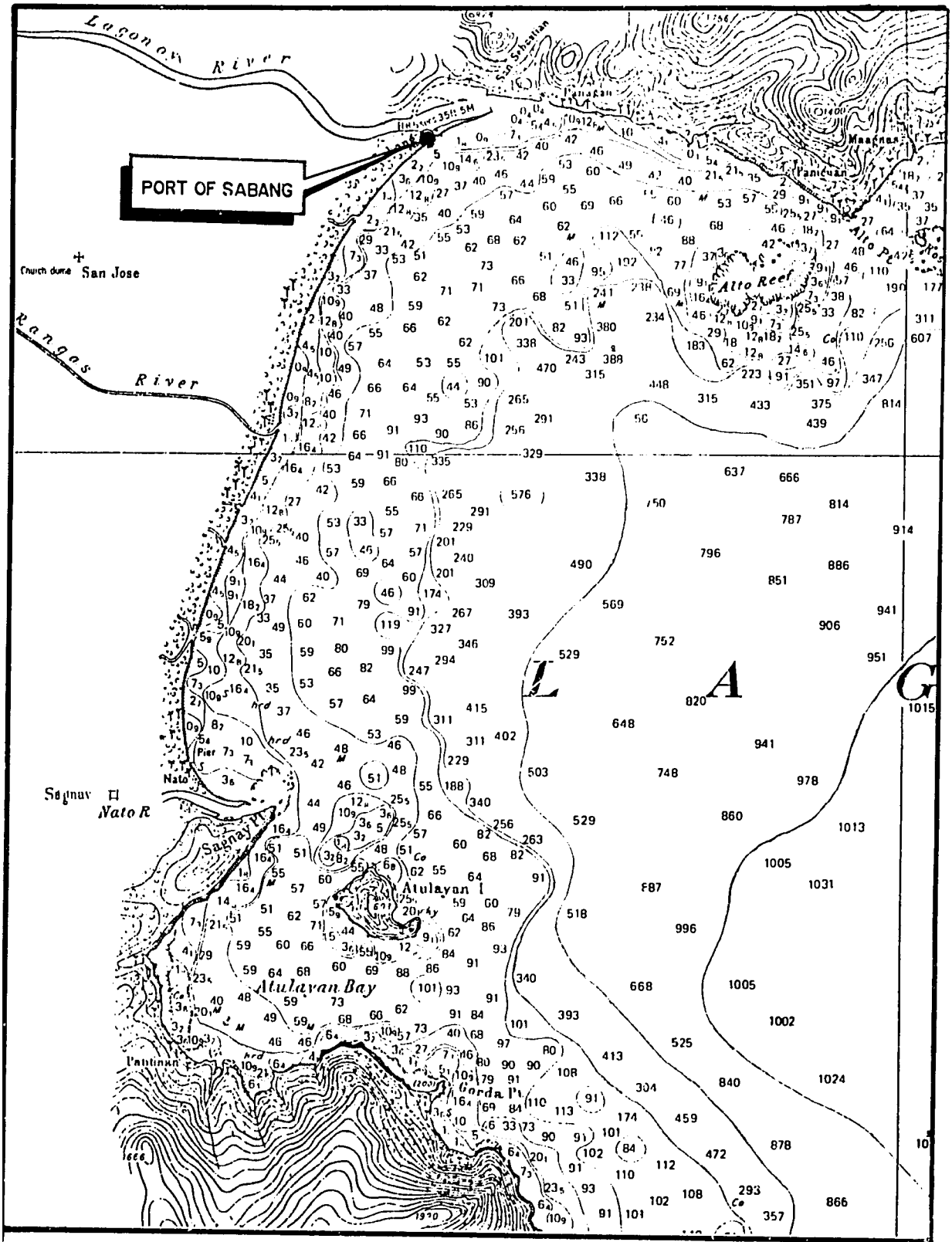


RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492 - 0420

ROAD INFRASTRUCTURE MAP

FIGURE A-2

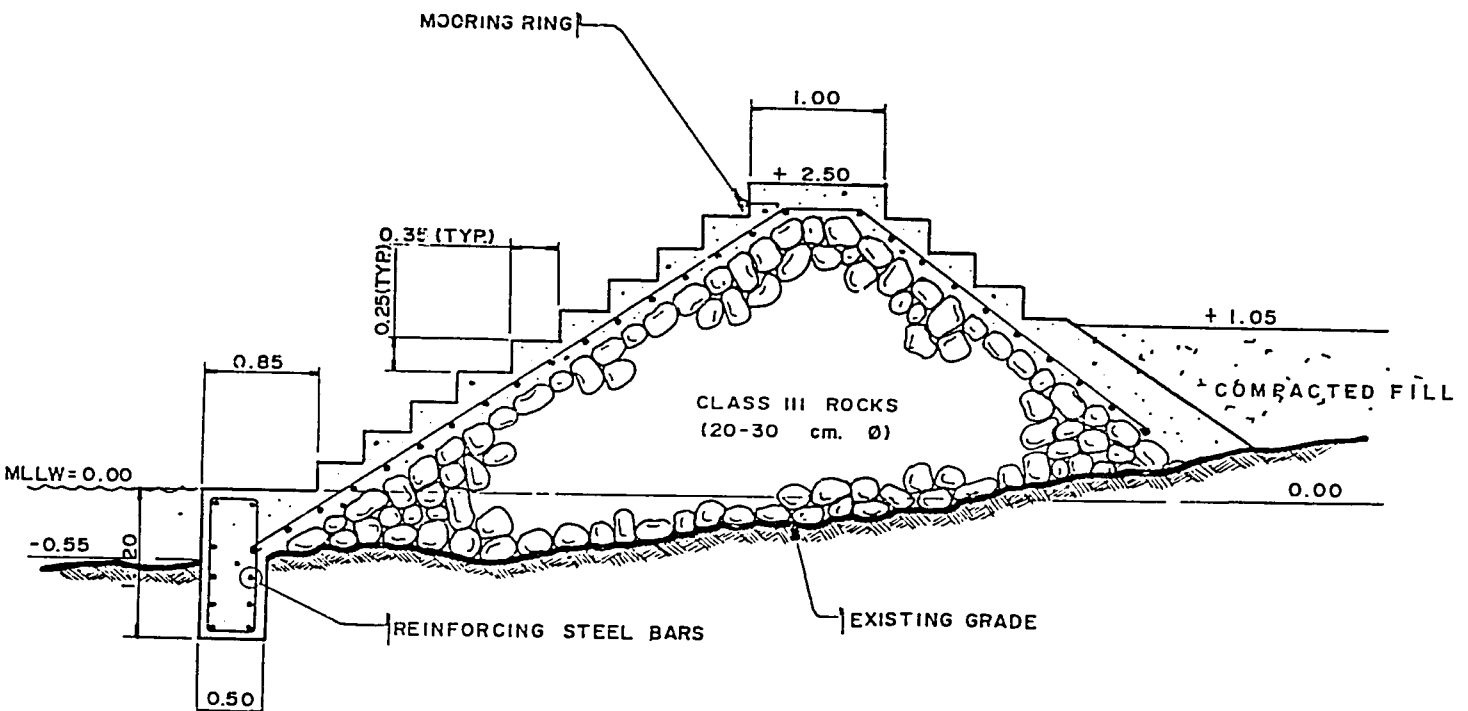


SOURCE: NAMRIA

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REGIONAL HYDRO MAP

FIGURE A-3

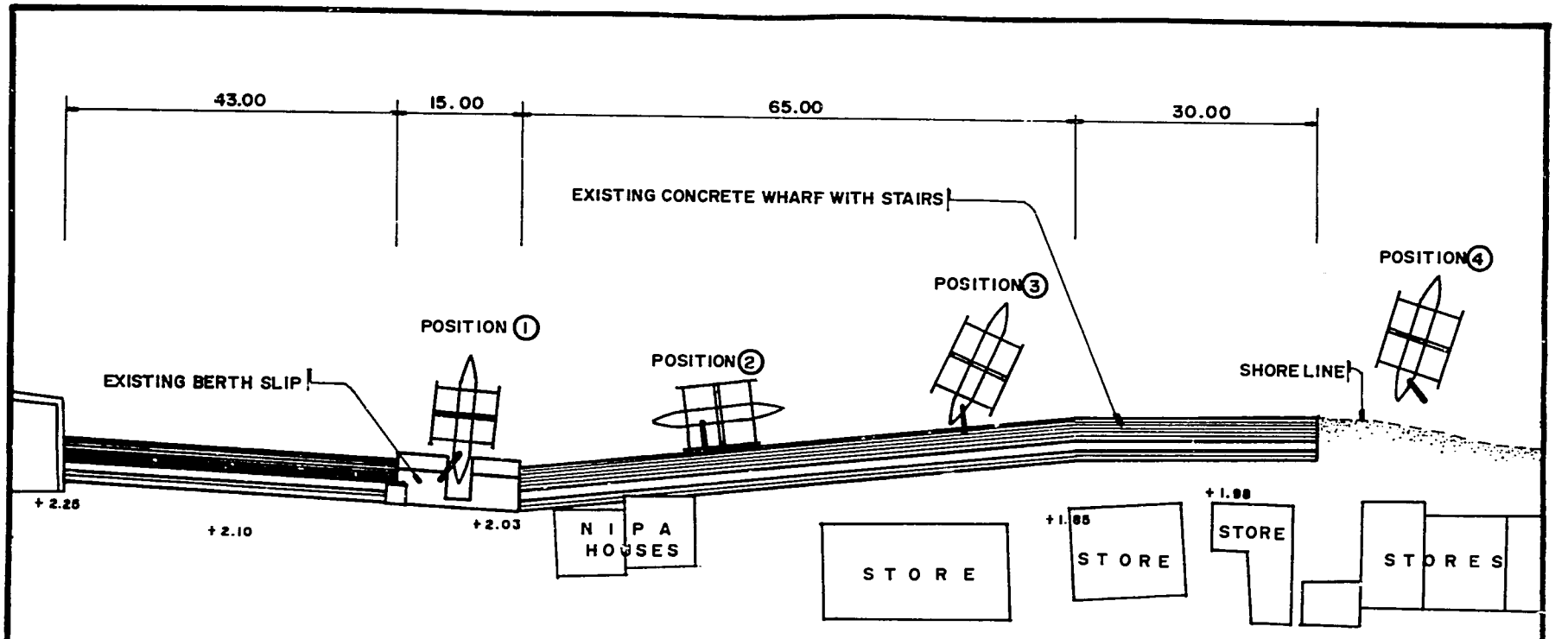


SCALE: 1:50

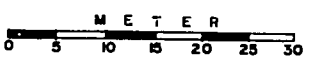
RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

TYPICAL SECTION OF EXISTING STRUCTURES

FIGURE A - 4



BOAT POSITIONS	DESCRIPTION
1	TRANSFER OF CARGO
2	NON-ACTIVE WAITING
3	UNLOADING / LOADING AT WHARF WITH STAIRS
4	BEACHED PASSENGER / CARGO TRANSFER



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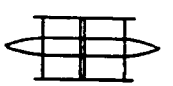


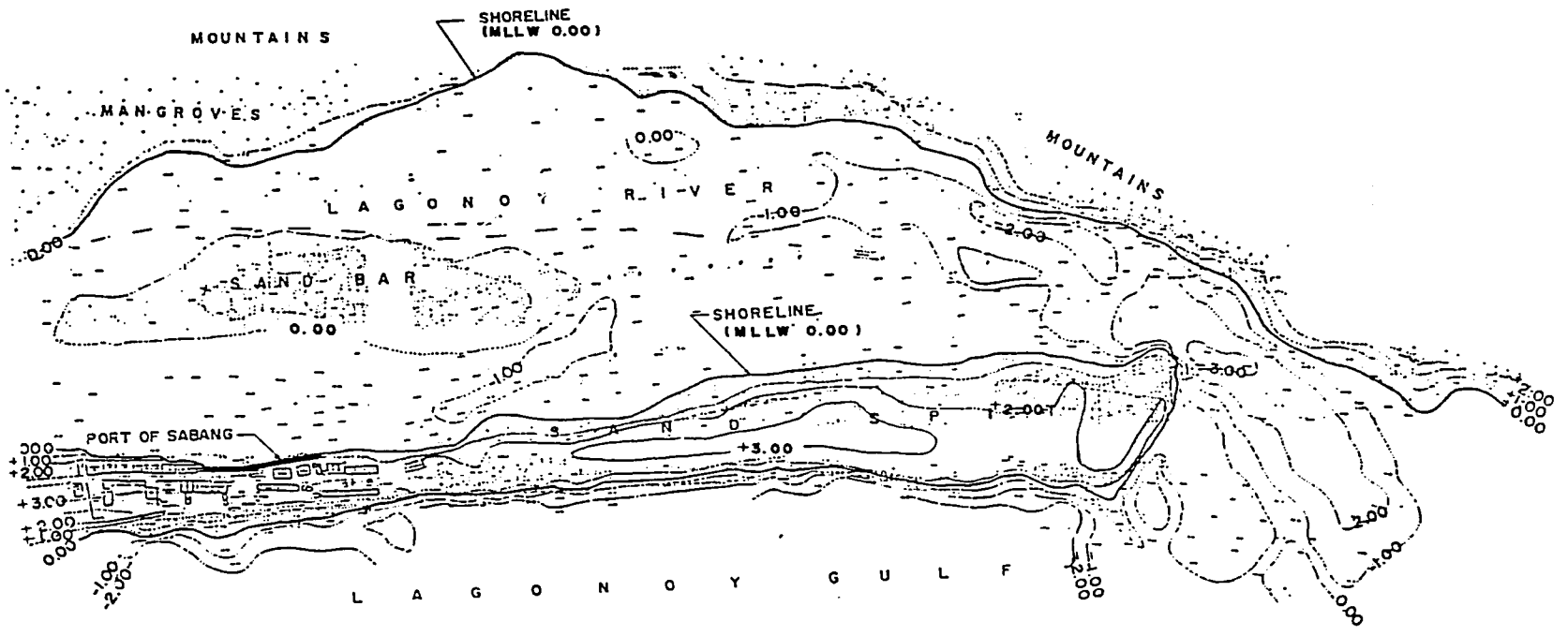
BOAT

WOODEN PLANK

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

BOAT POSITIONS FOR PASSENGER / CARGO TRANSFER

FIGURE A-5



LEGEND:

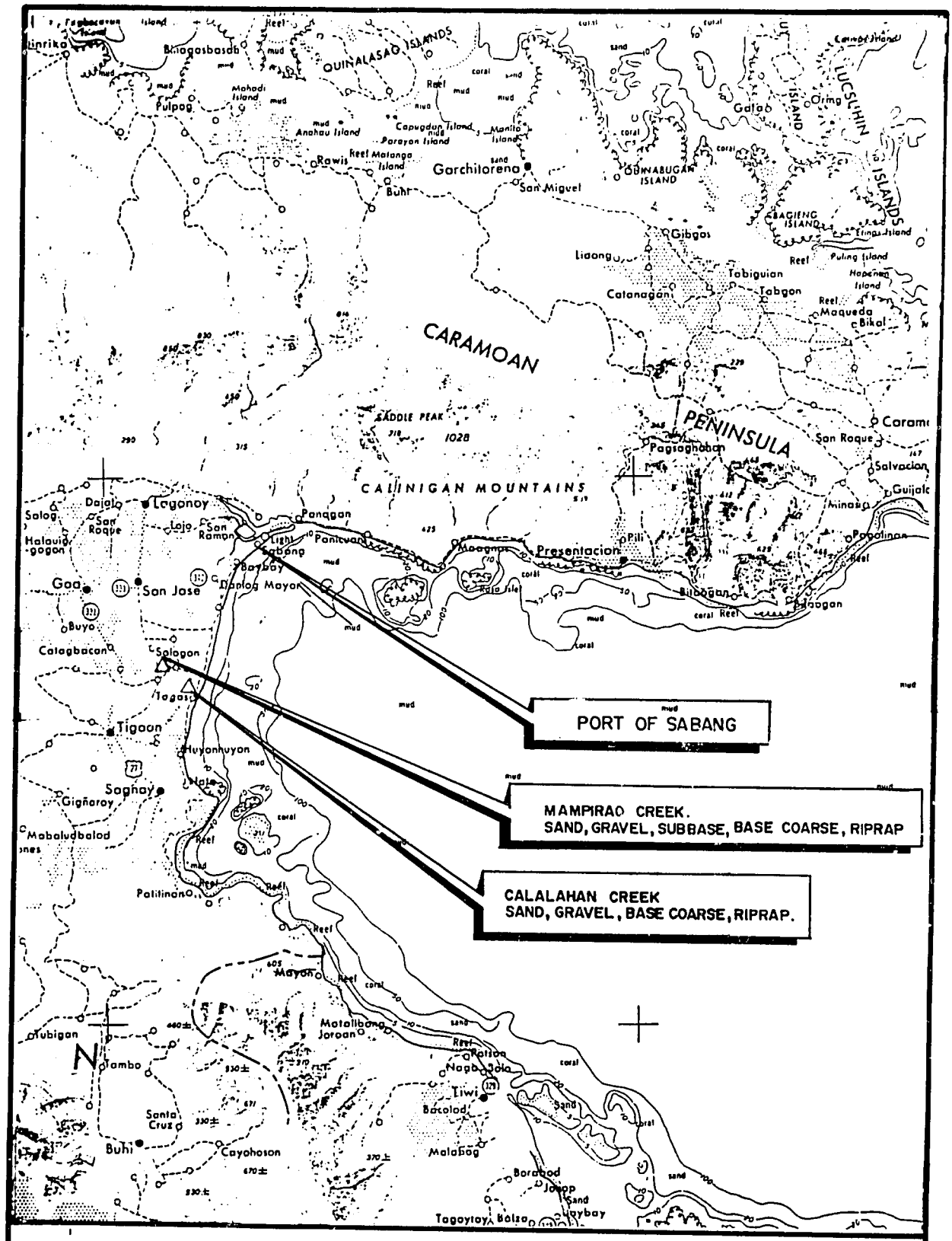
- - - - - - DEPTH CURVES

——— CONTOURS

RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492 - 0420

PLAN - TOPOGRAPHIC AND HYDROGRAPHIC SURVEY

FIGURE A-6

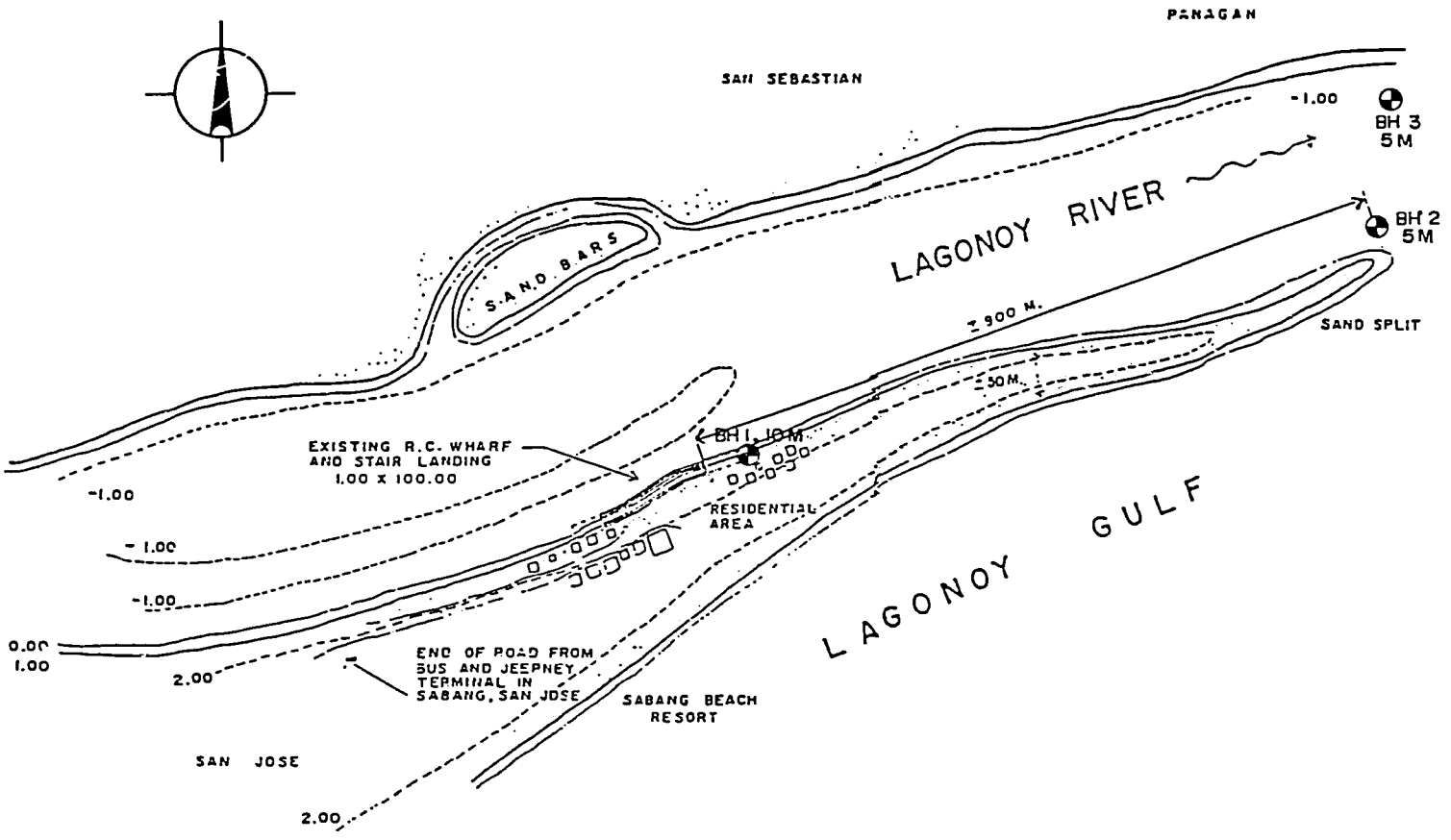


RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492-0420

LOCATION OF CONSTRUCTION MATERIALS

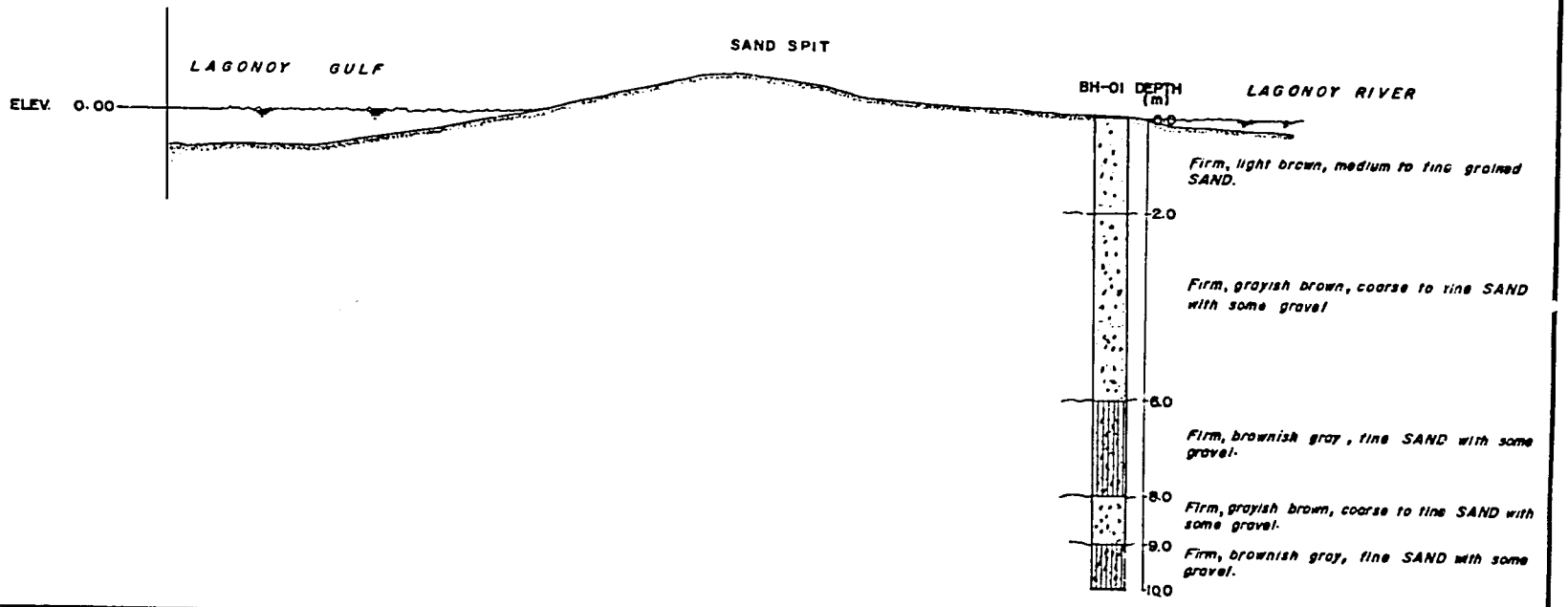
FIGURE A-7

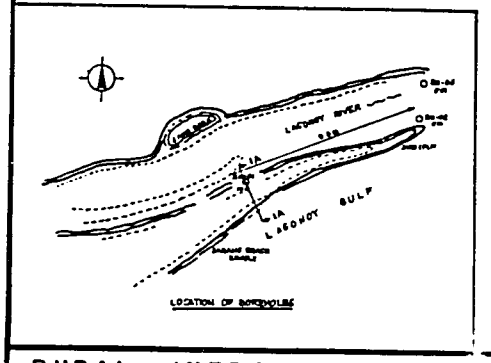


RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492-0420

SOIL INVESTIGATION - LOCATION OF BOREHOLES

FIGURE A-8





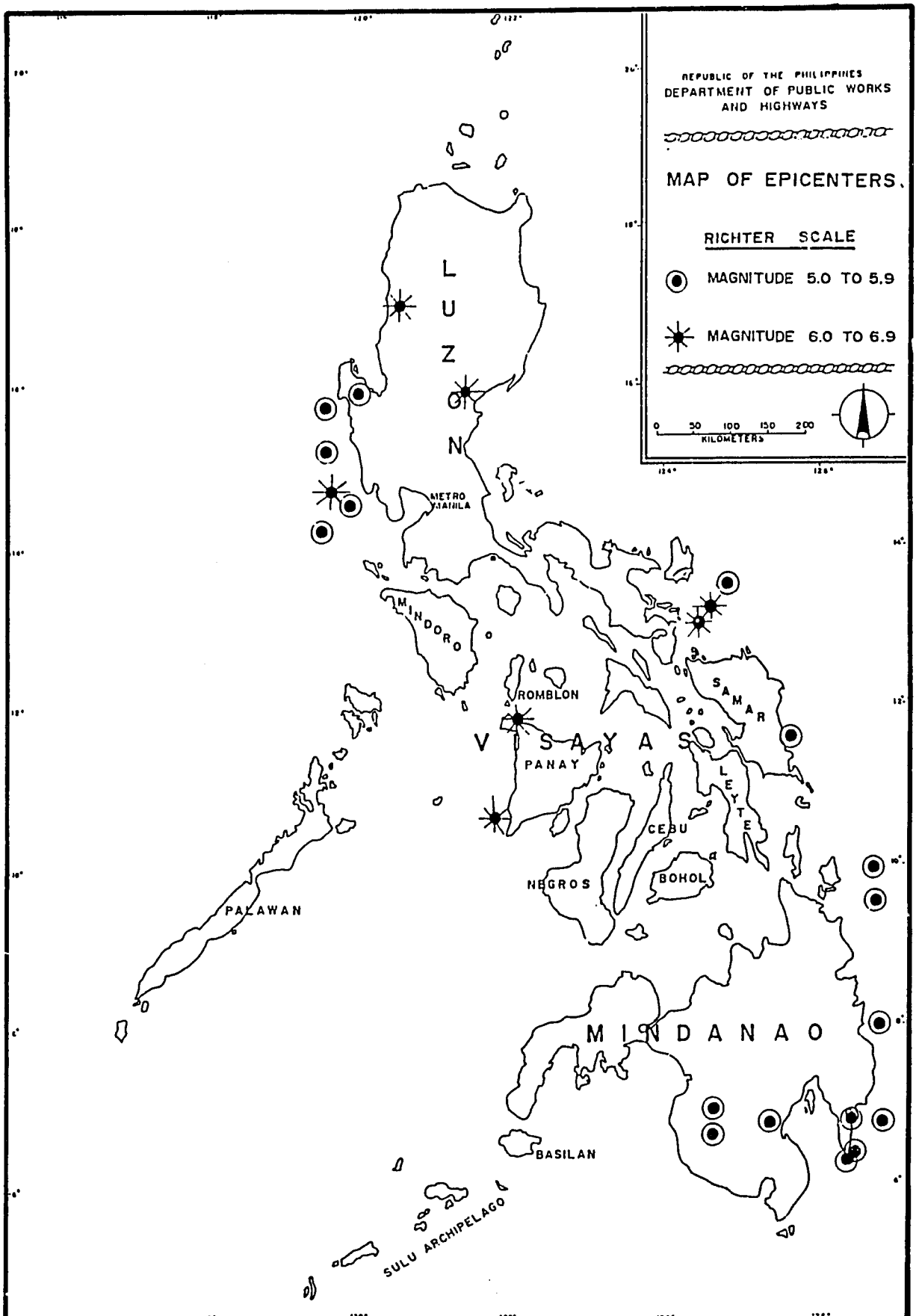
SOIL FORMATION AT PROPOSED SITE AT RIVER WHARF
SABANG PORT

SECTION SCALE 1:500 m.
BOREHOLE SCALE 1:100 m.

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

SOIL FORMATION - SABANG PORT

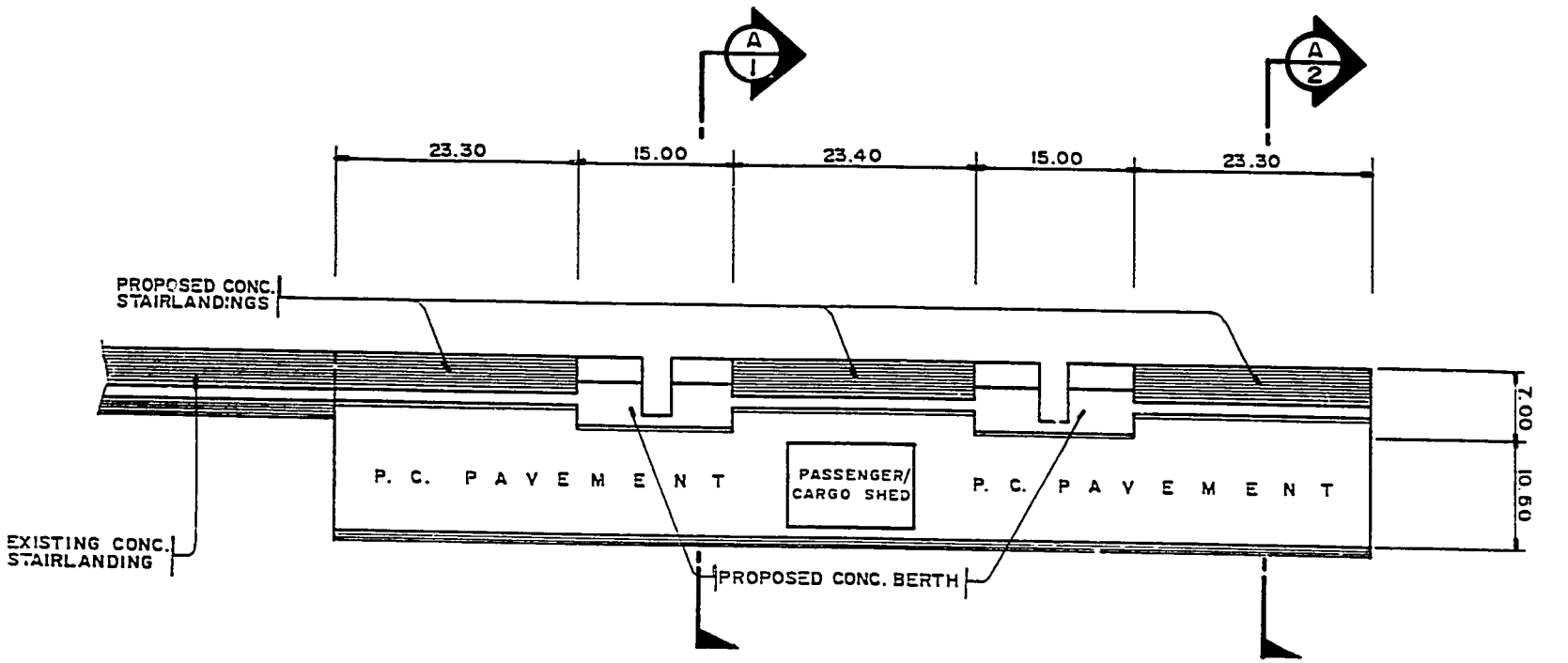
FIGURE A-9



RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492-0420

SIGNIFICANT PHILIPPINE EARTHQUAKES: 1960 - 1965

FIGURE A-10



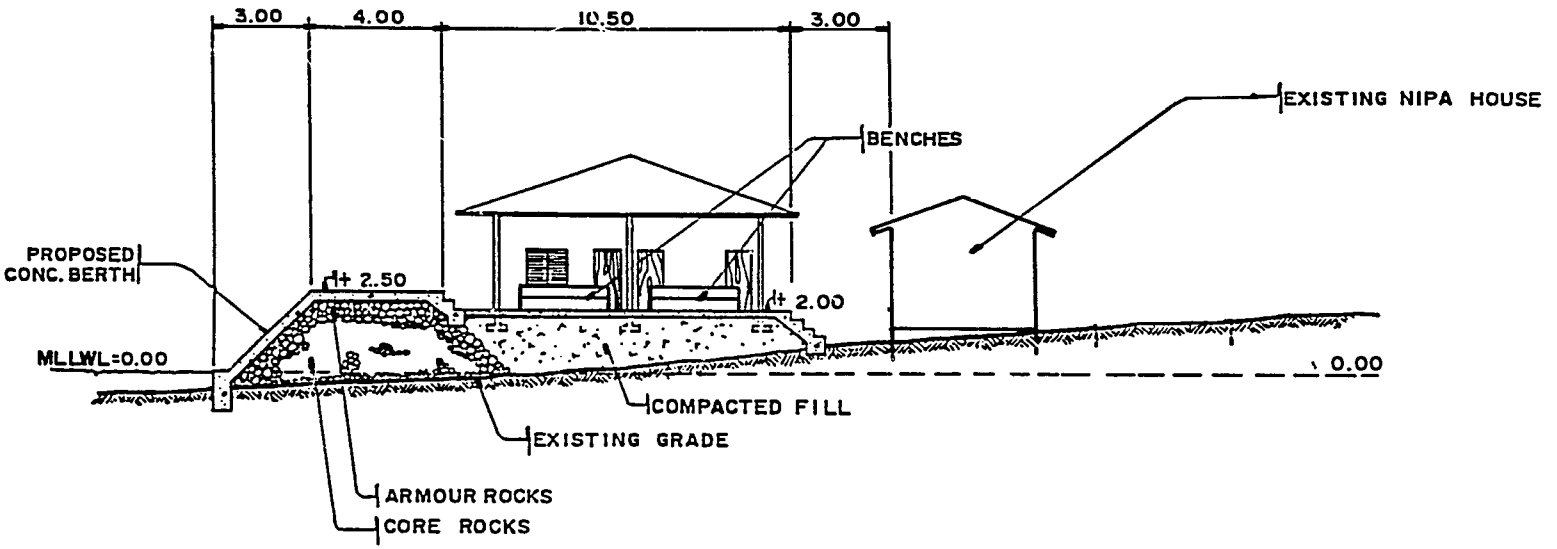
NOTE: LOCATION OF EXISTING STORES & HOUSES NOT SHOWN.

RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492 - 0420

PLAN – PROPOSED SABANG PORT FACILITIES

FIGURE A-11



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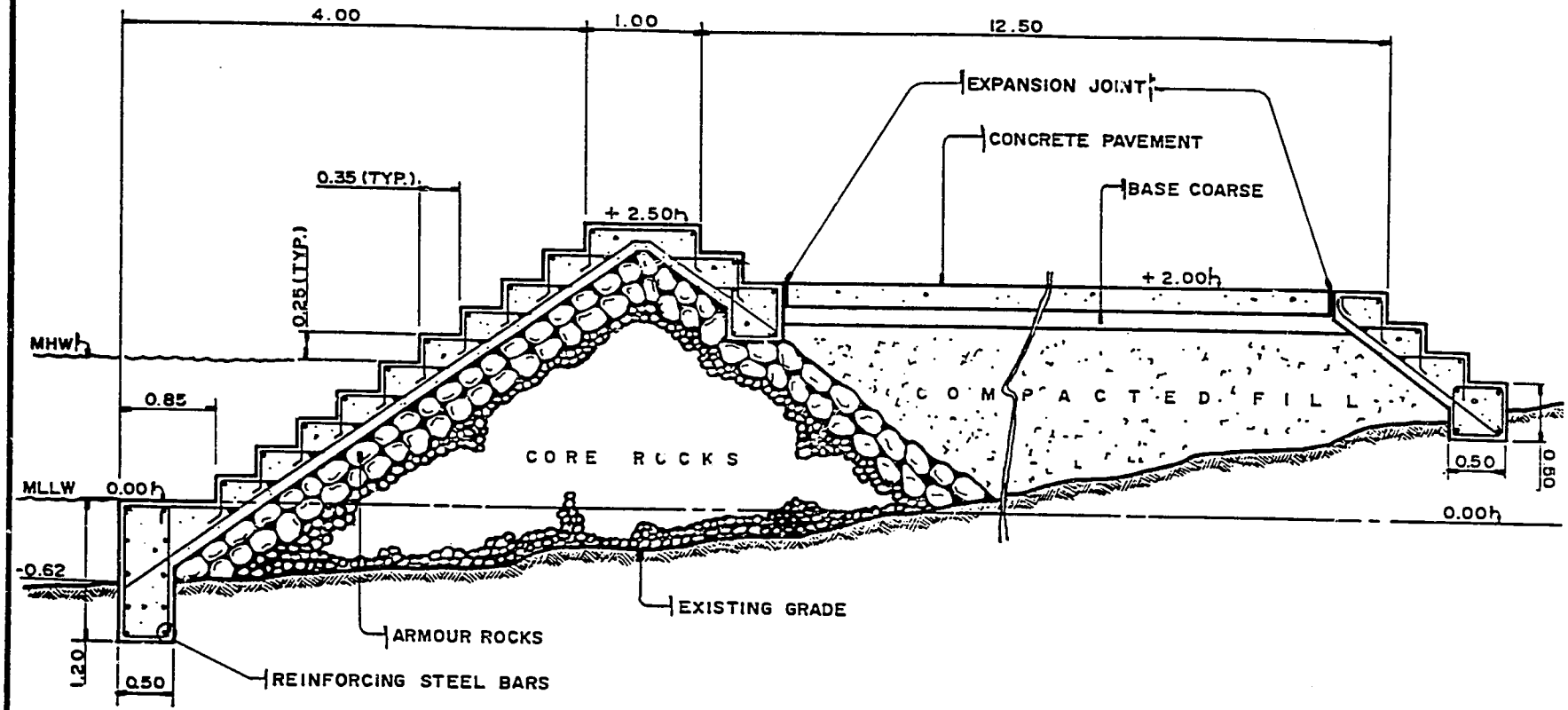
RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

SECTION (4) - PROPOSED SABANG PORT BERTH FACILITY

FIGURE A-12

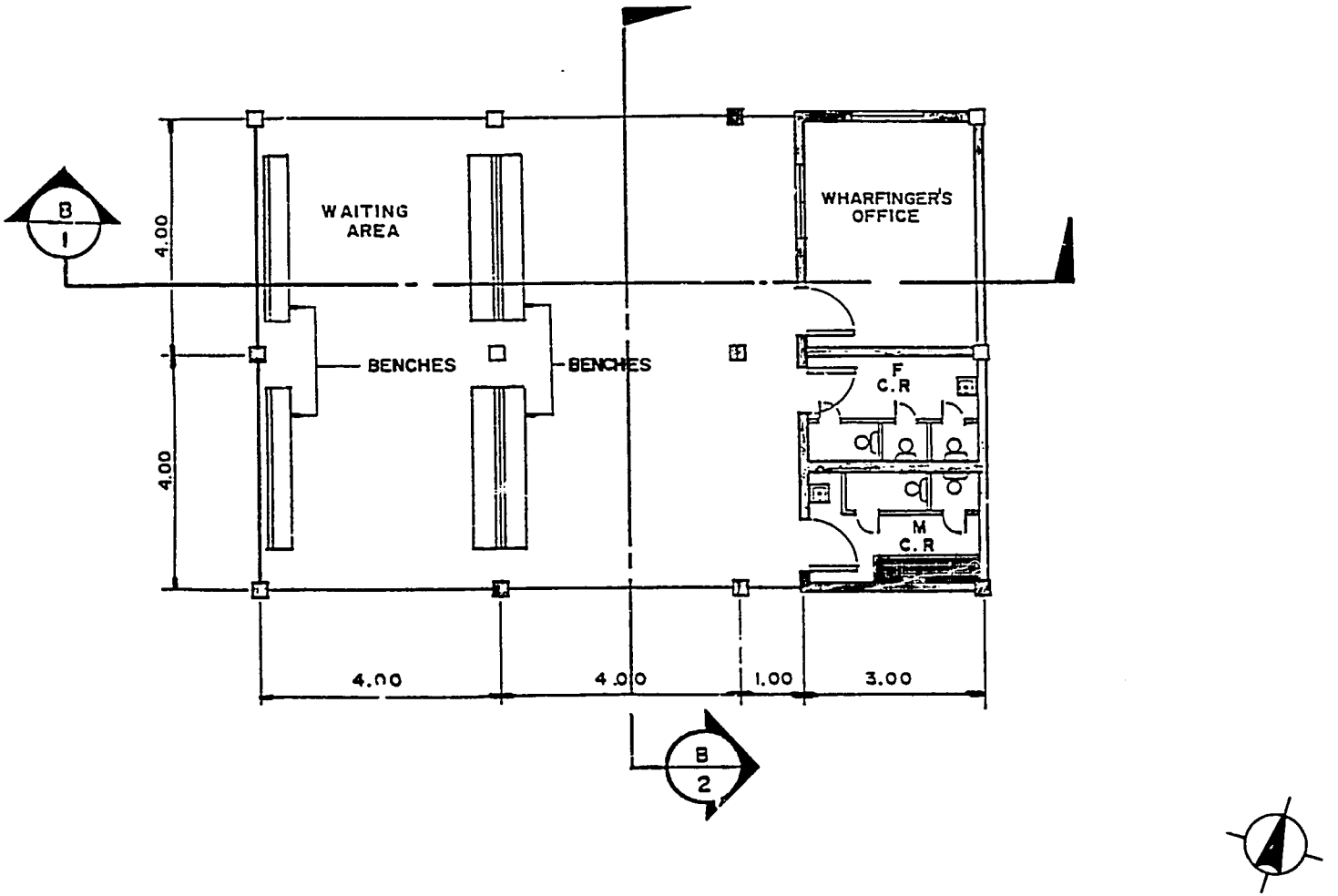


SCALE: 1 : 50

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

SECTION (A/4) - PROPOSED STAIRLANDING, PAVEMENT & LANDSIDE STEPS

FIGURE A-13

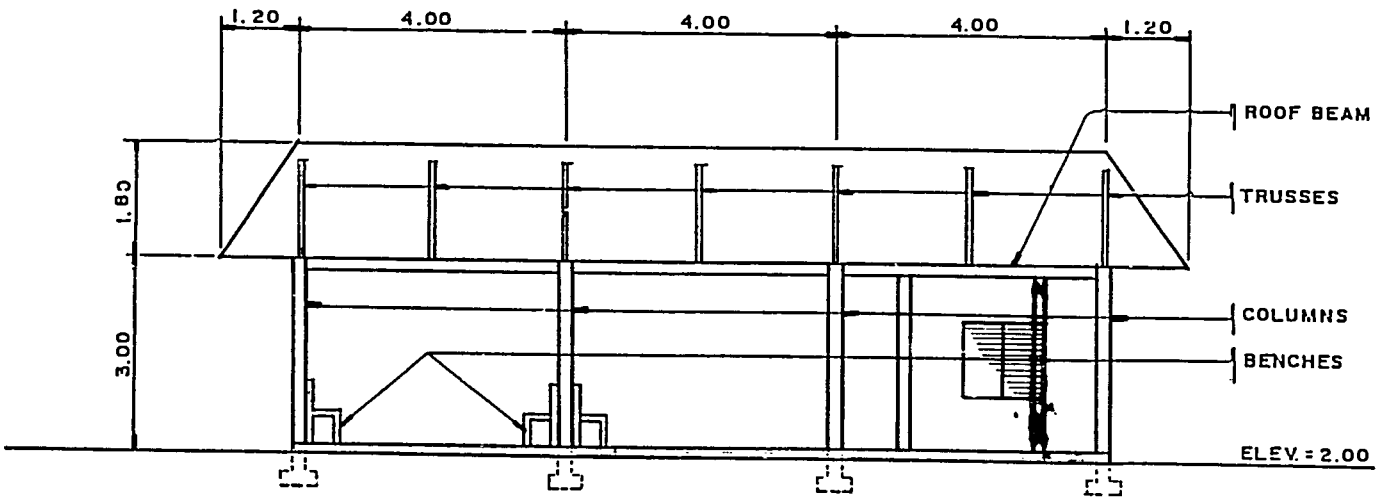


SCALE: 1:100

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

FLOOR PLAN - PROPOSED PASSENGER / CARGO SHED

FIGURE A-14



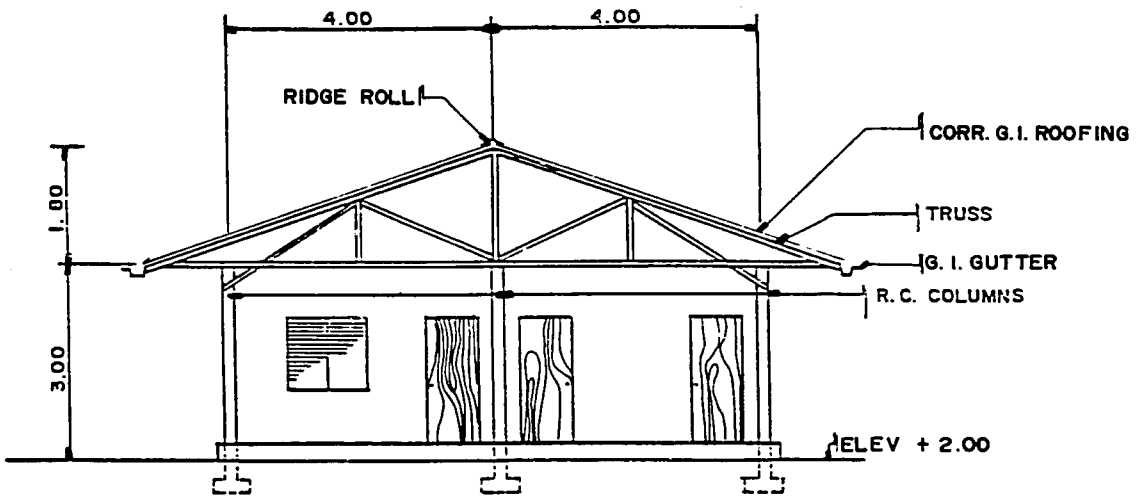
RURAL INFRASTRUCTURE FUND PROJECT

AID PROJECT NO. 492 - 0420

SCALE: 1:100

SECTION B - PROPOSED PASSENGER / CARGO SHED

FIGURE A-15

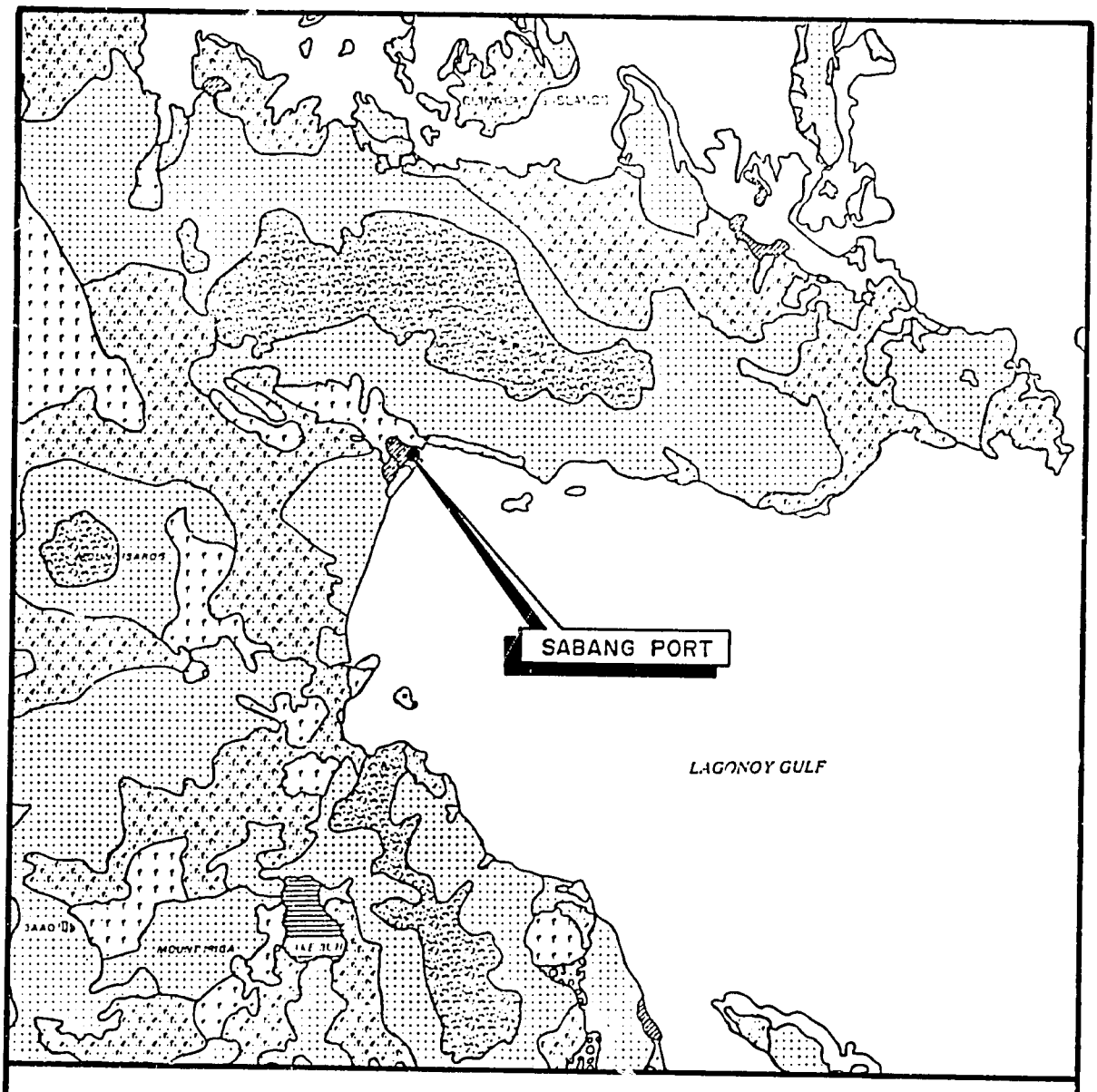


SCALE: 1:100

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492 - 0420

SECTION ⊕ - PROPOSED PASSENGER / CARGO SHED

FIGURE A-16



LEGEND:

- DIPTEROCARP FOREST, CLOSED CANOPY
- DIPTEROCARP FOREST, OPEN CANOPY
- CULTIVATED AREA MIXED W/ BRUSH & GRASS
- GRASSLAND, GRASS COVERING
- COCONUT PLANTATIONS
- CROPLAND MIXED W/ COCONUT PLANTATION
- ARABLE LAND, CROPS MAINLY CEREALS & SUGAR
- FISHPONDS DERIVED FROM MANGROVE
- MANGROVES
- CORAL REEFS

SCALE: 5 0 5 10 — 1:250,000 Km

SABANG PORT

SOURCE: PCGS 2616
National Mapping and Resource Information Authority, 1987

RURAL INFRASTRUCTURE FUND PROJECT — AID PROJECT NO. 492-0420

LAND COVER MAP

FIGURE A-17

APPENDIX B
EXHIBITS

EXHIBIT I
PORT SHIPPING STATISTICS

PORT : SABANG PORT
PROVINCE : CAMARINES SUR
ISLAND : LUZON
REGION : V

DATE : MAY 19, 1990
REPORTED BY: E.P. CHUA

CARGO: (If one sheet is insufficient, use second sheet attached)

COMMODITY	INBOUND/ OUTBOUND (Check one) In	Out	TONS PER YEAR	TYPE OF VESSEL	TONS PER VESSEL	PESOS VALUES per/kg	ORIGIN or DESTINATION	TARIFF or FARE
FISH/MARINE PRODUCTS			450 TONS			₱30./k	PRESENTACION - CARAMOAN - AND OTHERS	150 TONS 300 TONS
VEGETABLES			SAY 1350			15/k	CARAMOAN	
RICE			2000 TONS			8.50/k	PRESENTACION - CARAMOAN	- 50 % - 50 %
FUEL			SAY 600 TONS PER CAPITAL			6.00/L	CARAMOAN - PRESENTACION	
CEMENT			1400 TONS			90/BAG	CARAMOAN PRESENTACION	
COPRA			300 TONS			5/k	CARAMOAN - OTHERS -	- 10 SACKS 10 SACKS
BOTTLED CARGO			4,000 TONS OUT	COKE 70% BEER 30%	2,400 - IN		CARAMOAN - OTHER -	1000 TONS 3,000 TONS
CORN			8 TONS			5/k	CARAMOAN - PRESENTACION	- 50 % - 50 %
ICE			200 TONS			50/BLK	CARAMOAN - OTHERS	- 50 % - 50 %
SUGAR			400 TONS			15/k		
ANIMAL FEED								
LUMBER								
MEAT			SAY 1000 TONS					
SALT			150 TONS			4.50/k		
ABACA			45 TONS				CARAMOAN OTHERS	- 55 % - 45 %
MARIBE CHROMITE								

PASSENGERS	VESSELS/ WEEK	DAY	PASSENGERS PER YEAR	TYPE OF YEAR	PASSENGERS PER VESSEL	FARE	DEST.
IN							
OUT							

VESSELS:

TYPE OF VESSEL	NO. OF VESSELS BOATS PER WEEK or DAY	MAX. TONNAGE	AVE. LENGTH (m)	MAX. DRAFT (m)	ORIGIN OF VESSEL	TRA-VEL TIME	DIS-DIS-TANCE (km)	FUEL CONSP PER HOUR

EXHIBIT 2
SOCIO - ECONOMIC DATA

MUNICIPALITY OF : SAN JOSE DATE : JANUARY 20, 1990

REPORTED BY: E. ARELLANO

ANNUAL PRODUCTION

NAME OF PRODUCTS	CAMARINES SUR YEAR 1987		SABANG YEAR 89	
Agriculture				
rice	270,000	TONS cavans/year	N/A	cavans/year
copras	45	sacks/year	N/A	sacks/year
corn	34,000	cavans/year	N/A	cavans/year
		kilos/year	N/A	kilos/year
Fishing				
fish marine catch	64,000	M.T./year	445	M.T./year
fish cultures		M.T./year	N/A	M.T./year
shell fish		M.T./year	N/A	M.T./year
Cattle & Poultry Raising				
cow	39,000	heads/year	N/A	heads/year
carabao	59,000	heads/year		heads/year
hogs	124,000	heads/year		heads/year
goat	23,000	heads/year		heads/year
chickens	830,000	heads/year		heads/year
Local Products				

LAND TRAFFIC DATA (1990) 1988

FROM: TIGAON TO: GOA

VEHICLE			PASSENGER/DAY		CARGO (KILOS/DAY)	
TYPE	NO.	NO. OF TRIPS APT	INCOMING	OUTGOING	INCOMING	OUTGOING
CAR		923				
JEEPNEY		575				
MINI-BUS		354				
BUS		07				
TRUCK		477				
TOTAL		2,396				

EXHIBIT 2
(CONTINUED)

SOCIO - ECONOMIC DATA

MUNICIPALITY OF : SAN JOSE DATE : JANUARY 30, 1990

REPORTED BY: E. ARELLANO

LOCATION OF PORT SITE	DISTANCE TO NEAREST ROAD/TOWN/ BARRIO	AREA OF INFLUENCE	HINTERLAND TOPOGRAPHY
1. SABANG BRGY.	6 KMS. TO SAN JOSE.	LAGONOY GULF TO NAGA / PIL.	MOUNTAINS HILLS VALLEYS
2.			
3.			

DEMOGRAPHY: PRESENT POPULATION BARRIO: _____ POPULATION: 26784 (1990 CENSUS)

PROVINCE: 1,272,429 (1990 CENSUS) / 1,275,981 (RECONNAISSANCE)

COMMUNICATION	RADIO	TELEPHONE	TELEX	FAX	TELEGRAM	OTHERS
Available? (Yes or No)	YES	YES	YES			

List other development projects in agriculture, fishing, health, etc. within 50 km of Port.

MARBLE QUARRY AT LAGONOY MUNICIPALITY (CLOSED) DUE NPA

What is the purpose of the port projects? What will be the role of the port?

HARBOR CENTER FOR CATANDUANES ISLAND & SIBUYAN PENINSULA

If the port is built or improved, from where will traffic be diverted?

NAMES OF LOCAL OFFICIALS:

EXHIBIT 3

NAME OF PORT: SABANG | ISLAND: LUZON | PROVINCE: CAMARINES SUR

LOCATION:

PORT OPERATION INVENTORY

VESSEL ORIGIN	VESSEL STATISTICS: MAX TONNAGE	LENGTH	DRAFT	YEAR: 1959 (WEEKLY) NO. OF TRIP/BOAT	AVE. NO. OF PASS/TRIP IN	OUT	CARGO	INCOMING	OUTGOING	YEAR: AVE. NO. OF PASS. PER TRIP IN	OUT	NO. OF TRIPS	CARGO	INCOMING	OUTGOING
TABACO	15	50M		1			10,000 FUEL LITRS								
				1	20	20	MEAT								
SAGNAY/CARAMOAN TABACO/CABCAB				24			7 TONS ✓								
TABACO				2	20	20	30 TONS CEMENT								
CARAMOAN CABCAB				14	20	20	60 TONS RICE								
	5	12M		20	10	10	20 TONS VEGEATABLES								
				20			14 TONS FISH								

EXHIBIT 4

POPULATION BY PROVINCE

Socio-Economic Data by Province for Use in Forecasting Travel Demand.

This file contains, for each province, the base year (1990) and forecasted (for years 2000 and 2010) population and income per capita.

This spreadsheet uses these variables to calculate average annual traffic growth rates by province for the normal growth of passenger traffic.

Population by Province, Base Year (1990) and Forecasts for Years 2000 and 2010.

		POPULATION			AVERAGE ANNUAL GROWTH RATE	
REGION	PROVINCE	1990	2000	2010	1990 to 2000	2000 to 2012
I	Abra	190,634	223,919	252,506	1.62%	1.62%
I	Benguet	477,706	617,374	696,193	2.60%	2.60%
I	Ilocos Norte	455,395	517,582	583,661	1.29%	1.29%
I	Ilocos Sur	526,273	614,474	692,923	1.56%	1.56%
I	La Union	562,603	677,880	764,424	1.88%	1.88%
I	Mountain Province	126,455	151,647	171,007	1.83%	1.83%
I	Pangasinan	1,952,865	2,270,109	2,559,930	1.52%	1.52%
II	Batanes	14,748	17,510	19,746	1.73%	1.73%
II	Cagayan	891,370	1,077,806	1,215,408	1.92%	1.92%
II	Ifugao	138,827	167,787	189,208	1.91%	1.91%
II	Isabela	1,117,117	1,380,361	1,556,589	2.14%	2.14%
II	Kalinga Apayao	242,970	305,946	345,005	2.33%	2.33%
II	Nueva Vizcaya	322,034	410,811	463,259	2.46%	2.46%
II	Quirino	117,429	157,745	177,884	2.98%	2.98%
III	Bataan	479,034	659,363	743,543	3.25%	3.25%
III	Bulacan	1,395,274	1,695,899	1,912,411	1.97%	1.97%
III	Nueva Ecija	1,354,853	1,641,089	1,850,604	1.94%	1.94%
III	Pampanga	1,483,572	1,808,985	2,039,935	2.00%	2.00%
III	Tarlac	860,292	1,031,338	1,163,007	1.83%	1.83%
III	Zambales	568,593	692,201	780,573	1.99%	1.99%
IV-A	Aurora	138,273	172,004	193,963	2.21%	2.21%
IV-A	Batangas	1,466,451	1,767,352	1,992,987	1.88%	1.88%
IV-A	Cavite	1,076,137	1,399,737	1,578,439	2.66%	2.66%
IV-A	Laguna	1,260,610	1,551,619	1,749,711	2.10%	2.10%
IV-A	Marinduque	218,707	264,552	298,327	1.92%	1.92%
IV-A	Rizal	782,340	1,020,032	1,150,258	2.69%	2.69%
IV-B	Occidental Mindoro	315,536	419,919	473,529	2.90%	2.90%
IV-B	Oriental Mindoro	606,444	782,611	882,526	2.58%	2.58%
IV-B	Palawan	511,706	664,917	749,806	2.65%	2.65%
IV-B	Quezon	1,491,434	1,864,838	2,102,919	2.26%	2.26%
IV-B	Romblon	236,994	280,440	316,243	1.70%	1.70%
V	Albay	1,017,294	1,236,032	1,393,835	1.97%	1.97%
V	Camarines Norte	397,583	496,280	559,639	2.24%	2.24%
V	Camarines Sur	1,360,206	1,620,670	1,827,578	1.77%	1.77%
V	Catanduanes	225,575	282,818	318,925	2.29%	2.29%
V	Masbate	745,100	917,834	1,035,012	2.11%	2.11%
V	Sorsogon	642,377	801,182	903,467	2.23%	2.23%

EXHIBIT 4

(CONTINUED)

REGION	PROVINCE	POPULATION 1990	POPULATION 2000	POPULATION 2010	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
VI	Aklan	402,849	481,163	542,593	1.79%	1.79%
VI	Antique	434,893	525,447	592,530	1.91%	1.91%
VI	Capiz	627,494	766,587	864,455	2.02%	2.02%
VI	Iloilo	1,787,316	2,129,918	2,401,841	1.77%	1.77%
VI	Negros Occidental	2,419,758	2,896,811	3,266,642	1.82%	1.82%
VII	Bohol	893,359	967,868	1,091,434	0.80%	0.80%
VII	Cebu	2,655,417	3,229,110	3,641,365	1.98%	1.98%
VII	Negros Oriental	986,764	1,152,772	1,299,945	1.57%	1.57%
VII	Siguijor	80,498	90,847	102,445	1.22%	1.22%
VIII	Leyte	1,542,354	1,783,671	2,011,390	1.46%	1.46%
VIII	Southern Leyte	356,458	419,255	472,781	1.64%	1.64%
VIII	Eastern Samar	405,427	505,846	570,426	2.24%	2.24%
VIII	Northern Samar	465,235	567,231	639,648	2.00%	2.00%
VIII	Samar	590,960	696,994	785,978	1.66%	1.66%
IX-A	Basilan	252,894	304,018	342,832	1.86%	1.86%
IX-A	Sulu	437,994	504,300	568,683	1.42%	1.42%
IX-A	Tawi-Tawi	250,984	304,187	343,022	1.94%	1.94%
IX-B	Zamboanga del Norte	741,645	902,260	1,017,450	1.98%	1.98%
IX-B	Zamboanga del Sur	1,511,286	1,859,045	2,096,386	2.09%	2.09%
X	Agusan del Norte	452,794	542,951	612,269	1.83%	1.83%
X	Agusan del Sur	369,390	487,739	550,008	2.82%	2.82%
X	Bukidnon	826,513	1,033,392	1,165,324	2.26%	2.26%
X	Camiguin	67,356	78,157	88,135	1.50%	1.50%
X	Misamis Occidental	469,098	548,476	618,499	1.58%	1.58%
X	Misamis Oriental	947,529	1,238,810	1,396,966	2.72%	2.72%
X	Sorigao del Norte	482,934	610,398	688,326	2.37%	2.37%
XI	Davao	959,373	1,209,064	1,363,423	2.34%	2.34%
XI	Davao del Sur	1,465,011	1,808,583	2,039,481	2.13%	2.13%
XI	Davao Oriental	422,778	507,920	572,766	1.85%	1.85%
XI	South Cotabato	989,440	1,217,472	1,372,904	2.10%	2.10%
XI	Surigao del Sur	497,094	620,771	700,024	2.25%	2.25%
XII	Lanao del Norte	570,714	692,697	781,132	1.96%	1.96%
XII	Lanao del Sur	525,437	655,021	738,646	2.23%	2.23%
XII	Maguindanao	684,360	842,815	950,415	2.10%	2.10%
XII	North Cotabato	738,625	925,411	1,043,557	2.28%	2.28%
XII	Sultan Kudarat	423,122	559,363	630,776	2.83%	2.83%
Total		53,508,155	65,329,031	73,671,484	2.02%	2.02%

Source: NEDA

EXHIBIT 5

PER CAPITA INCOME GROWTH RATES

REGION	PROVINCE	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
I	Abra	5.25%	5.75%
I	Benguet	5.25%	5.75%
I	Ilocos Norte	5.25%	5.75%
I	Ilocos Sur	5.25%	5.75%
I	La Union	5.25%	5.75%
I	Mountain Province	5.25%	5.75%
I	Pangasinan	5.25%	5.75%
II	Batanes	5.15%	5.65%
II	Cagayan	5.15%	5.65%
II	Ifugao	5.15%	5.65%
II	Isabela	5.15%	5.65%
II	Kalinga Apayao	5.15%	5.65%
II	Nueva Vizcaya	5.15%	5.65%
II	Quirino	5.15%	5.65%
III	Bataan	4.90%	5.35%
III	Bulacan	4.90%	5.35%
III	Nueva Ecija	4.90%	5.35%
III	Pampanga	4.90%	5.35%
III	Tarlac	4.90%	5.35%
III	Zambales	4.90%	5.35%
IV-A	Aurora	4.50%	5.05%
IV-A	Batangas	4.50%	5.05%
IV-A	Cavite	4.50%	5.05%
IV-A	Laguna	4.50%	5.05%
IV-A	Marinduque	4.50%	5.05%
IV-A	Rizal	4.50%	5.05%
IV-B	Occidental Mindoro	4.50%	5.05%
IV-B	Oriental Mindoro	4.50%	5.05%
IV-B	Palawan	4.50%	5.05%
IV-B	Quezon	4.50%	5.05%
IV-B	Romblon	4.50%	5.05%
V	Albay	5.00%	5.00%
V	Camarines Norte	5.00%	5.00%
V	Camarines Sur	5.00%	5.00%
V	Catanduanes	5.00%	5.00%
V	Masbate	5.00%	5.00%
V	Sorsogon	5.00%	5.00%
VI	Aklan	5.05%	5.35%
VI	Antique	5.05%	5.35%
VI	Capiz	5.05%	5.35%
VI	Iloilo	5.05%	5.35%
VI	Negros Occidental	5.05%	5.35%
VII	Bohol	5.00%	5.35%
VII	Cebu	5.00%	5.35%
VII	Negros Oriental	5.00%	5.35%
VII	Siguijor	5.00%	5.35%
VIII	Leyte	5.65%	5.95%
VIII	Southern Leyte	5.65%	5.95%
VIII	Eastern Samar	5.65%	5.95%
VIII	Northern Samar	5.65%	5.95%
VIII	Samar	5.65%	5.95%
IX-A	Basilan	5.25%	5.65%
IX-A	Sulu	5.25%	5.65%
IX-A	Tawi-Tawi	5.25%	5.65%
IX-B	Zamboanga del Norte	5.25%	5.65%
IX-B	Zamboanga del Sur	5.25%	5.65%
X	Agusan del Norte	4.90%	5.35%
X	Agusan del Sur	4.90%	5.35%
X	Bukidnon	4.90%	5.35%
X	Camiguin	4.90%	5.35%
X	Misamis Occidental	4.90%	5.35%
X	Misamis Oriental	4.90%	5.35%
X	Sorigao del Norte	4.90%	5.35%
XI	Davao	4.60%	5.20%
XI	Davao del Su	4.60%	5.20%
XI	Davao Oriental	4.60%	5.20%
XI	South Cotabato	4.60%	5.20%
XI	Surigao del Sur	4.60%	5.20%
XII	Lanao del Norte	4.70%	5.15%
XII	Lanao del sur	4.70%	5.15%
XII	Maguindanao	4.70%	5.15%
XII	North Cotabato	4.70%	5.15%
XII	Sultan Kudarat	4.70%	5.15%

Source: Family Income & Expenditures Survey 1985 (FBS), NEDA

EXHIBIT 6

GROWTH RATE FOR PASSENGER TRAVEL DEMAND, BY PROVINCE

T = P + I * E where:

T is annual growth rate for passenger travel demand
P is annual growth rate of population in province
I is annual growth rate of income per capita in province
E is elasticity of passenger travel demand to change in income per capita:

private vehicle	1.40
jeepney (banca)	0.50
bus	0.80

		AVERAGE ANNUAL GROWTH RATE					
		1990 to 2000			2000 to 2012		
REGION	PROVINCE	CAR	JEEPNEY	BUS	CAR	JEEPNEY	BUS
I	Abra	8.97%	4.25%	5.82%	9.67%	4.50%	6.22%
I	Benguet	9.95%	5.22%	6.80%	10.65%	5.47%	7.20%
I	Ilocos Norte	8.64%	3.91%	5.49%	9.34%	4.16%	5.89%
I	Ilocos Sur	8.91%	4.19%	5.76%	9.61%	4.44%	6.16%
I	La Union	9.23%	4.51%	6.08%	9.93%	4.76%	6.48%
I	Mountain Province	9.18%	4.46%	6.03%	9.88%	4.71%	6.43%
I	Pangasinan	8.87%	4.14%	5.72%	9.57%	4.39%	6.12%
II	Batanes	8.94%	4.31%	5.85%	9.64%	4.56%	6.25%
II	Cagayan	9.13%	4.49%	6.04%	9.83%	4.74%	6.44%
II	Ifugao	9.12%	4.49%	6.03%	9.82%	4.74%	6.43%
II	Isabela	9.35%	4.71%	6.26%	10.05%	4.96%	6.66%
II	Kalinga Apayao	9.54%	4.91%	6.45%	10.24%	5.16%	6.85%
II	Nueva Vizcaya	9.67%	5.04%	6.58%	10.37%	5.29%	6.98%
II	Quirino	10.19%	5.55%	7.10%	10.89%	5.80%	7.50%
III	Bataan	10.11%	5.70%	7.17%	10.74%	5.92%	7.53%
III	Bulacan	8.83%	4.42%	5.89%	9.46%	4.65%	6.25%
III	Nueva Ecija	8.80%	4.39%	5.86%	9.43%	4.61%	6.22%
III	Pampanga	8.86%	4.45%	5.92%	9.49%	4.68%	6.28%
III	Tarlac	8.69%	4.28%	5.75%	9.32%	4.50%	6.11%
III	Zambales	8.85%	4.44%	5.91%	9.48%	4.66%	6.27%
IV-A	Aurora	8.51%	4.46%	5.81%	9.28%	4.73%	6.25%
IV-A	Batangas	8.18%	4.13%	5.48%	8.95%	4.41%	5.92%
IV-A	Cavite	8.96%	4.91%	6.26%	9.73%	5.19%	6.70%
IV-A	Laguna	8.40%	4.35%	5.70%	9.17%	4.62%	6.14%
IV-A	Marinduque	8.22%	4.17%	5.52%	8.99%	4.45%	5.96%
IV-A	Rizal	8.99%	4.94%	6.29%	9.76%	5.21%	6.73%
IV-B	Occidental Mindoro	9.20%	5.15%	6.50%	9.97%	5.42%	6.94%
IV-B	Oriental Mindoro	8.88%	4.83%	6.18%	9.65%	5.11%	6.62%
IV-B	Palawan	8.95%	4.90%	6.25%	9.72%	5.18%	6.69%
IV-B	Quezon	8.56%	4.51%	5.86%	9.33%	4.78%	6.30%
IV-B	Romblon	8.00%	3.95%	5.30%	8.77%	4.22%	5.74%
V	Albay	8.97%	4.47%	5.97%	8.97%	4.47%	5.97%
V	Camarines Norte	9.24%	4.74%	6.24%	9.24%	4.74%	6.24%
V	Camarines Sur	8.77%	4.27%	5.77%	8.77%	4.27%	5.77%
V	Catanduanes	9.29%	4.79%	6.29%	9.29%	4.79%	6.29%
V	Masbate	9.11%	4.61%	6.11%	9.11%	4.61%	6.11%
V	Sorsogon	9.23%	4.73%	6.23%	9.23%	4.73%	6.23%

EXHIBIT 6

(CONTINUED)

REGION	PROVINCE	AVERAGE ANNUAL GROWTH RATE 1990 to 2000 CAR	JEEPNEY	BUS	2000 to 2012 CAR	JEEPNEY	BUS
VI	Aklan	8.86%	4.32%	5.83%	9.28%	4.47%	6.07%
VI	Antique	8.98%	4.43%	5.95%	9.40%	4.58%	6.19%
VI	Capiz	9.09%	4.55%	6.06%	9.51%	4.70%	6.30%
VI	Iloilo	8.84%	4.29%	5.81%	9.26%	4.44%	6.05%
VI	Negros Occidental	8.89%	4.34%	5.86%	9.31%	4.49%	6.10%
VII	Bohol	7.80%	3.30%	4.80%	8.29%	3.48%	5.08%
VII	Cebu	8.98%	4.48%	5.98%	9.47%	4.65%	6.26%
VII	Negros Oriental	8.57%	4.07%	5.57%	9.06%	4.24%	5.85%
VII	Siguijor	8.22%	3.72%	5.22%	8.71%	3.89%	5.50%
VIII	Leyte	9.37%	4.29%	5.98%	9.79%	4.44%	6.22%
VIII	Southern Leyte	9.55%	4.46%	6.16%	9.97%	4.61%	6.40%
VIII	Eastern Samar	10.15%	5.06%	6.76%	10.57%	5.21%	7.00%
VIII	Northern Samar	9.91%	4.83%	6.52%	10.33%	4.98%	6.76%
VIII	Samar	9.57%	4.49%	6.18%	9.99%	4.64%	6.42%
IX-A	Basilan	9.21%	4.48%	6.06%	9.77%	4.68%	6.38%
IX-A	Sulu	8.77%	4.04%	5.62%	9.33%	4.24%	5.94%
IX-A	Tawi-Tawi	9.29%	4.57%	6.14%	9.85%	4.77%	6.46%
IX-B	Zamboanga del Norte	9.33%	4.60%	6.18%	9.89%	4.80%	6.50%
IX-B	Zamboanga del Sur	9.44%	4.72%	6.29%	10.00%	4.92%	6.61%
X	Agusan del Norte	8.69%	4.28%	5.75%	9.32%	4.51%	6.11%
X	Agusan del Sur	9.68%	5.27%	6.74%	10.31%	5.49%	7.10%
X	Bukidnon	9.12%	4.71%	6.18%	9.75%	4.93%	6.54%
X	Camiguin	8.36%	3.95%	5.42%	8.99%	4.17%	5.78%
X	Misamis Occidental	8.44%	4.03%	5.50%	9.07%	4.25%	5.86%
X	Misamis Oriental	9.58%	5.17%	6.64%	10.21%	5.39%	7.00%
X	Sorigao del Norte	9.23%	4.82%	6.29%	9.86%	5.04%	6.65%
XI	Davao	8.78%	4.64%	6.02%	9.62%	4.94%	6.50%
XI	Davao del Sur	8.57%	4.43%	5.81%	9.41%	4.73%	6.29%
XI	Davao Oriental	8.29%	4.15%	5.53%	9.13%	4.45%	6.01%
XI	South Cotabato	8.54%	4.40%	5.78%	9.38%	4.70%	6.26%
XI	Surigao del Sur	8.69%	4.55%	5.93%	9.53%	4.85%	6.41%
XII	Lanao del Norte	8.54%	4.31%	5.72%	9.17%	4.53%	6.08%
XII	Lanao del Sur	8.81%	4.58%	5.99%	9.44%	4.80%	6.35%
XII	Maguindanao	8.68%	4.45%	5.86%	9.31%	4.60%	6.22%
XII	North Cotabato	8.86%	4.63%	6.04%	9.49%	4.86%	6.40%
XII	Sultan Kudarat	9.41%	5.18%	6.59%	10.04%	5.41%	6.95%

Source: Consultant's calculations from (5 & 8)

EXHIBIT 7

GROSS REGIONAL DOMESTIC PRODUCT (GRDP)

REGION	PROVINCE	AVERAGE ANNUAL GROWTH RATE 1990 to 2000	AVERAGE ANNUAL GROWTH RATE 2000 to 2012
I	Abra	6.80%	6.80%
I	Benguet	6.80%	6.80%
I	Ilocos Norte	6.80%	6.80%
I	Ilocos Sur	6.80%	6.80%
I	La Union	6.80%	6.80%
I	Mountain Province	6.80%	6.80%
I	Pangasinan	6.80%	6.80%
II	Batanes	7.25%	7.05%
II	Cagayan	7.25%	7.05%
II	Ifugao	7.25%	7.05%
II	Isabela	7.25%	7.05%
II	Kalinga Apayao	7.25%	7.05%
II	Nueva Vizcaya	7.25%	7.05%
II	Quirino	7.25%	7.05%
III	Bataan	6.80%	6.80%
III	Bulacan	6.80%	6.80%
III	Nueva Ecija	6.80%	6.80%
III	Pampanga	6.80%	6.80%
III	Tarlac	6.80%	6.80%
III	Zambales	6.80%	6.80%
IV-A	Aurora	6.80%	6.80%
IV-A	Batangas	6.80%	6.80%
IV-A	Cavite	6.80%	6.80%
IV-A	Laguna	6.80%	6.80%
IV-A	Marinduque	6.80%	6.80%
IV-A	Rizal	6.80%	6.80%
IV-B	Occidental Mindoro	6.80%	6.80%
IV-B	Oriental Mindoro	6.80%	6.80%
IV-B	Palawan	6.80%	6.80%
IV-B	Quezon	6.80%	6.80%
IV-B	Romblon	6.80%	6.80%
V	Albay	6.80%	6.80%
V	Camarines Norte	6.80%	6.80%
V	Camarines Sur	6.80%	6.80%
V	Catanduanes	6.80%	6.80%
V	Masbate	6.80%	6.80%
V	Sorsogon	6.80%	6.80%
VI	Aklan	6.40%	6.20%
VI	Antique	6.40%	6.20%
VI	Capiz	6.40%	6.20%
VI	Iloilo	6.40%	6.20%
VI	Negros Occidental	6.40%	6.20%
VII	Bohol	6.85%	6.60%
VII	Cebu	6.85%	6.60%
VII	Negros Oriental	6.85%	6.60%
VII	Siguijor	6.85%	6.60%
VIII	Leyte	6.80%	6.80%
VIII	Southern Leyte	6.80%	6.80%
VIII	Eastern Samar	6.80%	6.80%
VIII	Northern Samar	6.80%	6.80%
VIII	Samar	6.80%	6.80%
IX-A	Basilan	6.80%	6.80%
IX-A	Sulu	6.80%	6.80%
IX-A	Tawi-Tawi	6.80%	6.80%
IX-B	Zamboanga del Norte	6.80%	6.80%
IX-B	Zamboanga del Sur	6.80%	6.80%
X	Agusan del Norte	6.80%	6.80%
X	Agusan del Sur	6.80%	6.80%
X	Bukidnon	6.80%	6.80%
X	Camiguin	6.80%	6.80%
X	Misamis Occidental	6.80%	6.80%
X	Misamis Oriental	6.80%	6.80%
X	Sorigao del Norte	6.80%	6.80%
XI	Davao	6.85%	7.00%
XI	Davao del Sur	6.85%	7.00%
XI	Davao Oriental	6.85%	7.00%
XI	South Cotabato	6.85%	7.00%
XI	Surigao del Sur	6.85%	7.00%
XII	Lanao del Norte	6.80%	6.70%
XII	Lanao del Sur	6.80%	6.70%
XII	Maguindanao	6.80%	6.70%
XII	North Cotabato	6.80%	6.70%
XII	Sultan Kudarat	6.80%	6.70%

Source: NEDA

EXHIBIT 8

VALUE OF PASSENGER TIME BY REGION

REGION	INCOME		POPULATION (IN THOUSANDS)		PROPORTION OF ADULTS (A)	UNADJUSTED PASSENGER TIME (V*)	ADJUSTED PASSENGER TIME (V)
	1988 INCOME	FEBRUARY 1988 INCOME (Y)	1988	FEBRUARY 1990			
I	2.086 x 10^10	2.656 x 10^10	4,099	4,236	0.593	2.843	2.001
II	1.435 x 10^10	1.847 x 10^10	2,689	2,806	0.570	3.954	2.784
III	4.778 x 10^10	6.144 x 10^10	5,816	6,065	0.580	6.014	4.234
IV	5.454 x 10^10	7.052 x 10^10	7,623	7,992	0.579	5.219	3.674
V	1.969 x 10^10	2.524 x 10^10	4,158	4,323	0.542	3.670	2.584
VI	2.909 x 10^10	3.721 x 10^10	5,387	5,588	0.578	3.945	2.777
VII	2.270 x 10^10	2.917 x 10^10	4,411	4,599	0.594	3.657	2.574
VIII	1.499 x 10^10	1.907 x 10^10	3,216	3,317	0.557	3.534	2.488
IX	1.727 x 10^10	2.211 x 10^10	3,033	3,150	0.546	4.402	3.100
X	2.089 x 10^10	2.695 x 10^10	3,408	3,567	0.560	4.620	3.252
XI	2.707 x 10^10	3.489 x 10^10	4,096	4,275	0.557	5.012	3.528
XII	1.706 x 10^10	2.197 x 10^10	2,778	2,902	0.534	4.856	3.420

Source:

NSCB, "1989 Philippine Statistical Yearbook", Manila, October 1989
1988 Income - Table 2.4, pp. 2-12 - pp. 2-13
February 1990 Population - Table 1.7, pp. 1-48 - pp. 1-59
1988 Population - Table 1.7, pp. 1-48 - pp. 1-59
Proportion of Adults in Population - Table 1.4, pp. 1-20 - pp. 1-42

EXHIBIT 9

LAGONOY GULF LOGISTICS NETWORK
(1000 Tons)

FROM/ TO	SANGAY (NATO)	SABANG	PRESEN-TACION	CARA-MOAN	CABCAB	TABACO	OTHERS	TOTAL
NATO								
%/passengers	50	0	6	7	5	5	16	9
passengers	51	1	5	20	10	5	10	102
fish, etc.	75							75
rice	140	140						280
fuel	42	42						84
consumables	95	95						189
bag cargo	207	207						413
bottle cargo	537	280		257				1,073
others	32	32						63
SABANG								
%/passengers	1	50	35	27	12	5	24	27
passengers	1	152	29	80	22	5	15	304
fish, etc.		540	90					630
rice	6	6						12
fuel	6	6						12
consumables	12	12						25
bag cargo	4	954	950					1,909
bottle cargo	3	1,031		1,028				2,062
others	2	272	270					543
PRESENTACION								
%/passengers	5	10	50	2	0	1	2	7
passengers	5	29	41	5	0	1	1	82
fish, etc.			360					360
rice	30	382	412					825
fuel	29	115	144					288
consumables	61	258	319					637
bag cargo	22	563	585					1,170
bottle cargo	15	764	844	65				1,687
others	7	86	93					186
CARAMOAN								
%/passengers	20	47	6	50	16	9	5	26
passengers	20	80	5	148	30	10	3	296
fish, etc.				660				660
rice	122	932		1,054				2,108
fuel	118	280		802		404		1,603
consumables	243	629		872				1,744
bag cargo	86	1,375		1,461				2,922
bottle cargo	59	1,864		3,823	1,900			7,646
others	29	210		239				478

EXHIBIT 9
(CONTINUED)

FROM/ TO	SANGAY (NATO)	SABANG	PRESEN-TACION	CARA-MOAN	CABCAB	TABACO	OTHERS	TOTAL
CABCAB								
%/passengers	10	7	0	10	50	28	0	16
passengers	10	22	0	30	92	30	0	184
fish, etc.								0
rice	141	290			431			862
fuel	59	87			146			292
consumables	122	196			318			635
bag cargo	43	428			461			932
bottle cargo	29	580		386	995			1,990
others	15	65			80			160
TABACO								
%/passengers	5	2	1	3	16	50	3	9
passengers	5	5	1	10	30	53	2	106
fish, etc.								0
rice	30	66				96		193
fuel	29	20				49		98
consumables	61	45				106		211
bag cargo	22	97	360			479		958
bottle cargo	15	132		129		276		552
others	7	15	70	125		217		434
OTHERS								
%/passengers	10	5	1	1	0	2	50	5
passengers	10	15	1	3	0	2	31	62
fish, etc.								0
rice	61	198					259	518
fuel	59	59					118	236
consumables	122	134					256	511
bag cargo	43	292					335	670
bottle cargo	29	396		38			425	888
others	15	45					60	119
TOTAL:								
passengers	102	304	82	296	184	106	62	1,136
%	9	27	7	26	16	9	5	100
fish	75	540	450	660	0	0	0	1,725
%	4	31	26	38	n/a	n/a	n/a	100
rice	530	2,014	412	1,054	431	96	259	4,797
fuel	342	608	144	802	146	453	118	2,613
consumables	715	1,368	319	872	318	106	256	3,953
bag	427	3,916	1,895	1,461	461	479	335	8,974
bottle	687	5,047	844	5,725	995	2,176	425	15,898
others	107	723	433	364	80	217	60	1,984
TOTAL CARGO	2,806	13,677	4,047	10,278	2,431	3,527	1,453	38,219
Percent	7	36	11	27	6	9	4	100

EXHIBIT 10 - SUMMARY OF UNIT RATES

(Sheet 1 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
PAY ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(0 - 19)	I. EARTHWORK															
1	Clearing & Grubbing	SQ.M.	1.76	100	49	0.9			49	0.9	19	0.3	32	0.6	68	1.2
2	Tree Removal, Small	EA.														
3	Demolition of Structures & Obstructions	L.S.														
4	Unsuitable Excavation	CU.M.	40	100	46	18.4			46	18.4	23	9.2	31	12.4	69	27.6
5	Surplus Rock Excavation	CU.M.	150	100	28	42.0			28	42.0	54	81.0	18	27.0	82	123.0
6	Structure Excavation	CU.M.	50	100	47	23.5			47	23.5	22	11.0	31	15.5	69	34.5
7	Foundation Fill	CU.M.	56	100	47	26.3			47	26.3	28	15.7	25	14.0	75	42.0
8	Excavation Below Water Elevation	CU.M.	190	100	16	30.4	18	34.2	34	64.6	52	98.8	14	26.6	86	163.4
9	Compacted Fill, Select Material, Borrow	CU.M.	70	100	47	32.9			47	32.9	28	19.6	25	17.5	75	52.5
(20 - 39)	II. PAVEMENT															
20	Aggregate Subbase Course	CU.M.	140	100	48	67.2			48	67.2	27	37.8	25	35.0	75	105.0
21	Aggregate Base Course	CU.M														
22	Crushed Aggregate Base Course	CU.M.	240	100	52	124.8			52	124.8	22	52.8	26	62.4	74	177.6
23	Soil Aggregate Shoulder	CU.M.	150	100	48	72.0			48	72.0	27	40.5	25	37.5	75	112.5
24	Gravel Surface Course	CU.M.														
25	Bituminous Prime Coat, MC-70	SQ.M.	11	100	5	0.6	50	5.5	55	6.1	25	2.8	20	2.2	80	8.8
26	Bituminous Tack Coat, CRS-2	SQ.M.	8	100	8	0.6	47	3.8	55	4.4	24	1.9	21	1.7	79	6.3
27	Single Bituminous Surface Treatment	SQ.M.	25	100	5	1.3	49	12.3	54	13.5	24	6.0	22	5.5	78	19.5
28	Double Bituminous Surface Treatment	SQ.M.	49	100	5	2.5	48	23.5	53	26.0	25	12.3	22	10.8	78	38.2
29	Bituminous Concrete Wearing Course	CU.M.	2740	100	31	849.4	21	575.4	52	1424.8	22	602.8	26	712.4	74	2027.6
30	Bituminous Concrete Binder Course	CU.M.	2600	100	31	806.0	21	546.0	52	1352.0	22	572.0	26	676.0	74	1924.0
32	Bituminous Concrete Leveling Course	MT	1130	100	31	350.3	21	237.3	52	587.6	22	248.6	26	293.8	74	836.2
33	Portland Cement Concrete Pavement	SQ.M.	400	100	18	72.0	32	128.0	50	200.0	31	124.0	19	76.0	81	324.0

EXHIBIT 10 - SUMMARY OF UNIT RATES

(Sheet 2 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
PAY ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(40 - 59)	III. CONCRETE STRUCTURES - ON LAND															
40	Precast Concrete Piles, Furnished (40 x 40cm)	L.M.	820	100	15	123.0	26	213.2	41	336.2	44	360.8	15	123.0	85	697.0
41	Precast Concrete Piles, Driven (40 x 40cm)	L.M.	626	100	14	87.6	32	200.3	46	288.0	38	237.9	16	100.2	84	525.8
42	Precast Concrete Piles, Furnished (45 x 45cm)	L.M.	1290	100	15	193.5	26	335.4	41	528.9	44	567.6	15	193.5	85	1096.5
43	Precast Concrete Piles, Driven (45 x 45cm)	L.M.	790	100	14	110.6	32	252.8	46	363.4	38	300.2	16	126.4	84	663.6
44	Prestressed Conc. Sheet Piles, Furn. (25 x 60cm)	L.M.	1180	100	15	177.0	26	306.8	41	483.8	44	519.2	15	177.0	85	1003.0
45	Prestressed Conc. Sheet Piles, Driven (25 x 60cm)	L.M.	590	100	14	82.6	32	188.8	46	271.4	38	224.2	16	94.4	84	495.6
46	Pile Transportation per 100 Kilometers, On Land	L.M.	250	100	30	75.0	20	50.0	50	125.0	30	75.0	20	50.0	80	200.0
47	Pile Transportation per 100 Kilometers, By Sea	L.M.	300	100	30	90.0	20	60.0	50	150.0	30	90.0	20	60.0	80	240.0
48	Test Pile, Concrete (40 x 40cm)	L.M.		100									100			
49	Test Pile, Concrete (45 x 45cm)	L.M.		100									100			
50	Reinforcing Steel	KG	21	100			45	9.5	45	9.5	44	9.2	11	2.3	89	18.7
51	Structural Concrete, Class A	CU.M.	2100	100	15	315.0	26	546.0	41	861.0	44	924.0	15	315.0	85	1785.0
52	Structural Concrete, Class B	CU.M.	2090	100	15	313.5	26	543.4	41	856.9	44	919.6	15	313.5	85	1776.5
(60 - 79)	IV. MARINE STRUCTURES OVER/IN WATER															
60	Precast Concrete Piles, Furnished (40 x 40cm)	L.M.	820	100	15	123.0	26	213.2	41	336.2	44	360.8	15	123.0	85	697.0
61	Precast Concrete Piles, Driven (40 x 40cm)	L.M.	660	100	25	165.0	20	132.0	45	297.0	40	264.0	15	99.0	85	561.0
62	Precast Concrete Piles, Furnished (45 x 45cm)	L.M.	1290	100	15	193.5	26	335.4	41	528.9	44	567.6	15	193.5	85	1096.5
63	Precast Concrete Piles, Driven (45 x 45cm)	L.M.	835	100	25	208.8	20	167.0	45	375.8	40	334.0	15	125.3	85	709.8
64	Structural Concrete, Class A (over water)	CU.M.	3300	100	15	495.0	20	660.0	35	1155.0	50	1650.0	15	495.0	85	2805.0
65	Structural Concrete, Class B (over water)	CU.M.	3280	100	15	492.0	20	656.0	35	1143.0	50	1640.0	15	492.0	85	2788.0
66	Structural Concrete, Class A (under water)	CU.M.	5300	100	15	795.0	20	1060.0	35	1855.0	50	2650.0	15	795.0	85	4505.0
67	Structural Concrete, Class B (under water)	CU.M.	5200	100	15	780.0	20	1040.0	35	1820.0	50	2600.0	15	780.0	85	4420.0
68	Core Rock for Causeway or Breakwater	CU.M.	260	100	50	130.0			50	130.0	30	78.0	20	52.0	80	208.0
69	Underlayer Rock	CU.M.	450	100	50	225.0			50	225.0	30	135.0	20	90.0	80	360.0
70	Armor Rock, Small (up to 1 ton)	CU.M.	575	100	50	287.5			50	287.5	30	172.5	20	115.0	80	460.0
71	Armor Rock, Large (larger than 1 ton)	CU.M.	690	100	50	345.0			50	345.0	30	207.0	20	138.0	80	552.0
72	Berthing Dolphins (5 Timber Piles)	EA.	30000	100	30	9000.0	20	6000.0	50	15000.0	35	10500.0	15	4500.0	85	25500.0
73	Berthing Dolphins (7 Timber Piles)	EA.	40000	100	30	12000.0	20	8000.0	50	20000.0	35	14000.0	15	6000.0	85	34000.0
74	Mooring Bollard	EA.	13000	100	40	5200.0			40	5200.0	45	5850.0	15	1950.0	85	11050.0
75	Mooring Cleat	EA.	8000	100	40	3200.0			40	3200.0	45	3600.0	15	1200.0	85	6800.0
76	Mooring Ring	EA.	450	100	40	180.0			40	180.0	45	202.5	15	67.5	85	382.5

Note: Items 40,42,44,60 and 62 are ex plant.

EXHIBIT 10 - SUMMARY OF UNIT RATES

(Sheet 3 of 3)

SUMMARY OF UNIT RATES RURAL INFRASTRUCTURE FUND PROJECT			FINANCIAL COST		FOREIGN COMPONENT DIRECT		FOREIGN COMPONENT INDIRECT		FOREIGN COMPONENT TOTAL		LOCAL COMPONENT		TAXES		ECONOMIC COST	
F.Y ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Pesos)	%	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)	%	UNIT COST (Pesos)
(80 - 99)	V. STANDARD PORT BUILDINGS															
80	Building w/ Comfort Room, Office	S.M.	4000	100	15	600.0	26	1040.0	41	1640.0	44	1760.0	15	600.0	85	3400.0
81	Open Building	S.M.	3070	100	15	460.5	26	798.2	41	1258.7	44	1350.8	15	460.5	85	2609.5
82	Comfort Rooms, incl. Walls (no foundation, no roof)	S.M.	1500	100	15	225.0	26	390.0	41	615.0	44	660.0	15	225.0	85	1275.0
(100 - 119)	VI. DRAINAGE/EROSION WORKS															
100	Backfill Material, Pipe Culvert	CU.M	136	100	47	63.9			47	63.9	27	36.7	26	35.4	74	100.6
101	RCPC, 61cm Diameter	L.M.	886	100	18	159.5	22	194.9	40	354.4	42	372.1	18	159.5	82	726.5
102	RCPC, 91cm Diameter	L.M.	1500	100	16	240.0	26	390.0	42	630.0	42	630.0	16	240.0	84	1260.0
103	RCPC, 107cm Diameter	L.M.	2000	100	14	280.0	28	560.0	42	840.0	42	840.0	16	320.0	84	1680.0
104	RCPC, 122cm Diameter	L.M.	3000	100	14	420.0	28	840.0	42	1260.0	42	1260.0	16	480.0	84	2520.0
105	Structural Concrete for Pipe Headwalls	CU.M.	2090	100	15	313.5	26	543.4	41	856.9	44	919.6	15	313.5	85	1776.5
106	Reinforcing Steel for Pipe Headwalls	KG	23	100			45	10.4	45	10.4	44	10.1	11	2.5	89	20.5
107	Removal, Cleaning, Replacement, Salvaged Pipe Culverts	L.M.														
108	Grouted Riprap	CU.M.	675	100	8	54.0	13	87.8	21	141.8	28	189.0	51	344.3	49	330.8
109	Concrete Slope Protection	CU.M.														
110	Gabions	CU.M.														
(120 - 129)	VII. INCIDENTAL WORKS															
120	Metal Beam Guardrail	L.M.	786	100	40	314.4			40	314.4	25	196.5	35	275.1	65	510.9
121	Warning Signs	EA.	2825	100	42	1186.5			42	1186.5	23	649.8	35	988.8	65	1836.3
122	Regulatory Signs	EA.	2825	100	42	1186.5			42	1186.5	23	649.8	35	988.8	65	1836.3
123	Informatory Signs	EA.	10800	100	44	4752.0			44	4752.0	21	2268.0	35	3780.0	65	7020.0
124	Sodding	SQ.M.	5	100	51	2.6			51	2.6	16	0.8	33	1.7	67	3.4
130	VIII. LAND ACQUISITION	KM	300000	100							90	270000	10	30000	90	270000

EXHIBIT 11

REPRESENTATIVE VESSEL COST MODEL

CLASS OF BOAT	(1) Paddle Banca	(2) Small Banca	(3) Medium Banca	(4) Large Banca	(5) Medium Launch	(6) Large Launch	(7) Small Trawler	(8) Large Trawler	(9) Inter-Island
ROLE I (40-60%)	Catch Fish	Catch Fish	Trnspt Fish	Trnspt Cargo	Trnspt Psngrs	Trnspt Psngrs	Catch Fish	Catch Fish	Trnspt Psngrs
ROLE II (20-40%)	Catch Fish	Trnspt Psngrs	Catch Fish	Trnspt Fish	Trnspt Psngrs	Trnspt Psngrs	Trnspt Fish	Trnspt Fish	Trnspt Cargo
ROLE III (10-20%)	Catch Fish	Trnspt Cargo	Trnspt Cargo	Trnspt Psngrs	Trnspt Cargo	Trnspt Cargo	Catch Fish	Catch Fish	Trnspt Produce
FIXED COSTS									
DWT	0.75	1.5	4	9	10	20	20	40	80
HP	n/a	16	85	165	165	250	250	300	450
New building	10,000	25,000	100,000	200,000	220,000	440,000	1,600,000	2,800,000	1,600,000
10% Deprec.	1,000	2,500	10,000	20,000	22,000	44,000	160,000	280,000	160,000
15% Maint.	1,500	3,750	15,000	30,000	33,000	66,000	240,000	420,000	240,000
30% Other	3,000	7,500	30,000	60,000	66,000	132,000	480,000	840,000	480,000
Tot/yr;Fin	5,500	13,750	55,000	110,000	121,000	242,000	880,000	1,540,000	880,000
Tot/yr;Econ	4,675	11,688	46,750	93,500	102,850	205,700	748,000	1,309,000	748,000
CREW COSTS									
# Crewmen	2	2	4	6	10	20	20	40	80
Crew costs	20,000	40,000	120,000	180,000	310,000	615,000	625,000	1,240,000	2,450,000
FUEL COSTS									
Liters/hour	n/a	3	10	19	19	35	35	55	75
Km/hour	3	15	20	20	20	20	15	15	20
Liters/km	n/a	0	1	1	1	2	2.33	3.67	3.75
Km/day	5	15	30	45	60	60	30	40	80
%/days/year	1	1	1	1	1	1	0.6	0.7	0.9
Km/year	913	2,738	6,570	11,498	13,140	15,330	6,570	10,220	26,280
Fuel;Fin	n/a	7	5	5	5	5	4.96	4.96	4.96
Fuel;Econ	n/a	4	4	4	4	4	4.18	4.18	4.18
Fuel/yr;Fin	n/a	3,663	16,294	54,176	61,916	133,064	76,037	185,868	488,808
Fuel/yr;Econ	n/a	1,933	13,731	45,657	52,179	112,139	64,079	156,639	411,939
TOTAL COSTS									
Tot/yr;Fin	25,500	57,413	191,294	344,176	492,916	990,064	1,581,037	2,965,868	3,818,808
Tot/yr;Econ	24,675	53,620	180,481	319,157	465,029	932,839	1,437,079	2,705,639	3,609,939
Hours/yr	2,190	2,190	2,628	3,066	2,628	3,066	2,628	3,066	3,942
Cost/hr;Fin	12	26	73	112	188	323	601.61	967.34	968.75
Cost/hr;Econ	11	24	69	104	177	304	546.83	882.47	915.76

EXHIBIT 11
(CONTINUED)

CLASS OF BOAT	(1) Paddle Banca	(2) Small Banca	(3) Medium Banca	(4) Large Banca	(5) Medium Launch	(6) Large Launch	(7) Small Trawler	(8) Large Trawler	(9) Inter-Island
FISHING COSTS									
% Avail/day	1	1	0	0			0.7	0.7	
Avg/catch	0	0	0	0			2	3.5	
Avg/day/yr	183	128	44	26			153	179	
Tons/year	3	5	7	8			306.60	625.97	
Cost/kgm;Fin	9	8	6	4			3.61	3.32	
Cost/kgm;Eco	9	7	5	4			3.28	3.03	
FISH TRANSPORT COSTS									
% Avail/day	0	0	0	0			0.3	0.3	
Tons/trip	0	0	2	5			15	30	
Trips/year	0	0	88	77			66	77	
Tons/year	0	0	175	345			985	2,299	
Cost/kgm;Fin	0	0	0	0			0.48	0.39	
Cost/kgm;Eco	0	0	0	0			0.44	0.35	
Cost/tkm;Fin	0	0	29	13			32.09	19.35	
Cost/tkm;Eco	0	0	27	12			29.16	17.65	
PASSENGER TRANSPORT COSTS									
% Avail/day	0	0	0	0	1	1			0.6
#/Roundtrip	0	30	60	120	150	300			800
Trips/year	0	37	44	51	153	179			197
Psgr/year	0	1,095	2,628	6,132	22,995	53,655			157680
Cost/psgr;Fi	0	10	15	11	15	13			14.53
Cost/psgr;Ec	0	10	14	10	14	12			13.74
Cost/pkm;Fin	0	1	0	0	1	0			0.36
Cost/pkm;Eco	0	1	0	0	0	0			0.34
CARGO TRANSPORT COSTS				CARGO TRANSPORT					
% Avail/day	0	0	0	0	0	0			0.4
Tons/day	0	1	2	5	5	10			40
Days/year	0	18	44	102	44	51			131
Tons/year	0	18	88	460	219	511			5256
Cost/ton;Fin	0	315	437	299	450	388			291
Cost/ton;Eco	0	294	412	278	425	365			275
Cost/tkm;Fin	0	42	29	13	15	13			7.27
Cost/tkm;Eco	0	39	27	12	14	12			6.87

SOURCE: Consultant's survey.

BASIS:
1. New building costs from field surveys.
2. Depreciation over 10 years at straight line.
3. Ordinary maintenance at 15% per year in lieu of 10% first year increasing at 8% per year.
4. Other and extraordinary costs at 15% per year for tri-annual hull rehabilations, lost and damaged nets and gear as well as excessive wear and tear due cargo and passenger overloads.

EXHIBIT 12

PORT TARIFFS AND CHARGES

Municipal ports do not, for the most part, collect dues, rates or charges for the use of ports located in their municipalities.

The following basis for determining probable revenues levels at municipal ports which might elect to assess charges is derived from current Philippine Port Authority (PPA) tariffs or from particular municipal ports who do currently assess rates or charges.

Most current PPA and municipal port charges are by vessel, crate, sack, bag, can, piece or commodity and have been converted herein to approximate per ton or kilogram equivalents for purposes of comparative evaluation.

A. **Docking and Landing Fee** (per trip)

Small-inter island vessels <100 DWT	P. 100.00
Pump boats & larger bancas >3 DWT	P. 100.00
Small motor bancas <3 DWT	n/c
Paddle and sail bancas <1 DWT	n/c

B. **Port Charges** (per day)

Small inter-island vessels <100 DWT	P. 100.00
Pump boats & larger bancas >3 DWT	P. 20.00
Small motor bancas <3 DWT	n/c
Paddle and sail bancas <1 DWT	n/c

C. **Cargos** (per ton equivalent)

Storage (2 days free, average stay 5 days)	P. 1.00
Dried fish @ P. 0.05 per box & P. 0.20 per sack	P. 5.00
Cement @ P. 0.10 per bag	P. 2.00
Other bagged cargo @ P. 0.20 sack	P. 4.00
Hogs @ P. 1.0 per head	P. 4.00
Cattle @ P. 2.0 per head	P. 4.00
Bottled cargo @ P. 0.05 per case	P. 5.00
Petroleum Products @ P. 0.05 per liter	P. 50.00
Other items not otherwise itemized by name	P. 4.00

D. **Passengers**

Passenger amenity fee (per passenger)	P. 0.50
Baggage and parcels (per package)	P. 2.00
Bagged cargos (per sack)	P. 2.00
Other cargos (per ton)	P. 50.00

SOURCES: Consultant's surveys and Philippine Port Authority

EXHIBIT 13

CLIMATOLOGICAL NORMALS - LEGASPI

STATION : LEGASPI
COORDINATES: 13'09' N 123°43' E

PERIOD OF RECORDS: 1951 - 1985

MONTH	RAIN FALL (mm)	RAINY DAYS	TEMPERATURE (deg C) MAX-IMUM	MIN-IMUM	MEAN	DRY BULB	WET BULB	DEW PT.	RH (%)	MEAN SEA LEVEL PRESSURE (mbs)	PREVAILING WIND DIREC-TION	SPEED (mps)	CLOUD (octa)	DAYS WITH TSTM	LGHT
JAN	296.9	20	28.6	22.1	25.3	25.1	23.0	22	84	1012.9	NE	4	6	1	0
FEB	195.6	17	29.1	22.2	25.6	25.4	23.1	22	82	1013.1	NE	4	6	0	0
MAR	192.6	17	29.9	22.8	26.3	26.1	23.7	23	82	1012.8	NE	4	5	0	0
APR	152.1	16	31.1	23.5	27.3	27.2	24.7	24	81	1011.6	NE	4	5	2	1
MAY	181.3	14	32.1	24.1	28.1	28.0	25.4	25	81	1009.8	NE	3	5	7	9
JUN	240.9	16	32.2	24.0	28.1	27.8	25.4	25	82	1009.1	NE	3	5	11	12
JUL	251.3	19	31.8	23.7	27.7	27.3	25.1	24	84	1008.6	SW	3	6	10	10
AUG	264.2	20	31.6	23.7	27.6	27.2	25.1	24	84	1008.2	SW	3	6	10	8
SEP	259.9	20	31.5	23.5	27.5	27.0	25.0	24	85	1008.9	W	3	6	11	11
OCT	325.5	21	31.1	23.3	27.2	26.8	24.7	24	84	1009.4	NE	3	6	9	10
NOV	483.7	22	30.1	23.1	26.6	26.4	24.4	24	85	1010.2	NE	4	6	6	5
DEC	456.0	23	29.0	22.9	25.9	25.7	23.8	23	85	1011.7	NE	4	6	2	2
ANNUAL	3300.0	225	30.7	23.2	26.9	26.7	24.5	24	83	1010.5	NE	4	6	69	68

EXHIBIT 14

CLIMATOLOGICAL NORMALS - DAET

STATION : DAET
COORDINATES: 14'07'N 122°57' E

PERIOD OF RECORDS: 1951 - 1985

MONTH	RAIN FALL (mm)	RAINY DAYS	TEMPERATURE (deg C) MAX-IMUM	MIN-IMUM	MEAN	DRY BULB	WET BULB	DEW PT.	RH (%)	MEAN SEA LEVEL PRESSURE (mbs)	PREVAILING WIND DIREC-TION	SPEED (mps)	CLOUD (octa)	DAYS WITH TSTM	LGHT
JAN	312.0	23	28.8	22.3	25.5	25.0	22.9	22	84	1014.1	NE	3	5	0	0
FEB	175.0	16	28.9	22.3	25.6	25.2	22.9	22	82	1014.0	NE	3	4	0	0
MAR	153.9	13	30.0	22.6	26.3	26.1	23.5	23	80	1013.6	NE	3	4	1	0
APR	126.1	12	31.4	23.5	27.4	27.2	24.6	24	81	1011.9	NE	3	4	4	3
MAY	139.1	12	32.8	24.0	28.4	28.0	25.3	24	80	1010.0	ENE	2	5	12	14
JUN	173.9	16	32.8	24.0	28.4	28.0	25.3	24	80	1009.2	S	2	5	14	17
JUL	235.7	17	32.2	23.9	28.0	27.4	25.1	24	83	1008.6	S	2	6	14	16
AUG	222.3	17	32.1	24.0	28.0	27.4	25.0	24	82	1007.9	S/SSW	2	6	11	12
SEP	267.6	19	31.8	23.6	27.7	27.0	24.9	24	84	1008.9	NE	2	6	12	13
OCT	518.6	23	30.9	23.5	27.2	26.7	24.8	24	86	1010.1	NE	2	5	10	12
NOV	590.2	24	29.9	23.6	26.7	26.4	24.4	24	85	1011.1	NE	4	6	5	4
DEC	591.9	26	28.7	23.1	25.9	25.6	23.7	23	85	1012.8	NE	4	6	1	1
ANNUAL	3506.3	218	30.9	23.4	27.1	26.7	24.4	24	83	1011.0	NE	3	5	84	92

EXHIBIT 15

CLIMATOLOGICAL EXTREMES - LEGASPI
(AS OF 1986)

MONTH	TEMPERATURE (deg. C)				GREATEST DAILY RAINFALL (mm)		HIGHEST WIND (mps)		SEA LEVEL PRESSURE (mbs)			
	HIGH	DATE	LOW	DATE	AMOUNT	DATE	SPD/DIR	DATE	HIGH	DATE	LOW	DATE
JAN	32.7	24'12	17.0	12'79	239.0	9'04	23/N	8'72	1020.7	6'58	996.2	9'72
FEB	33.7	18'12	16.7	19'14	185.1	24'35	26/ENE	13'80	1021.0	1'62	996.2	25'70
MAR	33.9	29'50	17.0	25'13	209.2	11'71	18/NE	16'62	1020.9	12'64	1004.5	22'82
APR	36.1	29'48	16.7	4'63	193.0	6'35	21/NE	24'68	1018.2	7'65	1002.1	21'56
MAY	37.7	27'68	17.1	7'72	202.7	5'51	41/ENE	26'71	1016.0	9'57	985.8	26'71
JUN	37.6	11'63	18.9	14'71	377.9	3'23	57/S	24'72	1017.2	15'53	961.7	25'60
JUL	36.6	5'15	15.8	20'71	239.4	15'83	29/ENE	14'71	1015.5	7'53	969.2	14'83
AUG	36.9	7'39	19.4	8'71	178.3	13'63	28/SW	13'63	1015.0	11'69	990.0	24'67
SEP	36.0	1'08	19.0	13'75	216.3	2'29	29/SSW	18'79	1015.5	5'53	984.1	26'76
OCT	35.3	3'30	17.2	31'69	263.9	28'58	49/WSW	13'70	1016.4	20'79	972.0	6'60
NOV	34.4	3'13	17.9	1'69	484.6	3'67	41/N	3'67	1019.2	30'78	938.4	3'67
DEC	33.2	18'04	13.9	28'71	458.6	26'75	36/SSW	31'79	1019.8	1'78	984.8	31'59
OVERALL	37.7	5/27/ 1968	13.9	12/28/ 1971	484.6	11/3/ 1967	57/S	6/24/ 1972	1021.0	2/1/ 1962	938.4	11/3/ 1967
PERIOD OF RECORDS		1903-1918, 1930-1939 1947-1986				1902-194 1949-1986		1950-1986		1949-1986		

NOTE: DOUBLE APOSTROPHE ('') MEANS FOR YEAR 1800

100

EXHIBIT 16

LAGONOY RIVER DATA

RIVER = LAGONOY R
STA ID= 05SW134233PW032 GRID NO.= 5 4 7
LAT: 13 44 38 LONG: 123 31 52

LOCATION= CAGAYCAY,GOA,CAMARINES SUR
ABT 3 KMS U/S FR MOUTH OF CAGAYAN GULF,ABT S OF DIV'N DAM 100M D/

DRAINAGE AREA(SQ.KM)= 45.
START OBSERVATION =DEC 1951
OBS LAST CONSIDERED =DEC 1970

ELEV.OF Z GAGE= 41.53 METERS ABV MSL
GAGE OPERATION= GAGE READ 3X/DAY
REMARKS= RECORDS FAIR,ABV IRRIG DAM

GAGE TYPE=
AGENCY =BPW-WRSD
STATUS =OPERATING

A. ANNUAL DISCHARGE CHARACTERISTICS (Q IN CU.M./SEC.)

YEAR	PEAK Q	GAGE HT. -METERS-	DATE	TIME	MAX.DLY Q	MEAN Q	MIN.DLY Q	GAGE HT. -METERS-	DATE	RUNOFF --MM--
1951	5.06	******	DEC 11		5.06	******	3.77	******	DEC 31	******
1952	26.19	1.970	OCT 22	05PM	24.64	******	1.50	.78	APR 29	******
1953	15.04	1.730	DEC 05	12NN	13.01	5.34	2.28	******	OCT 22	3737.1
1954	65.10	3.000	NOV 16	05PM	34.06	3.66	1.77	******	JUL 29	2575.1
1955	46.50	2.600	NOV 29	06AM	37.50	4.70	2.16	******	OCT 02	3289.9
1956	116.00	4.000	DEC 09	05PM	67.07	5.85	2.55	******	JUL 29	4110.4
1957	210.00	4.000	NOV 11	05PM	84.25	4.54	2.13	******	JUN 19	3185.5
1958	189.00	3.950	OCT 30	12NN	50.10	5.20	1.84	1.33	MAY 20	3646.1
1959	358.00	4.200	DEC 31	12MN	66.00	5.92	2.08	******	AUG 23	4151.4
1960	70.90	2.120	SEP 30	06AM	63.20	6.56	2.44	******	APR 10	4607.5
1961	9.42	1.500	OCT 16	06AM	9.42	2.36	.34	.75	OCT 04	1656.7
1962	41.00	2.000	DEC 04	06AM	41.00	2.12	.32	.70	AUG 18	1486.4
1963	19.84	2.650	DEC 08	06AM	19.48	3.11	******	.85	MAY 31	2180.1
1964	22.36	2.790	SEP 27	05PM	21.46	3.24	.23	1.08	JUN 15	2276.8
1965	8.14	2.000	JAN 04	24HR	8.14	1.81	.20	1.09	JUL 06	1209.0
1966	7.45	1.950	NOV 21	06AM	7.17	******	.28	1.10	FEB 28	******
1967	6.07	1.850	FEB 01	05PM	5.93	******	.44	1.16	MAY 12	******
1968	1.75	1.460	JAN 01	06AM	1.68	.61	.07	1.00	SEP 25	428.8
1969	7.73	1.970	DEC 09	06AM	7.59	1.71	.07	1.00	MAR 31	1198.4
1970	9.94	2.100	NOV 02	12NN	8.14	******	.58	1.21	JUL 11	******

B. EXTREMES OF DISCHARGE AND STATISTICAL PARAMETERS

EXTREME DISCHARGE IN CMS

MAX.Q = 358.00 MIN.Q = *****
DATE = DEC 31,1959 DATE = MAY,1962
GAGE H= 4.20 GAGE H= .85
INSTANTANEOUS PEAK INSTANTANEOUS

STATISTICS	PEAK Q	MAX.DLY Q	MEAN Q	MIN.DLY Q
MEAN FLW=	61.774	28.745	3.782	1.313
STD.DEV.=	91.900	25.328	1.817	1.107
SKEWNESS=	2.249	.856	-.117	.458
KURTOSIS=	8.236	2.898	2.426	2.651
NO.YEARS=	20	20	15	19

C. MEAN MONTHLY DISCHARGE IN CU.M./SECOND

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1951	******	******	******	******	******	******	******	******	******	******	******	******
1952	4.64	3.47	2.77	2.27	******	2.28	3.22	3.59	4.66	8.21	8.70	8.61
1953	6.84	5.19	4.69	4.25	5.02	6.74	5.60	5.96	4.19	2.92	4.80	7.74
1954	4.59	3.16	3.10	2.66	2.54	2.16	2.10	2.47	2.50	3.25	7.31	8.10
1955	10.24	5.37	3.94	3.41	3.00	3.68	3.66	2.89	2.55	3.75	7.60	6.34
1956	4.72	4.45	3.72	6.22	4.06	3.32	3.27	3.53	5.99	4.80	8.91	16.95
1957	9.90	5.25	3.94	3.39	2.76	2.37	4.03	3.00	2.56	4.50	9.09	3.77
1958	3.72	3.19	3.19	2.43	2.37	4.04	4.71	4.68	2.08	9.59	12.50	9.12
1959	9.40	7.34	9.33	4.44	4.38	3.54	4.44	3.27	2.63	3.60	9.20	9.53
1960	12.08	7.60	6.10	4.41	3.42	4.46	3.61	3.38	5.92	11.28	9.72	6.72
1961	4.11	2.75	2.32	2.13	2.10	1.02	2.13	2.68	2.66	1.69	1.71	2.27
1962	1.97	1.50	1.30	1.41	1.32	.78	.64	.69	.76	1.51	3.54	9.91
1963	4.25	2.98	1.07	1.47	.23	5.36	1.00	2.65	1.94	2.92	4.26	9.21
1964	4.69	2.23	.98	1.76	.57	1.25	1.65	.79	2.97	4.61	8.57	8.80
1965	5.54	3.12	1.58	.77	.39	.43	1.52	1.36	1.58	2.39	1.39	1.69
1966	1.86	.57	.41	1.37	1.46	.56	.43	1.00	.42	.99	3.06	******
1967	******	3.48	1.17	.65	******	******	******	******	******	******	******	1.04
1968	1.48	.98	.64	.55	.83	.17	.07	.07	.21	.47	.82	1.04
1969	1.31	1.57	.07	1.25	1.42	1.45	1.09	.73	.92	1.05	3.27	6.34
1970	6.60	******	6.16	4.29	1.79	******	7.10	******	3.60	******	6.94	******
MEAN =	5.44	3.57	2.97	2.59	2.23	2.57	2.79	2.51	2.71	3.97	6.19	6.89
ST.DEV=	3.18	1.99	2.38	1.53	1.44	1.29	1.94	1.57	1.69	3.07	3.39	4.06
SKEWSS=	.670	.594	1.123	.645	.454	.061	.533	.330	.515	1.266	-.064	.455
KURTSS=	3.082	3.333	4.654	3.122	2.816	3.232	3.162	3.361	3.288	4.403	2.410	4.458
NO.YRS=	18	18	19	19	17	17	18	17	19	17	18	17

NOTE: ***** INDICATES MISSING DATA,NOT INCLUDED IN CALC OF STATISTICAL PARAMETERS

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EXHIBIT 17

ENVIRONMENTAL CONTACT LIST

Pedro M. Arboso, Mayor
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Leyte

APPENDIX C
PHOTOGRAPHS

PHOTO 3: TYPICAL LAGONOY RIVER PASSENGER BOAT LANDING USING WHARF WITH CONCRETE STAIRLANDING, LOOKING DOWNSTREAM

RURAL INFRASTRUCTURE FUND PROJECT AID PROJECT NO. 492-0420

REPRESENTATIVE VIEWS OF THE SUB-PROJECT AREA

PLATE C-1

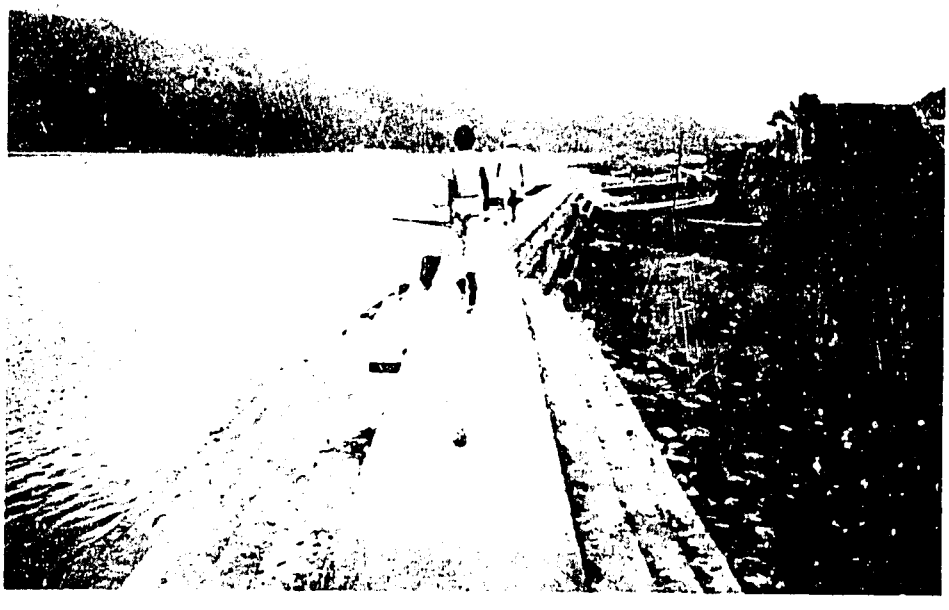

PHOTO 4: EAST END OF STAIRLANDING WHARF, LOOKING DOWNSTREAM

PHOTO 5: LARGE-MOTOR BANCA AT BERTH, LOOKING UPSTREAM

PHOTO 6: BERTH SLIP LANDING

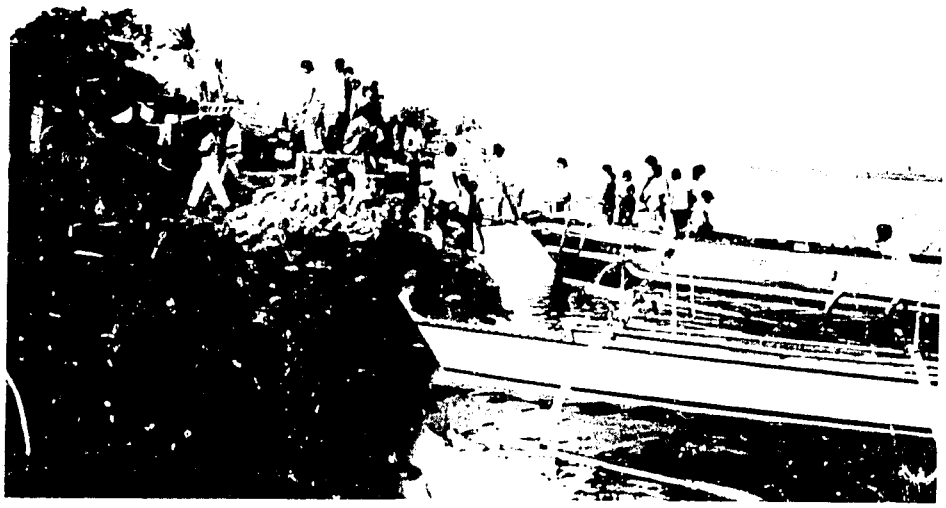

PHOTO 7: MEDIUM MOTOR BANCAS BEACHED AND UNLOADING

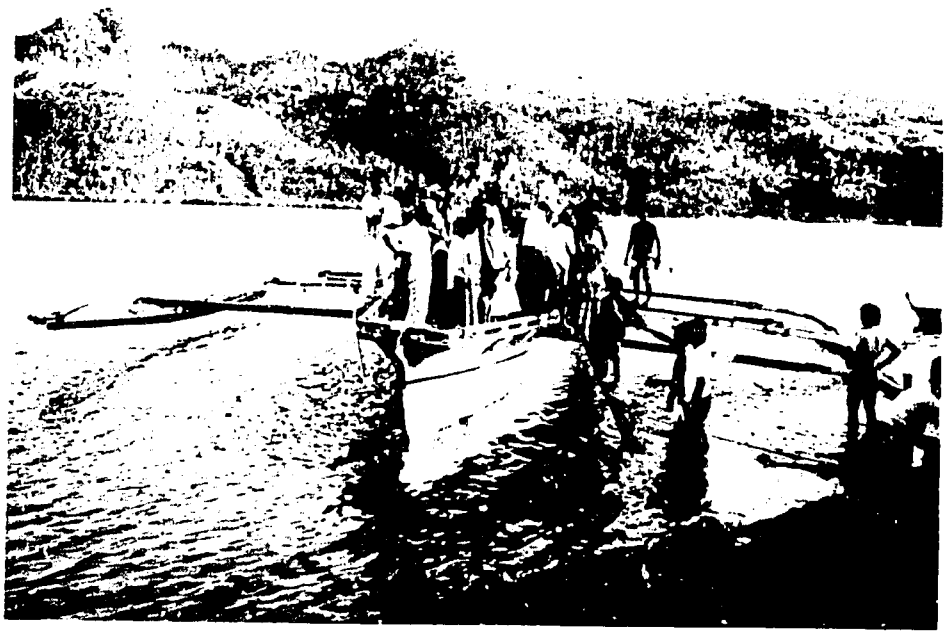

PHOTO 8: LARGE MOTOR BANCA UNLOADING PASSENGERS VIA GANGPLANK

APPENDIX D
SOCIAL SOUNDNESS OVERVIEW

APPENDIX D

THE SOCIAL SOUNDNESS OF PORT IMPROVEMENTS: AN OVERVIEW

A. INTRODUCTION

Social soundness analysis evaluates the effect of rural port projects from the perspective of the intended beneficiaries: users, residents and local institutions. It considers project adaptability, social participation, spread of benefits, and equity of benefit distribution. Social sensitivity in feasibility analysis can improve understanding of real needs, projection of future usage, and anticipation of negative social impacts. Social consideration in project design can help in mitigating or compensating for negative impacts and developing community capabilities for self-directed and self-sustained growth.

Social soundness analysis involves five steps:

- Identifying and describing potential port users (individuals and organizations)
- Evaluating potential benefits and/or negative social impacts for these users
- Analyzing socio-economic institutions influencing port usage
- Assessing overall social soundness
- Identifying design and implementation considerations to improve social soundness.

This report provides general social soundness analysis for Philippine port projects, common to many of the proposals. It emphasizes five important aspects of social impact:

- Influences on family income for various social groups
- Implications for population movements
- Potential effects on vulnerable cultural minorities
- Institutional effects
- Design and implementation considerations.

B. THE PHILIPPINE CONTEXT

Many social analysts have recognized the importance of the family as the basic element underlying Filipino social structure. Jocano (1971;410) notes "It is through this structural unit of society that much local authority, rights and obligation and

modes of interactions are expressed, defined, ordered and systematized."

Andres (1981;21) concludes "Structurally speaking the social system in the Philippines is the kinship system. Philippine society is markedly segmented into subgroups with which the members identify themselves to exclusion of others....The most important and highly valued segment in the Philippine society is the family and the kinship system. Obligations to the family are of the highest order. For the Filipino, the concept 'blood is thicker than water' is highly regarded. Within the network of his alliance system which consists of relatives, friends, or followers, status age-grading, generation, authority and power differentials are ranked and observed."

In the family, the father rules, but the mother governs. She is the educator, financial officer, laundry woman and cook (Agoncillo and Alfonso 1961;7). Traditionally, Filipino parents exercise almost absolute powers over their children. It is unthinkable for a Filipino to undertake something important without consulting his parents. When the parents are absent, the eldest sibling takes on the parental role. Grandparents are also consulted and their recommendations carry considerable weight. There is a deeply ingrained respect for elders (Andres 1981;22).

Ritual kinship extension through inclusion of compadre and comadre (ninong and ninang) in baptism, confirmation and wedding services is the immediate linkage between family and community. Ninong are sought from upper income social and political elites to solidify social support networks which are expected to ultimately result in concrete benefits such as granting employment and promotion, providing money in times of need, lending a vehicle, or arranging medical care.

From the family and the local community, allegiances are eventually extended as far as the region sharing a common language and religion. Regionalism generally overshadows nationalism in the Filipino value system. As Agoncillo and Alfonso (1961;9) note: "Regionalism is an extension of the closeness of family ties. Invariably, the Filipino believes that the person known to him, no matter how bad, is better than the one unknown to him."

Inherent Filipino Regionalism has been reinforced historically by Spanish "divide and rule" policies and American "democratic" values. Andres (1981;24) says: "Filipinos have the natural tendency to band together segregating themselves according to regions and home towns. Social status, sex, age and other differences seem to break their barriers at the mention of magkababayan (compatriot) and a closer interpersonal relationship, carried almost to the degree of kinship, is expected mutually of both parties at this point of time."

It is within this social context that Philippine port projects are proposed. Political leaders, loyal to their kin, barangay, and kababayan followers, naturally seek construction projects for their home communities. It is the role of feasibility studies to ensure that approved proposals also meet

rational economic and engineering criteria.

C. PHILIPPINE PORT PROJECTS

The Philippines consists of over 7,000 islands (about 700 of which are inhabited), and is dominated economically by two major cities, Manila and Cebu. Thus, ports play an extremely important role in linking small communities into the economic life of the country. In addition to inter-island traffic, ports play an important role in coastal transportation where roads are either lacking or only seasonally passable. This section summarizes lessons from social soundness analyses of previous Philippine port projects.

For coastal communities, travel by banca often fulfills the same social functions as road transport serves inland. These include moving goods to market, going shopping, visiting relatives, attending high school, and emergency dashes to hospitals or clinics. Such trips are necessary even where bancas must simply land on the beach. Improved port facilities make these journeys easier, faster and safer, and can cause travel to become feasible under previously unnavigable weather conditions.

In general, socio-economic benefits are much more dramatic where new facilities are added than where an existing port is repaired or enlarged. Most proposed RIF sub-projects involve a simple combination of repairing typhoon damage and extending existing piers. For such sub-projects, social benefits are incremental rather than striking. When passenger or marketing sheds, ice plants and cold storage, marine gas stations, or comfort rooms are added, the advantages to the user are much more impressive. Projects which include breakwaters or dredging and land reclamation can have a dramatic impact, sometimes providing year-round access to larger vessels.

Most proposed port sub-projects concern small municipal landings, primarily in rural areas, where users tend to be relatively poor. There are four major types of port users: fishermen, passengers, merchants, and companies. Fishermen may represent family or commercial enterprises. Passengers are local or inter-island. Merchants may be wholesale or retail, and companies reflect various concerns such as trading, agribusiness, and mining. Most port users are individuals from lower and middle income categories. Deep-water ocean ports, which accommodate inter-island vessels, also service large companies.

Fishermen, usually the poorest coastal residents, use the ports regularly and will benefit most. Passengers and merchants, improved port facilities can considerably speed and facilitate travel and cargo shipments. At Morong, Bataan, for example, motorized bancas come from Olongopo in 40-60 minutes, but require an additional 40 minutes to ferry passengers and their goods ashore in the shallow cove where no docking facilities exist. The transport operators and merchants benefitted are usually small operators, but cannot be considered really poor.

Socio-economic benefits from port development projects are generally reflected in:

- Better access through more regular and frequent departures
- Time savings through more rapid loading and unloading
- Added comfort through easier boarding/landing and new facilities
- Increased safety through protection of passengers and boats during inclement weather
- Reduced costs through the landing of larger craft, protection of cargo, reduced spoilage, and less ice consumption

In short, travel and transport become more convenient, faster, more comfortable, safer, and less expensive. This, in turn, can result in higher income and improved access to medical and educational facilities, especially where roads are lacking.

D. INCOME EFFECTS

Speedier travel, faster turnaround times and reduced spoilage translate into reduced transportation expenses. Given a fixed market price in Manila, this will result in lower prices for goods from the capital and higher prices for commodities exported by the port community. Both factors imply a higher effective disposable income available to community residents.

For the many small farmers in the rural port hinterlands, this can mean reduced costs for farm inputs and higher farm-gate prices for crop exports. In practice, capitalizing on this opportunity requires a road network linking the hinterland to the port and no alternative access to markets. However, most RIF sub-project ports have alternative port or road access to markets.

The most direct economic benefits accrue to fishermen, who usually represent the poorest social class. Port improvements can decrease costs, lessen spoilage, and improve marketing. A clear understanding of fishermen's needs can easily multiply such benefits. For example, an ice plant or cold storage facility will often be of greater utility than repairing a cracked market structure. Similarly, sensitivity to functional needs might be reflected in provision of a marine fueling facility where gas stations are far away.

E. POPULATION MOVEMENT

Voluntary migration effects are less likely for port development than for road projects where the value of the land

along the road increases dramatically. It would be unusual for a port to improve access to the point where it would influence a family's decision to move. Involuntary displacement, however, remains a significant concern, especially where squatters line the coast and may have to be moved for port construction.

One pair of ports has been designed with the objective of resettling squatters. A docking facility will provide access to a previously remote peninsula where small house plots have been laid out. Another will serve as a market landing, providing access to the area from which the squatters are being moved. One fisherman/ squatter noted that "resettling" usually means provision of farmland. Fishermen who wish to continue with their livelihood are provided only with a little hardware for rebuilding. In the RIF case, the new area is a peninsula and the operation should satisfy all, if properly implemented. Until now, however, the project has been planned without either consulting or informing the squatters.

F. CULTURAL MINORITIES

A special social soundness consideration is to protect tribal and cultural minorities from unfair exploitation resulting from construction projects. This is a significant consideration where roads are planned through or near ancestral tribal lands. Such considerations are less likely for port projects where less land is involved and non-existent for the large majority of the proposed projects which involve only extension of an existing port.

Historically, however, such events have occurred. In Panacan Port (Narra, Palawan), for example, the Tagbanwa formerly occupied the area where the port was constructed. They were relocated to a mountainside reservation to facilitate the development. Only about three of the original Tagbanwa residents held title to their lands. These three still hold their titles and can legally reap some of the development benefits through the increased value of their property.

Thus, the most significant step in protecting tribal minorities is ensuring them title to their lands. This is feasible in the coastal areas applicable to port projects. (Land titles are not permitted in forest reserves where many tribes live, but communal stewardship arrangements provide some protection.) Where vulnerable minorities are involved, the social soundness of development projects can be increased by including in the project provisions for assisting these people to obtain titles for their property. The Offices of Northern and Southern Communities in the President's Office are currently charged with the task of protecting tribal minorities. Outsiders wishing to purchase land from such minorities are required to obtain approval from these offices.

Appropriate consideration of minority communities's needs in port project planning could be facilitated by more pro-active consultation with them during early project planning. As with other local residents, they too often learn about development

projects when the bulldozers arrive.

G. DESIGN AND IMPLEMENTATION CONSIDERATIONS

Appropriate design considerations can be identified for individual ports by including the intended beneficiaries in the planning process. Most simply, this requires only a few interviews with representative port users. Local leaders could reap political recognition as well as economic gains by expanding the process to include public meetings. People almost always react more positively towards projects in which they are involved.

Consultation with port users can also avoid serious negative consequences. For example, the fishermen a port is intended to aid are often squatters living in huts built on stilts at the waters edge. If construction of a landing requires destruction of their houses and dislocation of their families, their net benefit will be strongly negative.

Land tenure considerations deserve special attention. Wherever private land is involved, port projects should provide assistance in obtaining titles to ensure equitable distribution of benefits.

Labor-intensive construction methods employing local labor should be considered wherever feasible. The Philippine context is characterized by extensive under-employment, and the temporary boost to the economy through provision of temporary employment opportunities can be significant.

In addition, port projects can make permanent contributions to the economy. Kiosks in newly constructed passenger sheds, for example, represent added entrepreneurial ventures. Port maintenance activities may require regular laborers. And, where municipal ports collect docking fees, local institutions will be strengthened through income generation.

Institution-strengthening efforts linked to port improvements can include support for fishermen's cooperatives. Ice plants and cold storage facilities, for example, are often a major concern of fishermen. These plants could be owned and managed through such cooperatives. Government projects could provide credit to local cooperatives, linked with appropriate management training, rather than paying for such facilities outright. DPWH could design small, inexpensive cold storage facilities appropriate for rural fishing ports, in place of the larger plants now available. Appropriate development of such interventions can be pursued effectively if fishermen are involved and consulted from the beginning.

Educational efforts can also be utilized to facilitate the development of local capacity. Municipal port personnel, for example, might benefit from management training including the collection and management of funds and port maintenance. In areas with coral reefs, workshops could be conducted for port users on appropriate practices for maintaining the integrity and

beauty of the reefs while fishing, diving or conducting normal port operations. Such seminars would be especially useful in tourist locations.

H. Conclusions

In general, the proposed port sub-projects will make transportation more convenient, faster, more comfortable, safer, and less expensive. Most port sub-projects will tend to improve real income slightly in the port communities and will not adversely affect cultural minorities or result in significant population movements.

This appendix has presented general analysis common to all port projects. Considerations specific to each case are analyzed in the main body of the report. Socio-economic characteristics of port users are summarized in Chapter II and social soundness analysis is presented in Chapter VIII.

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