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AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington, D. C. 20523

PROJECT PAPER

PHILIPPINES: Rural Infrastructure Fund (492-0420)

September 28, 1987

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Project Paper

Philippines

Rural Infrastructure Fund Project
492-0420

September 1987

USAID / Manila

PROJECT PAPER

PHILIPPINES

RURAL INFRASTRUCTURE FUND PROJECT

492-0420

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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete)

Amendment Number

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: REPUBLIC OF THE PHILIPPINES

3. PROJECT NUMBER: 492-0420

4. BUREAU/OFFICE: ASIA AND NEAR EAST 04

5. PROJECT TITLE (maximum 40 characters): RURAL INFRASTRUCTURE FUND PROJECT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 92

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY 87 B. Quarter 4 C. Final FY 89

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 87 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	25,296	25,894	51,190	44,475	45,525	90,000
(Grant)	(25,296)	(25,894)	(51,190)	(44,475)	(45,525)	(90,000)
(Loan)	(-)	(-)	(-)	(-)	(-)	(-)
Other U.S. 1.						
Other U.S. 2.						
Host Country			2,560		4,500	4,500
Other Donor(s)						
TOTALS	25,296	25,894	53,750	44,475	50,025	94,500

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ES	260	061	-	-	-	51,190	-	90,000	-
(2)									
(3)									
(4)									
TOTALS				-	-	51,190	-	90,000	-

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 062, 063

11. SECONDARY PURPOSE CODE: 821

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	ER	COOP
B. Amount	59,000	31,000

13. PROJECT PURPOSE (maximum 480 characters)

To provide assistance to improve and expand rural infrastructure in the transportation, rural electrification or telecommunication subsectors in order to enhance the flow of commerce, encourage investment and production, and provide for further economic expansion and growth of rural areas.

14. SCHEDULED EVALUATIONS

Interim MM 12 YY 89 MM YY Final MM 06 YY 92

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [ ] 941 [X] Local [ ] Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

- NOT APPLICABLE -

17. APPROVED BY

Signature: FREDERICK W. SCHIECK

Title: Director, USAID/Philippines

Date Signed: MM DD YY

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

RURAL INFRASTRUCTURE FUND
SUMMARY AND RECOMMENDATIONS

1. Grantee	:	The Government of Philippines (GOP)
2. Implementing Entities	:	National Economic Development Authority (NEDA)
A. Roads and Bridges	:	Department of Public Works and Highways (DPWH)
B. Ports & Marine Navigational Areas	:	Department of Public Works and Highways (DPWH)
C. Air Navigational Aids	:	Bureau of Air Transportation (BAT), Department of Transportation and Communications
D. Rural Electrification	:	National Electrification Administration (NEA)
E. Rural Telecommunications	:	Department of Transportation and Communications (DTC)
3. Grant Amount	:	$90 Million
4. Purpose	:	The purpose of the Project is to provide assistance to improve and expand rural infrastructure in the transportation, rural electrification or telecommunication subsectors in order to enhance the flow of commerce, encourage investment and production, and provide for further economic expansion and growth of rural areas.
5. Project Description	:	Possible components of the Project and a brief description of each follow:

(1) Roads and Bridges: The construction or upgrading to an all-weather standard and improve maintenance of approximately 250 kilometers of rural roads and highways, including bridges and drainage systems.

(2) Ports: The rehabilitation, improvement and/or construction of at least nine small municipal feeder ports and access roads and installation of marine navigational aids to facilitate inter-island transport of people and goods.

(3) Air Navigational Aids: The upgrading of air navigational aids for the Manila International Airport and 13 provincial airports.

(4) Rural Electrification: The assisting, restructuring and/or consolidating of selected rural electric cooperatives. Participating cooperatives will receive or achieve upgraded facilities and distribution systems, reduced line losses, more reliable electric power delivery, improved billing and collection procedures, and acceptable management and maintenance practices. The project will provide more focussed power retailing and service role for rural electric cooperatives, a more rational rate structure for cooperatives, and reorganization and institutional development of the National Electrification Administration.

(5) Rural Telecommunication: The project will promote an assessment of the Philippine telecommunication sector, including the identification of policy constraints and inter-regional deficiencies.

It will help the Government of the Philippines (GOP) complete its study of the telecommunications sector including organization, investment options, and feasibility analyses to support GOP decisions to improve inter-island communications and associated intra-island telephone systems.

6.	AID Project Inputs	:	$90 Million
	A. Engineering	:	$ 6.95 million
	B. Construction	:	$46.40 million
	C. Technical Assistance	:	$ 5.22 million
	D. Commodities	:	$29.65 million
	E. Training	:	$ 1.21 million
	F. Data Collection, Evaluation Monitoring and Audit	:	$ 0.57 million

7.	Total project cost	:	$94.5 million of which AID will provide $90 million in grant funds and the GOP will provide $4.5 million (equivalent) of in-kind goods, services and budget.
8.	Grantee's Request	:	The GOP's request for assistance is included as Annex B.
9.	Statutory Requirements	:	All statutory requirements have been met. See Annexes D and E.
10.	Analyses	:	The analyses presenting overall feasibility considerations are included in Article IV, Section A through F.
11.	Recommendations	:	That a $90 million grant be authorized for the Government of the Philippines for the development of rural infrastructure based on terms and conditions described in the Project Authorization.

LIST OF ABBREVIATIONS

AA	Advices of Allotment
ADB	Asian Development Bank
AID or USAID	United States Agency for International Development
BAT	Bureau of Air Transportation
BIR	Bureau of Internal Revenue
BTR	Bureau of Treasury (GOP)
BWP I & II	Barangay Water Projects I and II
CAFR	Clark Access and Feeder Roads
CBD	Commerce Business Daily
CDC	Cash Disbursement Ceiling
CDSS	Country Development Strategy Statement
CEDP	Community Employment Development Program
C&F	Commodity and Freight
COA	Commission on Audit (GOP)
DBM	Department of Budget and Management
DPWH	Department of Public Works and Highways
DTC	Department of Transportation and Communications
8(a)	Minority Small Business Firm
ESF	Economic Support Funds
FAA	Foreign Assistance Act of the U.S. Government
GDP	Gross Domestic Product
GNP	Gross National Product
GOP	Government of the Philippines
IA	Implementing Agencies
IBRD	International Bank for Reconstruction and Development
IQC	Indefinite Quantity Contract
JPIL	Joint Project Implementation Letter
MDF	Municipal Development Fund of ESF Program
NEA	National Electrification Administration
NEDA	National Economic Development Authority
PACD	Project Assistance Completion Date
PDAP	Provincial Development Assistance Project
PIO/C	Project Implementation Order, Commodities
PIO/P	Project Implementation Order, Participant
PIO/T	Project Implementation Order, Technical
PSA	Procurement Service Agent
PSC	Personal Services Contract
RDDA	Regular Demand Deposit Account
RDF	Regional Development Fund of ESF Program
REC	Rural Electric Cooperatives
REDP	Rural Energy Development Project
REP I - V	Rural Electrification Projects I through V
RFTP	Request for Technical Proposal
RIG	Regional Inspector General Office of AID
RRP I & II	Rural Roads Project I and II
SBA	Small Business Administration
TA	Technical Assistance
TCAA	Treasury Checking Account for Agency
TOR	Terms of Reference
USDH	United States Direct Hire staff

PROJECT AUTHORIZATION

Name of Country: Philippines

Name of Project: Rural Infrastructure Fund

Number of Project: 492-0420

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended (the "FAA"), and in accordance with the authority delegated to me in Delegation of Authority No. 652 and in STATE 207959 dated July 7, 1987, I hereby authorize the Rural Infrastructure Fund Project (the "Project") for the Republic of the Philippines (the "Cooperating Country") involving planned obligations of not to exceed $90,000,000 in Grant funds over a three year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. O/B/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is five years and three months from the date of initial obligation.

2. The Project will provide assistance to improve and expand rural infrastructure in the transportation, rural electrification or telecommunication subsectors in order to enhance the flow of commerce, encourage investment and production, and provide for further economic expansion and growth of rural areas.

3. The Project Agreement(s), which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and delegations of authority, shall be subject to the following essential terms and conditions, together with such other terms and conditions that A.I.D. may deem appropriate.

Source and Origin of Commodities and Nationality of Services. Commodities financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the Cooperating Country

or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

By: Frederick W. Schieck
Mission Director
USAID/Philippines

Date: Sept. 28, 1987

Clearances:

Name	Initial	Date
OCD:KEBrown	KEB	9/28/87
ORAD:JRBrady	JRB	9/28/87
OPHN:WHJohnson	[illegible]	9/28/87
OFFPVC:BGeorge	[illegible]	9/28/87
PRO:WTOliver	[illegible]	9/28/87
CO:BLEckersley	[illegible]	9/28/87
RLA:BMMiller	[illegible]	9/28/87
OD/PE:PRDeuster	[illegible]	9/28/87
OD:JSBlackton	[illegible]	9/28/87

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I. PROJECT RATIONALE AND DESCRIPTION

A. Statement of the Problem

The Philippines has experienced an extended period of economic depression and parallel deterioration of essential socio-economic infrastructure. This latter condition is especially severe in outer islands and rural areas which traditionally receive a smaller share of GOP investments. Past Government policies to pursue import substitution and restrict the private sector also distorted commercial and agricultural activities and weakened the rural economy. Changes are being made by the new government, but participation of the rural sector in the recovery will be limited unless highly deteriorated or inefficient infrastructure (roads, ports, electric power, telecommunications) is upgraded to allow the market system to exchange and distribute essential goods and services efficiently.

Improvements in agricultural productivity and a strengthening of the rural sector are preconditions to sustainable, broad-based economic recovery in the Phillipines and stability of its political process. The country enjoys a comparative advantage in certain export crops and expanded employment is possible in these regions. Investments in rural infrastructure and institutions must be made in order to remove communications barriers, enhance the distribution of productive goods and services, and expand commercial opportunities. Besides supporting the national recovery program, improved rural economic conditions will moderate regional instability and make conditions more attractive for employment generating investments. Giving special attention to outer islands and rural areas over the urban areas will encourage a more equitable distribution of incomes within the Philippines or, at least, not as inequitable as otherwise would occur.

B. Background

The Philippines is slowly emerging from its worst economic crisis since independence. In 1982 and 1983 the economic rate of growth fell below the rate of population growth, and in 1984 and 1985 it was negative. During the period 1983-1985, the Gross National Product (GNP) dropped 10.3 percent. The 1986 GNP was only up by 1.5 percent over 1985 -- i.e., still less than population growth. Real per capita GNP at about $540 in 1986 was 18 percent below the 1981 level.

The GOP reacted to this economic crisis by reducing public expenditures by 50 percent. In an effort to stabilize the economy, investments in infrastructure and other sectors were cut from 7.7 percent of GNP to about 3.6 percent of a reduced GNP. The GOP directed the bulk of available funds to urban areas, while the deterioration of existing rural infrastructure facilities outpaced new development.

In spite of its observed resiliency, the agriculture and rural sectors bore a large part of the burden during the crisis and the adjustment period that followed. Past policies on price controls, overvalued exchange rate, export taxes and marketing monopolies and the bias related to urban infrastructure support contributed to a relatively weak performance of the

sector during the crisis. In addition, the sector faced a strong contraction in the supply of agricultural credit, partly caused by liquidity problems of retail banks and government policies to reduce excess liquidity in the system. Moreover, reductions in expenditures for infrastructure, health and other basic services, in response to the tight budget situation, particularly aggravated the already deteriorating standards of living in the rural areas.

The reasons for such a crisis are myriad, including the GOP adoption of inappropriate policies, excessive foreign borrowings, and increasing interventions in the economy, e.g., setting exchange rates, wages, and interest rates; expanding the role of government financial institutions; and establishing agricultural monopolies, e.g. in food grain imports, coconuts, sugar, and fertilizers. At that time the GOP was attempting through import substitution to transform the economy structurally from one based on agriculture to an industrial mode which would foster opportunities for Filipino entrepreneurs. Duty-free and tax exemption privileges were granted to many industries. Favored entrepreneurs were successful in securing continued GOP protection so as to maintain and expand profits without having to become innovative and cost-effective.

The present GOP administration realizes that past policies and interventions in support of capital-intensive industries did not bring about the anticipated gains in productivity, export earnings or increased employment levels. Instead, the overconcentration of public and private investment in the industrial sector and urban areas commanded most available resources, leaving little to arrest the deterioration of rural infrastructure. Reduced rural mobility and increased transportation costs have negatively affected investments and agricultural productivity and have severely limited employment opportunities in outlying areas.

With more than 35 million Filipinos, or about 70 percent of the labor force living in rural areas, the GOP recognizes that sustained economic recovery and employment generation must involve increases in rural productivity. It is thus placing greater emphasis on restoring growth in the rural economy. The GOP is examining policy constraints and regulatory defects which heretofore have discouraged increased productivity and investment in the rural sector. Nevertheless, the success of the GOP's agricultural reforms and job creation efforts depends on adequate rural infrastructure. It is also a critical element to the government's efforts to reduce regional security problems and bring about political stability.

Although policy analysis and formulation are essential to understanding and improving the economic environment, rehabilitation and basic investment in rural infrastructure are also needed for the Philippines to sustain its economic recovery. Rural economic growth is dependent to a significant degree on the establishment and continuing serviceability of adequate infrastructure. Basic transport, communications and power services are needed to leverage existing investments and attract new ones to the countryside. It is in the countryside where the labor pool provides the comparative advantage in certain export crops to support overall growth and

help the country earn needed foreign exchange. Development of rural infrastructure includes investments in institutions as well to ensure that, after rehabilitation, physical infrastructure is operated and maintained in an efficient and reliable manner. For example, management and financial controls in some rural electric cooperatives are so weak that collections from customers were foregone. Funds recovered from operations were not applied to systems maintenance and service. Interrupted power and line losses caused electricity to become a marginal contributor or actual barrier to expanded agricultural and commercial productivity.

The present deteriorated state of a large portion of rural infrastructure now poses a real obstacle to economic recovery. Industries to obtain any size must have adequate and reliable power systems; commerce can grow quicker with access to communications networks; and an adequate supply of goods can be marketed with proper roads and ports. Inadequacies in these factors are disincentives to further investment in rural areas. Although the economy exhibited signs of recovery last year, with a 1.5 percent growth in real GNP, industry and real investments continued to contract. Through its own resources the GOP cannot yet afford all required infrastructure investments essential to spur the private sector and thereby the economy as a whole.

C. Specific Constraints

There are numerous physical and environmental constraints affecting the recovery of island and rural area sub-economies in the Philippines. For example, market demand, price incentives, factor access, and political stability are all important to improved productivity and higher incomes. Some of these constraints are under the direct influence of the GOP; others, such as local security and international pricing, may not be. What this project attempts to focus on are those basic investments which, in the short run, will reduce or eliminate constraints which may be influenced by the GOP and are presently barriers to improvement. In normal times and over a longer horizon, it could be argued that some of these investment activities (electric power, ports, telecommunications, even roads) would be better undertaken by the private sector. The security and economic conditions, however, dictate that the GOP move as quickly as possible to restore these systems to efficient working order. Consideration will be given to maintaining and expanding private sector ownership in these activities; however, the constraints of time and degree of rehabilitation needed imply prompt GOP intervention. The Project will directly reduce the present negative impact of these "public" goods on rural productivity by helping to restore them to efficient condition. Issues of private ownership or operation -- e.g., in telecommunications and power will be considered in parallel with the rehabilitation activities.

Notwithstanding its broad concerns, the Project cannot address all problems associated with rural infrastructure in the Philippines. Areas selected for attention under the Project will address those subsector problems in which USAID has operational experience. Because of resource and absorptive capacity limitations, these activities are seen as supporters of increased productivity, not outright solutions. The Project will attempt to move resources as rapidly as the GOP is able to use them; but mutual objectives of quality and management control are expected to be pursued likewise.

The following economic subsectors were selected as areas where possible interventions could be identified and developed due to their priority need and potential for early and lasting contribution to rural economic recovery.

1. Transport: Although primary, secondary and tertiary roads and water and air transport facilities exist in many parts of the country, most are in need of rehabilitation, upgrading and maintenance. This is especially true for the secondary and tertiary road systems and critical segments of the primary road system. Furthermore, air navigational aids are required to bring the 18 major airports up to international operational and safety standards. Although not as prevalent, navigational aids to make ports safer and better pier and cargo staging areas are critical to reduced transport cycle costs. These aids will also lessen the environmental risks of unrestricted anchorage of vessels in confined waterways.

(a) Roads and Bridges: The main deficiencies of the present road network are: (i) Less than 50 percent of the total road network consists of all-weather roads and only about 44 percent of the national road network is paved with concrete or asphalt; (ii) Many roads, including national road segments, are in poor condition because initial design standards were inappropriate, construction was substandard, maintenance was inadequate, and damage was incurred from overloaded vehicles; and (iii) Missing or weak bridges diminish the usefulness of many existing roads.

(b) Ports: Access problems prevent many areas, particularly smaller outer island communities, from participating fully in national development efforts. The lack of municipal ports (also known as feeder ports) isolates many people from even the local economy. In addition, some areas lack usable roads to link agricultural areas with local and inter-island ports that are critical to production and marketing.

Until recently, there was no overall development program for small ports handling annual cargo traffic of less than 40,000 MT. Causeways, piers and wharves are scarce. A recent Department of Public Works and Highways (DPWH) study found that small ports, in combination with road networks, are as important to the inter-island movement of goods as the larger ports.1/ Weaknesses in the municipal ports network are therefore particularly significant. Furthermore, there are few, if any, navigational aids such as buoys, lights, etc., to assist feeder ports and inter-island transport. These navigational aids are needed to encourage the use of larger, more efficient vessels and increase safety during poor weather.

(c) Air Navigational Aids: Given the poor road system, unreliable shipping schedules and extremely limited storage facilities, many agricultural goods are presently transported by air. Heavily used air routes throughout the country are in urgent need of navigational upgrading to support the flow of passengers and commerce and meet required international standards for air traffic safety.

1/ See Department of Public Works and Highways Nationwide Feeder (Municipal) Ports Development Program, February, 1987.

2. Rural Electrification: The absence of dependable, affordable power in many rural areas poses an increasing obstacle to rural economic development. Specific problems include Rural Electric Cooperatives (RECs) that are too small in scale to be economically viable, are poorly managed, have equipment and distribution systems which have deteriorated because of political problems, and lack funding for maintenance, resulting in unacceptable line losses on portions of the systems. The National Electrification Administration (NEA) is unable to finance replacement of fully amortized and deteriorating equipment, and, e.g., transformer repair facilities are either unavailable to many RECs or unaffordable. Also, national energy pricing policies work to the disadvantage of rural cooperatives in many areas. Regulations which allow "direct connection" of large users to the National Power Corporation's transmission lines also hurt the income potential of some RECs.

3. Telecommunications: About 73 percent of the total telephones in the Philippines are concentrated in Metro Manila; the rest are in major cities and municipalities. While there are 5.73 main telephone lines per 100 persons in Metro Manila, the telephone density is under 1.02 for the whole country. Many production areas have no phones and cannot efficiently communicate with suppliers, shippers or buyers. This is especially harmful in an island nation such as the Philippines. In addition, service quality in existing systems remains poor.

The telecommunications network, which involves both Government and private sector organizations, consists of one large and 54 small municipal telephone companies, seven domestic record carriers, four international record carriers, and two satellite systems (both domestic and international). Duplication and redundancies exist in most of these systems. The smaller telephone companies located on the outer islands operate almost in a void, lacking connections to the national telecommunications grid. Moreover, the Bureau of Telecommunications and related government agencies need institutional strengthening. The licensing and tariff system needs thorough review so the GOP can decide what steps need to be taken to rationalize services and interconnect these systems.

D. Project Description

The Rural Infrastructure Fund will utilize an "umbrella" concept to provide financing for GOP activities in a designated infrastructure subsector or subsectors. While general proportions of the funding package are indicated herein, final allocation of AID monies among competing activities will not be made until later in the project. In this way, maximum advantage can be taken of GOP and construction contractors' absorptive capacities. All of these subsectors are high priority and feasibility studies have identified viable activities well beyond the present dollar value of the Project. Therefore, a selection process and system are the critical decision-making and implementation features of this "infrastructure fund", rather than fixing a series of subprojects at this time which equates to the overall value of the Project. Since the typical subproject is only a small percentage of total available funds, there is little risk in not having enough resources to complete the designated subprojects. This "process" will also allow the

demonstration of absorptive capacity in each subsector institution before final allocations of budgets are made. Individual subprojects will not, however be accepted for financing hereunder unless, in their updated status, they satisfy normal project acceptability criteria. Subprojects which pass decision criteria and show the greatest promise of assisting in the revitalization of the rural economy will be given funding priority. Potential subprojects will be identified initially from the transport subsector including roads/bridges, ports, and navigational aids. Moreover, it is anticipated that the project will also finance studies related to the policy, management, and structural constraints inherent within the telecommunications and rural electrification subsectors and examine methods to alleviate them.

E. Project Goal and Purpose

The goal of the Rural Infrastructure Fund is to develop adequate physical infrastructure to support and sustain economic growth. Achievement of this goal implies: (a) improved opportunities for the development of rural enterprises, investment, and employment; (b) improved agricultural productivity; and (c) increased rural incomes.

The purpose of the Project is to provide assistance to improve and expand rural infrastructure in the transportation, rural electrification or telecommunication subsectors in order to enhance the flow of commerce, encourage investment and production, and provide for further economic expansion and growth of rural areas. The Project will focus on one or more of the transportation, rural electrification or telecommunications subsectors, with the following specific purposes in each subsector:

Transport: To facilitate the movement of goods and services between farming, processing, and manufacturing areas; enhance communications; and improve labor mobility and employment opportunities.

Rural Electrification: To strengthen the institutional and selected physical aspects of rural electric power systems in the Philippines.

Rural Telecommunications: To identify possible system interventions and policy changes which would enable outlying areas to communicate with and participate more fully in local and national markets.

F. Project Outputs

The Project will provide support for rural infrastructure in one or more of the transportation, rural electrification or telecommunications subsectors. Implementation of selected subprojects is envisioned to result in the following outputs:

1. Transport: Construction or improvement of selected rural roads and highways, and the construction or improvement of small ports, including access roads and marine navigational aids. Potential areas of concentration include the Bicol region; Central Luzon; Mindanao; and the Visayas.

(a) Roads and Bridges/Drainage Works: This activity will result in the construction or upgrading to an all-weather standard and improved maintenance of approximately 250 kilometers of rural roads.

(b) Ports: This activity will result in the rehabilitation, improvement and/or construction of at least nine small municipal ports and, where appropriate, accompanying access roads. Marine navigational aids will be installed to facilitate inter-island transport of people and goods and minimize risks of environmental degradation.

(c) Air Navigational Aids: Existing air navigational aids will be upgraded to meet international standards and improve the safety and operating conditions at Manila and 13 provincial airports.

2. Rural Electrification: This activity will result in the restructuring or, as appropriate, consolidation of selected rural electric cooperatives. RECs are also expected to have upgraded facilities and distribution systems; reduced line losses, more reliable power delivery, improved billing and collection procedures, and acceptable management and maintenance practices. The activity will also seek a more focussed power retailing and service role for RECs, a more rational rate structure for cooperatives, and a reorganization of the National Electrification Administration.

3. Rural Telecommunications: The project will provide support for an assessment of the Philippines telecommunications sector, including the identification of policy constraints and inter-regional system deficiencies. It will help the GOP complete its study of the telecommunications sector, including organization/investment options and feasibility analyses to support GOP decisions to improve inter-island communications and associated intra-island telephone systems.

G. Project Inputs

The project will finance engineering services, construction services, technical assistance, training, commodities, and project evaluation/monitoring and audit services. Given the flexible nature of the Project and its intention to take maximum advantage of the absorptive capacities of participating GOP units, the inputs financed may vary in both scope and magnitude over the life of the project and may depend on the subsectors receiving support. However, cost estimates as of August, 1987, are reasonable and consistent with individual subproject feasibility on which the overall program is based.

Given the limited available financial and administrative resources (compared to the overall needs of the rural economy), the planned inputs under the project will be provided in such a way as to maximize their economic and developmental impact, complement ongoing AID-financed activities (where possible), and ensure reasonable rates of disbursement over the five year life of project. A brief description of each input is provided below.

1. Engineering Services: Engineering services will be provided to develop or update feasibility studies and subproject designs, and review or, if needed, prepare detailed planning and design work. Subproject

specifications, bid documents, and contracts will be prepared or, if already available from GOP sources, reviewed by engineering consulting firms. Engineering management services will also be provided to monitor implementation of all subprojects.

2. Construction Services: The project will finance contracts for the upgrading or construction, as appropriate, of roads and bridges/drainage structures, ports, air navigational aids and communications improvements, and, at a later date, power distribution systems. Supervision of subproject construction activities will also be provided.

3. Technical Assistance: The project will finance technical and managerial assistance to address institutional needs of such organizations as the NEA, RECs, DPWH provincial engineering offices and telecommunications organizations; to assist in the upgrading, installation, and operation of air and marine navigational aids; and to improve operations and maintenance practices of participating entities. Consulting assistance to address policy and management issues involved with the power and telecommunications sectors -- as well as assistance to upgrade feasibility reports and conduct technical, economic, social soundness and environmental analyses -- will be provided for selected subprojects. RECs accepting reforms will also be strengthened by management operations and, if needed, financial restructuring.

4. Commodities: The project will finance construction materials and commodities to support selected subprojects. It is envisioned that electric poles, transformers, switch gear etc., and engineering, construction and maintenance equipment, air and marine navigational aids, and other transport/electrification/port items will be financed under the project.

5. Training Assistance: The project will provide in-country and participant training in such fields as planning, management, financial management, system operation and maintenance, commodity procurement, contract administration and supervision of construction for personnel of the implementing agencies of the project.

6. Data Collection, Audit, Evaluation and Monitoring Services: Technical services for data collection, auditing, evaluation, and subproject monitoring are eligible for financing with project funds.

H. Project Beneficiaries

The Project's primary beneficiaries will be the tens of thousands of inhabitants of rural agricultural areas and small market and transhipment centers where infrastructure facilities are rehabilitated or constructed. The air and water transport facility improvements will benefit users in various regions of the country and will have a secondary impact on the country as a whole through improvements in the flow of goods and services. Direct benefits will be in the form of faster, safer and more reliable transportation of people and goods. This will in turn reduce transport costs, increase market access, and foster increases in employment and incomes in the rural and provincial areas. Electric power management and distribution improvements

will benefit the rural electric cooperative members and communities through the provision of more reliable and less costly energy sources. Such power will strengthen farming and fishing service centers and support the expansion of private businesses in the outlying regions. Telecommunications studies should improve market information channels and increase the productivity of individuals, businesses and institutions throughout the country.

Because all subprojects have not yet been selected, it is impossible to estimate the total number of beneficiaries within subproject categories. However, given that investments will be concentrated in outlying and rural areas, and that the majority of the country's poor lives in rural areas, it is appropriate to assert that the majority of beneficiaries will be from the relatively poorer segments of Philippine society.

In addition to the foregoing beneficiaries, GOP agencies and personnel involved in managing and overseeing these subprojects will benefit from the institutional strengthening, training and technical assistance provided during project implementation.

I. Relationship to GOP Priorities and AID Assistance Strategy

The 1987 Philippine Country Development Strategy Statement (CDSS) update identified rural productivity increases and improved income distribution as the principal Mission goals. The strategy to achieve those goals includes: a) increased public sector investment in agricultural research and essential rural infrastructure; b) improved capability of local government and the private sector to provide services and inputs to agriculture and rural enterprise; and c) implementation of policies which will correct the highly unequal access to productive resources within the rural population.

The CDSS underscores the cost-effectiveness of maintaining existing infrastructure rather than new construction and of investing in institutional as well as physical infrastructure. The GOP historically emphasized the expansion of infrastructure, i.e., roads, bridges, ports, power systems, etc., at the expense of maintenance and institutional development. Increased attention to institutional development and policy changes will complement gains realized from restoring and interconnecting physical infrastructure elements. Accordingly, the project includes, e.g., rate structure adjustments, and provides technical assistance and maintenance elements designed to improve overall infrastructure management and impact. The transportation component places a high priority on improvement of existing roads and bridges/drainage structures to generate a near term impact on rural economic recovery. The electrification component is designed to streamline ongoing operations and enhance efficiency and reliability of existing systems before promoting expansion into new areas. Such interventions will hopefully achieve a greater short-term economic impact and be consistent with GOP and AID objectives to simultaneously revitalize the Philippine rural and national economies. Where possible, subprojects will be coordinated with other AID, GOP, and other donor financed activities to enhance the incidence of benefits and accelerate the impact of the investments on rural Philippine society.

The four cornerstones of AID's development assistance policy are directly being addressed in the Project. Policy dialogue between USAID and the National Electrification Agency and Rural Electric Cooperatives (RECs) will lead to an organizational restructuring of RECs and the intended rationalization of pricing to end-users. Projected studies to examine possible interventions in the telecommunications subsector is another example of how the project will address policy dialogue concerns. The project is proposing institutional improvements within the RECs and the Department of Public Works and Highways (DPWH) with regard to the introduction of operational efficiencies. The provision for upgrading air navigation aids and the introduction of marine navigational aids at small feeder ports are but two examples of technology transfer financed under the project. Finally, it should be noted that as many of the RECs and telecommunication organizations are private sector entities, the project will also have direct private sector participation. Commodities and construction, technical, and engineering services provided under the project will come from private sector companies. Further, as a direct consequence to the availability of improved physical and institutional infrastructure financed under the Project, private sector participation is expected to play even a greater role in generating and sustaining overall rural economic growth.

The GOP is placing great emphasis on restoring growth in the rural economy as the centerpiece of their economic recovery efforts. The goals of the Medium-Term Philippine Development Plan (1987-1992) are poverty alleviation, employment generation, income redistribution, and sustained economic growth. The Plan specifically calls for the installation and improvement of essential infrastructure, particularly in rural areas. The Plan's major short-term goal is rural-based economic recovery, to be achieved by increasing jobs, incomes and demand. In the medium term, the government will continue to focus on agriculture, agribusiness and labor-intensive industry. Additional emphasis will be placed on poverty alleviation and equitable distribution of the benefits of growth. The rural and agricultural sectors, relying heavily on private initiative, are to lead the economy. The plan states that the government's role is not to compete with the private sector but to support it. To this end, the government will facilitate private initiatives in agriculture by removing institutional and bureaucratic impediments and by improving rural infrastructure and social services. Construction and improvement of infrastructure elements will be done primarily by private firms under contract with line GOP Departments.

The Government's infrastructure development program places highest priority on the rehabilitation and maintenance of existing infrastructure, and on the implementation of small scale projects essential to rural development, such as access roads and municipal ports. The Plan points out that increased efficiency, improved resource management and the strengthening of institutional capabilities are essential to maximize benefits of the infrastructure development program. Yet a lack of resources constrains the government from moving the Plan forward. It has called for the involvement of not only the private sector but also of bilateral and multilateral agencies. Accordingly, the Project will help fill this rural investment gap by providing financial resources to implement rural infrastructure segments of the Plan in transport and electric power distribution, and provide for policy and feasibility studies required to support investment decision in the telecommunications subsector.

J. Response to Sectoral Policy Issues

Critical policy issues in the transport, electrification and telecommunications sectors need to be resolved before full benefits of rural infrastructure projects can be realized. The Project Paper takes cognizance of these issues as well as the efforts the GOP is undertaking to resolve them. Where the solution to such issues are not forthcoming in the immediate future, they are taken as constraints or are offered possible solution through the provision of technical assistance.

Transportation infrastructure projects in the Philippines typically face issues related to (1) maintenance and recurrent costs, (2) right of way, access and environmental assessment, and (3) the application of labor based technologies in construction. Provision of an adequate budget for maintenance remains an important issue in the roads and municipal ports subsectors. The problem is a chronic one that was seriously exacerbated by the present economic crisis. In 1986 in its review of the Public Investment Program, the World Bank noted that budget for operations and maintenance had consistently declined in real terms since 1977.

The maintenance of public infrastructure in the Philippine is a nagging problem, but it is not as serious as in other less developed countries. It is an issue well recognized by other development institutions, such as the World Bank. Section II-B of the Project Paper specifically addresses the issue of recurrent costs. Among others, it requires that budgetary analyses be conducted to determine the ability of government units to provide for their shares in recurrent costs after subproject completion.

Two recent events augur well for the upkeep of public infrastructure. The new administration recently refocused its infrastructure priority from road construction/expansion to maintenance/rehabilitation and is setting aside a greater proportion of the public works budget to the maintenance of existing thoroughfares. For municipal ports, GOP has revised an earlier policy directing revenues from feeder ports to be turned over to the National Treasury. Provincial port revenues will now remain with the Philippines Port Authority for port maintenance; revenues from municipal ports will be kept by their respective municipalities for port maintenance as well. Municipal ports do charge user fees. For individual port construction activities, the structure of such local fees will be analyzed and, if needed, proper adjustments to take account of the maintenance needs of the port and the users' ability to pay will be recommended.

Right of way and environmental assessment issues in road construction are addressed in feasibility studies conducted for the subprojects. Two of these studies are appended, one for the Quirino Highway and the other for the Southern Philippines Highway Network Development. The studies typically contain environmental impact assessment, seismic evaluation, and discussions of the affected areas' physiography, topography and hydrology. Alternative alignments are presented. No serious access and environmental problems are anticipated for the subprojects.

The thrust of the current GOP Medium Term Development Plan is employment creation, especially in rural areas. The GOP itself has taken the lead through its Community Employment Development Program (CEDP) which is aimed, among others, at constructing and/or rebuilding rural road infrastructure with labor based technology. The Mission is aware of such a thrust and, as part of its Rainfed Resources Development Project, is currently sponsoring a study on the technical and economic feasibility of utilizing labor based techniques in rural road construction and maintenance. The results of such study, as well as the ongoing assessment of the CEDP, will provide insights and guidelines into subproject design and implementation.

The problems of the rural electrification sector include poor equipment maintenance and system losses, pilferage, management and organizational problems, distorted power rate structure, proliferation of franchises, collection difficulties, problems with the National Power Corporation related to the direct connection of large industrial users, as well as unrelated activities imposed on RECs by the previous GOP administration. Specific recommendations to these problems were provided in a study by Price Waterhouse. Initial reactions of the GOP to the policy recommendations have been favorable. Some have been acted upon, including the dismantling of REC activities unrelated to rural electrification, a study of power rate structure to reflect long run marginal pricing principles, and the gradual abolition of consumer subsidies. The remaining areas are being reviewed for GOP decision and/or implementation.

One of the more critical issues in rural electrification is the proliferation of franchises which has reduced some of them to uneconomic size. The Project Paper takes this problem as a starting point. Hence, the subproject objective is to restructure/consolidate uneconomic RECs and make such restructuring/consolidation a basis for procurement of upgraded facilities, which in turn will result in reduced line losses and more reliable electric power delivery.

The GOP has set a policy that only RECs that meet certain criteria, especially on power reliability, can reconnect large industrial users which would be significant sources of REC revenue. By providing upgraded facilities, the subproject will assist RECs meet such criteria and thereby make them more financially viable.

The Project Paper addresses organizational and management problems and collection difficulties arising from ill-functioning billing systems of RECs through the provision of technical assistance. In all cases, physical improvements will be given to each REC only after the REC has completed any necessary organizational reform.

The problem of electric pilferage does not lend itself to easy solution. Strict legislation to penalize pilferage and a strong GOP and REC commitment to enforce it are needed to curb the problem. Participating RECs will have to increase surveillance efforts.

A whole range of policy issues in the telecommunications sector remain unresolved. The question of sectoral organization, i.e., whether the operating entity will be the GOP, a nationalized entity, or the private sector, has not been firmed up. Technology choices, i.e., whether the system will be 100 percent digital or not, have not been made. The preferred institutional arrangements remain nebulous. Frequency management as well as the appropriate tariff rate structure are still under study. Financing and implementation problems have hampered progress of the national telephone program.

Given these constraints, the project will initially provide technical assistance aimed at providing a sectoral assessment, including the completion of feasibility studies, and thereby assist the GOP in making decisions necessary for the improvement of inter-island telecommunications.

K. Lessons Learned

The Mission has been involved in rural infrastructure development projects over a long period which are similar in many respects to those proposed for financing under this project. These include the following projects: (1) Provincial Development Assistance Project (PDAP); (2) Rural Roads Projects I and II (RRP); (3) Barangay Water Projects I and II (BWP); (4) Rural Electrification Projects I through V; (5) Regional Development Fund (RDF); (6) Municipal Development Fund (MDF); (7) Markets; (8) Rural Energy Development Projects; and the Clark Access Road Project.

The PDAP developed the planning, financial, design, construction and maintenance capabilities of the Local Government's Planning and Engineering organizations. The Rural Roads, Rural Electrification, and Barangay Water Projects provided follow-on efforts in improving the capabilities of the local governments and providing important infrastructure for rural development. The Economic Support Fund Program further developed the infrastructure development planning and implementation capabilities of the local governments. The types of projects outlined above were comparable in size, nature and location. Further, the socio-economic characteristics of the identified project beneficiaries were similar.

Implementation problems related to past infrastructure projects indicate that the GOP line departments for each type activity should be the subproject coordinating and implementing unit for the Government. Special committees used in other projects to coordinate and implement multiple activities have not worked well. An improved GOP-USAID payment system is another response to payment approval difficulties experienced in other mission activities. The design of the Rural Infrastructure Fund has taken into account the lessons learned from these previous activities through the introduction of a new payment system and the identification of GOP line departments as the direct implementing agencies under the project.

L. Donor Coordination

The project will be complementary to efforts of other donors that are active in infrastructure development in the Philippines. While there is heavy involvement by other major donors in financing infrastructure, in general, such assistance has been characterized by its large-scale orientation. Our efforts will be significantly smaller in size and directed more at rural/secondary population centers than those of the Asian Development Bank (ADB), the International Bank for Reconstruction and Development (IBRD) and the Japanese Government. However, we will coordinate with the other donors to ensure that our activities are not duplicative (this is one reason, along with updating of existing feasibility studies, why final selection of subprojects will be effected somewhat later in the program). In some cases, clear areas of responsibility have already emerged. For example, in the power sector, USAID will focus on the distribution of power while other donors, such as Japanese Government and the ADB, will focus on the generation and transmission of electric power.

The experience of other donors in rural infrastructure development has been mixed. In transport, the ADB has been implementing roads projects annually, and, given positive experiences with the DPWH, plans to continue doing so. Both rural and major roads are covered. IBRD has been less successful with the Department of Local Governments in road improvements. Consequently, IBRD has redirected some of its planned road projects through the DPWH. In ports, the ADB has focussed on the Manila port, with a $60 to $80 million loan planned for 1987. The World Bank has financed secondary ports and is now processing a $32 million loan for provincial ports development. The ADB plans a possible feeder ports project for 1989. In the power sector, although the ADB continues to make loans for generation, it has extracted itself from rural electrification because of its unsuccessful 1982 loan to NEA.

The World Bank is now involved in an ongoing technical assistance project designed to identify telecommunications sector policy issues and spur GOP movement toward sector rationalization. Prior to development of a substantial telecommunications sector loan, currently scheduled for FY 1989 approval, the IBRD seeks resolution of several policy issues and development of a mechanism to mobilize private investment in the sector. The ADB plans a telecommunications sector loan for 1989, to be preceded by a feasibility study in 1987. Our contributions in this subsector will be technical assistance to help the GOP clarify policy issues and implementation options that are preconditions to subsector reforms and investments. Since these matters are still in the assessment mode, it is not likely at this time that commodities or direct investments will be provided by the Project in telecommunications.

II. COST ESTIMATES AND FINANCIAL PLAN

A. Project Costs

The Rural Infrastructure Fund has an AID life-of-project cost of $90 million. A total of $51.19 million is proposed for FY 1987 obligation. Feasibility studies, including reliable cost data for potential subprojects, exist to support this figure. Future obligations will occur in FY 1988 and 1989. The amount of such obligations is subject to the availability of funds and the development of updated cost data for potential subprojects. Disbursements are expected to continue through FY 1993.

The expected distribution of AID project costs over the project life are: engineering services, 8.3%; construction services, 59.2%; technical assistance, 5.6%; commodities, 25.3%; training, 1%; and data collection, audit, evaluation, and monitoring, 0.6%.

Table 1 below provides an estimate of budget allocations per subsector, while Table 2 provides a projection of AID project expenditures by fiscal year. The overall project will finance engineering, construction, technical assistance, commodities, training, and other costs. The life-of-project cost under each subsector represents the Mission's best estimate of the amounts of AID funds which will be allocated to each subsector, based on current data and our evaluation of the absorptive capacity of each GOP implementing agency. However, final subproject budgets will be a function of the subsector or subsectors selected, activities accepted for financing, the ease of administration and monitoring, and other factors. GOP inputs to the program will be in the form of supporting administrative and engineering costs on an "in-kind" basis and periodic maintenance expenditures.

1. Potential Road and Bridge Subprojects

The following is a list of potential roads and bridges subprojects for which the necessary plans and reasonably firm cost estimates are presently available for implementation under this project.

Subproject	Length (Kms.)	Width (Meters)	1987 Estimated (US$)	IRR %
1. Quirino Highway	71.9	6.70	12,947,000	33.0
2. Kalilo-Ivisan-Estancia Road	96.0	6.00	9,415,000	N/A
3. Marawi-Malabang Road	54.3	6.00	7,718,000	29.0
4. Famy-Infanta Road	64.9	6.00	8,313,000	11.0
5. Surigao-Davao Coastal Road	146.7	6.00	23,196,000	16.0
6. Cotabato City-Zamboanga City Road	295.5	6.00-7.00	39,464,000	25.0
7. Borongan-Sohotan-Basey Road	80.0	6.00	10,366,000	N/A
8. Lucena-Mainit Loop Road	539.0	6.00	5,878,000	N/A
9. Lake Lanao Circumferential Road	71.2	6.00	10,108,000	40.0
10. Bauan-Mabini Road	29.5	6.00	3,196,000	N/A
11. San Jose-Bulacoa Road	51.8	6.00	2,176,000	38.0
12. Zamboanga City-Ayala Road	14.8	7.00	2,279,000	35.0
	1515.6		135,057,000	

It is anticipated that the approximately 250 kilometers of road/bridge subprojects that will be implemented under this project will be selected from the above list of projects.

2. Potential Municipal Ports Subprojects

The following is a list of potential Municipal Feeder Ports subprojects for which the necessary plans and reasonably firm cost estimates are presently available for implementation under this project.

	Subproject	1987 Estimated Cost (US $)
1.	Tayamoan Port (Mindoro Occ.)	$283,000
2.	Mandaon Port (Masbate)	352,000
3.	Santa Rosa (Cebu)	191,000
4.	Babak Port (Davao Norte)	230,000

The following is a list of Municipal Feeder Ports subprojects for which feasibility studies are presently being developed by the DPWH and which may be funded under this project.

	Subproject	Province	Estimated Cost (US $)
1.	Basco	Basco Batanes	$373,000
2.	Itbayat	Itbayat, Batanes	373,000
3.	Sabtang	Sabtang, Batanes	373,000
4.	Calayan	Calayan, Cagayan	373,000
5.	Panganiban	Panganiban, Catanduanes	373,000
6.	Milagros	Milagros, Masbate	373,000
7.	Aroroy	Aroroy, Masbate	373,000
8.	Cawayan	Cawayan, Masbate	373,000
9.	San Jacinto	San Jacinto, Masbate	373,000
10.	San Pascual	San Pascual, Masbate	373,000
11.	Balud	Balud, Masbate	373,000
12.	Cataingan	Cataingan, Masbate	373,000
13.	Cabucgayan	Cabucgayan, Leyte	373,000
14.	Kawayan	Kawayan, Leyte	373,000
15.	Maripipi	Maripipi, Leyte	373,000
16.	Liloan	Liloan, Southern Leyte	373,000
17.	Hinunangan	Hinunangan, Southern Leyte	373,000
18.	San Ricardo	San Ricardo, Southern Leyte	373,000
19.	San Antonio	San Antonio, Northern Samar	373,000
20.	Zumaragga	Zumarraga, Western Leyte	373,000
21.	Alumagro	Alumagro, Western Samar	373,000

The estimated nine Municipal Feeder Ports and access roads that will be implemented under this project will be selected from the above list of subprojects. Standard designs and cost estimates have been approved for developing these ports. Adaptation to local sites will be accomplished under the project during the preparation of detailed construction plans.

B. Recurrent Costs

The project is part of a major program by the GOP to revitalize the rural economy by providing the necessary physical and institutional infrastructure. The institutional development component of this project, principally directed at local management and engineering units of the DPWH, NEA, and the RECs, incorporates only existing organizations which are already funded through other GOP or REC budgetary processes. Costs in support of technical assistance and construction supervision/engineering, e.g., administration, field travel expenses, will increase GOP administrative outlays somewhat during the life-of-project. Maintenance of subprojects and the equipment and materials provided during the implementation period will necessitate a recurrent expense of the GOP within and beyond the project implementation period. Further, training to reinforce and strengthen the ideas, concepts and procedures introduced to participating institutions will generate some recurrent costs for the GOP and private or cooperative entities which participate in the project. Recurrent costs related to institutional development should, however, be capable of coverage by the participating entity through revenues or cost savings arising from rehabilitated facilities and improved management. The recurrent costs of maintaining physical outputs of the project will be provided through the normal GOP budget.

Rural Infrastructure Fund
Project No. 492-0420

Table 1

ESTIMATED SUBPROJECT FINANCING
($000)

INPUTS	SUBSECTOR ACTIVITIES: Roads & Bridges	Ports	Air Navigational Aids	Rural Electrification	Rural Telecommunications	TOTAL
INITIAL OBLIGATION						
Engineering	$ 3,500	$ 330	$ -0-	$ 820	$ -0-	$ 4,650
Construction	32,655	2,650	800	500	-0-	36,605
TA	200	100	20	1,910	400	2,630
Commodities	50	200	2,850	2,980	-0-	6,080
Training	50	-0-	110	740	100	1,000
Data Collection, Audit, Eval. and Monitoring	125	20	20	40	20	225
TOTALS	$36,580	$ 3,300	$ 3,800	$ 6,990	$ 520	$ 51,190
PROJECTED LIFE-OF-PROJECT						
Engineering	$ 4,300	$ 650	$ -0-	$ 2,000	$ -0-	$ 6,950
Construction	35,200	6,900	800	3,500	-0-	46,400
TA	200	200	20	3,320	1,480	5,220
Commodities	150	200	2,850	26,450	-0-	29,650
Training	100	-0-	110	800	200	1,210
Data Collection, Audit, Eval. and Monitoring	250	50	20	200	50	570
TOTALS	$40,200	$ 8,000	$ 3,800	$36,270	$ 1,730	$ 90,000

Table 2

PROJECTION OF EXPENDITURES BY FISCAL YEAR[1/]
($000)

Source	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93[2/]	Total
TA	$ 745	$ 1,116	$ 1,206	$ 1,083	$ 740	$ 330	$ 5,220
Training	134	220	334	302	182	38	1,210
Engineering	1,120	2,335	2,150	980	315	50	6,950
Construction	5,680	10,650	13,250	9,690	4,220	2,910	46,400
Commodities	6,170	9,075	8,450	4,595	1,238	122	29,650
Data Collection, Audit, Evaluation and Monitoring	140	108	114	75	30	103	570
TOTALS	$13,989	$23,504	$25,504	$16,725	$6,725	$3,553	$90,000
	(15.54%)	(26.12%)	(28.34%)	(18.58%)	(7.47%)	(3.95%)	(100%)

1/ As initial obligation is projected in the fourth quarter of FY 1987, it is envisioned that the first project year to realize expenditures will be FY 88.

2/ Although the PACD of the Project is scheduled as December 31, 1992, billings for goods and services will be received until September 30, 1993.

Table 3

APPLICATION OF FUNDS ESTIMATE
($000)

Applications	Foreign Exchange	Local Currency	Totals
Engineering	$ 5,350	$ 1,600	$ 6,950
TA	3,850	1,370	5,220
Construction 1/	4,750	41,650	46,400
Training	950	260	1,210
Commodities 2/	29,200	450	29,650
Data coll, Audit, Evaluation and Monitoring	375	195	570
T O T A L S	$ 44,475 (49.4%)	$ 45,525 (50.6%)	$ 90,000 (100%)

1/ Anticipates some participation by U.S. firms and/or foreign exchange expenses in larger highway projects.

2/ Includes Procurement Services fees.

C. Assessment of Methods of Financing

Table 4, below, illustrates the anticipated methods of implementation and financing under the Project. The financing method envisioned for a contract for technical assistance will be a direct letter of commitment (direct L/Com) issued by the Office of the Controller, Manila, Philippines. In the case of the contract for procurement services, the preferred methods of financing the commodities will be a bank letter of commitment (Bank L/Com), due to the number of commodity items. The actual procurement services will be financed by a direct letter of commitment (direct L/Com) issued by the Office of the Controller, Manila, Philippines. The financing method recommended for evaluation services under the project is direct payment utilizing either an IQC or PSC arrangement. To finance participant training, it is recommended that a credit transfer mechanism be utilized.

Table 4

METHODS OF IMPLEMENTATION AND FINANCING
($000's)

Implementation Activity	Method of Financing	Estimated Amount
TA; Direct Contract	Direct AID Payment	$ 5,220
Engineering and Construction Services; Direct or Host Country	Direct Payment by AID or Implementing Agency	53,350
Commodities; Host Country	Direct Payment by Implementing Agency	250
Commodities, U.S.	Bank L/Comm	27,636
Procurement Services; Direct Contract	Direct AID Payment	1,764
Training	Credit Transfer	1,210
Evaluation, Monitoring, Audit, and Data Collection; PSCs or IQCs	Direct Payment	570
TOTAL		$90,000

D. Financing Mechanisms and Disbursements

In the past, ESF grants to the Philippines have been in the form of cash transfers and projectized assistance. For the latter, the pesos equivalent to the U.S. dollars transferred by USAID were deposited by the GOP into interest bearing ESF Special Accounts designated for the Projects. Subprojects were then implemented using a two-step process which involved: (a) peso drawdowns from the GOP-Bureau of Treasury's Checking Account for Agency/Regular Demand Deposit Account (TCAA/RDDA) to pay contractors; and (b) peso drawdowns from the ESF Special accounts to reimburse the TCAA/RDDA. This local currency payment system, while appearing straightforward on paper, resulted in a myriad of GOP clearance and approval levels, contractor problems, audit and payment complications and delays in project implementation. Many of these problems resulted because the Cash Disbursement Ceilings (CDCs) expired at the end of each calendar year--and had to be renewed if not fully expended. The renewal process often took months. Because rapid implementation of subprojects is a high priority in restoring deteriorated infrastructure and improving rural economic activity, the time-consuming GOP payment procedures of the past will not be satisfactory.

Discussions with the GOP officials indicate that the payment procedures can be materially expedited through a one-step process where payment to contractors can be made directly by the Implementing Agencies in the form of checks drawn against their respective commercial bank accounts which have been established to carryout approved project activities. This procedure will eliminate the use of both the Special Account and the TCAA/RDDA in making payments to contractors. The problem with CDCs, which lapsed at the end of each calendar year, will also be eliminated. Under the project, A.I.D. will make U.S. dollar payments and, at the request of the GOP, may make direct Philippine peso payments to contractors and/or suppliers. For Philippine peso payment, implementing agencies (IAs) will submit annual work/financial plans (WFPs) through the Department of Budget and Management (DBM) to A.I.D. for review and approval. Based on approved WFPs, DBM will issue corresponding Advices of Allotment (AAs) covering the total estimated life of subproject costs (for all subprojects to be started during the year) to the IAs. IAs will then submit quarterly cash advance requests, based on approved and executed contracts, to DBM for review, approval and forwarding to A.I.D. A.I.D. will review contract costs for reasonableness and advance the appropriate amount to the Bureau of the Treasury (BTR) for credit to the IAs account.

BTR certification will be issued to DBM, and Treasury Funding Warrants will be issued to the respective IAs for deposit in commercial bank accounts established solely for the Project activities implemented by the respective IAs. IAs will issue checks for payment of authorized Project expenditures, and then submit liquidation reports to A.I.D. Liquidation reports will be submitted to A.I.D. by Implementing Agencies within one month following the close of the quarter. A.I.D. will not provide a third advance on behalf of any IA without liquidation of its first advance.

Disbursements at the Implementing Agencies' level will permit the voucher approval process to be limited to each Implementing Agency and USAID while still reserving the post audit and inspection rights of each government. We expect when the project is operational to be able to determine each Implementing Agency's quarterly cash requirements and release the corresponding ESF dollar amounts to the GOP based on this estimate.

Many of the subprojects being considered for financing under this project have already been included in the 1987 GOP Budget and Appropriations Act. Other subprojects chosen for financing will have to be included in subsequent years' budgets.

E. Audits

Responsibility for audits for all programs of the Philippine Government lies with the Commission on Audit (COA). Representatives of this office are assigned to monitor financial and procurement activities for major Departments and Agencies of the Philippines. Guidelines to facilitate the implementation of infrastructure projects are embodied under the Memorandum of Agreement (Circular No. 69, series of 1987 dated 7/31/87) entered into by COA, Department of Finance, DBM, DPWH, NEDA and the Department of Local Government. Accordingly, the COA shall conduct a pre-audit only on the initial and last billings of the contract, provided the amount involved shall not be less than 5% of the contract amount. If the first billing is less than 5%, the next billing shall also be pre-audited until the billing reaches 5% or more. Intermediate billings shall only be post audited together with the pre-audit of the last billing. The pre-audit of initial and final progress billings, including inspection, shall under normal circumstances, be completed by COA within 5 working days from receipt thereof, provided that the period may be extended to 10 working days under extraordinary circumstances. Under the Project Agreement, A.I.D. will have independent audit rights. There is no indication at this time that this project will require special audit coverage.

III. IMPLEMENTATION AND MONITORING PLAN

A. Implementation Plan and Schedule

The project is designed with a five-year implementation period. It is expected that authorization by the Mission will take place and the project grant Agreement executed during September, 1987. The Project Assistance Completion Date is December 31, 1992.

The project will utilize a fund or "umbrella" approach to project implementation where subprojects will be identified and selected in accordance with established criteria. This project will provide assistance to one or more infrastructure subsectors: transport, rural electrification and rural telecommunications, with the latter initially confined to studies to address issues and decision options in the telecommunications subsector. Criteria used in selecting subprojects will include standard cost-benefit evaluation procedures, investment criteria such as benefit/cost ratios, expected rates of return, linkages to the rural economy, impact on employment and income distribution, the absorptive capacity of the GOP implementing agency to administer subprojects, and how such subprojects may assist other AID-financed development activities. The process of subproject selection will be an on-going one involving the GOP and USAID management during the life-of-project.

The identification and selection of individual construction subprojects will be accomplished through the following procedure:

(1) Transportation.

(a) Roads, Bridges and Ports. Individual road, bridge and port construction subprojects will be identified and selected through a process based on the following procedures:

1) Provincial and Regional Development Councils and Government line departments will submit a listing of infrastructure projects and requirements to the National Economic Development Authority(NEDA).

2) NEDA will review the subprojects for appropriateness, list them in priority order according to national economic and administrative criteria and forward the list to A.I.D.

3) A.I.D. will review the subproject listing and available feasibility studies and will further appraise the subprojects based on available technical, micro-economic, financial, social soundness and environmental analyses, as required.

4) As determined necessary by A.I.D., existing feasibility studies may be updated or new feasibility studies be undertaken in order to ascertain the feasibility of subprojects.

5) Upon completion of the necessary analyses, the subprojects submitted by NEDA will be rank ordered by A.I.D. according to a combination of factors including their economic rate of return, how they may assist other A.I.D. development activities, regional impact, and other investment criteria as A.I.D. may consider appropriate.

6) A.I.D. will present its recommended ranking of subprojects to NEDA with an explanation of its rationale for the rankings. The listing will serve as the basis for further discussions with NEDA to develop a final listing of subprojects that will receive Project funding.

7) NEDA will then submit the subprojects to the Government line departments to be included in their budget submissions. At this time, NEDA will formally request that A.I.D. participate in the implementation of the selected subprojects.

8) Once a listing of subprojects and technical assistance activities that will receive Project financing is agreed to by NEDA and A.I.D., Joint Project Implementation Letters (JPILs) will be executed by A.I.D. and the Implementing Agency that is responsible for subprojects in the sector. These JPILs will indicate A.I.D.'s agreement that Project resources may be made available to finance selected subproject activities, subject to final contracted cost and feasibility confirmation. The JPIL will also specify the responsibilities of the parties in implementing the subproject.

(b) Air Navigational Aids. The furnishing and installation of air navigational aids will be based on completed detailed analyses and cost estimates.

(2) Rural Electrification.

Initially the activities in this subsector will focus on institutional improvement and policy reform. A host country contract will be used to obtain technical assistance for NEA to review and implement the following recommendations in the Price Waterhouse report on the Rural Electrification Subsector 2/:

a) Consolidation of RECs to form more economical and effective units

b) Restructuring of the National Electrification Administration

c) Reconciliation of NEA-REC loan accounts

d) Rationalization of power rates

e) Improvement of management and operation of RECs.

Subject to the mutual agreement of the GOP and AID, the Project will also assist the RECs in upgrading their physical plant through the rehabilitation, purchase and installation of equipment required to permit safe and economical operation of the system.

2/ See "National Electrication Administration and Rural Electric Cooperatives: Financial, Organizational and Technical Assessment," Price Waterhouse International Consulting Group, January, 1987

There are several actions that the Mission has taken or will undertake prior to the execution of the Project Agreement that will expedite implementation. These actions are considered routine and have not involved expenditures or commitments by AID. Such actions include, but are not limited to the following:

-- Identification of a pool of infrastructure projects for which necessary and detailed plans are available, reliable cost data exist, and for which AID financing has been requested by the GOP;

-- The issuance of a Commerce Business Daily announcement informing the public of A.I.D.'s intent to award the air navigational aids as a sole source procurement;

-- Re-examination or confirmation of financial and economic feasibility of potential subprojects within this pool of activities;

-- Preliminary agreement on the contents of Joint Project Implementation Letter (JPIL) No. 1;

-- Preparation of a PIO/T for IQC assistance in providing necessary environmental, social soundness, and other relevant analyses to upgrade or complete feasibility reports of potential subprojects;

-- Preparation of PIO/Ts for IQC services to begin subproject design and final analysis work and develop scopes of work for engineering/consulting assistance in roads, electrification, and telecommunications subsectors.

As it is expected that the first year funding (FY 87) will be provided in support of subprojects identified in the transport subsector only, the following is an illustrative implementation schedule of major implementation events and the approximate time they will take place, using the date of project agreement execution as a reference:.

ILLUSTRATIVE IMPLEMENTATION SCHEDULE

Action	Timing (Months)
--Receipt/review of feasibility reports for potential subprojects	-12
--Identification of pool of potential subprojects in the transport subsector where necessary plans are complete, reliable cost data exist, and AID has been selected as the donor agency	-3
--Preliminary discussions of contents of JPIL No. 1 held	-1
--Project Authorization and Project Agreement Executed	-0-

Action	Timing (Months)
--JPIL No. 1 issued	+ 1
--GOP/AID agreement on TOR for IQC services to upgrade/complete feasibility studies where needed	+ 1
--GOP/AID agreement on TOR for collection of baseline data	+ 1
--Initial Conditions Precedent Satisfied	+ 1
--PIO/T issued to initiate contracting of the supply/installation of air navigational aids	+ 1
--PIO/T issued for IQC services to upgrade/complete feasibility studies	+ 3 through +12
--Execution of contract to supply/install air navigational aids	+ 3
--Identification and agreement reached on initial subprojects in transport subsector to be financed from FY 87 funds	+ 3
--GOP/AID agreement on TOR for long-term engineering, construction supervision and monitoring services for transport subsector	+ 4
--IQC arrives to collect baseline data	+4 through + 6
--IQC arrives to upgrade/complete necessary feasibility studies for remaining subprojects in transport subsector	+4 through +15
--Contractor to supply/install air navigational aids mobilized	+ 5
--PIO/T issued for engineering, construction supervision and monitoring services for transport subsector	+ 6
--Issue RFTP for engineering, construction, supervision & monitoring services for transport subsector	+ 7

Action	Timing (Months)
--Identification of pool of potential subprojects to be financed from second tranche of funds (FY 88).	+ 8
--Project site visits initiated by AID	+ 8 through +55
--Air Navigational aids equipment arrives and is cleared through customs	+ 9
--GOP/AID agreement or TOR for TA of institutional development of RECs	+10
--Receive and evaluate proposals in response to RFTP for engineering, construction supervision & monitoring services	+10
--Identification and agreement reached on subprojects to be financed with FY 88 funds.	+10
--Project Amendments Executed providing additional incremental funding	+10 and +20
--Agreement reached on TOR for TA requirements of NEA/REC	+12
--Agreement reached on TOR for TA requirements of telecommunications subsector	+12
--Negotiate/Award/Contract for engineering, construction supervision & monitoring services required under the transport subsector	+13
--PIO/Ts issued for TA services in the telecommunications and rural electricfication subsectors	+14
--Construction supervision/monitoring Contractor arrives at post	+15
--Engineering, construction supervision & monitoring Contractors review existing engineering designs	+15 through +35
--Subproject construction activities continued	+15 through +45

Action	Timing (Months)
--RFTP for TA for institutional development for RECs issued and advertised in CBD	+16
--RFTP for TA requirements under the telecommunications subsector is advertised in the CBD and issued	+16
--If designs found acceptable, supervision Contractors to develop IFBs for selected subprojects	+16 through +38
--First Monthly Progress Meeting Held between GOP/AID and Supervision Contractor	+16 through +52
--IFBs for construction are reviewed/ approved by GOP/AID	+16 through +39
--TOR for PSA agreed to by GOP/AID	+17
--Construction supervision/monitoring quarterly progress report due	+17 through +58
--Proposals received in response to RFTP for institutional TA evaluated	+18
--IFBs for construction issued and advertised in CBD	+18 through +40
--PIO/T for PSA services issued to AID/W and subsequently forwarded to SBA	+18
--TA institutional Contractor arrives	+18
--Identification of pool of potential subprojects to be financed from third tranche of funds provided in FY 1989	+18
--Installation of Air Navigational Aids is completed at Manila and 13 rural airports	+19
--Negotiate/Award/Contract for institutional TA required for RECs	+20

Action	Timing (Months)
--Construction Proposals are received and evaluated by supervision Contractors. Awards proposed.	+20 through +41
--Specification development for Rural electrification equipment initiated	+20
--Training plan proposed by TA Contractor	+20
--Mutually agree to subsprojects to be financed from FY 89 funds	+20
--Negotiate/Award/Contract by SBA for PSA	+20
--Awards for construction services approved by GOP/AID	+22 through +42
--Training plan reviewed/approved by GOP/AID	+22
--Air Navigational Aids Installed/Tested and GOP personnel trained	+24
--Construction Contractors for large jobs mobilized and maintenance equipment ordered	+24 through +44
--Long-term trainees identified and selected	+25
--PIO/Ps issued for long-term training	+25 through+33
--Long-term trainees depart for training	+27 through +32
--Mid-Term Evaluation conducted	+27
--In-country equipment maintenance training initiated	+28 through +48
--TOR for evaluation services agreed to by GOP/AID	+28
--Rural electrification equipment specifications reviewed/approved by AID/GOP	+28
--In-Country management training for Rural Electrification subprojects initiated	+30 through +49

Action	Timing (Months)
--PIO/Cs issued to PSA based upon Supervision Contractor requirements for Rural Electrification subprojects	+30 through +40
--Review of Evaluation Findings by GOP, AID and Supervision Contractors	+34
--Needed Adjustments to Project if required	+36
--Commodity items for Rural Electrification subprojects arrive	+36 through +50
--Commodities for Rural Electrification subprojects are cleared and sent to appropriate project sites	+40 through +52
--Close Out procedures initiated	+48
--Final Evaluation Completed	+55
--All long-term trainees complete training	+52 through +56
--PACD	+63

B. Project Management

Once selected, the individual subprojects will be implemented by the appropriate GOP department responsible for each subsector. For example, the DPWH, with the help of firms in design and construction supervision, will be responsible for the implementation of the roads/bridges and port improvements, including marine navigation aids. The Bureau of Air Transportation, Department of Transportation and Communications, will oversee the air navigational aids system upgrade. The National Electrification Administration will administer the technical assistance contract and, with help from the contractor, will implement the designated rural electric cooperative improvements. The Department of Transportation and Communications will direct the technical assistance services provided it for the telecommunications sector assessment.

The Office of Capital Development through its Engineering, Infrastructure and Energy Division (OCD/EIE) will be the implementing office within the Mission. It will act as the duly authorized Mission representative in discussions with GOP departments/agencies and all contractors assigned under the project. The division is presently staffed by two USDH engineers, one USDH project development officer, two PSC engineers, eleven local staff engineers, one energy specialist, and four staff personnel. OCD/EIE will be the Mission's point of contact in helping develop, with the appropriate GOP department/agency, necessary scopes-of-work and budgets; and review RFTPs and contract documents. Further, OCD/EIE will initiate the issuance of PIO/Ts, PIO/Cs, and PIO/Ps, (where appropriate), and with GOP counterparts, will evaluate proposals received in response to RFTPS, review/approve contract documents and awards, coordinate project implementation with the GOP and construction supervision contractors, and visit project sites. This unit will work closely with other OCD Divisions. The Office of the Controller will be responsible for direct and reimbursement payments and processing letter of commitment requests. Other Mission offices which will play a significant role in overall project implementation include the Regional Legal Advisor; the Program Economist (OD/PE); two divisions of the Executive Office; Contract Services and Logistics; the Office of Rural and Agriculture Development; and Project Design and Implementation Division, OCD.

U.S., or a joint venture of U.S./Philippines engineering, technical assistance consulting firms will be directly responsible for providing construction supervision, project monitoring and reporting services for project subsectors (with the exception of the air navigational aids activities.). It is envisioned that officials of these firms, along with the appropriate GOP department/agency representative(s) will meet as often as necessary but not less than once a month with USAID officials to review progress/problems of subproject implementation within each of the subsectors during the preceeding period and agree to corrective courses of action, as appropriate. These firms will also assist during scheduled project evaluations.

With regard to air navigational aids improvements planned under the project, the U.S. manufacturer responsible for procurement and installation of the navigational equipment will report directly to OCD/EIE and the GOP regarding progress and problems encountered in implementation.

C. Contracting and Procurement Plan

AID will contract for all internal data collection, audit, and evaluation services required for the project utilizing a direct contracting mode or IQC arrangement. The project will also engage the services of a U.S. Procurement Services Agent to purchase commodities in support of the rural electrification subsector. AID will also contract directly on a sole source basis (for all but air conditioning equipment and generators) with the U.S. manufacturer for the procurement and installation of the required air navigational aids. The project will finance U.S. and or Philippine consulting firms, via direct and host country contracting modes, to provide technical services for the institution-building and training component of subprojects under the rural electrification subsector. It is expected that the project will engage the services of several U.S./Philippine engineering consultants under host country contracts to provide detailed feasibility studies and engineering designs to supervise construction and monitor subprojects. Finally, it is envisioned that studies and analyses needed under the telecommunication subsector, as well as analyses needed to upgrade current feasibility studies, will be contracted via an IQC or direct USAID contract.

Commodities expected to be financed under selected subprojects include items such as electric poles, transformers, switch gear, engineering and maintenance equipment, and air and marine navigational aids. The approved source/origin of all commodities financed under the Project will be the United States and the Philippines.

All procurement will be accomplished in accordance with AID procurement regulations and good commercial practice. The following will be observed:

Offshore Procurement: USAID will prepare a PIO/T for PSA services. The PIO/T will name 3-4 PSAs which qualify as 8(a) firms and have proven records of reliability and competence in procurement. The PIO/T is submitted by USAID to SER/CM for appropriate action In order to effectively monitor subcontracting to Gray Amendment firms by the PSA, the PIO/T will contain the stipulation that the PSA must maintain records of subcontracting to Gray Amendment firms and provide such information to the Mission on a fiscal year basis (October - September). This way the Mission can be credited with the total amount of minority firm procurement instead of the amount of the PSA fee only. As it is expected that the PSA fee will exceed $25,000, notification of PSA services contracting will be published in the CBD. Lists of equipment and equipment specifications will be prepared by the TA advisors and construction supervision/monitoring firms under the respective subsectors. The lists will be submitted to USAID for review and approval. At this stage USAID will determine if the commodities are eligible for financing and if any waivers are necessary. After review by USAID, the Mission will issue a series of PIO/Cs to the PSA to procure the items in accordance with Handbook 11 procedures.

Local Procurement: The GOP contractors responsible for commodity procurement under project subsectors will submit commodity requirements, e.g., electrical hardware, to the construction supervision/monitoring contractor for review. They are then forwarded to USAID for review and approval. After USAID concurs, it issues a PIL to authorize the procurement. All local procurement will be done using good commercial practices and will be in accordance with AID and GOP procurement regulations. The GOP implementing entity issues the purchase order or contract to the local supplier to initiate procurement.

Delivery: All offshore commodities will be procured on the basis of C&F Manila. Suppliers will be required to obtain all risk insurance in the amount of 120% of the C&F Manila costs of the commodities shipped, unless the procurement services agent covers such shipments under a blanket insurance policy. AID shipping and marking regulations will be observed.

Receipt and Utilization: The appropriate GOP entity for the subprojects will monitor the arrival, clear project commodities through customs and make the arrangements for storage and/or forwarding to the project sites. The GOP entities are also responsible for the inspection of commodities and the preparation of receiving reports. Reports of shortages and damages of project commodities will be submitted to USAID who in turn will forward all documents to the PSA for filing insurance claims. These same GOP entities will also insure prompt and proper utilization of the commodities.

D. Training Plan

This project will support long- and short-term training both in-country and overseas, which directly supports the institutional development objectives of one or more of the selected subsectors and contributes to the improved manpower skills critical to the development, operation and maintenance of facilities and equipment.

Training for overseas participant training will be funded through PIO/P's submitted to AID/W's training office or by technical assistance consultants engaged under the Project. In-country training will be provided by technical assistance consultants engaged under the project or by training institutions in the Philippines.

Detailed plans for specific training to be undertaken cannot be specified fully at this time because the specific needs of each subsector will be identified during implementation of the project. However, examples of the types of training needed are shown in the following sections.

1. Rural Electrification

a. Training Program for Transmission and Distribution Engineers

(i) Substation Operation and Maintenance: Protective devices, primary cable installation, grounding bus connection, control wiring, meter and test equipment, station services transfer switches, circuit breakers, capacitor banks, transformers and switching.

(ii) Line Equipment Maintenance: Basic theory and principles of maintenance, three-phase connections, distribution line connections, inductance and capacitance and the functions of capacitors.

(iii) Meter Test and Repair: Introduction to testing of meters, single phase and three-phase meters, indicating demand meters, recording demand meters, station metering and instruments.

(iv) Maintenance: (a) Technicians: Cable testing procedures and field application, fault location and isolation procedures, electric equipment failure and analysis reports, line construction and maintenance equipment and tool inspection, repair and replacement reports and development of new construction and maintenance procedures; and (b) Linemen: Equipment fault recognition and isolation procedures, equipment and line removal procedures, and maintenance reports and replacement requisition procedures.

b. Development Program for REC Managers and Supervisors

(i) Distribution System Engineering

(ii) Planning and Design: Subject course would include: short and long-range system planning, construction standards and specifications, equipment specifications, load forecasting, service area load requirements, transformer loading, voltage studies and sectionalizing studies.

(iii) Construction: Subject course would include: construction planning, construction supervision, work order procedures, inspection procedures (pole, line, line equipment, substation).

(iv) Operations and Maintenance: Subject course would include: planned preventive maintenance programs, work plans, distribution equipment operations, maintenance records, system load analysis, line sagging pole treatment, improving the load factor, identifying peak loads, recent developments in loan management equipment technology and its application, sectionalizing, transformer loading, distribution transformer and circuit reclosure operations and maintenance.

(v) Materials Management: This course would be offered to supervisors both in the operating and procurement departments. The subject material would include: inventory control principles, procurement procedures, stock records posting, stock number and cataloging practices, special stores control practices, warehouse safety and security and methods of material accounting.

(vi) Accounting Procedures: This course would be for accounting supervisors in the operating, finance and administration departments. The course would include the following: time, attendance and payroll records, miscellaneous sales (billing for services, cash sales records), maintaining accounts receivable ledgers, billing and accounts receivable procedures, service contracts, meter reading cards, cash receipts (daily collection reports) accounts payable records, cash disbursements, special accounting procedures and journal vouchers.

(vii) Auditing: This course would be for accountants in the auditing section. The subject material would include: purpose of the audit function, scope of the financial records, auditing and reporting requirements.

(viii) Financial Planning and Cash Management: This course would be for supervisors in the finance and administration department. The subject material would include: financial policies, measuring financial performance, developing financial objectives, techniques in projecting financial ratio needs, forecasting cash flow requirements, sources and application of funds statements and implementing a financial planning program.

(ix) Management: Managers should be scheduled for training on electric utility system generation, transmission and distribution management courses. This will provide exposure to state-of-the-art technology and management techniques. They should also be offered short term courses in system and project planning, construction, operation and maintenance management.

2. Ports

(a) Training program for Port Managers in planning financial management, operations and maintenance for small ports.

(b) Training program for Port Operations personnel in facilities and equipment operation.

(c) Training program for Port Maintenance personnel in facilities and equipment maintenance.

3. Roads and Bridges

(a) Training programs for Engineering Managers in planning, financing, implementing, and maintaining roads and bridges.

(b) Training programs for planning, financing and performing road and bridge maintenance.

(c) Training programs for planning, financing, procuring and maintaining road and bridge maintenance equipment and workshops.

(d) Training programs for contract award, administration and supervision for both construction and maintenance contracts.

4. Navigational Aids

(a) Training programs for operations of the navigational systems.

b) Training programs for planning, financing and performing maintenance of the navigational aids systems.

E. Monitoring and Evaluation Plan

A. Monitoring System

Quarterly comparison of planned versus implemented activities. Each participant agency will collect, collate, and summarize performance data, as well as identify constraints to implementation. Indicators to be used include, but are not limited to, financial management information, cash flow data, efficiency of documentation processes, interaction among and between agencies and USAID.

On account of required quarterly comparison of planned and actual activities, the project will require participant agencies to prepare a detailed implementation plan patterned on a PERT-CPM scheme. This will serve as baseline for the monitoring scheme.

Information collected through the scheme will be summarized on an annual basis. This annual summary will include an assessment of the procedural constraints to implementation. An external institution will be contracted by USAID to consolidate and analyze overall results drawing from data and reports generated by participant agencies. Available data will also be supplemented through site visits by the contractor.

B. Evaluation System

1. The project will be evaluated twice during its project life. Two years after all conditions precedent have been met, a process evaluation will be conducted. This evaluation will focus on effectiveness of the implementation structure, administrative constraints, and socio political impediments to efficient implementation. It is designed as a management tool and as a means to determine need for redesign activities.

2. Six months prior to termination of the project, an impact evaluation will be carried out. The impact evaluation will focus on initial effects of the project on immediate or direct beneficiaries. It will, therefore, assess the impact on effectiveness of GOP agencies to deliver services most affected by the project. In addition, it will determine initial changes on the peformance of selected business enterprises expected to gain most from better rural infrastructure. Finally, the evaluation will investigate project effects on residents, especially regarding employment and income, access to services, general productivity, inter alia.

C. Baseline Data

In order for the impact evaluation to be more effective, benchmark data should be collected prior to implementation of each component. The following are illustrative of baseline data needed: a) effectiveness of GOP agencies to deliver services; b) existence and performance of business establishment in project areas; and c) socioeconomic information of households in affected sites.

IV. PROJECT ANALYSIS

This project is a vehicle for supporting the rapid implementation of GOP development activities in one or more rural infrastructure subsectors. The general technical, economic, financial, and administrative analyses applied to proposed subprojects are contained in various studies prepared by consultants for the USAID or cognizant GOP implementing agency. In many cases, specific GOP subproject proposals are those assessed within these studies. Subprojects that are proposed for financing during future years may, however, need an updating or application of such analyses to meet criteria for inclusion within the Project financing list. USAID staff will be reviewing these analyses before accepting the subproject for financing. Activities that are yet to be identified for AID financing will be subjected to the same kinds of feasibility assessments and will therefore satisfy feasibility requirements of AID Handbook 3, Project Assistance. Included in these assessments will be considerations, such as, implementation priority, expected rates of return, linkages to the regional or national economy, impact on employment and incomes, GOP implementing capacity. The process of subproject selection and subobligation will be an ongoing one and will be closely monitored by the Mission to prevent any conflicts with overall Agency policies and funding availability.

The presentation of technical, economic, financial, social soundness and administrative analyses is highly abbreviated in the following sections because the Project will cover several subsectors and include dozens of individual activities prior to the PACD. The types of analyses presented below and in Appendices to this Paper are typical of those that will be used to assess activities proposed for inclusion in subsequent periods. For supplementary assessments, e.g., financial analysis of a particular rural electric cooperative, analytical procedures and requirements will be as recommended or applied by a consulting firm hired under TA components of the Project.

The following is a list of the major engineering feasibility studies and technical reports which form the basis for subproject involvement and decisions to finance a particular subactivity:

National Airport and Planning Study of the Republic of the Philippines (Supplemental Report) - June 1982

Consultants: Federal Aviation Administration, USDOT

Southern Philippines Highway Network Development Feasibility Studies - February, 1983

Consultants: DCCD Engineering Corporation
Phil-Consult, Transportation Planning (Manila)

Study of Infrastructure Investment and Maintenance in the Philippines - December 1984

Consultants: Tippetts-Abbett-McCarthy-Stratton
EBASCO Services, Inc.
Development and Technology Services

Quirino Highway Feasibility Study - November 1985

Consultant: Project Management Office, DPWH

Nationwide Feeder (Municipal) Ports Development Program - February, 1987

Consultant: Project Management Office, DPWH

National Electrification Administration and Rural Electric Cooperatives Financial, Organization and Technical Assessment - March 1987

Consultant: Price Waterhouse, Inc.

Philippine-Rural Infrastructure Fund: Telecommunications (Draft Report) - April 1987

Consultant: Teleconsult, Inc.

Philippines Provincial Ports Project - May 1987

Consultant: Transportation Division, IBRD Regional Office

Pipeline Projects for Economic Support Fund Financial Assistance - June, 1987

Consultant: Project Management Office, DPWH

A. Technical

Because the Project will have several subproject components and will finance a number of different activities, within one or more subsectors, the technical analyses described below are only conceptual and representative in nature. Analyses summarized in appendices to this Paper are of actual subprojects already proposed for financing hereunder. These analyses were developed and applied by consultants working for AID and the GOP. The analytical sequence used will also be applied to assess the technical feasibility of activities proposed for inclusion in subsequent years of the Project. Since the Project's focus is primarily on the rehabilitation or upgrading of existing elements of rural infrastructure, the question of technical feasibility is not of significant concern. Designs and implementation of these activities or types of activities have been confirmed over the years by actual installations. Adaptation of previously proven standard designs within a specific subproject will nonetheless be appropriate because site conditions vary. A brief outline of considerations included in these technical analyses is provided below.

1. Technical Feasibility of Roads/Bridges

The Department of Public Works and Highways (DPWH) conducts site surveys and generates preliminary designs and cost estimates which are consistent with widely used engineering standards. Principal considerations of their technical feasibility studies are outlined below:

- Regional and local transport needs
- Existence or condition of current infrastructure
- General hydrologic and geologic factors
- Projected traffic densities and road bed loadings
- Calculation of drainage basins, rainfall, runoff patterns, and drainage structure sitings
- History of traveled way, surfacing, and drainage structures performance
- Existence of suitable borrow pits and construction materials
- Construction techniques and contractor capacities
- Rights-of-way implications and effect on towns along the proposed route
- Potential impact on physical environment, including quality of life, forested areas, animal and aquatic species, within influence areas of the road.
- Future maintenance and alignment factors.

Appendices B and C contain abstracts of technical considerations for typical highway subproject which has been proposed for inclusion within the Project. USAID staff and project consultants will be reviewing all such analyses prior to accepting the activity for Project financing.

2. Technical Feasibility of Small Ports

The Department of Public Works and Highways is responsible for construction of small ports that are operated by local municipalities. (The Philippines Port Authority handles larger regional ports and international facilities such as the Metro Manila Port). Feasibility studies for these proposed installations have been prepared by various consulting firms and the GOP implementation agencies as part of requests for donor assistance. For example, the World Bank is currently negotiating a $32 million project for the improvement of medium-sized regional ports. The ADB is financing improvements at the Manila Port. These undertakings, as well as the proposal for AID to help improve the smaller municipal ports, are all parts of an integrated ports investment program.

As with road construction, the rehabilitation or construction of small ports in the Philippines does not present significant technical questions. The GOP has standard design criteria and a history of implementation which satisfy most technical feasibility concerns. Actual site adaptations and construction supervision warrant careful review, and provisions are included for the Department and Project supervision consultant to carry out these functions. The following are typical technical considerations applied in small ports assessments.

- Transport and passenger volumes
- Productive potential of the land area served
- Value of goods and crops shipped
- Proximity to local or regional ports
- Ship/boat frequency of calls
- Ship/boat types and docking requirements
- Unloading/turnaround times
- Cargo storage needs
- Water/tide/wave action factors
- Seismic and storm risks
- Channel and shoreline problems
- Environmental risks
- Capacity of pier facilities and access roads

An example of an assessment and port development proposal is included in Appendix D. These feasibility matters will be reviewed by USAID staff and the project consultant prior to acceptance of a particular activity for subproject financing.

3. Technical Feasibility of REC Upgradings

The upgrading of rural electric cooperatives will start with technical assistance to NEA and individual cooperatives to improve management and financial systems, and will address the needs for physical systems upgrade, to be implemented in subsequent periods. Initiation of physical improvements in REC distribution systems is intended to come after TA and organizational reforms, so the USAID will have some breathing room to concentrate on subsector policy issues and organizational reforms.

Discussions with NEA on the need for assistance to the Rural Electrification Program have indicated agreement towards the development of a comprehensive technical assistance package which will address the following concerns a) policy level problems concerning power rates, direct connection of large non utility customers, formation of new REC's and or consolidation of existing coverage areas and b) financial and management issues of REC's. Upgrading of REC's systems will be contingent upon REC's progress in implementing policy changes and in the individual REC's effectiveness in operating and managing their system, and in implementing recommended improvements in their management systems and policies as recommended by the TA contractor and NEA. Second, detailed studies will be made of the specific needs of the various cooperatives for system upgrade. Finally, equipment and materials will not be procured for any individual cooperative unless it accepts the management, financial and maintenance improvements specified and agreed by NEA and the TA consultant, and gives demonstrable proof of its efforts to implement such changes. In a limited number of cases the project could reach the stage of justifying system upgrade of individual REC's during the first year of the project, but most equipment procurement will in any case occur in later project years.

The project paper provides information on, e.g., rural electric power problems, and focusses interventions on both policy and institutional weaknesses. The REC improvement program plans to benefit only those individual cooperatives that subscribe to management and financial restructuring, so equipment provided to upgrade power systems will have a better chance of producing long run systems viability and economic benefits. NEA, reacting to management suggestions made in the recent analysis by Price Waterhouse, has already started an aggressive program of management reform and improved account collection in the REC's. Interest in the new project and a revitalized REC system has developed in other sectors of the GOP as well. The GOP is seriously considering rate reforms which will help support REC operations, and has recently issued Executive Order (EO) 215 which opens power generation to private sector investment.

4. Telecommunications Feasibility

During earlier stages of project identification and development, consideration was given to direct assistance for the improvement and expansion of telecommunications throughout the country. The World Bank, ADB and other donors are likewise considering assistance in this sector. However, project investigations revealed numerous policy (private sector role, system responsibility, rate structures) and technical (hardware, area coverage, satellite links versus microwave transmission) issues which need decisions before systems integration and expansion can be outlined. This is the basis for USAID's decision to temporarily postpone direct systems involvement and, instead, respond to the GOP's request to only provide top level consulting assistance to further define subsector issues and GOP and private sector options. Early implementation of technical assistance for helping with GOP telecommunications studies is not considered an excessive administrative complication. Such services will be secured as quickly as possible to increase their value to the GOP in its study of sector reforms. Initial

discussions with the Department of Public Works and Highways indicated general agreement regarding the use of TA for design and supervision. The feasibility of doing so will be addressed by selecting the most highly regarded advisors from professionally recognized telecommunications organizations. The GOP has expressed a keen interest in obtaining such assistance quickly to help it shape and respond to investment interests of other donors. The environment for successful technical assistance delivery is therefore highly positive. There are several internationally-recognized firms and communications institutes that can provide qualified advisors under direct contract, so the feasibility of accomplishing this advisory services objective is not a significant question.

Direct assistance to the telecommunications sector is not contemplated at this time. If national system policies and technology choices are satisfactorily decided later in the Project, USAID assistance, and the specific technical feasibility thereof, could be established as an eligible component under subsequent Project obligations.

B. Economic

As previously noted, the project may support activities in one or more subsectors and include many discrete individual subprojects or activities. In the process of implementation, each individual subproject will be subjected to confirmation of its economic feasibility as required byand according to A.I.D. Handbook 3. The actual analysis will vary for each type of activity, but will generally include the standard indicators of benefit/cost ratio and internal rate of return. However, sufficient potential activities with supporting feasibility studies have already been identified to give assurances that it will be easy to select economically feasible subprojects, at least in aggregate for the project, even if difficulties should arise in one or the other of the subsectors. Based on available evidence and procedures to be followed, below is a discussion of the general expected benefits overall and in the various subsectors along with discussion of measurement issues. In addition a representative analysis of one of the possible transport activities is presented. Further examples are contained in the appendices to the paper.

1. General

In general, the project will help reverse the deteriorating state of public infrastructure and thus aid in the economic recovery of the Philippines. The project will assist the GOP to correct the extreme imbalance in infrastructure investment between the rural and urban areas. Investments in the construction, upgrading and improvement of selected facilities will maximize the utility of existing infrastructure.

The rural economy will benefit from the enhanced access to resources and markets resulting from transport improvements; increased efficiency of production and marketing activities resulting from improvements in electric service and telecommunications; and, increased employment during and after construction. Benefits from transport investments will accrue in the form of

reduced operating expenses, for the users of both the new or improved facilities and of the existing facilities, which may become less congested; savings in time for passenger and cargo movements; fewer accidents and reduced property and environmental damage; and increased comfort and convenience. The benefits of improved rural electrification and telecommunications include increased economic activity, particularly in small-scale farm and non-farm enterprises such as welding shops, rice mills and aquaculture aerators; enhanced household and community living standards; and, improved education and health.

2. Social and External Effects

Some of the benefits may not be adequately captured by conventional economic analysis. This disparity occurs because of the presence of market distortions, such that market prices differ significantly from social values. For example, the most familiar extra economic value expected out of the transport improvement relates to the distribution of income. Measures of willingness to pay are dependent on the distribution of income, with alternative distributions of income leading to different demand functions and different market information. The prevailing distribution of income will thus influence market pricing and resource allocation decisions. Since direct means for redistributing income are usually difficult to implement (e.g. land reform), the distribution of income, among income classes and especially among regions, is an important contribution of transport projects. Furthermore, the project activities are likewise expected to have a considerable impact on regional location decisions, again potentially implying income redistribution effects of considerable importance. Location effects are particularly relevant to these/infrastructure projects.

Induced long-term effects on employment and investment are relevant, especially under existing conditions of less than full employment and in the presence of capital market imperfections. Since unemployment exists, market prices for factors presumably overstate real costs. However,the source of unemployment is relevant. In many cases, the problem of jobs mismatch is due to labor market imperfections. Where the project activities provide employment in areas where other means of relief are not available, the employment is a special benefit from the project. To achieve consistency in investment allocations, one should take into account the positive employment effect which can arise from other expenditures possibly displaced by the project investment.

3. Benefit measures for transport projects

a. Reduced Operating Expenses

The new or improved transport facilities resulting out of the project will lead to reduction of transport costs. While this benefit will initially accrue to the users or owners of the facility, competition, profit maximizaton, or government pricing policies will induce the initial gainers to share it in various degrees with other groups, such as producers, shippers and consumers. Therefore, the cost reduction will benefit the whole economy and not merely the immediate users of the facility.

The types of reduction in transport costs vary across modes. Road improvements are expected to lead to lower operating costs for vehicles and rolling stock. Better maintenance of roads will likewise reduce vehicle operating costs, passenger and freight delays, accident costs, and the level of future maintenance and rehabilitation expenditures. Proper maintenance will also help prevent road closures and the losses associated with such closures (e.g. diversion time, loss of perishable goods, etc.). Port improvements are expected to lead to savings in the costs of ship delay and cargo handling. Better and larger port facilities will make possible the use of larger ships and eventually lead to some savings for the shipping companies.

b. Diverted Traffic

In cases where the transport subproject diverts traffic to a new or improved facility from other modes of transport or from other routes, the project benefits will be in terms of the difference between transport costs on the old route or mode of transport and those on the new facility. The relevant costs are the avoidable costs or the savings involved in the shift. If diversion occurs between different modes wherein transport costs may not be directly comparable, the relevant cost is the marginal costs of carrying traffic in the new mode. If the diverted traffic is only part of the total traffic for a certain mode, and that mode has excess capacity, the marginal savings would be substantially less than what would be indicated by a comparison of average costs.

c. Economic Development

Improvement or a new transport facility will lead to increased output. The net value of this additional output is the relevant measure of economic benefit. For rural roads, new construction or improvement of existing rural roads with little traffic as well as for all road projects which are justified on large increases in economic activity and traffic will provide savings to road users and stimulate growth of the rural communities. To measure the development impact, the following issues are relevant: (1) how are savings in transport cost distributed among producers, traders and consumers; (2) how will beneficiaries respond to lower transport costs, e.g. will lower input costs, higher farmgate prices and better transport service encourage producers to increase production; and (3) what nontransport constraints exist which may prevent the beneficiaries from responding to the transport improvement? Given indications that transport costs do constitute a large proportion of production costs, the transport subprojects will likely have a high marginal impact on farmer incentives.

d. Time Savings

Transport improvements are expected to reduce travel time and enhance quality of transport services. Time has a money value. On the other hand, this has to be evaluated on the basis of the types of opportunities created by the increased availability of time, whether for increased production or voluntary leisure on one hand or for involuntary idleness on the other. Since there is large scale underemployment in rural areas, the savings in time may not be particularly valuable.

4. Expected Benefits of Rural Electric Cooperative Upgrading

The rural electric cooperatives in the Philippines currently face serious technical, financial and management problems which have hampered their operations and their ability to provide adequate and expanded services. In general, a number of identified social benefits from rural electrification have not been realized fully due to these problems.

The proposed subproject concentrates on improving existing cooperatives and service areas to reduce line losses, power interruptions and other technical and managerial problems. An immediate benefit of this may be the reconnection of large industrial power users to the RECs instead of the National Power Corporation (NPC) and thereby improve the REC's finances. Because of the RECs' technical inefficiencies and their financial problems, the GOP has taken the position that large industrial power users remain connected with the NPC rather than the RECs until such time that the RECs can show proof that they can provide reliable power supply. Such condition of rural electric supply has hampered industrial dispersal to the countrysides, a problem which the subproject can alleviate.

The most frequently quoted social benefits from rural electrification are all related to use. It has been observed that electricity (1) increases productivity and output in rural areas by reducing the costs of energy and thus increasing the profitability of farms, agro-industries and commerce; (2) adds to the standard of living in village homes and communities; and (3) assists the government achieve its health and education objectives. Often the claim is made that electricity helps stem migration from rural areas to cities. However, little concrete evidence supports this claim and it is ignored here.

a. Agricultural and Off-Farm Productivity

Agricultural productivity is expected to improve as a result of a range of activities made possible by rural electrification. Off-farm activities can also be expanded and made more profitable. The following are examples of what can result from rural electrification:

1) Irrigation systems utilizing electric system equipment, tube wells, etc. allowing for multiple cropping.

2) Automated poultry processing/breeding systems.

3) Refrigeration of perishable farm, livestock and aquatic products and utilization of milk coolers.

4) Electricity-powered grain drying and processing, storage and fumigation systems.

5) Fish farms in areas where pumps are required.

6) Electrically-powered handicraft/home-based enterprises

b. Standard of Living of the Household and Community

Electrification enhances rural standard of living in many ways, among them:

1) Easing of home chores which permits women to engage in other activities.

2) Utilization of appliances for education/entertainment/ leisure or health.

3) Night lighting which acts as crime deterrent.

4) Outdoor lighting of community facilities which permits certain activities to be conducted at night.

c. Social Benefits Related to Health and Education

Electrification indirectly assists the government achieve its objectives in health, education and improvement of the general well-being of the citizens through the following:

1) Reliable source of power for hospitals and clinics.

2) Refrigeration of vaccines and other medical supplies.

3) Reduction in health hazards through food refrigeration.

4) Observed negative correlation between the extent of electrification and population growth rate.

5) Expanded and improved delivery of extension services and education.

d. Aspects on the Measurement of Benefits

In practice, it is necessary to confine cost-benefit analysis to what can be measured, and to supplement this as neccessary with descriptive analysis. In general, the benefits which can be measured are: (1) direct benefits to households, reflected in revenues; (2) direct benefits to farms, agro-industries, and commerce, again reflected in revenues; and (3) "surplus" benefits to farms, agro-industries, and commerce, reflected in the net effects on profits and output of electricity to these activities.

Descriptive analysis of households, and of household demand, can be couched in terms of indications of living standards, the number and percentage of the people demanding service, and the purposes for which they are likely to use electricity. Analysis of the growth of the area - its history, whether people are likely to move into it and/or remain there - is also important.

Where there is a strong demand for "productive" uses, the above basis of benefit estimation will be more than sufficient to justify a good subproject. The revenues from farms and agro-industries should boost the activity, unless tariffs are low. Counting the "surplus" benefits to "productive" uses will boost justification further.

On the other hand, where the demand for "productive" uses is small, and is coupled with low tariffs and a low level of demand from households, justification will be difficult.

5. Expected Benefits of Technical Assistance to the Telecommunications Sector

The telecommunications sector in the Philippines is characterized by problems of underinvestment, lack of sectoral organization, and weak institutional organization which have led to the absence or inadequacy of telecommunications extensions in rural areas and the generally poor quality of services where such services exist. Because of this situation, the Philippines has not been able to fully realize substantial social benefits from a good telecommunications system.

Mission assistance to the telecommunications sector in the form of top level consultancy will take time to translate into tangible social benefits. However, such assistance is imperative in view of the very fluid state of the Philippine telecommunications policy milieu. Unless a clearer direction is set, foreign investors and multilateral development institutions will continue to be hesitant in taking an active role in the sector. The Department of Transportation and Communication will benefit directly from the assistance but this is expected to trickle down to the other participants in the sector once clearer directions and options have been defined.

Widespread telecommunications facilitate two-way interactive links that enable the people in all regions of the nation to participate and share in the process of economic development. It provides a means of contributing to the reduction of regional disparities and the "gap" between the potential of a nation for development and the actual realization of those potentials.

Any reduction of these disparities can be a significant step forward in the reduction of income and expenditure differentials. Telecommunications enable a more equitable distribution of the gains of the development process itself. It can also assist in bringing about an improvement in the living standards of rural areas, where more than 70 percent of the population lives.

These improvements will create greater opportunities and inject greater productivity into the operation of the communities touched by the telecommunications network. Motivational stimulus, imparted through easy access to market information and by two-way interactive flows of ideas and information between rural and urban entities, can contribute to the synergy of a growing nation.

Listed below are some of expected social benefits from an improved and/or expanded telecommunications as well as measurement aspects.

a. Agricultural, Commercial and Industrial Productivity

1) Reduction in transaction costs for business and government.
2) Farmers and traders access to price information.
3) Improvement of communication organization.
4) Expansion of business opportunities.
5) Better utilization of scarce management skills.
6) Incentive to a manufacturing program for telecommunications.
7) Increase in tourism.
8) Infrastructure support to power supply, water supply, waterways, transportation, etc.
9) Agricultural support for the supply of seeds, and fertilizer and for irrigation control.

b. Household Activities

1) Improved social activities.
2) Expanded entrepreneurial activities.
3) Better purchasing decisions.
4) Reduction in transportation expenditures as better communication facilities can substitute for transportation.

c. Social Benefits Related to Health Care and Education

1) Better health referral system
2) Development of a higher level of health care program.
3) Access to higher medical centers for assistance in diagnosis, medicinal supplies and ambulance dispatch.
4) Acceptance by more doctors of rural assignments, with less possibility of professional isolation.
5) Expanded role of radio and TV in formal and informal education.
6) Two-way interactive feedback system for local participation.
7) Access by barrio people to extension workers.
8) Access by extension workers to higher levels of information and assistance.
9) More contact with individual families/small groups at relatively shorter intervals.

d. Planning and Development

1) Stronger participation of barangays, barrios, municipalities, provinces and regions in planning.

2) Improved lateral and vertical sharing of ideas, plans, techniques and experiences, leading to increased production and development.

e. Migration and Mobility

1) Improved communications with areas characterized by poor transportation systems.

2) More efficient regional and interregional migration.

3) Possible reduction in urban in-migration as commercial and industrial activities move out to the countryside.

4) Generation of employment as a result of industrial dispersal.

f. Aspects on the Measurement of Benefits

In the past, the benefits of telecommunications were measured by aggregate international comparison of input-output tables, or the relation between GNP and telephone availability or usage, or by the analysis of countrywide transport, energy or locational objectives. The survey of literature and experience presented so far, however, suggests that benefits of a specific telecommunications project or investment program cannot be readily identified and measured by very aggregative methods. Attention is now focused on microeconomic analysis in addressing the issue of telecommunications benefits.

Cost-benefit analysis providing internal rates of return can be used to help determine not only the amount of resources that should be devoted to telecommunications but also the best way to allocate those resources within the sector. However, artificial restrictions on the growth of telecommunications and massive unsatisfied demand in a developing country makes the rates of return to telecommunications relatively high. It is argued by some that these high rates of return may reflect benefits accruing only to higher income groups, and that expansion of the sector merely exacerbates income inequality. To examine the validity of such arguments, to the extant available, two kinds of information will be reviewed: First, the estimated costs will be compared with the estimated benefits to users based on (1) their observed willingness to pay for access and calls, (2) their observed willingness to incur travel costs to where service is available, (3) their observed willingness to purchase or rent connections from intermediaries, or (4) their observed willingness to incur higher communication costs in the absence of a telephone or other telecommunications service. Second, available information on the characteristics of the beneficiaries of the improved and expanded services and on how those beneficiaries use these services will be reviewed. These data will then be qualitatively analyzed in the light of that country's national development policy goals and programs.

6. Economic Analysis of Sample Transport Subproject: Quirino Highway

The analysis provided below is a summary of findings from the feasibility study for opening Quirino Highway. It is presented as an example of the analysis done or to be done on transport subprojects. The analysis

lays out three options for aligning the highway. Each option has three alternatives, one for each type of road surface, e.g. gravel, paved road, dense graded bituminous macadam (DG8M).

a. Investment Cost

The investment cost for each option/alternative was estimated as follows:

Alternative	(Kms.)		Investment Cost Economic (₱M)	Investment Cost Financial (₱M)
I	92.772	AC	297.5	346.0
		DGBM	244.5	290.0
		Gravel	186.5	210.0
II	96.093	AC	267.0	313.0
		DGBM	215.5	257.5
		Gravel	156.0	182.0
III	108.404	AC	271.5	316.5
		DGBM	218.5	262.0
		Gravel	151.0	177.0

b. Benefits

The economic benefits realizable in the implementation of the project are the savings in the traffic cost which are quantified on the basis of the effectiveness of the proposed highway in the project influence area. The traffic cost is composed of the vehicle operating costs, i.e., running fixed and time costs. The quantifiable development benefits, such as net value added from generated production, associated with the new road construction were also studied. The project life of the proposed highway is 20 years.

1) Basic Traffic Costs

The vehicle operating cost (VOC) is composed of the running distance-related cost, the time-related fixed cost and the passenger time cost. Time cost of cargoes on truck was excluded because there was no specific condition under which the time of cargo could be reasonably quantified.

Vehicle Types	Running Cost (₱/Vehicle-km)	Time Costs (₱/vehicle-hour) Vehicle and Crew	Passenger	Total
Car/Van	1.24	2.92	17.56	20.48
Jeepney	1.01	22.05	9.71	31.76
Bus	2.57	30.05	46.55	76.60
Truck	2.89	32.61	-	32.61

2) Actual Traffic Cost

"dl Method"

Basic vehicle operating cost are defined as the costs which would be incurred by vehicles using roads under ideal conditions, i.e., with good surface, no gradients, curves, insignificant road side friction, and light traffic volume. The VOC on the road section which was not in ideal condition was assumed to be equal to the cost (VOC) of running a road distance which was the duration of the original length and an imaginary additional length. The additional length is determined by "dl values" which represent the realistic traffic flows and VOCs.

The dl and travel time savings were drawn from NTPP reports on Quirino Highway with some modifications for application to the three alternative alignments. The following tables show the comparative analysis for time per trip by alternative alignments for Quirino Highway and the actual traffic cost figures by vehicle type in case Quirino Highway is constructed into a gravel road. The actual traffic cost figures by vehicle type were converted into traffic cost per passenger kilometer and per ton kilometer by applying average occupancy rates and commodity load.

3) Cost-Benefit Analysis

Each of the alternative alignment and road improvement options were tested for their viability using the following assumptions:

- opportunity cost of capital is 15 percent;
- project life is 20 years;
- no salvage value to the road structure after life of the project.

The benefits were assessed according to high, medium and low assumptions. The analysis showed that all alternatives under the three levels of assumptions were economically feasible and viable, i.e. economic internal rate of return exceeded 15 percent and benefit/cost ratios exceeded unity. As shown in the following table, the second alternative alignment using dense graded bituminous macadam (DGBM) surface had the highest internal rate of return for all levels assumed. The rates of return for the DGBM surface for the first alternative was close to the results in the second alternative. However, the investment cost for the second alternative, DGBM surface is lower than that for the first alternative. Thus, the second alternative, DGBM surface type appears the most economical choice. All the gravel surface alternatives have marginally viable internal rate of returns.

AC/DGEM Option

a. High Assumption

(i) Traffic cost savings from divertible traffic from Maharlika Highway

(ii) Traffic cost savings from divertible traffic from railroad projected to transfer to road facility

(iii) Local traffic cost savings

(iv) Development benefits

b. Medium Assumption

(i) Traffic cost savings from divertible traffic from Maharlika Highway

(ii) Local traffic cost savings

(iii) Development benefits

c. Low Assumption

(i) Traffic cost savings from divertible light vehicles (LV) from Maharlika Highway

(ii) Traffic cost savings from half of the estimated bus and truck traffic (HV) estimated to divert to Quirino Highway (50% diversion to Quirino Highway)

(iii) Traffic cost savings from LV local traffic

(iv) Traffic cost savings from HV local traffic (50% reduction from expected traffic)

(v) Development benefits

Gravel Option

a. High Assumption

(i) Traffic cost savings from the estimated divertible truck traffic

(ii) Local traffic cost savings

(iii) Development benefits

b. Medium Assumption

(i) Traffic cost savings from the estimated divertible truck traffic (50% reduction)

(ii) Local traffic cost savings

(iii) Development benefits

b. Low Assumption

(i) 20% reduction of traffic cost savings estimated in the high assumption level for both divertible and local traffic

(ii) Development benefits

C. Financial

Since this is an "umbrella" type project, financial analyses will be performed and/or reviewed, as appropriate, by the Controller at the time subprojects are considered by the USAID for financing. Detailed guidelines for financial analysis are contained in Appendix 3D of AID Handbook 3 (a substantial revision of this Appendix is expected to be issued shortly). The purpose of financial analysis is to ensure that a proposed subproject will be financially viable and that the stream of projected expenses can actually be financed as planned. It is also used to determine the profitability of a project from the stand point of an individual or public or private entity for whose benefit the project is undertaken. Financial analysis uses actual and projected costs and revenues, taking into account all expenses including taxes, interest and all revenues including items such as government subsidies.

For some infrastructure projects, an economic analysis will be more germane than financial analysis. Economic analysis is concerned with the costs incurred and the benefits obtained by the society as a whole. It uses constructed values, i.e., "shadow prices" and "opportunity costs", disregarding all costs which represent transfers between members of the same community, but including costs borne by others than the direct beneficiary.

For infrastructure projects which do not generate revenues, profitability measures and assessments are not appropriate. In these cases, the financial analyses which may be performed are budgetary analysis, institutional analysis and least cost analysis.

Budgetary analysis indicates the amount and timing of financial resources required to operate the project and an evaluation of the entity's ability to finance operating costs after AID financing has ended.

Institutional analysis assesses the ability of the entity to manage and discharge its responsibilities during implementation and after completion and should recommend any needed changes in management and procedures.

Least cost analysis estimates the monetary value of inputs required under alternative methods of achieving the project goals and identifies the least cost alternative.

Financial analysis is most valuable in the case of revenue producing projects such as rural electrical cooperatives. The analysis is then a straightforward assessment of the operating unit including a review of its

financial condition, capital structure, post financial results and planned changes in organization and operating methods. The financial analysis should include a review of projected income and expenses, capital expenditures, profitability, costs flow, working capital and internal rate of return.

Least cost analysis and budgetary analysis will be appropriate for most of the roads and feeder ports subprojects and installation of air navigational aids. Budgetary analysis will be appropriate for the assessment of technical assistance aspects of the Project and for analyzing maintenance financing. The rural electrification element will be appropriate for traditional profitability reviews. Assessments of individual cooperatives for restructuring and plans of action to make them financially viable will be the responsibility of NEA and financial analysts under the REC technical assistance contract.

Samples of financial analyses are contained in several of the typical subproject feasibility studies contained in Appendices A thru F of this Paper.

D. Social Soundness

1. Introduction

The Rural Infrastructure Fund does not lend itself to a conventional social soundness analysis. As designed, it will utilize an "umbrella" concept under which subprojects in transport-related, energy and communication sectors will be funded. These subprojects have not yet been identified, owing to which a conventional social analysis (i.e., one referring to a discrete activity) is impossible to conduct. Nonetheless, using AID's experiences in related activities, as well as evaluation of roads and rural electrification projects in the Philippines, we can identify potential issues germaine to social soundness of rural infrastructure activities.

However, once discrete subprojects have been identified, it is incumbent upon implementing agencies to conduct sub-project specific social soundness analysis while these are being designed.

2. Socio-cultural Feasibility

Two of the more basic sociocultural feasibility questions addressed in this section ask whether there exists a need for the project among its beneficiaries, and second, whether project activities and outputs are mutually adaptable to the beneficiaries' social system.

A. Question of Need

Drawing on results of studies, consultations with potential beneficiaries and evaluations of past USAID-funded rural infrastructure projects we can infer existence of actual and perceived need. For instance:

1. Results of the Regional Workshops on Agri-Business and Food conducted by the Philippine Chamber of Commerce and Industry in 1986 identified improvement and construction of roads as a primary constraint to growth in the agribusiness sector. The complaint is pervasive and invariably appears in resolutions submitted by all regional workshop committees.

2. The same workshop also points to inadequacy of rural telecommunication and the need to improve information dissemination.

3. Results of the most recent Presidential consultations in the Bicol (Region V) show that energy-related problems rank as the highest concern among diverse groups of Bicolanos. Although complaints focussed on the high cost of electricity, the fact that this ranked as the most serious perceived problem indicates a widespread recognition of the importance of electrification to the well-being of residents.

4. Evaluation of the Western Mindanao rural electrification program show that beneficiaries clearly associate electrification with a host of perceived and actual benefits. Among the benefits reported, it is significant to note that simple illumination ranks highest. Furthermore, few relate electrification to income or work-related benefits in spite of the report findings that in areas serviced there appears to be a correlation between electrification and improvement in incomes and increases in employment opportunities. What this suggests is that at the perceptual level, rural residents associate electrification more with qualitative changes in well-being even when quantitative changes occurred. By inference, we can assume that even if rural electrification does not bring about actual improvements in productivity and income, it will still be viewed to contribute positively to quality of life. The intangible effect may in itself be worth the cost and the effort.

We can cite more examples showing either an expressed need for rural infrastructure projects or on ascribed need by virtue of peoples awareness of the benefits such projects provide. What is important, however, is that these examples show that various categories of beneficiaries do in fact recognize the potential positive impact of rural infrastructure projects.

B. Question of Mutual Adaptability

The question of mutual adaptability is more complex. Defining mutual adaptability as a community's preparedness to accept and sustain functionality of an innovation, we ask whether a proposed recipient is ready for the innovation. Theories of social differentiation, i.e., the growth in complexity of social and institutional structures, suggest that not all communities have the same capacity to accept innovations. A port introduced in one community may end-up a fully utilized structure, whereas in another it may quickly degenerate and fall into disrepair. The latter happens when the innovation is not supported by existing demands nor by other support facilities, among others.

Thus, evaluators of the rural electrification project in the Philippines conclude in a 1980 report:

"Those areas where electricity had a positive effect on development were characterized by a concentrated population, diverse markets, availability of capital and technical skills, and proximity to a larger market. These were places such as market towns and areas near to Manila where there were more opportunities to use power productively and which were relatively at a more advanced stage of development."

The same observation is probably true of the rural telecommunication component or of the ports element in the transport subproject. It is possible that if discrete subprojects are identified without concern for the capacity of recipient communities to absorb the change, long-term sustainability will be endangered. What we, therefore, suggest is that as project subcomponents are implemented, implementors should be more conscious of the readiness of recipient communities to adapt an innovation. Without the requisite structures or social demand the innovation will most likely not have significant impact.

3. Potential Impact and Spread

Potential impact of rural infrastructure projects are easy to establish especially at an abstract level. For instance, a road once constructed can be assumed to improve residents' access to various services provided by both the government and the private sector. Business enterprises will have an easier time to reach markets and resources. The same may be said of rural electrification and telecommunication. What is important, however is for project implementors to recognize that various recipients have differential access to project benefits and consequently will gain differentially. Thus, evaluations of past infrastructure projects show that the more affluent and influential, those with the means to utilize project outputs gain more whereas the poor gain marginally. Therefore, an issue that should be dealt with when these rural infrastructure activities are identified, selected, and implemented is how to enhance benefits among the poorer sectors of society.

E. Administrative

The following are summaries of administrative considerations effected during project development. Additional information as to the staffing, experience organization and authorities of implementing agencies are found in appendices to this Paper and in the original feasibility studies.

Air Navigational Aids - Preliminary discussions were held with representatiaves of the Bureau of Air Transportation, Department of Transportation and Communications, regarding subsector needs and possible implementation arrangements. The Bureau has a record of sound administration and operations and expects no difficulty in overseeing work of the manufacturer of the guidance equipment. The contract for equipment supply and installation is expected to be a direct AID contract, negotiated under a sole source procurement waiver. Since installation of the equipment only involves minor modifications to existing airport guidance systems, no major physical or administrative barriers are foreseen. Contingency funds could be made available to handle minor site refinements or finance extra operating or replacement spares. Approximately 52 person weeks of factory training is planned for to ensure Bureau personnel are familiar with test and maintenance requirements of the revised installations.

Rural Roads/Bridges and Feeder Roads - The Department of Public Works and Highways (DPWH) is a large and mature organization with an extended record of managing and implementing projects with external donor financing. Implementation schemes generally include DPWH or consultant studies and designs; use of local and foreign construction services contractors and/or force account work; administration of projects by a central Projects/Planning Office or the regional Department Engineers; use of direct, split-funded or reimbursement payment methods by District and Headquarters units; supervision and quality control by DPWH staff or consulting firms; and periodic maintenance of completed works by contractors and/or force account resources by Provincial Offices. The World Bank is presently assisting the Department with bridges replacement and district road maintenance programs. Recent GOP improvements in maintenance budgeting and releases of funds for maintenance work are very encouraging.

With assistance from local and perhaps expatriate engineering consultants, we expect few administrative delays or problems. Close coordination will be maintained with the GOP Department of Budget and Management and Bureau of the Treasury to ensure local currencies are made available to the DPWH as needed. A separate local currency account may be used to ensure timely releases and contractor payments. The Department has sound project development, contracting and administrative procedures and regulations. The GOP Commission on Audit has resident staff at DPWH headquarters and provincial offices to clear contracts, oversee project work and payment practices. The proposed engineering management firm will also be checking DPWH plans and bid packages; monitoring field work; and reporting on physical progress, payments and quality control. USAID-financed activities will also be co-located where possible to ease administration and oversight.

Telecommunications Assistance - As noted earlier in the Paper, the GOP is faced with a number of major decisions and investment options in its quest for a rationalized and effective national telecommunications system. Because of the perplexing array of choices and pressures exerted by interested sector entities, the GOP changed its request for subsector assistance simply to technical expertise to clarify problem areas and sort out policy options and the technical and financing implications thereof. USAID will seek qualified advisors from internationally recognized sources to help the Department of Telecommunications with this assessment . A budget has been set aside to finance approximately two person years of advisory services to help with studies of trunking, equipment technology, rate structures, sector policies and management, etc. USAID plans to use direct contracting procedures to obtain such services, so administrative burdens on the DOT are expected to be minimal.

Restructuring NEA and Rural Electric Coops - This subproject has four major components: reorganization of the National Electric Authority; revisions in GOP policies and practices (power rates, system responsibilities, etc.); consolidation and improvement of local cooperatives; and provision of equipment and materials to upgrade distribution systems in restructured cooperatives.

Regarding the latter area, USAID will be getting equipment needs from the TA contractor and will employ a procurement services agent to handle procurement and delivery of equipment from the United States. Payment to suppliers will be by bank letters of commitment/letters of credit and equipment is of standard designs and specifications. Therefore few administrative delays or complications are expected. A contract will be let for technical assistance to help NEA with its reorganization and management changes and to assess cooperatives' performance. The TA contractor will also provide recommendations restructuring cooperatives and making them administratively and financially viable. Such services are available from commercial sources. Procurement problems are therefore not expected once the general scope of TA work is cleared with the GOP. Agreement on policy changes and/or a plan and schedule for such changes will be preconditions for distribution system upgrades. Equipment and materials are not expected to be released to individual cooperatives unless they accept management, financial and maintenance improvements specified by NEA and the TA consultant. Since local contractors and the cooperatives have the expertise to physically upgrade the power distribution systems, no major administrative complications are foreseen. Reviews of cooperatives' sales records, loan administration, and information management systems will be undertaken, and if need be strengthened, by TA contractor personnel. Some problems may nonetheless arise if cooperative boards or memberships are not sufficiently interested in early reform measures.

F. Environmental

In order to determine the likelihood of significant environmental impacts, the Project will conduct an environmental appraisal for each subproject activity. The objective of each appraisal is both to minimize the harm of potential impacts and to decide if a more detailed environmental analysis is needed. The Chief Engineer and the Mission Environmental Officer will conduct the environmental appraisals, together with other Mission staff and consultants as needed and available. Appraisals will use existing data, i.e., maps and engineering reports, and may include site-specific investigations. This section describes the procedures for conducting both an environmental appraisal and a detailed environmental analysis.

1. Environmental Appraisal: Since the subproject activities proposed under this project will be moderate in size and duration, the project will conduct only one environmental appraisal per specific activity. However, an appraisal may identify the need for additional appraisal(s) over the life of a particular activity. In identifying and evaluating potential impacts, an appraisal will consider four aspects of an environmental impact: number, magnitude, exposure and irreversibility.

-- Number of Impacts

While an individual proposed action may be relatively small in itself and affect a limited land area, the cumulative effect of many impacts--and possible interactions among them--may cause substantial harm to an area. Secondary or indirect impacts resulting from direct impacts shall also be considered. The cumulative importance of secondary impacts may often be greater in the long run than that of the direct impacts.

-- Magnitude

The amount of change occurring within any given impact type. A large amount of change is likely to increase the severity of an impact on people, communities and the bio-physical environment (air, water, soil, flora and fauna).

-- Exposure

Impact exposure includes: timing of occurrence (the number of times an impact occurs and its duration); geographic area exposed (whether the location of impact is either a confined area close to the source or a large area beyond the source); number of receptors (number of people and organisms affected by the impact); and sensitivity of the receptors (the degree to which persons or organisms experience the impact).

-- Irreversibility

The probability that the impact will be permanent. Impacts that are naturally short-lived and those which can be mitigated or reversed through human action may be judged less important than those that are irreversible.

Using the above framework for evaluating potential impacts, the appraisal will look at various biophysical, social and cultural aspects.

a. Terrestrial Ecosystem

Following are some key questions for assessing the potential impact(s) on terrestrial resources:

-- Are important terrestrial organisms found in areas near the proposed activity?

-- Will the activity affect elements of organisms' life-support system such as site vegetation, wildlife habitat, air and water quality, and food chains and webs?

-- Are unusual populations of plants or animals, areas containing rare or endangered species, unusual vegetative beauty, unusual species diversity or productivity found near areas of the proposed activity?

b. Aquatic Ecosystem

Following are some key questions for assessing the potential impact(s) on aquatic resources:

-- Will streams or ponds be affected by construction or operation of the proposed activity?

-- Will the activity be located near aquifers?

-- Are water bodies which exhibit good water quality or contain unusually high species diversity or density found near the location of the proposed activity?

-- Are important or protected aquatic organisms found near the proposed activity?

-- Will the activity affect elements of the organisms' habitat such as water quality, channel form, site requirements or food chains and webs?

-- Are wetlands found near the location of the proposed activity?

c. Atmospheric Systems

-- Are important avian and/or other animal species found in areas near the proposed activity?

-- Will the activity affect these organisms' habitat or food sources?

-- Will the activity affect air quality, including noise levels?

d. Communities

Following are some key questions for assessing the potential impact(s) on human communities:

-- Do identifiable communities exist within the project area?

-- Will the proposed activity intersect or bypass these communities?

-- Will the activity affect the stability of a community by displacing or disrupting important segments of the residential or business community or by isolating segments of a community?

-- Will the activity alter levels of community cohesion through either the physical or psychological separation of residents or activities?

-- Will the construction process itself affect community quality due to the presence of construction equipment, increased air and noise pollution, the need for vehicular and pedestrian detours or other disruptive features?

-- What identifiable groups (ethnic, age, income, etc.) will be adversely affected by the activity?

e. Accessibility of Facilities and Services

Following are some key questions for assessing the potential impact(s) on accessibility of facilities and services:

-- Will the proposed activity displace or alter the character (through proximity effects such as noise) of any major facilities or services?

-- Will regional access by land or water transit to provide facilities and services in the project area be enhanced or hindered by the proposed activity?

-- Will any local groups or individuals experience a loss or reduction of pedestrian, vehicular or boat access to community facilities and services as a result of the activity?

-- Where access to facilities and services is diminished, are alternative facilities and services of comparable quality accessible to those persons who need or use them?

-- Will accessibility to public services, such as medical, police and fire protection, be reduced in any part of the project area?

-- Will improved accessibility to certain areas affect the land value and usage level of existing facilities and services?

f. Employment, Income and Business Activity

Following are some key questions for assessing the potential impact(s) on employment, income and business activity:

-- What business activities will be displaced?

-- What business activities will benefit from the increased accessiblity the activity provides?

-- What business activities will suffer losses in sales or income as a result of losses in accessibility, both during and after construction?

-- What business activities will suffer losses in sales or income as a result of negative proximity effects such as air, noise and water pollution, both during and after construction?

-- What business activities will benefit--as measured in increased income and employment--from the stimulus of construction expenditures for labor and materials?

g. Displacement of People

Following are some key questions for assessing the potential impact(s) if people are displaced:

-- What is the probable magnitude of the displacement associated with the activity?

-- Analyzing the socioeconomic characteristics of the study area population, can special relocation problems or needs be anticipated? Particular attention should be given to minority groups.

-- Have provisions been made to carry out a program of special relocation advisory services for households with special needs or problems?

-- Is replacement housing matching the needs of displaced households currently available in either the same or nearby neighborhoods?

-- If adequate replacement housing is currently not available, are housing sites and money available to construct replacement housing?

2. Detailed Environmental Analysis: If the appraisal determines that important environmental impacts are likely, then the Project will obtain through an Indefinite Quantity Contract (IQC) the services of a firm with environmental analysis capabilities to conduct a detailed environmental analysis. It is expected that the IQC firm can complete the required detailed analysis within the 120 calendar days provided under IQC procurement procedures.

The detailed environmental analysis will produce sufficient information on the potential impacts to enable Mission management to: 1) modify the design, minimizing serious impacts, or 2) reject the proposed activity.

Transport Infrastructure

The project will rehabilitate, expand and convert approximately 250 kms. of roads and bridges into all-weather facilities. Furthermore, the project will develop nine small port facilities including, where appropriate, related access roads and navigational aids (buoys and lights). Finally, the project will install air navigational aids at 14 existing airports.

Rural Electrification

The primary focus of this subsector is on strengthening the National Electrification Administration (NEA's) capability to provide electricity to rural cooperative members. However, the Project will also provide materials to rehabilitate portions of the rural distribution systems.

Rural Telecommunications

This subproject will finance detailed studies of policy concerns and an implementation plan for a national telephone network. The project is not expected to finance construction services or equipment for this subproject at this time.

V. CONDITIONS PRECEDENT, COVENANTS AND WAIVERS

The following are conditions precedent and covenants A.I.D. intends to negotiate in the Project Agreement. Their substance is not expected to change during negotiations.

A. Conditions Precedent to First Disbursement

Prior to disbursement under the Grant, or to the issuance of documentation pursuant to which disbursement will be made, for Project activities of an Implementing Agency, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(a) an opinion of counsel acceptable to A.I.D. that this Agreement has been duly authorized or ratified by, and executed on behalf of, the Grantee and that it constitutes a valid and legally binding obligation of the Grantee in accordance with its terms; and

(b) a statement of the name of the person holding or acting in the office of the Grantee and of any additional representatives, together with a specimen signature of each person specified in such statement.

(c) an agreement in writing by the Grantee, acting through the Department of Budget and Management (DBM), providing:

(i) The Department of Public Works and Highways (DPWH) and any other agency or instrumentality of the Grantee agreed upon by the Grantee and A.I.D. for purposes of implementation of any activity financed under the Grant (the "implementing Agencies") shall establish a separate commercial bank account for the payment of local costs financed under the Grant (the "Implementing Agency's Project Account"); and

(ii) DBM shall issue to each Implementing Agency an Advice of Allotment for the total estimated peso cost of each Project activity that the Grantee and A.I.D. agree shall be financed under the Grant. Each such Advice of Allotment shall be valid for the life of the Project activity. The term "Project activity" shall mean each approved construction subproject and, in the case of an activity not within the scope of a particular construction subproject, the contract or contracts related to that activity; and

(iii) DBM shall issue to each Implementing Agency on a quarterly basis Funding Warrants for crediting to the respective Implementing Agencies' Project Accounts the entire amount of pesos disbursed by A.I.D. to the Grantee for payment of the costs of Project activities of each respective Implementing Agency for the ensuing quarter; and

(d) a statement of the name of the person designated as Project Manager for such Implementing Agency for such Project activities, together with a statement of the authorities delegated to such Project Manager and of the staffing and budgetary provisions made available in support of implementation of such Project activities by such Implementing Agency.

B. Conditions Precedent to Disbursement for Construction Subprojects.

(a) Prior to disbursement under the Grant, or to the issuance of documentation pursuant to which disbursement will be made, for road, bridge or port construction subprojects, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., approval in writing by a duly authorized representative of the Grantee, of an A.I.D. Project Implementation Order or Orders authorizing A.I.D. to procure under an A.I.D. direct contract or contracts financed under the Grant the short-term services of an architectural and engineering contractor or contractors for the review and updating of feasibility studies, engineering designs, plans and specifications, detailed cost estimates, and contract and bid documents for such construction subprojects in the first year of Project activities.

(b) Prior to disbursement under the Grant, or to the issuance of documentation pursuant to which disbursement will be made, for road, bridge or port construction subprojects, in excess of 20 percent of the amount budgeted for construction of subprojects under this Agreement, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an executed contract between DPWH and an architectural and engineering consultant together with evidence that the executed contract has received all necessary approvals required by the Grantee.

C. Special Covenants.

Project Evaluation. The Parties agree to establish an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

(a) Evaluation of progress toward attainment of the objectives of the Project;

(b) Identification and evaluation of problem areas or constraints which may inhibit such attainment;

(c) Assessment of how such information may be used to help overcome such problems; and

(d) Evaluation, to the degree feasible, of the overall development impact of the Project.

D. Waivers.

Pursuant to the justification which appears in Annex G to this paper, a waiver of full and open competition for the procurement and installation of air navigational aids required under the project will be processed once advertising requirements have been satisfied and an acceptable cost proposal received.

ANNEXES

A. Logical Framework

B. Grantee's Request for Assistance

C. PID Review Issues

D. Statutory Checklist

E. FAA, Section 611(e) Certification

F. Certification Pursuant to Utilization of Gray Amendment Organization

G. Draft Waiver

Annex A

LOGICAL FRAMEWORK

AID 1020 20 11 72

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Rural Infrastructure Project (492-0320)

Life of Project:
From FY 1987 to FY 1991
Total U. S. Funding [illegible]
Date Prepared: July 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: (A-1) Steady expansion of economic activity in rural sector, including increased: - opportunities for the development of rural enterprise and employment; - agricultural productivity; and - rural income.	**Measures of Goal Achievement: (A-2)** (Must be the Project end within 3 years after the PACD:) - Rural employment levels. - Rural household income changes in provinces where subprojects are implemented. - Agricultural yields and gross output. - Reduced [illegible] in product-processed costs and input/product ratios.	**(A-3)** National statistics: data collection [illegible] agricultural and commerce at regional and national levels.	**Assumptions for achieving goal targets: (A-4)** GOP priorities of income redistribution, employment generation, and poverty alleviation remain unchanged. Continued political/social stability. Macroeconomic factors and demand for agricultural products remain positive.
Project Purpose: (B-1) To upgrade and expand rural infrastructure facilities in order to enhance the flow of commerce, attract investment and provide for further rural economic expansion. Specific subproject purposes are: (a) Transport: To facilitate the movement of goods from farm and manufacturing areas to market and processing areas. (b) Rural Electrification: To upgrade and strengthen the institutional and physical rural electrification infrastructure in the Philippines. (c) Rural Telecommunications: To study telecommunications and policy concerns which would enable rural communities to join the modern economy and begin to correct the serious overconcentration of telecommunications services in Metro Manila.	**Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)** Transport: Improvement of selected rural feeder roads and bridges and the rehabilitation and/or upgrading of small ports. Small islands and remote agricultural areas will be better linked to market towns and transport networks. Rural Electrification: A financially viable and operationally efficient national rural electrification system in place. Rural Telecommunications: New studies and decisions to improve inter-island communications facilities and associated inter-island telephone systems. Potential inter-island connections will be studied.	**(B-3)** Record of trade/commerce taken place 18 months after project assess traffic and drayage statistics; reports on rural usage power delivered, [illegible] flows and financial viability, cost and ridership statistics.	**Assumptions for achieving purpose: (B-4)** Investment in rural enterprise development will be made when adequate infrastructure exists. Commercial and overall economic activity will increase thus creating employment opportunities for the rural population. Pricing regulations and other GOP interventions are not disincentives to agricultural and rural commercial investment. Planned inputs can be delivered and outputs generated in a timely manner.
Project Outputs: (C-1) Roads/Bridges: Improved rural roads and bridges. Ports: Ports upgraded to new GOP standard designs with accompanying access roads and navigational aids. Air Navigational Aids: Airports upgraded to meet International standards. Rural Electrification: Electric Coops rehabilitated or consolidated into viable units with improved system efficiencies. Rural Telecommunications: A continuous on the further environmental policy constraints related to the telecommunications sector to be issued. Completed engineering and management feasibility studies, including technical, micro-economic, financial, social soundness, and environmental analyses which will support GOP decisions to improve rural and inter-island communications systems.	**Magnitude of outputs: (C-2)** 1. Approximately 250 kilometers of total roads/bridges and highways completed. 2. At least nine small multiport ports (ML, Ro approximate accompanying access roads) upgraded. 3. Air navigational aids installed at Manila and 17 regional airports. 4. Majority of the 117 high priority [illegible] reorganized and improved. 5. 300 trainees completed financial planning, budgeting and accounting, equipment and maintenance and general management courses. 6. A study of telecommunications system improvements and person months of advisory services provided to the Telecommunications Department.	**(C-3)** GOP department and consultant's project reports. Project officer monitoring reports. Disbursement records. USAID evaluations.	**Assumptions for achieving outputs: (C-4)** Weather, natural disasters and area security conditions will have minimal effects in project areas. Delays in securing rights-of-way contracting and procurement are minimized. Candidates identified for training will be released for in-country and overseas training. Funding mechanisms and payments flow smoothly.
Project Inputs: (D-1) Engineering Services Construction and Construction Supervision Technical Assistance Commodities Training Services Data Collection, Auditing, Evaluation and Monitoring	**Implementation Target (Type and Quantity) (D-2)** USAID GOP FUNDS: (US$000) Engineering - 8,950 Construction - 46,150 Technical Assistance - 9,250 Commodities - 39,650 Training - 1,210 Other - 570 TOTAL - 50,000	**(D-3)** Payment vouchers; GOP department and Consultant's reports; project officer monitoring records and Procurement Services Agent's reports.	**Assumptions for providing inputs: (D-4)** Conditions precedent are met on schedule. Contractor selection, procurement and staffing proceed on schedule. Commodities are procured and moved to subproject sites expeditiously. Funding is adequate and released for a timely manner.

A1-3

ANNEX A

Annex B

GRANTEE'S REQUEST FOR ASSISTANCE

REPUBLIC OF THE PHILIPPINES
NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY
NEDA sa Pasig, Amber Avenue
Pasig, Metro Manila.

Cable Address: NEDAPHIL
P.O. Box 419, Greenhills
Tels. 673-50-31 to 50

11 September 1987

The Director
USAID Mission
Ramon Magsaysay Center
Roxas Blvd., Manila

Dear Sir:

This has reference to the $51.190 million allocation of the FY 1987 ESF Program which is proposed for utilization under the Rural Infrastructure Fund, an "umbrella" project for the improvement and expansion of small-scale rural infrastructure facilities.

The transportation subsector was initially identified by the Philippine Government under the program, to cover specific projects such as roads and highways, bridges, drainage systems, small ports and air navigational aids for provincial airports. If there are additional allocations for the program in the future, other subsectors that may be considered are rural electrification and telecommunications.

We would appreciate if USAID could now prepare the final draft documents for the program, for our mutual consideration.

Very truly yours,

SOLITA COLLAS-MONSOD
Secretary of Economic Planning &
Director-General

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DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
BUREAU OF AIR TRANSPORTATION
PASAY, CITY METRO MANILA 3110

July 28, 1987

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8-20-87		

Mr. Frederick Schieck
Director
U.S. Agency for International Development
Ramon Magsaysay Center Building
1680 Roxas Boulevard, Manila

S i r :

Further to our discussion with your representative, Mr. Michael De Metre last July 21, 1987, we were made to understand that there is a possible source of funding from your agency to accommodate additional requirements of air navigational equipments.

In response to this recent development, we are submitting a list of additional air navaids equipment for your consideration. These additional equipment will supplement the original requirements in the upgrading program of air navigational equipments.

Thanking you for your kind attention.

Very truly yours,

VICTORINO G. PALPAL-LATOC
Director

ACTION TAKEN
NAN _____ Other _____
Type _____ No. _____
Date _____ Issue _____

16

LIST OF ADDITIONAL REQUIREMENTS FOR THE UPGRADING OF AIR NAVIGATIONAL SYSTEM

a)

SITES	EQUIPMENT	QTY.
1. Bacolod	Wilcox 596 DME	2 Systems
2. Cagayan de Oro	Wilcox 596 DME	1 System
3. Puerto Princesa	Wilcox 596 DME	1 System
	Wilcox 585 VOR	2 Systems
4. Cotabato	Wilcox 596 DME	1 System
5. San Jose	Wilcox 596 DME	2 Systems

NOTE: Sites arranged by priority.

b) 12 Sets Portable A/G VHF Transceiver (any brand) hand held type with battery charger and other accessories for flight check coordination.

118 - 135 MHz capable to transmit and receive 5W to 10W.

c) 28 Sets VHF Monitor Receiver for all sites (Wilcox/267).

A1-8

Annex B
Section 2

COPY

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

BUREAU OF AIR TRANSPORTATION

PASAY CITY, METRO MANILA 3110

OFFICE OF THE DIRECTOR

16 May 1986

MEMORANDUM

TO : The Minister of Transportation and Communications

FROM : The Acting Director, BAT

SUBJECT : Request for Upgrade of Navaids System

I. BACKGROUND

Sometime in 1968, the Civil Aeronautics Administration (CAA) now Bureau of Air Transportation (BAT) undertook a nationwide modernization program on Air Traffic Control, Navigational Aids and Aeronautical Telecommunications through an international public tender. The navigational aids facilities installed under this program in the primary and secondary airports are still in operation. However, due to BAT's budgetary constraints, their condition has not been upgraded inspite of their being in service for more than 15 years. Maintenance costs become prohibitive due to obsolescence brought about by the ever changing modern technology.

Sometime in 1982, BAT was able to obtain a portion of the Yen Credit, which was used to upgrade the aeronautical telecommunications facilities and some air traffic control and navaids, on the first phase of the project. Included in this phase are a couple of long range surveillance/approach radars. In this program, also included are TOSHIBA Doppler VOR (which is very expensive as compared to the Conventional VOR). After the first phase was completed, the team of Japanese Consultants prepared the second phase of the project which consists mostly of aeronautical telecommunication, and including the replacement of some existing Wilcox navigational aids in Davao, Mactan and Zamboanga Airports. This program was approved and is included in the 13th Yen Credit. In this program, the Wilcox navigational aids in the aforementioned airports will eventually be scrapped and replaced with Japanese manufactured nav-aids equipment.

The rest of the navaids facilities not included in the approved program still uses Wilcox brand models operating almost at the end of their useful life.

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Sometime in 1982, the BAT requested the U.S. Government to evaluate the present airways and airports system in the Philippines. A team of U.S. Aviation experts carried out the survey and evaluated the navigational aids facilities. The team made a recommendation that the existing navaids equipment life cycle can be prolonged by upgrading with the introduction of retrofit kits by replacing the tube model to solid-state transistorized modules, the cost of which will be very much less as compared to the proposed total replacement of the equipment as programmed under the Japanese Yen Credit. These retrofit kits, which convert an old model into a newer one, that is, Wilcox 485B tube type into a Wilcox 585B solid-state electronics, guarantee performance reliability of the equipment and that extends its operational life cycle to another 12 years. Same programs are being implemented in Malaysia and other Southeast Asean countries.

II. OBSERVATION

In the light of the foregoing, the following are evident:

1. With the present BAT existing capital investment for navigational aids equipment, there is no need to replace the equipment but just to upgrade with retrofit kits (solid-state transistorized modules) that will have a performance reliability guarantee for another 12 years.

2. The BAT does not have to raise or allocate peso counterpart funds to cover the local cost such as civil works, site development, installation cost, power tables, telephone communication lines, etc., which is a substantial amount.

3. Replacing the equipment, as offered by the Japanese using the Yen Credit, will increase our foreign debts, whereas by retrofitting, we will use Economic Support Funds which is an aid that need not be paid, plus the big savings in costs achieving the same objectives.

III. RECOMMENDATION

1. It is recommended that navaids facilities be retrofitted immediately to assure safety of air travel and maintain our facilities within the required ICAO Standards. The cost is approximately US$2 Million.

2. To achieve the foregoing, it is recommended that a request for funds of US$2 Million from the Economic Support Funds be made to the Minister of Finance.

3. This request is urgent, and should be given PRIORITY because this involves the safety of air travelling public which is the primary obligation of the BAT.

Attached is a report submitted by the Acting Chief, Airways Navigation Section of this office, on the equipment status of the various Nav-aids facilities including the recommendation for their upgrading for the information of the Minister.

VICTORINO G. PALPAL-LATOC
Acting Director

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

BUREAU OF AIR TRANSPORTATION

PARAT CITY, METRO MANILA 3116

OFFICE OF THE DIRECTOR

March 6, 1987

The Honorable Secretary
Department of Transportation
and Communications
Philcomcen Bldg., Ortigas Ave.
Pasig, Metro Manila

S i r :

This is supplemental to BAT Memo dated May 16, 1986 relevant to the request for allocation of U.S. Economic Support Fund of $2M for Upgrading Ground Navigational Aids, such as VOR, DME's, ILS' and NDB's which are all U.S. supplied equipment.

In view of the BAT availment of 13th Yen Credit Fund which provides mainly the air traffic control equipment, runway lighting system and power generator equipment, the ground navigational equipment have not been included in the Yen Credit Program. In order to comply with the safety requirements based on the ICAO criteria, the Upgrading Program for Navaids Equipment is vitally necessary.

Enclosed is the summary of upgrading of nationwide navigational aid consisting of three (3) pages for your information and reference.

Very truly yours,

VICTORINO G. PALPAL-LATOC
Director

Encl.: a/s

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LOCATION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED	TEST EQUIPMENT
ILOILO	VOR	DD-VOR 585B			with Associated Test Eqpt./Tools
BACOLOD	T-VOR	Wilcox 476	Wilcox 585B	Complete System	with Associated Test Eqpt./Tools
CAGAYAN DE ORO	VOR	Wilcox 485	Wilcox 585	Complete System	with Associated Test Eqpt./Tools
	DME	Wilcox 596	Wilcox 586 1 sys	Complete System	-do-
GENERAL SANTOS	T-VOR	Wilcox 476	Wilcox 585	Complete System	with Associated Test Eqpt./Tools
ZAMBOANGA	DME	Wilcox 496	Wilcox 596	Complete System	with Associated Test Eqpt./Tools
	VOR	Wilcox 585	Wilcox 585		-do-
COTABATO	VOR	Wilcox 485	Wilcox 585	Complete System	with Associated Test Eqpt./Tools
	DME	Wilcox 596	Wilcox 596 1 sys	1 ea. Signal Gen. (Monitor) 1 ea. HF Gen. (Transponder) 1 ea. HF Amplifier	

PREPARED BY:

BENJAMIN H. SARENAS
Asst. Chief, Avys. System Maintenance Unit-ANS

SUBMITTED BY:

MANUEL F. ESCOBAR
Chief, Avys. System Maintenance Unit-ANS

LOCATION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED	TEST EQUIPMENT
LIPA	VOR	DO-VOR 585B			with Associated Test Eqpt./Tools
JOHALIO	VOR	DO-VOR 585B			with Associated Test Eqpt./Tools
HAUA	VOR	Wilcox 485B	Wilcox 585B	Completes System	with Associated Test Eqpt./Tools
SAN JOSE	VOR	Wilcox 485B	Wilcox 585B		with Associated Test Eqpt./Tools
PUERTO PRINCESA	VOR DME	Wilcox 485B Wilcox 596B	Wilcox 585B Wilcox 596B	Complete System 1 ea. Signal Gen. (Monitor) 1 ea. RF Gen. (Transponder) 1 ea. RF Amplifier	with Associated Test Eqpt./Tools
MAGBATE	VOR	Wilcox 485	Wilcox 585	Complete System	with Associated Test Eqpt./Tools
ROXAS	VOR	DO-VOR 585B			with Associated Test Eqpt./Tools

UPGRADING OF PATICKSIDE NAVIGATIONAL AIDS

TION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED.	TEST EQUIPMENT
	DME	Wilcox 596B		3 ea. Signal Gen. (Monitor)	
	Trainer ILS/DME/VOR Personnel Training		Wilcox Type	3 ea. RF Gen. (Transponder) 3 ea. RF Amplifier	
	ILS 06	Mark I-D	Mark II	Complete System	1 portable ILS Receiver
	ILS 24	Mark I-D	Mark II	Complete System	
	VOR	Wilcox 485	Wilcox 585B	Complete System	
	VOR	Wilcox 485	Wilcox 585B	Complete System	
	DME	Wilcox 496	Wilcox 596B	Complete System	
	VOR	Wilcox 485 B	Wilcox 585B	Complete System	with Associated Test Eqpt./Tools
	VOR	Wilcox 485B	Wilcox 585B	Complete System	with Associated Test Eqpt./Tools
	VOR	DC-VOR 585B			with Associated Test Eqpt./Tools

OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area, Manila

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28 July 1987

Mr. Frederic W. Schieck
Director, USAID
1680 Ramon Magsaysay Bldg.
Roxas Blvd., Manila

Dear Sir:

SUBJECT: Proposed Infrastructure Projects for Financial Assistance under the U.S. Agency for International Development (USAID)

We are pleased to submit for your consideration the proposed projects contained in the attached list under the Department of Public Works and Highways for possible financial assistance under the USAID.

The initial list of projects consists of 12 national road sections with a total aggregate length of about 1,500 kilometers and 25 feeder ports.

As we have emphasized to your staff with whom we have had the opportunity to discuss these projects on a preliminary basis, the proposed road projects are important links which need to be improved/constructed in support to our current development efforts in the countryside, as well as to improve the overall efficiency of the road network. On the other hand, the port projects are aimed to complement the basic transport infrastructure, particularly in areas which are virtually inaccessible by land transport.

All the above projects are included under our Medium-Term Public Investment Program for the period 1987-1992.

The total investment requirement amounts to approximately ₱2,960 Million, and the projects are to be implemented within a six-year period starting in 1987.

We will appreciate, therefore, your favorable consideration in this regard and your continued support to our development efforts.

Very truly yours,

VICENTE T. JAYME
Secretary

ACTION TAKEN

PROPOSED PRIORITY PROJECTS FOR FINANCIAL ASSISTANCE UNDER THE 1987 ECONOMIC SUPPORT FUND (ESF)

PROJECTS	Length (Km.)	Estimated Cost	Obligational Authority (OA)	Cash Requirement (In Million Pesos) 1987	1988	1989	1990	1991	1992	EIRR (%)
A. HIGHWAYS	1,514.6	2,768.5	710.0	98.1	611.9	998.4	574.8	327.3	158.0	
✓ 1. Quirino Highway	71.9	265.4	132.7	20.1	112.6	112.7	20.0			33.0
ADB 2. Marawi-Malabang Road	54.3	158.2	76.0	6.0	70.0	82.2				29.0
3. Pany-Infanta Road	64.9	170.4	70.4	5.5	64.9	100.0				11.0
4. Surigao-Davao Coastal Road (Surigao del Norte & Sur Section)	146.7	475.5	107.2	15.2	92.0	138.0	138.0	92.3		
ADB 5. Cotabato-Pagadian-Zamboanga City	295.5	809.0	26.0	10.3	15.7	155.0	235.0	235.0	150.0	
6. Kalibo-Ivisan-Estancia	96.0	193.0	43.7	6.2	37.5	93.5	55.8			
7. Borongan-Sohoton-Basey	80.0	212.5	47.8	6.8	41.0	100.0	64.7			
8. Lucena-Tayabas-Lucban-Sarialoc-Mauban-Mainit Loop Road	539.0	120.5	50.5	3.8	46.7	70.0				
9. Lake Lanao Circumferential	71.2	207.2	56.6	6.6	50.0	100.0	50.6			
✓ 10. Batan-Mabini	29.5	65.5	46.1	2.1	38.0	25.4				40.0
11. San Jose (via Magsaysay)-Bulalacao Road	51.8	44.6	12.3	1.5	10.8	21.6	10.7			
ADB 12. Zamboanga City-Ayala Road	14.8	46.7	46.7	14.0	32.7					33.0
B. PORTS (Feeder Ports)	25 Proj.	191.0	28.0	3.0	25.0	30.0	45.0	45.0	43.0	35.0
GRAND TOTAL		2,959.5	738.0	101.1	636.9	1,028.4	619.8	372.3	201.0	

A1-17

REPUBLIC OF THE PHILIPPINES

National Electrification Administration

28 July 1987

Mr. Frederick W. Schieck
Director
United States Agency for International Development
Ramon Magsaysay Center
1680 Roxas Boulevard, Manila

S i r :

May we take this opportunity to reiterate our gratitude for the USAID's continuing assistance to the rural electrification program. In 1986 USAID funded a study prepared by Price Waterhouse which produced a report titled "National Electrification Administration and Rural Electric Coop Financial Organization and Technical Assessment". The study proposes USAID technical assistance and system improvements by upgrading management capability of both the NEA and electric coops and improving physical infrastructure of the electric coops with the end view of attaining efficient coop operation.

Since NEA got hold of the Price Waterhouse Report, we studied and discussed the recommendations and have been anxious to initiate the reforms recommended in the report. Thus for the past few months we have endeavored to get in touch with your office to request USAID financial and technical assistance to enable us to implement as soon as possible the upgrading of the Rural Electrification system.

In order to be able to execute the recommendations contained in the Price Waterhouse Report, an estimate amount of about $ 50 Million will be required.

We hope our request will be favorably considered and we look forward to our continuing partnership in the implementation of the Philippine rural electric program.

Very truly yours,

ERNESTO N. TABIOS
Administrator

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Annex C

PID REVIEW ISSUES

UNCLASSIFIED STATE 207959/01

ACTION: AID-6 INFO: CHG A/DCM AA ECON ADB AGR/12

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DE RUEHC #7959/01 1881926
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UNCLAS SECTION 01 OF 03 STATE 207959

AIDAC

ACTION COPY
Action Taken: _____
No action necessary: _____
Date _____ Inits: _____

E.O. 12356: N/A
TAGS: N/A
SUBJECT: RURAL INFRASTRUCTURE PROJECT (492-0420) - PID
ANPAC REVIEW

SUMMARY: THE BUREAU PROJECT ADVISORY COMMITTEE (ANPAC) REVIEWED AND APPROVED THE SUBJECT PID JUNE 19 AND APPROVED MISSION AUTHORIZATION OF THE PP SUBJECT TO THE FOLLOWING GUIDELINES:

- IN THE FIRST CALENDAR YEAR OF IMPLEMENTATION, CONSTRUCTION AND EQUIPMENT FINANCING SHOULD BE LIMITED TO RURAL ROADS AND NAVIGATIONAL AIDS AND SHOULD BE PROVIDED ONLY IF POLICY AND INSTITUTIONAL CONSTRAINTS ARE SUFFICIENTLY ADDRESSED TO ENSURE ECONOMIC VIABILITY.

- FIRST YEAR FUNDING IN OTHER SUBSECTORS SHOULD BE LIMITED TO TECHNICAL ASSISTANCE, STUDIES (INCLUDING ENGINEERING STUDIES), TRAINING AND DATA COLLECTION.

- FUNDING OF CONSTRUCTION IN THESE SUBSECTORS SHOULD PROCEED ONLY AFTER THE MISSION AND AID/W ARE SATISFIED THAT APPROPRIATE AGREEMENTS HAVE BEEN REACHED WITH THE GOP ON HOW AND WHEN KEY POLICY AND INSTITUTIONAL CHANGES WILL BE IMPLEMENTED. REQUEST MISSION SHARE WITH AID/W INFORMATION SUPPORTING SUCH AGREEMENTS BEFORE INITIATING CONSTRUCTION.

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1. ANPAC DISCUSSIONS FOCUSED ON THE CONFLICT BETWEEN PRESSURES TO DISBURSE QUICKLY AND CONCERN OVER PROJECT VIABILITY. COMMENTS AND GUIDANCE FOR PP PREPARATION FOLLOW.

2. IMPLEMENTATION FEASIBILITY: THE ANPAC NOTED THAT THE PROJECT IS VERY AMBITIOUS AND, BECAUSE OF THE CURRENT AND ANTICIPATED POLITICAL AND ECONOMIC PRESSURES, COULD INVOLVE UNACCEPTABLE IMPLEMENTATION RISKS.

THIS CONCLUSION IS BASED ON THE TENSIONS LIKELY TO BE CREATED BY: (1) SERIOUS POLICY AND INSTITUTIONAL CONSTRAINTS THAT ARE NOT SUBJECT TO RAPID RESOLUTION; (2) SIGNIFICANT MANAGEMENT REQUIREMENTS LIKELY TO RETARD

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IMPLEMENTATION; (3) THE NEED TO ACHIEVE A SUSTAINED IMPACT ON RURAL EMPLOYMENT AND INCOME; AND (4) THE NEED FOR A TIMELY IMPACT ON ECONOMIC RECOVERY. THE LATTER NEED IS GENERATED BY THE DETERIORATED ECONOMIC SITUATION, OUR POLITICAL COMMITMENT TO SUPPORT THE AQUINO GOVERNMENT AND CONGRESSIONAL AND PHILIPPINE GOVERNMENT EXPECTATIONS OF RAPID DISBURSEMENT OF PROJECT FUNDS.

THE ANPAC EMPHASIZED APPROPRIATELY PHASING PROJECT IMPLEMENTATION. INITIAL PROJECT FUNDING SHOULD FOCUS ON SUBSECTORS AND SUBPROJECT COMPONENTS ABOUT WHICH WE ARE CONFIDENT THAT (1) POLICY AND INSTITUTIONAL CONSTRAINTS WHICH ARE ALREADY CLEARLY IDENTIFIED, ARE LEAST BURDENING, AND CAN BE MOST READILY REMOVED; AND (2) CAN BE REALISTICALLY EXPECTED TO SHOW A HIGH ECONOMIC RATE OF RETURN. THESE CONDITIONS MET, PRIORITY SHOULD BE GIVEN TO PROJECTS PROMISING A RAPID RETURN.

THE ANPAC CONCLUDED THAT THE INITIAL FOCUS SHOULD BE ON RURAL ROAD CONSTRUCTION. THIS SUBSECTOR HAS ESTABLISHED INSTITUTIONS WITH WHICH THE MISSION IS FAMILIAR. THE MAJOR UNDERLYING POLICY ISSUE (I.E. LACK OF BUDGET SUPPORT FOR MAINTENANCE) APPEARS TO BE ONE WHICH THE GOP AND THE MISSION CAN RESOLVE OR AGREE ON A PROCESS THAT WOULD LEAD TO RESOLUTION. WITH THIS RESOLUTION, THE ECONOMIC RATE OF RETURN SHOULD BE FAVORABLE.

WHILE OTHER SUBSECTORS MAY MEET THESE CRITERIA, IT WAS THE SENSE OF THE ANPAC THAT WE KNOW LESS ABOUT POLICY AND INSTITUTIONAL ISSUES ASSOCIATED WITH THEM AND/OR THEY ARE NOT OPEN TO EARLY RESOLUTION. INITIAL FUNDING IN THESE AREAS SHOULD BE LIMITED TO STUDIES TO IDENTIFY KEY POLICY AND INSTITUTIONAL CONSTRAINTS AND PROVIDE DETAILED GUIDANCE FOR THEIR REFORM. WHERE THE POLICY CONSTRAINTS ARE OR BECOME KNOWN, WE SHOULD BE PREPARED TO PROVIDE TECHNICAL ASSISTANCE TO THINK THROUGH NEEDS FOR POLICY CHANGES OR TO ASSIST THE GOP TO MAKE SUCH CHANGES.

THE RURAL ELECTRIFICATION SUBSECTOR PROVIDES AN EXCELLENT MODEL FOR THIS APPROACH. THE RECENT PRICE-WATERHOUSE REPORT IDENTIFIES KEY POLICY AND INSTITUTIONAL CONSTRAINTS TO SUSTAINED IMPROVEMENTS IN THIS SUBSECTOR AND ADDITIONAL MORE SPECIFIC STUDIES/TA NEEDED TO GUIDE THE REFORM PROCESS. THE ANPAC SUPPORTS FINANCING THESE STUDIES IN THE FIRST YEAR. HOWEVER, THE ANPAC CONCLUDED THAT THE MISSION SHOULD NOT FUND CONSTRUCTION OR EQUIPMENT IN THIS OR OTHER SUBSECTORS UNTIL SATISFIED THAT POLICY AND INSTITUTIONAL CONSTRAINTS HAVE BEEN RESOLVED OR A PLAN FOR RESOLVING THEM HAS BEEN AGREED WITH THE GOP.

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THIS PROJECT PHASING WOULD NOT ONLY ALLOW FOR MORE RATIONAL TREATMENT OF POLICY AND INSTITUTIONAL ISSUES, IT WOULD ALSO LIMIT COMPLEXITY OF PROJECT MANAGEMENT IN THE FIRST YEAR OR SO OF THE PROJECT. OUR POLICY, INSTITUTIONAL AND MANAGEMENT CONCERNS ARE DISCUSSED IN GREATER DETAIL BELOW.

3. POLICY CONSTRAINTS: THE PID INDICATES THAT INAPPROPRIATE POLICIES CONTRIBUTED DIRECTLY TO THE DETERIORATION OF RURAL INFRASTRUCTURE. REMOVAL OF CERTAIN POLICY CONSTRAINTS IS A PRECONDITION TO ESTABLISH THE FEASIBILITY OF CERTAIN INFRASTRUCTURE COMPONENTS.

FOR EXAMPLE, A 1984 TAMS STUDY OF INFRASTRUCTURE MAINTENANCE IN THE PHILIPPINES POINTS OUT THAT MANY RURAL PORTS GENERATE SUFFICIENT FUNDS FROM USER FEES TO FINANCE OPERATING AND MAINTENANCE COSTS. HOWEVER, THE PORT AUTHORITY WAS REQUIRED TO TURN FEES IN TO THE TREASURY WHILE THE BUDGET FOR OPERATION AND MAINTENANCE OF PORTS WAS INSUFFICIENT. THE TAMS STUDY RECOMMENDS AGAINST A.I.D. INVESTMENT IN PORT CONSTRUCTION/REHAB UNTIL THIS POLICY IS CHANGED.

THE PP SHOULD IDENTIFY POLICY CHANGES REQUIRED TO INSURE THE VIABILITY OF PROPOSED CONSTRUCTION INVESTMENTS, THE PROCESS FOR CARRYING OUT CHANGES, GOP COMMITMENT, AND PROSPECTS FOR TIMELY ACHIEVEMENT. UNLESS AND UNTIL THE MISSION IS SATISFIED THAT KEY POLICY CONSTRAINTS HAVE BEEN RESOLVED OR THAT THE GOP HAS AGREED TO A PROCESS

THAT WILL RESULT IN THEIR TIMELY RESOLUTION, CONSTRUCTION ACTIVITIES SHOULD NOT PROCEED.

4. INSTITUTIONAL CONSTRAINTS: THE PID POINTS OUT THAT INSTITUTIONAL CONSTRAINTS HAVE ALSO CONTRIBUTED TO INFRASTRUCTURE DETERIORATION. REMOVAL OF MAJOR INSTITUTIONAL CONSTRAINTS IS A PREREQUISITE TO ECONOMIC FEASIBILITY AND SUSTAINABILITY OF INFRASTRUCTURE INVESTMENTS.

FOR EXAMPLE, THE RECENT PRICE-WATERHOUSE STUDY OF THE NATIONAL ELECTRIFICATION ADMINISTRATION AND RURAL ELECTRIC COOPERATIVES STATES THAT NEA AND RECS SHOULD BE RELIEVED OF RESPONSIBILITY FOR SOCIAL, COMMUNITY, AND BUSINESS FUNCTIONS UNRELATED TO THEIR WORK. THEY SHOULD RETURN TO THEIR BASIC BUSINESS OF DISTRIBUTION OF ELECTRICITY. IT FURTHER POINTS OUT THAT A FINANCIAL ASSISTANCE PROGRAM IN THE ABSENCE OF THESE REFORMS WILL NOT PROVIDE LASTING COMMERCIAL VIABILITY AND WOULD LIKELY SUBSIDIZE CURRENT OPERATIONAL INEFFICIENCIES.

THE PP SHOULD: (1) IDENTIFY UNDERLYING INSTITUTIONAL PROBLEMS THAT HAVE CONTRIBUTED TO THE DETERIORATION OF RURAL INFRASTRUCTURE (E.G., THE LACK OF FUNDS AND TECHNICAL RESOURCES, INAPPROPRIATE ORGANIZATIONAL STRUCTURES, INAPPROPRIATE INCENTIVES, ETC.); (2) INDICATE HOW THE PROJECT WILL ADDRESS THESE PROBLEMS AND AVOID A REPEAT OF PAST MISTAKES; AND (3) STRUCTURE THE PROJECT TO DEAL WITH INSTITUTIONAL ISSUES SO THAT THEY ARE NOT DRIVEN

OUT BY A BIGGER PRIORITY CONCERN WITH CONSTRUCTION.

5. PROJECT MANAGEMENT COMPLEXITY: THE ANPAC CONCLUDED THAT THE PROJECT MAY BE OVERLY AMBITIOUS, NOT SO MUCH IN TERMS OF THE NUMBER OF SUBACTIVITIES INVOLVED AS THE POSSIBILITY THAT THEY MAY BE ATTEMPTED SIMULTANEOUSLY OR ALL OF THEM BE EXPECTED TO HAPPEN QUICKLY.

AS PROPOSED, THE PROJECT WOULD INVOLVE MANY LINE DEPARTMENTS AT THE NATIONAL, PROVINCIAL AND MUNICIPAL LEVELS AND DIRECT AND HOST COUNTRY CONTRACTORS FOR PROCUREMENT, ENGINEERING DESIGN/ SUPERVISION, TECHNICAL ASSISTANCE AND MONITORING. AT LEAST SOME GOP UNITS ARE RELUCTANT TO ACCEPT U.S. TECHNICAL ASSISTANCE. CONSIDERABLE LEAD TIME WILL LIKELY BE REQUIRED TO COMPLETE CONTRACTING ARRANGEMENTS.

THE MISSION WILL BE FACED WITH A CONTINUING HEAVY WORKLOAD AFTER THE CONTRACTING PROCESS IS COMPLETED. FOR EXAMPLE, IT WILL STILL HAVE MAJOR RESPONSIBILITY FOR MONITORING THE ACTIVITIES OF THE VARIOUS CONTRACTORS;

FOR MANAGING A.I.D. PROCUREMENT (ALBEIT THROUGH A CONTRACTOR); AND FOR FINANCIAL TRANSACTIONS UNDER THE PROJECT.

THE PP SHOULD IDENTIFY KEY MANAGEMENT INTERRELATIONSHIPS AND THE MISSION'S ROLE IN PROVIDING SUPPORT AND IN MONITORING ACTIVITIES.

6. ECONOMIC VIABILITY: GIVEN THE BASICALLY ECONOMIC OBJECTIVES OF THE PROJECT (I.E., INCREASING RURAL PRODUCTIVITY AND EXPANDING EMPLOYMENT AND INCOME IN THE RURAL AREAS) AND THE POLICY AND INSTITUTIONAL FACTORS MENTIONED EARLIER, THE ANPAC CONCLUDED THAT THE PP SHOULD PLACE MAJOR EMPHASIS ON THE ECONOMIC VIABILITY OF INFRASTRUCTURE INVESTMENTS AND THEIR CONTRIBUTION OVER TIME TO SUSTAINABLE RECOVERY.

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UNCLAS SECTION 03 OF 03 STATE 207959

IN SELECTING SUBSECTORS FOR INCLUSION UNDER THE UMBRELLA PROJECT AND SUBPROJECT ACTIVITIES TO BE FINANCED WITHIN EACH SUBSECTOR, MAJOR EMPHASIS SHOULD BE PLACED ON THEIR ECONOMIC VIABILITY, INCLUDING EXPECTED PRIMARY AND SECONDARY ECONOMIC IMPACTS IN TERMS OF JOBS CREATED AND INCOME GENERATED.

6. GIVEN INADEQUATE INFRASTRUCTURE MAINTENANCE, CRITICAL ANALYSIS OF OSTENSIBLY HIGH RETURN PROJECTS SUCH AS ROADS AND PORTS IS ESSENTIAL. THE PP SHOULD REAPPRAISE ASSUMPTIONS IN THE ECONOMIC JUSTIFICATION OF SUBPROJECTS, SUCH AS RATES OF RETURN ASSOCIATED WITH VARIOUS LEVELS OF MAINTENANCE. ANALYSIS OF POTENTIAL SOLUTIONS TO THE MAINTENANCE PROBLEM, SUCH AS BUILDING TO HIGHER STANDARD, THE IMPOSITION OF USER FEES, ETC., SHOULD ALSO BE INCLUDED. FINALLY, THE PP SHOULD INCORPORATE ECONOMIC ANALYSIS INTO MONITORING AND EVALUATION SO THAT CRITICAL ASSUMPTIONS CAN BE REAPPRAISED, AND ESTIMATES OF RATES OF RETURN CAN BE UPDATED.

7. 611(A) REQUIREMENTS: IN VIEW OF THE TYPES AND COMPLEXITY OF SUBPROJECTS AND BECAUSE SHELF-ITEM GOP ANALYSES HAVE BEEN THE MAJOR SOURCE OF DOCUMENTATION FOR FEASIBILITY AND COST ANALYSES, THE ANPAC IS CONCERNED ABOUT MEETING 611(A). THE PROJECT PAPER SHOULD CLEARLY DEFINE THE PROJECT AND SUBPROJECTS AND SHOW COMPLIANCE WITH 611(A).

8. CONGRESSIONAL STATUS: A CONGRESSIONAL NOTIFICATION FOR THIS PROJECT WENT TO THE HILL ON 1 JULY. WE WILL NOTIFY THE MISSION WHEN THE WAITING PERIOD HAS EXPIRED. SHULTZ
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E.O. 12356: N/A
SUBJECT: RURAL INFRASTRUCTURE PROJECT (492-0420)

REF: STATE 207959

CLASS: UNCLASSIFIED
CHRGE: 07/15/87
APPRV: OD:FWSCHIECK
DRFTD: OCD:MDENNTRE:EML
CLEAR: 1. OOCD:KEBROWN
2. OCD:WMCALEER
3. OD:JSBLACKTON
DISTR: AID (OCD-3 OD CSR)
ORGIN: OCR

1. USAID APPRECIATES TIMELY ANPAC REVIEW AND APPROVAL OF PID FOR SUBJECT PROJECT AND APPROVAL FOR MISSION AUTHORIZATION OF THE PP.

IN RESPONSE TO ANPAC GUIDANCE:

- A. PROJECT WILL CONCENTRATE FIRST YEAR CONSTRUCTION AND EQUIPMENT PROCUREMENT ON RURAL ROADS, NAVIGATIONAL AIDS AND SMALL MUNICIPAL PORTS. ACTIVITY IN LATTER AREA APPROPRIATE SINCE FEASIBILITY STUDIES ALSO COMPLETED AND GOP REVISED POLICY WHICH PREVIOUSLY DIRECTED THAT REVENUES FROM PROVINCIAL PORTS TO BE RETURNED STRAIGHT TO THE TREASURY. PROVINCIAL PORT REVENUES WILL NOW REMAIN WITH THE PHILIPPINES PORT AUTHORITY FOR PORT MAINTENANCE; REVENUES FROM FEEDER PORTS WILL BE KEPT BY MUNICIPALITIES FOR PORT MAINTENANCE AS WELL.

- B. FIRST YEAR FUNDING FOR TELECOMMUNICATIONS AND RURAL ELECTRIFICATION WILL BE LIMITED TO TA, TRAINING AND DATA COLLECTION UNLESS AGREEMENT IS REACHED SOONER WITH GOP ON IMPLEMENTATION OF KEY SUBSECTOR POLICY AND INSTITUTIONAL CHANGES. PER SUMMARY IN REFTEL, USAID WILL CONSULT WITH AID/W ON HOW AND WHEN SUCH CHANGES WILL BE IMPLEMENTED BEFORE INITIATING CONSTRUCTION IN EITHER OF THESE SUBSECTORS.

3. INITIAL REACTIONS OF THE GOP TO PRICE WATERHOUSE STUDY HAVE BEEN FAVORABLE. MOST RECOMMENDATIONS HAVE ALREADY BEEN ENDORSED; THE FEW REMAINING AREAS ARE BEING REVIEWED FOR DECISION AND/OR IMPLEMENTATION TIMING. PROCUREMENT OF EQUIPMENT WILL BE PHASED TO CORRESPOND TO RESOLUTION OF CONSTRAINTS AND/OR AGREEMENT WITH GOP ON PLAN FOR RESOLVING THEM.

4. AS SUGGESTED BY REFTEL, SUBPROJECTS ACCEPTED FOR FINANCING WILL HAVE ECONOMIC RETURNS EQUIVALENT TO OPPORTUNITY COST OF CAPITAL AND PROSPECTS FOR RAPID IMPACT ON LOCAL ECONOMIES. GIVEN ISLAND CHARACTER OF THE PHILIPPINE REPUBLIC, INVESTMENTS IN INTER MODAL

TRANSPORT, COMMUNICATIONS, AND RURAL ELECTRIC POWER VIEWED AS ESSENTIAL TO GOP RECOVERY PROGRAM AND IMPROVED WELL BEING OF RURAL POPULATION.

5. ANPAC CONCERNS ABOUT, E.G., PAYMENT PROCEDURES, INSTITUTIONAL CHANGES, TA CONTRACTING, BEING ADDRESSED IN EVOLVING PROJECT DESIGN AND NEGOTIATIONS WITH GOP.

6. WILL POUCH COPIES OF PROJECT PAPER WHEN COMPLETED.
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Annex D

STATUTORY CHECKLIST

5C(1) - COUNTRY CHECKLIST

Country Checklist for the Philippines for 1987 -- See Budget Support Program II, Program Assistance Approval Document, Annex D, PAAD No. 492-0407, May 27, 1987. No changes required.

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5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A includes criteria applicable to all projects. Part B applies to projects funded from specific sources only: B(1) applies to all projects funded with Development Assistance; B(2) applies to projects funded from Development Assistance loans; and B(3) applies to projects funded from ESF.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 1987 Continuing Resolution Sec. 523; FAA Sec. 634A. Describe how authorization and appropriations committees of Senate and House have been or will be notified concerning the project.

   The Congressional Notification submitted to Congress expired July 16, 1987, per STATE 272322.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance, and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

   Yes. Necessary plans and updated cost estimates are available for sub-projects financed under the project. Total value of this "pool" of sub-projects is greater than the project life-of-project funding total.

3. FAA Sec. 611(a)(2). If legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   None required.

4. FAA Sec. 611(b); FY 1987 Continuing Resolution Sec. 501. If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for guidelines.)

   N/A.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and total U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	Yes.
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	No.
7. FAA Sec. 601(a). Information and conclusions on whether projects will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	(a) No; (b) Yes, planned assistance will encourage local engineering and construction firms to compete during project implementation (c) Yes, project will restructure rural electrical cooperatives; (d) N/A; (e) Yes, assistance for roads, ports, etc.; (f) N/A.
8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	The project will facilitate investment in rural development and may indirectly encourage U.S. trade investment. It is planned that project procurement will be the U.S. when applicable.
9. FAA Secs. 612(b), 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	A local contribution is not required for ESF projects. The Philippines is not an excess currency country.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.

11. FY 1987 Continuing Resolution Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? No.

12. FY 1987 Continuing Resolution Sec. 558 (as interpreted by conference report). If assistance is for agricultural development activities (specifically, any testing or breeding feasibility study, variety improvement or introduction, consultancy, publication, conference, or training), are such activities (a) specifically and principally designed to increase agricultural exports by the host country to a country other than the United States, where the export would lead to direct competition in that third country with exports of a similar commodity grown or produced in the United States, and can the activities reasonably be expected to cause substantial injury to U.S. exporters of a similar agricultural commodity; or (b) in support of research that is intended primarily to benefit U.S. producers? No.

13. FY 1987 Continuing Resolution Sec. 559. Will the assistance (except for programs in Caribbean Basin Initiative countries under U.S. Tariff Schedule "Section 807," which allows reduced tariffs on articles assembled abroad from U.S.-made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to assist the establishment of facilities specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U.S. exports, of textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel? No.

14. FAA Sec. 118(c). Does the assistance comply with the environmental procedures set forth in A.I.D. Regulation 16? Does the assistance place a high priority on conservation and sustainable management of tropical forests? Specifically, does the assistance, to the fullest extent feasible: (a) stress the importance of conserving and sustainably managing forest resources; (b) support activities which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and help countries identify and implement alternatives to colonizing forested areas; (c) support training programs, educational efforts, and the establishment or strengthening of institutions to improve forest management; (d) help end destructive slash-and-burn agriculture by supporting stable and productive farming practices; (e) help conserve forests which have not yet been degraded, by helping to increase production on lands already cleared or degraded; (f) conserve forested watersheds and rehabilitate those which have been deforested; (g) support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing; (h) support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation; (i) conserve biological diversity in forest areas by supporting efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis, by making the establishment of protected areas a condition of support for activities involving forest clearance or degradation, and by helping to identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas; (j) seek to increase the awareness of

It will, see Section VI-F of the PP.

U.S. government agencies and other donors of the immediate and long-term value of tropical forests; and (k) utilize the resources and abilities of all relevant U.S. government agencies?

15. FAA Sec. 119(c)(4)-(6). Will the assistance (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity; (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife habitats; (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection; or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas?

(a) No; (b) No; (c) No; (d) No.

16. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate sysem for accounting for and controlling receipt and expenditure of project funds (either dollars or local currency generated therefrom)?

N/A.

17. FY 1987 Continuing Resolution Sec. 532. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution?

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Secs. 102(b), 111, 113, 281(a). Describe extent to which activity will (a) effectively involve the poor in development by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, dispersing investment from cities to small towns and rural areas, and

The Project is planned to upgrade and expand rural infrastructure, therefore, by its nature, it will attract investment and encourage employment opportunities to rural areas where the majority of poor Filipinos reside.

insuring wide participation of the poor in the benefits of development on a sustained basis, using appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries.	It will assist to restructure rural electrical cooperatives so they are viable, efficient organizations. Greater investment in the rural areas should encourage employment generation in agri-business and service industries and provide greater opportunities for women. The Project directly supports the GOP efforts to stimulate rural development, but will have little effect on regional cooperation.
b. FAA Secs. 103, 103A, 104, 105, 106, 120-21. Does the project fit the criteria for the source of funds (functional account) being used?	ESF funding will be used.
c. FAA Sec. 107. Is emphasis placed on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	N/A.
d. FAA Secs. 110, 124(d). Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?	N/A.
e. FAA Sec. 128(b). If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?	Yes.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

Under the Project, training will be provide to support institutional development activities contemplated as well as upgrading current skills of local populace.

g. FY 1987 Continuing Resolution Sec. 540. Are any of the funds to be used for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?

N/A.

Are any of the funds to be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any person to undergo sterilizations?

Are any of the funds to be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?

h. FY 1987 Continuing Resolution. Is the assistance being made available to any organization or program which has been determined to support or participate in the management of a program of coercive abortion or involuntary sterilization?

N/A.

If assistance is from the population functional account, are any of the funds to be made available to voluntary family planning projects which do not offer, either directly or through referral to or information about access to, a broad range of family planning methods and services?

i. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes.

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j. FY 1987 Continuing Resolution. How much of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)?

It is anticipated that PSA services required under the Project will be satisfied by 8(a) firms. Estimated values of services approximately $1 million over life-of-project.

k. FAA Sec. 118(c)(13). If the assistance will support a program or project significantly affecting tropical forests (including projects involving the planting of exotic plant species), will the program or project (a) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and (b) take full account of the environmental impacts of the proposed activities on biological diversity?

Yes.

l. FAA Sec. 118(c)(14). Will assistance be used for (a) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner and that the proposed activity will produce positive economic benefits and sustainable forest management systems; or (b) actions which significantly degrade national parks or similar protected areas which contain tropical forests, or introduce exotic plants or animals into such areas?

No.

m. FAA Sec. 118(c)(15). Will assistance be used for (a) activities which would result in the conversion of forest lands to the rearing of livestock; (b) the construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands; (c) the colonization of forest lands; or (d) the construction of dams or other water

(a) No; (b) Yes; (c) No; (d) No. An environmental analysis will be completed prior to initiation of any activity.

control structures which flood relatively undegraded forest lands, unless with respect to each such activity an environmental assessment indicates that the activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development?

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan at a reasonable rate of interest. N/A.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20 percent of the enterprise's annual production during the life of the loan, or has the requirement to enter into such an agreement been waived by the President because of a national security interest? N/A.

c. FY 1987 Continuing Resolution. If for a loan to a private sector institution from funds made available to carry out the provisions of FAA Sections 103 through 106, will loan be provided, to the maximum extent practicable, at or near the prevailing interest rate paid on Treasury obligations of similar maturity at the time of obligating such funds? N/A.

d. FAA Sec. 122(b). Does the activity give reasonable promise of assisting long-range plans and programs designed to develop economic resources and increase productive capacities? N/A.

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of Part I of the FAA? — Yes.

b. FAA Sec. 531(e). Will this assistance be used for military or paramilitary purposes? — No.

c. ISDCA of 1985 Sec. 207. Will ESF funds be used to finance the construction, operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such country is a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin America (the "Treaty of Tlatelolco"), cooperates fully with the IAEA, and pursues nonproliferation policies consistent with those of the United States? — No.

d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? — N/A.

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5C(3) - STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. PROCUREMENT

1. FAA Sec. 602(a). Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?

   Procurement of commodities and services from the U.S. will include small business participation. Offshore procurement will be from the U.S. The balance will be purchased in the Philippines

2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?

3. FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?

   The GOP does not discriminat against marine insurance companies authorized to do business in the U.S.

4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If non-U.S. procurement of agricultural commodity or product thereof is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)

   Agricultural commodities are not contemplated for procurement under this Project.

5. FAA Sec. 604(c). Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under Code 941 and which have attained a competitive capability in international markets in one of these areas? (Exception for those

   Construction or engineering services will only be procured from the U.S., Philippines or US-Philippine joint venture firms.

countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries.)

6. FAA Sec. 603. Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates?

No. Surface shipments will be in compliance with such requirements.

7. FAA Sec. 621(a). If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? will the facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

Yes. Private sector firms will be used to the maximum extent practicable.

8. International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available?

Yes. U.S. carriers will be used to the extent such service is available.

9. FY 1987 Continuing Resolution Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States?

Yes. U.S. contracts will contain such a provision.

10. FY 1987 Continuing Resolution Sec. 524. If assistance is for consulting service through procurement contract pursuant to 5 U.S.C. 3109, are contract expenditures a matter of public record and available for public inspection (unless otherwise provided by law or Executive order)?

Yes. Contract expenditures will be a matter of public record and available for audit and inspection.

B. CONSTRUCTION

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services be used?

Yes. The use of U.S. consulting and contracting firms is contemplated for appropriate parts of the Project.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes. Contracts will be awarded on a competitive basis to the maximum extent practicable.

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP), or does assistance have the express approval of Congress?

The Project does not contemplate assistance to a productive enterprise in excess of $100 million.

C. OTHER RESTRICTIONS

1. FAA Sec. 122(b). If development loan repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent per annum thereafter?

N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries?

The funds used will not promote or assist activities of Communist-bloc countries.

4. Will arrangements preclude use of financing:

a. FAA Sec. 104(f); FY 1987 Continuing Resolution Secs. 525, 540. (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; or (4) to lobby for abortion?

Project funds will not be used for activities related to family planning or abortions.

b. FAA Sec. 483. To make reimburse-bursements, in the form of cash payments, to persons whose illicit drug crops are eradicated?

Funds will not be used for illicit cropping activities or payments.

c. FAA Sec. 620(g). To compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President?

A.I.D. funds will not be used for such payments or compensation.

d. FAA Sec. 660. To provide training, advice, or any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?

Project funds will not be used for police or law enforcement activities of any kind.

e. FAA Sec. 662. For CIA activities?

No.

f. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained?

Such purchases, sale, lease, exchange or guaranty will not be financed unless appropriate waivers are obtained.

g. FY 1987 Continuing Resolution Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel?

Funds will not be used for any payments of military personnel salaries or benefits.

h.	FY 1987 Continuing Resolution Sec. 505. To pay U.N. assessments, arrearages or dues?	No.
i.	FY 1987 Continuing Resolution Sec. 506. To carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending)?	Project funds will not be transferred to multi-lateral organizations for lending.
j.	FY 1987 Continuing Resolution Sec. 510. To finance the export of nuclear equipment, fuel, or technology?	Project funds will not be used for financing any such exports.
k.	FY 1987 Continuing Resolution Sec. 511. For the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?	Yes.
l.	FY 1986 Continuing Resolution Sec. 516. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?	Project funds will not be used for publicity or propaganda purposes with the United States.

Annex E

FAA, SECTION 611(e) CERTIFICATION

Annex E

CERTIFICATION PURSUANT OF SECTION 611(e)
OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, FREDERICK W. SCHIECK, the principal officer to the Agency for International Development in the Philippines, having taken into account, among other things, the maintenance and utilization of projects in the Philippines previously financed or assisted by the United States, do hereby certify that in my judgment, the Philippines has both the financial capability and the human resources to effectively maintain and utilize the capital improvements and facilities effected under this proposed Rural Infrastructure Fund Project.

This judgement is based upon the project analysis as detailed in the Rural Infrastructure Fund Project Paper and is subject to the conditions imposed therein.

FREDERICK W. SCHIECK
Director, USAID Philippines

Sept. 28, 1987
Date

Annex F

CERTIFICATION PURSUANT TO UTILIZATION OF GRAY AMENDMENT ORGANIZATION

Annex F

CERTIFICATION PURSUANT TO UTILIZATION OF GRAY AMENDMENT ORGANIZATION

I, FREDERICK W. SCHIECK, Director of the Agency for International Development in the Philippines, having taken into account the potential involvement of small and/or economically and socially disadvantaged enterprises, do hereby certify that in my judgment the majority of the goods and services other than the technical assistance required under this project can best be procured through open competition. However, all other things being equal, preference will be given to firms which submit joint proposals with Gray Amendment-satisfying firms. The bulk of the off-shore commodities can be procured using Gray amendment qualifying Procurement Service Agents (PSA). Furthermore, for the scheduled external evaluations, joint efforts involving both local expertise and Gray Amendment-satisfying organizations are anticipated. My judgment is based on the recommendations of the Project and Mission Review Committees.

FREDERICK W. SCHIECK
Director, USAID Philippines

Sept. 28, 1987
Date

Annex G

DRAFT WAIVER

Annex G

Waiver Control No._____

DRAFT WAIVER
JUSTIFICATION FOR OTHER THAN
FULL AND OPEN COMPETITION
(FAR)

CONTRACTING AGENCY	:	Agency for International Development
CONTRACTING ACTIVITY	:	USAID/Philippines
PROJECT NO.	:	492-0420
PROJECT NAME	:	RURAL INFRASTRUCTURE FUND
FUND CITATION	:	Economic Support Fund
STATUTORY AUTHORITY	:	FAR 6.302-1(a)(2); 41 U.S.C. 253(c)(1)

Procurement without full and open competition is required in order to acquire retrofit air navigational aids and operational/maintenance spare parts. The required equipment and installation services will be provided from Northrop-Wilcox. The estimated value of this procurement is $2,800,000 (FOB).

Section 6.302-1(b)(1) of the Federal Acquisition Regulation permits procurement without full and open competition where there is a reasonable basis to conclude that the agency's minimum needs can only be satisfied by unique supplies or services available from only one source or only one supplier with unique capabilities.

The subject procurement satisfies the foregoing criterion for the following reasons:

At the request of the Government of the Philippines (GOP), the original U.S. equipment manufacturer, Northrop-Wilcox, conducted a site survey and prepared a proposal to upgrade/retrofit the electronic subsystems of the Manila and 13 regional airports. The proposal recommended upgrading existing Northrop-Wilcox equipment by replacing tube modules with solid-state transistorized modules while maintaining existing shelters, cabling, distribution panels, and ancillary civil works. Necessary equipment includes electronic navigation systems such as distance measuring equipment and instrument landing systems; test equipment; and needed spare parts. By retrofiting existing equipment, it is expected that significant cost savings will be realized and the operational life cycle will be prolonged by 12 years.

Northrop-Wilcox is not the only U.S. supplier of air navigational aids, but is the only responsible source available to retrofit and warrant the existing navigational subsystems originally supplied by them to the Manila and 13 regional airports. Further, there are no independent dealers/distributors of Northrop-Wilcox equipment to compete for this activity.

State cable #206078 (attached) confirms that Northrop-Wilcox is the only U.S. manufacturer to retrofit and warrant the air navigational aids and electronic subsystems currently in use at the Manila and 13 regional airports.

A notice of intent of award to Northrop-Wilcox will be advertise in the Commerce Business Daily in accordance to FAR Section 6.302-1(c)(2), 15.402(g) and 5.207(e).

Contracting Officer's Determination and Certification (FAR 6.303-2(a)):

The undersigned Contracting Officer has determined that the anticipated cost of the subject procurement to the U.S. Government is fair and reasonable and certifies that this justification is accurate and complete to the best of the Contracting Officer's knowledge and belief.

By : _____

Title : Contracting Officer

Date : _____

Requiring Office's Certification (FAR 6.303-2(b):

The undersigned Chief of the office requesting the subject procurement certifies that the supporting data for which that office is responsible (such as the statement of the minimum needs of the U.S. Government) and which form a basis for other than full and open competition are accurate and completed.

By : _____

Title : Chief, Office of Capital Development

Date : _____

Approvals Pursuant to FAR Section 6.304:

By : _____

Title : Director

Date : _____

Attachment: a/s

PDAAX-132
52671

Project Paper

Philippines

Rural Infrastructure Fund Project
492-0420

APPENDICES

September 1987

USAID/Manila

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APPENDICES

Project Paper Appendices

Detailed Description of the Air Navigation Aids Subproject - FAA, U.S. Department of Transportation

Extracts from the Proposed Quirino Highway Feasibility Sutdy - DPWH

Extracts from the Southern Philippines Highway Network Development Studies - DCCD Engr. Corp.

Extracts from the Philippine Provincial and Feeder Ports Project - DPWH

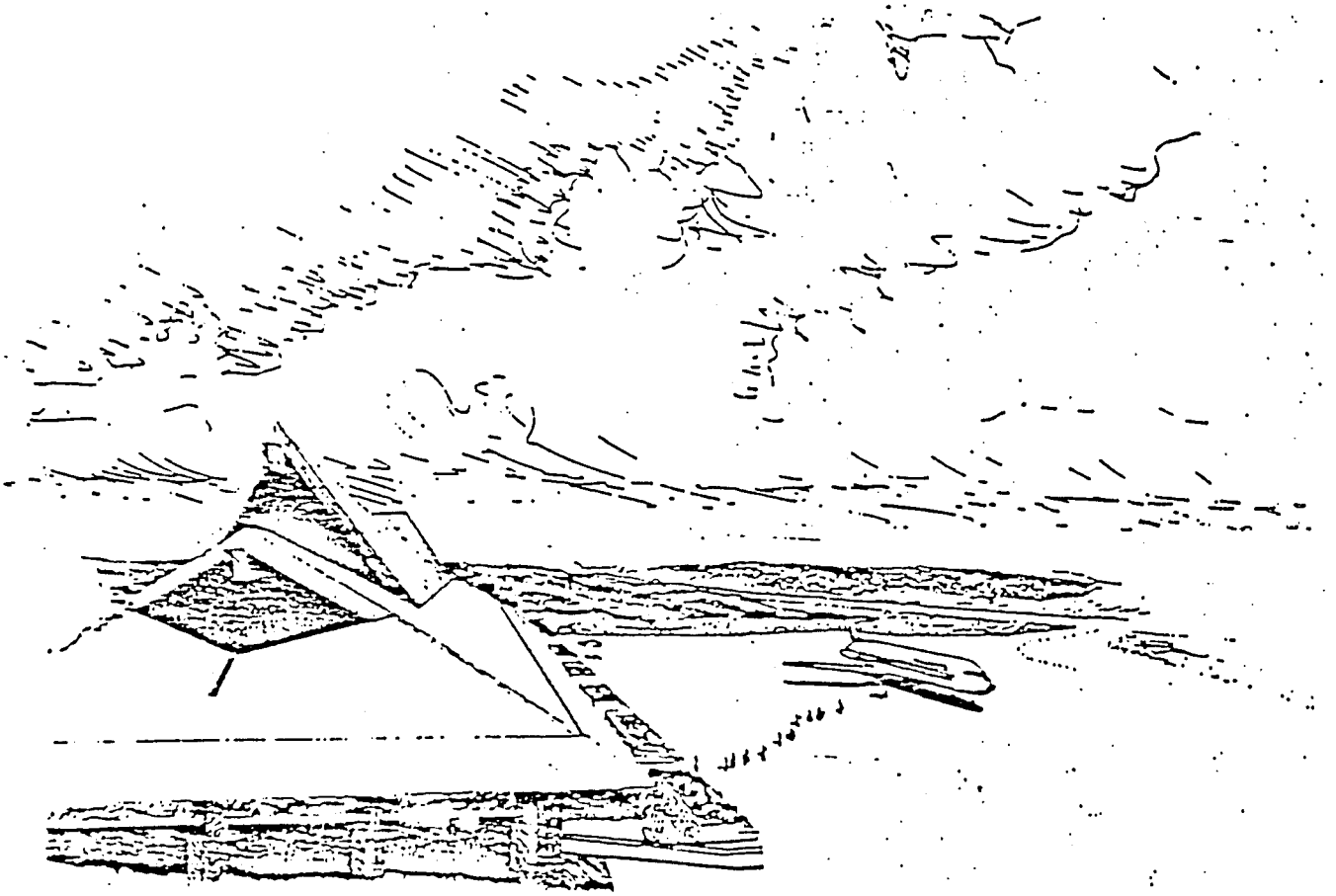
Extracts from Financial, Organizational and Technical Assessment of NEA and Rural Electric Cooperatives and Report on the Institutional Setting for Maintenance of Electric Power

Extracts of the Reports on the Institutional Setting for the Maintenance of Transportation Infrastructure - TAMS, Inc.

NATIONAL AIRPORT AND AIRWAY PLANNING STUDY

of the

REPUBLIC OF THE PHILIPPINES

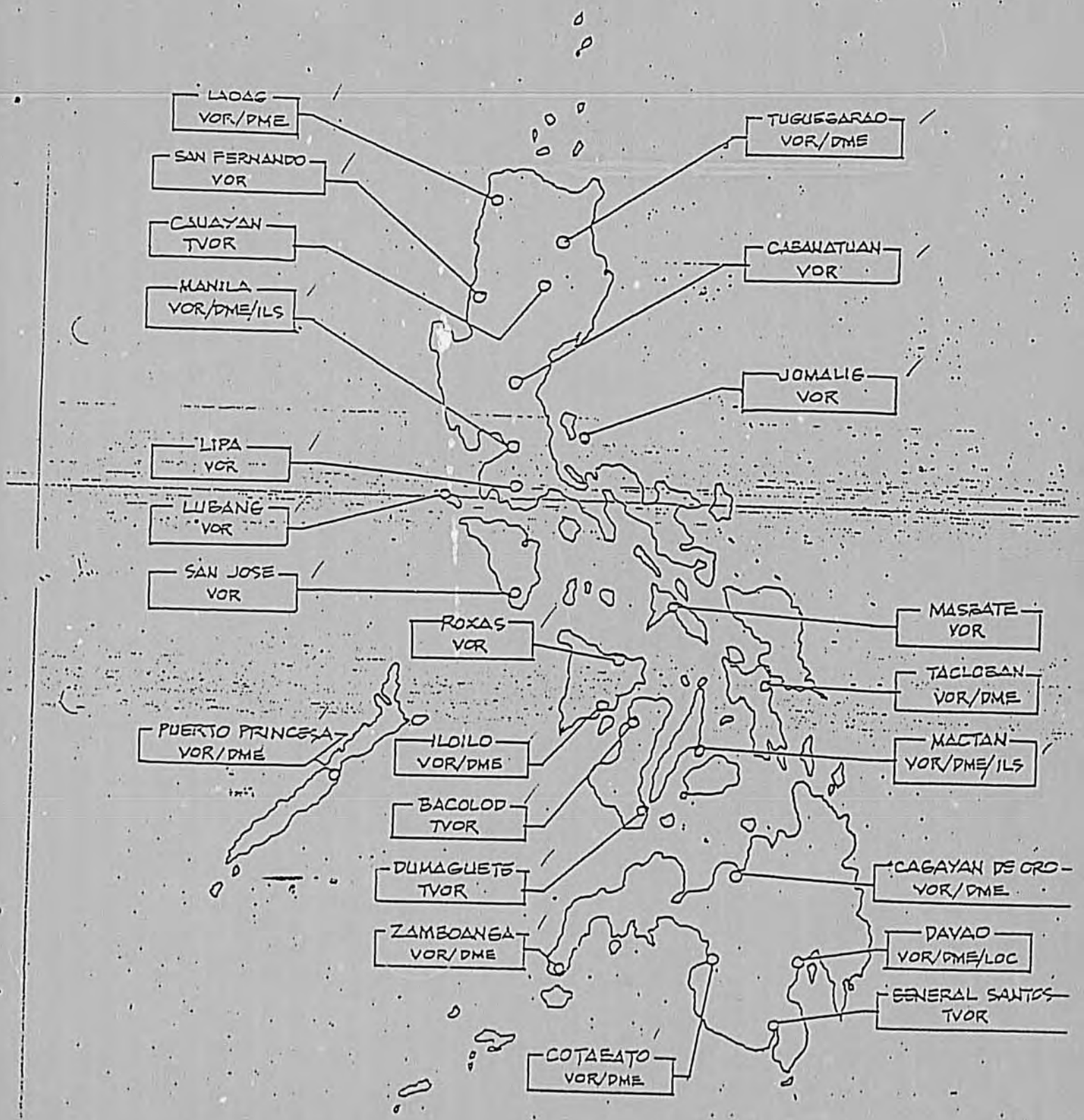


Supplemental Report

Federal Aviation Administration
U.S. Department of Transportation

Trade and Development Program
U.S. International Development
Cooperation Agency

Washington, D.C.
JUNE 1982



Navaids facilities covered under the Wilcox Survey Report
11 April 1983

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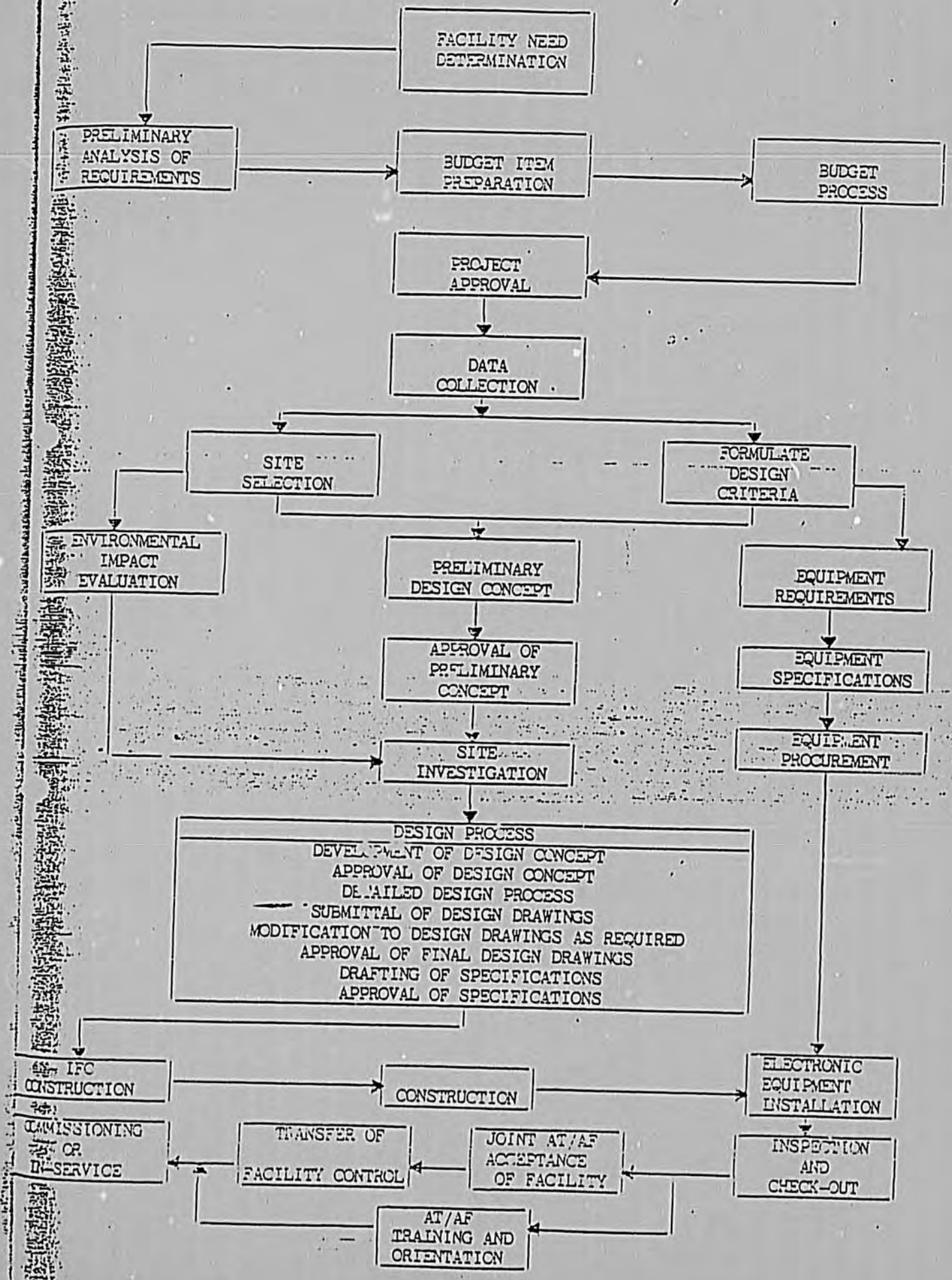
FIGURE V-7



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UPGRADING OF NATIONWIDE NAVIGATIONAL AIDS

LOCATION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED.	TEST EQUIPME
NIA	DME	Wilcox 596B		3 ea. Signal Gen. (Monitor) 3 ea. RF Gen. (Transponder) 3 ea. RF Amplifier	
	Trainer ILS/DME/VOR Personnel training		Wilcox Type		
	ILS 06 ILS 24	Mark I-D Mark I-D	Mark II Mark II	Complete System Complete System	1 portable II Receiver
LAGAG	VOR	Wilcox 485	Wilcox 585B	Complete System	
TUGUEGARAO	VOR DME	Wilcox 485 Wilcox 496	Wilcox 585B Wilcox 596B	Complete System Complete System	
SAN FERNANDO	VOR	Wilcox 485 B	Wilcox 585B	Complete System	with Associat Test Eqpt./To
CABANATUAN	VOR	Wilcox 485B	Wilcox 585B	Complete System	with Associat Test Eqpt./To
LUBANG	VOR	DC-VOR 585B	SUPPLY WALK-IN PANEL AND [illegible] TO REPLACE SLEEVE ANTENNA	SPARE PARTS, MODULES	with Associat Test Eqpt./To

UPGRADING OF NATIONWIDE NAVIGATIONAL AIDS

LOCATION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED.	TEST EQUIPMEN
I A	DME Trainer ILS/DME/VOR Personnel Training	Wilcox 596B	Wilcox Type	3 ea. Signal Gen. (Monitor) 3 ea. RF Gen. (Transponder) 3 ea. RF Amplifier	
	ILS 06 ILS 24	Mark I-D Mark I-D	Mark II Mark II	Complete System Complete System	1 portable IL Receiver
CAG	VOR	Wilcox 485	Wilcox 585B	Complete System	
GUEGARAO	VOR DME	Wilcox 485 Wilcox 496	Wilcox 585B Wilcox 596B	Complete System Complete System	
H FERNANDO	VOR	Wilcox 485 B	Wilcox 585B	Complete System	with Associat Test Eqpt./To
BANATUAN	VOR	Wilcox 485B	Wilcox 585B	Complete System	with Associat Test Eqpt./To
BANG	VOR	DC-VOR 585B	SUPPLY WALK-IN PANORAMIC ANTENNA TO REPLACE SLEEVE ANTENNA	SPARE PARTS, MODULES	with Associat Test Eqpt./To

LOCATION	SERVICE	MODEL/TYPE	UPGRADE TO	MODULES NEEDED	TEST EQUIPMENT
LIPA	VOR	DC-VOR 585B	WALK IN ANTENNA RADOME	SPARE PARTS MODULES	with Associate Test Eqpt./Too
JOMALIG	VOR	DC-VOR 585B	WALK IN ANTENNA RADOME	SPARE PARTS MODULES	with Associate Test Eqpt./Too
NAGA	VOR	Wilcox 485B	Wilcox 585B	Complotes System	with Associate Test Eqpt./Too
SAN JOSE	VOR	Wilcox 485B	Wilcox 585B	COMPLETE SYSTEM	with Associate Test Eqpt./Too
PUERTO PRINCESA	VOR DME	Wilcox 485B Wilcox 596B	Wilcox 585B Wilcox 596B	Complete System 1 ea. Signal Gen. (Monitor) 1 ea. RF Gen. (Transponder) 1 ea. RF Amplifier	with Associate Test Eqpt./Too
MASBATE	VOR	Wilcox 485	Wilcox 585 SUPPLY OF AIRCON	Complete System	with Associate Test Eqpt./Too
ROXAS	VOR	DC-VOR 585B	SUPPLY WALK IN RADOME	SPARE PARTS AND MODULES	with Associate Test Eqpt./Too

SCOPE OF WORK FOR:

REHABILITATION OF BAT NAVAIDS SYSTEM

A R E A I

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
1. Manila	MARK ID ILS R/W24	• Move R/W24 ILS to Cebu - Mactan. • Supply modular MARK II ILS with wide aperture antenna array to replace R/W24 ILS. • Supply new equipment shelters.
	MARK ID ILS R/W06	• Supply 14 Element localizer antenna array to replace existing 8-element. • OPTION: Relocate MARK ID ILS to either Laoag or Zamboanga and supply Cebu - Mactan with MARK II ILS.
		• Supply remote monitor receivers for localizer, glide slope, etc. • Install all foregoing items. • Supply spare modules. • Supply tools and test equipment. • Supply walk-in antenna radome to replace sleeve radome.
2. Tuguegarao	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace 485B tube-type VOR. • Supply spare modules. • Supply walk-in antenna radome to replace sleeve radome. • Supply tools and test equipment.

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
	496B DME	• Supply 596B modular/solid state DME with battery power supply to replace tube type 496B DME. • Install all foregoing items.
3. Lacag	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace 485 tube-type VOR. • Supply spare parts and modules. • Supply walk-in antenna radome to replace sleeve radome. • Supply tools and test equipment. • Supply spare modules. • OPTION: Supply MARK II Full CAT I ILS. • Install all foregoing items.
4. Jomalig	585B VOR	• Supply walk-in antenna radome to replace sleeve radome. • Supply spare parts modules. • Supply tools and test equipment. • Install all foregoing items.
5. Lipa	585B DC VOR	BEING REPLACED WITH DC VOR FROM BALISIN • Supply spare parts modules. • Supply tools and test equipment. • Supply walk-in antenna radome to replace sleeve radome. • Install all foregoing items.

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
6. Lubang	585B DC VOR	• Supply tools and test equipment. • Supply spare parts and modules. • Supply walk-in antenna radome to replace sleeve radome. • Install all foregoing items.
7. Puerto Princesa	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B. • Supply spare modules and parts. • Supply tools and test equipment. • Supply walk-in antenna radome to replace sleeve radome. • Supply 596B solid state/modular DME single channel modules. • Install all foregoing items.
8. San Fernando	485B VOR	• Supply 585B DC modular/solid state with test generator to replace tube-type 485B. • Supply spare parts and modules. • Supply tools and test equipment. • Supply walk-in antenna radome to replace sleeve radome. • Install all foregoing items.
9. San Jose	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B. • Supply spare parts and modules.

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SITE	EXISTING EQUIPMENT	SCOPE OF WORK
		• Supply walk-in antenna radome to replace sleeve radome.
		• Install all foregoing items.
	A R E A II	
1. Mactan (Cebu)	1261 Localizer	• Move to opposite end of runway. • Supply spare parts and modules.
	595 DME (colocated with 1261)	• Relocate with 1261 localizer.
		• Supply tube-life modification kit.
	Localizer Equipment Shelter	• Supply labor and materials for repainting.
		OPTION: Supply Full ILS MARK II for Runway 22 or relocate MARK I/D from MTA for Runway 22. Dismantle/ship/ and install.
	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B.
		• Supply walk-in antenna radome to replace sleeve radome.
		• Supply spare parts and modules.
		• Supply tools and test equipment.
		• Install all foregoing items.
2. Zamboanga	585 DC VOR	• Recommission existing 585 DC VOR modular electronics - repair/reinstallation.
		• Supply walk-in antenna radome to replace sleeve radome.
		• Supply tools and test equipment.
		• Supply 5960 Modular solid state DME with battery power. Supply to replace tube type 4960 [illegible]

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SITE	EXISTING EQUIPMENT	SCOPE OF WORK
		• Supply spare parts and modules.
		• Install all foregoing items.
3. Davao	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B.
		• Supply walk-in antenna radome to replace sleeve radome.
		• Supply tools and test equipment.
		• Supply spare parts and modules.
	496B DME	• Supply 596B modular/solid state DME with battery power supply to replace tube-type 496 DME.
		• Supply spare parts and modules.
		• OPTION: Supply glideslope and marker beacons with existing 1261 localizer.
		• Install all foregoing items.
4. Iloilo	585B DC VOR	• Supply walk-in radome to replace sleeve radome.
		• Supply spare parts and modules.
		• Supply tools and test equipment.
		• Supply new field detector with cables.
		• Supply standby generator sets 2 to 5 KW.
5. Bacolod	476 VOR	• Upgrade to 585 VOR
		• Supply walk-in radome to replace sleeve radome.
		• Supply tools and test equipment.

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
		• Supply standby generator set.
		• Supply 596B DME.
		• Install all foregoing items.
6. Tacloban	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B.
		• Supply walk-in antenna radome to replace sleeve radome.
		• Supply spare parts and modules.
		• Supply tools and test equipment.
	Power Supply	• Supply generator sets with auto changeover and with spare parts.
		• Install all foregoing items.
7. Masbate	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B.
		• Supply walk-in antenna radome to replace sleeve radome.
		• Supply airconditioning units.
		• Supply spare parts and modules.
		• Supply tools and test equipment.
		• Install all foregoing items.
8. Romas	585B DC VOR	• Supply walk-in antenna radome to replace sleeve radome.
		• Supply spare parts and modules.
		• Supply tools and test equipment.
		• Upgrade to 585.
		• Install all foregoing items.

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
9. Dumaguete	476A VOR	• Supply walk-in antenna radome to replace sleeve radome. • Supply spare parts and modules with battery power supply and charger inverter. • Supply tools and test equipment. • Supply emergency standby generator sets. • Install all foregoing items.
10. Cagayan de Oro	485B VOR	• Supply 585B DC modular/solid state VOR with test generator to replace tube-type 485B. • Supply walk-in antenna radome to replace sleeve radome. • Supply tools and test equipment. • Supply spare parts and modules.
	596 DC DME	• Supply inverter for battery power supply. • Supply spare parts and modules. • Install all foregoing items.
11. Gen. Santos	476A VOR	• Upgrade to 585. • Supply walk-in antenna radome to replace sleeve radome. • Supply spare parts and modules. • Supply tools and test equipment. • Supply inverter with battery power supply. • Install all foregoing items.

SITE	EXISTING EQUIPMENT	SCOPE OF WORK
12. Cotabato	4853 VOR	• Supply 5853 DC modular/solid state VOR with test generator to replace tube-type 4853. • Supply walk-in antenna radome to replace sleeve radome. • Supply tools and test equipment. • Supply spare parts and modules. • Install all foregoing items.
CENTER AREA I		• Supply new digital flight inspection panel with ground support equipment, electronic calibration equipment and installation services. • Supply VOR test generator.
CENTER AREA II		• Supply VOR test generator. • Install all foregoing items.
13. CABANATUAN	4852 VOR	• SUPPLY 5852 DC MODULAR / SOLID STATE VOR WITH TEST GENERATOR TO REPLACE TUBE - TYPE 4852 • SUPPLY WALK-IN ANTENNA RADOME TO REPLACE SLEEVE RADOME. • SUPPLY TOOLS AND TEST EQUIPMENT. • SUPPLY SPARE PARTS AND MODULES. • INSTALL ALL FOREGOING ITEMS.

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Four sets of new AEROCOM-1330 5KW-PEP transmitters were installed in 1977. The transmitters have not been officially commissioned, but have been in continuous service since 1977. The AEROCOM units replaced Collins Type 231-D HF transmitters. The equipment is well maintained and operating satisfactorily. However, the section of the transmitter building containing the equipment is not air conditioned. Thus, high humidity and high ambient temperatures exist in the equipment area. This condition needs to be corrected.

4.5 Navigational Aids

4.5.1 VOR/DME

An extensive VOR/DME/NDB network has been installed and commissioned by the Bureau of Air Transportation to establish the domestic and international airway structure within the Manila FIR. The network consists of 11 VOR and 9 VOR/DME facilities located throughout the Philippines from Laoag in the north to Zamboanga in the south, as shown in Figure IV-10. Many of these VOR systems are located on or near airports and serve as both enroute and terminal NAVAID's. The field survey included 18 of the 20 enroute VOR sites.

In addition, there are five VOR's installed to serve primarily as terminal NAVAIDs; at Tuguegarao, General Santos, Calbayog, Dumaguete, and Bacolod. It appears that the Tuguegarao terminal aid should be incorporated into the route structure. The route is being flown by PAL, but has not been established as a controlled airway in the route structure. The route can be installed by establishing an airway from Manila/Cabanatuan/Tuguegarao/Laoag.

4.5.1.1 VOR/DME System Status

The basic system appears to be satisfactory to meet route structure requirements. However, facilities were found to be functioning from excellent to marginal, depending upon the caliber of electronics maintenance being performed; the availability of spare parts; and the status of the various engine generators furnishing power to the facilities. The lack of air conditioning in the NAVAID structures is of primary importance. The lack of air conditioning is causing unnecessary failures and instabilities in some equipment due to high ambient temperatures and humidity in the equipment buildings.

EN-ROUTE VOR/DME SYSTEM

SITE NAME	VOR	DME	VISITED	REMARKS
Cabanatuan	485		YES	
Cagayan de Oro	435		YES	
Cotabato	485B		YES	
Davao	485B	496	YES	
Iloilo	585B	496	YES	485 decommissioned but still on site. DME O/S for many months.
Jomalig	585B	496	YES	
Legaspi	485	596	YES	
Lipa	TW-1002		YES	D/VCR
Lubang	585B		YES	
Mactan	585B		YES	
Manila	485B	496	YES	
Masbate	VFS-30D	496	YES	a) old 485/496 site Decom b) D/VCR (new)
Naga	485		YES	
Puerto Princesa	*		NO	*Unknown
Roxas	485B	596	YES	
San Fernando	*		NO	*Unknown
San Jose	485		YES	
Tacloban	485		YES	
Zamboanga	485B	496	YES	
	*485B	496	YES	*585 was installed but due to heat, failed, and the old 485 unit re-installed.
Terminal VOR Sites				
Baguio	476A		YES	13 watt T/VOR
Calbayog	*		NO	*Unknown
Dumaguete	*		NO	*Unknown
General Santos	*		NO	*Unknown. T/VOR
Tuguegarao	485	496	YES	Not in route structure, but should be.

Figure IV-10

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Although some of the VOR and DME equipment installed date back to the late 1960s and early 1970s, the equipment age alone does not indicate a need for replacement. The normal useful life of such equipment is 20 years if they are properly maintained and environmental constraints are followed. It was found that in most cases the constraints were not followed. This does not necessarily mean these systems should be replaced in the near future. It does mean, however, that to extend the life of the systems in question it is imperative that steps be taken to correct existing maintenance and environmental deficiencies.

The problems found to be common in all but a few of the VOR/DME facilities were:

1) excessive heat and humidity in the equipment room;

2) dark interiors causing poor visibility in the work areas;

3) shortage of critical spare parts and extended delays in obtaining replacement parts from Manila;

4) deficient A.C. power at several locations due to a) the use of underrated generators and b) the use of generators to furnish power to facilities other than the VOR/DME sites;

5) replacement of failed generators with equipment not compatible with the original auto/switch equipment causing a lack of automatic standby switching capability;

6) old and unused equipment left at some sites; and

7) operational test equipment that is no longer required but has been left at several sites.

4.5.2 Airport Instrument Landing System (ILS)

Manila and Mactan airports have instrument landing systems installed. The system at Manila has an operational glide path, a localizer with associated DME, middle marker, and an outer marker. The Manila system appears to be in good condition and should serve through Phase I. The status of the system flight check program was not determined.

The Mactan system was recently moved and is still under test at the new location. The system consists of a glide path, a localizer with associated DME, as well as a middle marker. There is no outer marker. The Mactan system equipment is vacuum tube and is near the end of its useful life. It is unlikely that the present system will be operationally adequate at Mactan.

4.5.3 Non-Directional Beacon (NDB)

At present, the BAT is operating 16 NDB facilities throughout the archipelago. Ownership of the NDB facilities varies as follows:

1) BAT-owned

2) PAF-installed and turned over or will be turned over to BAT (i.e., Laoag, Basco, Surigao, Pagadian, and Tacloban)

3) BAT has taken over responsibility and installed equipment to meet a PAF requirement (i.e., Lipa)

In addition, there are 12 NDB's owned and operated by other agencies (PAF, USAF, PAL, USN, PICOP). Such NDB's meet specific agency requirements.

Of the NDB's operated by BAT, only one (Alabat) is considered a part of the enroute NAVAID system. All other NDB's are basically terminal NAVAID's. It is understood that BAT is considering installation of a new VOR/DME facility on Balesin Island to replace the Alabat NDB and Jomalig VOR/DME facilities. If this plan is carried out, the enroute airway system will be all VOR structured. As such, all NDB's will serve as terminal NAVAID's.

The survey team visited ten of the BAT-owned or operated NDB facilities (Figure IV-11). At the surveyed sites, the NDB equipment was found to be quite well maintained considering: 1) the problem of obtaining spare parts in some instances; 2) the age of some equipment; and 3) the lack of air conditioning in all facilities structures (with the exception of Laoag and Tacloban). At Laoag and Tacloban the PAF has installed solid state equipment (Nautel/Canada) and provided air conditioning for the equipment rooms. The solid state equipment should provide reliable service for at least 15 to 20 years if properly maintained. The equipment at Baguio should be replaced early in the program since the NDB is the primary NAVAID for that airport. Likewise, the Bacolod NDB should be replaced, if it is determined that an NDB is required, noting that a TVOR is currently the primary terminal NAVAID for the airport.

At least 10 of the 16 BAT-operated NDB's are located at airports where VOR or VOR/DME facilities are also installed and commissioned. Further, the two PAL NDBs at San Jose and Tuguegarao are also installed at airports where BAT has VOR or VOR/DME facilities in operation. Before additional NDB equipment is purchased for installation at new sites or to replace equipment at existing facilities, a thorough review of the NDB requirements should be conducted to determine if and how many NDB facilities are required in the Philippines air traffic system. Where existing NDBs are no longer required, they

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INVENTORY OF NDB EQUIPMENT AT SITES SURVEYED

SITE	TYPE	MFG	POWER OUT	APPROXIMATE COMM. DATE	REMARKS
Bacolod	TAM-250	REHCO	250W	1964	Old & Inoperative
Baguio	556	Phillips	50W	1973	Very Old
Davao	1000-L	Aerocom	1KW	1973	
Lacag	NX-1000D	Nautel (Canada)	500W	1980	PAF transferring to BAT
Lipa	TW-1201X	Tokyo Shibaura	300W	1980	
Mactan	TW-1201X	Tokyo Shibaura	300W	1976	
Manila	785-E	Wilcox	50W	1980	
Puerto Princesa	1000-L	Aerocom	1KW	1975	
Tacloban	NX-1000	Nautel (Canada)	500W	1980	PAF transferring to BAT
Zamboanga	1000-L	Aerocom	1KW	1973	

Figure IV-11

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6) Purchase additional HF-SSB transceivers to provide main/standby capability at those FSS's presently equipped with one unit.

7) The Las Pinas receiver site should be closed and decommissioned during Phase I. BAT employs some 32 personnel, including 13 electronics technicians, to staff a site operating only 14 type RY-910 HF receivers and a microwave link system (Las Pinas/Manila AFC). Of the 14 operational receivers, 3 are not used and 2 are on the domestic HF-AM air/ground net. The FAA project team has recommended that the HF-AM air/ground network be discontinued. The receivers still required on HF-SSB and HF-ISB circuits should be relocated in the Tagaytay site.

8) For the Laoag facility, the FAA project team recommends that Upon establishing leased teletype and voice circuits (Laoag/Manila):

(a) The HF-CW circuit be decommissioned.

(b) The HF-ISB circuit be decommissioned and equipment be removed for use elsewhere in the domestic HF point-to-point network.

5.1.2.4 International Point-to-Point Communications

The existing system, with the exception of level adjustments, appears satisfactory at this time. However, to meet future requirements when the BAT up-grades the interphone switching system in the Manila ACC, planning should start in Phase I to coordinate the up-grading plans with the ACC's in adjacent FIR's. Planning should include establishing selective signaling (SS-1) on some of the circuits in lieu of the existing ring down (R/D) system presently in use. The exact form that the final engineering will take is dependent upon with the BAT ATC requirements and the success of the coordination between the BAT engineers and their counterparts in the adjacent FIR's.

.1.3 Radar

.1.3.1 Enroute

Prior to the purchase and installation of a civil owned long-range radar system, the Bureau of Air Transportaton should first carry out the following major steps in Phase I.

1) Coordinate with the Philippine Air Force to ascertain whether there is an existing PAF long-range radar in the geographical area under consideration by BAT that could also meet civil aviation requirements.

2) Conduct a joint flight check to determine if the PAF radar will provide satisfactory coverage over the area under consideration.

3) If PAF radar/s do exist or will be in existance in time to satisfy civil aviation ATC system requirements, the Bureau of Air Transportation should initiate a joint-use agreement with the Philippine Air Force to obtain radar and SSR data from the system, and to install agreed-upon electronic equipment in existing PAF site structures or structures to be built by the BAT on PAF-site grounds.

4) Prepare equipment specifications and cost estimates for the purchase of radar and SSR digitizers, PPI's, processors, Link system, ACC operator consoles, inter-phone and air/ground radio systems and all associated ancillary equipment required to remote data to the Manila ACC and display it at the appropriate ATC radar controller position(s).

5) Prepare a detailed project plan, including flow charts and PERT charts, to cover all areas of procurement, installation, construction, training and commissioning from the beginning of the project until completion. (See Figure V-7 for a typical flow chart.) This will assist the BAT in assuring all activities will be carried out in a timely manner in relationship to all phases of the over-all project.

6) Develop a comprehensive long range plan for eventually providing LRR/SSR and RCAG coverage throughout the Manila FIR, with all LRR/SSR's being connected to the Manila ACC.

5.1.3.2 Terminal ASR/SSR Radar

The following actions related to terminal (airport) radar are proposed by the FAA team for Phase I:

1) Replace the Cossor SSR on the Manila Selenia ASR with an ATCRBI-5 system. Move the entire Selenia system to the Bacolod - Iloilo area to provide radar APP for those two airports.

2) At Manila, add ARTS II system to the Toshiba ASR/SSR and 2 BRITE displays in the tower cab.

3) At Mactan, add ATCRBI-5 and ARTS-II systems to the Selenia ASR and 2 BRITE displays in the tower cab.

4) If the Zamboanga Toshiba ASR has not been commissioned or relocated, as recommended in Phase I, this action should be taken on a priority basis early in Phase II.

5.1.4 NAVAID's

The majority of NAVAID (VOR/DME/ILS/NDB) equipment operated by the BAT is or should be capable of providing 20 years or more of satisfactory service from the date of installation. The optimum service life can be obtained if the equipment is properly maintained and the normal operating environment is provided. It is not reasonable to replace equipment with a 20-year useful life every 5 to 10 years. Therefore, it is essential that maximum usable life be realized from all equipment installed.

It is the intent of this section to set forth a plan for the rehabilitation of the NAVAID facilities including electronic equipment, structures, and air conditioning systems, so as to improve system performance and extend the longevity of existing equipment and structures.

5.1.4.1 VOR/DME

Equipment Shelter

Install air conditioners in all shelters. These should be heavy duty, 220V window-type units suitable for mounting in the openings provided by the shelter manufacturer.

One air conditioner should be installed at each facility having solid-state VOR/DME equipment. Two air conditioners should be installed at those facilities with either vacuum tube or a combination of vacuum tube/solid-state equipment. The installation priority is listed in Figure V-8. All VOR/DME structures should be insulated on the interior. Interior ceilings and walls should be painted with a good grade hi-gloss white enamel.

Spare Parts

Expedite procurement of needed replacement parts to restore any failed electronic or electro/mechanical equipment to service. If required, a highly-qualified electronics technician and/or electro/mechanical technician from Manila or Mactan should be assigned to assist site personnel.

AIR CONDITIONING INSTALLATION SCHEDULE FOR VCR/DME SITES

SITE	TYPE VCR/DME	NO. A/C REQUIRED	PHASE I 1982	1983	1984	REMARKS
1. Cabanatuan	485/	1		X		
2. Cagayan de Oro	485/	1		X		
3. Cotabato	485B/	1		X		
4. Davao	485B/496B	2		X		
5. Iloilo	585B/496	2	X			
6. Jomalig	585B/	1	X			
7. Laoag	485/596B	1	X			496 unusable
8. Legaspi	TM-1202	1	X			One unit already installed
9. Lipa	585B	1	X			D/VOR
10. Lubang	585B	1	X			
11. Mactan	485B/596B	2	X			
12. Manila	VRB/50-D/596B	2	X			
13. Masbate	485/	1		X		
14. Naga	*	1		X		*Unknown
15. Puerto Princesa	485B/596B	2	X			
16. Roxas	*	1		X		*Unknown
17. San Fernando	485	1		X		
18. S - Jose	485	1		X		
19. Tacloban	485B/496	2		X		
20. Zamboanga	*485B/496	2	X			*585 to be reinstalled
21. Bacolod	476A	1	X			13 watt T/VOR
22. Calbayog	*	1		X		*Unknown
23. Dumaguete	*	1		X		*Unknown
24. General Santos	*	1	X			*Unknown
25. Tuguegarao	485/496	2		X		
# of Sites Per Year			12 Sites	13 Sites		Priority given in 1982 for sites having solid-state equipment in place.
TOTAL NO. UNITS REQ.		33 Units	17 Units	16 Units		

FIGURE V-8

Engine Generators

Standardize engine generator installations at all sites providing their own power. Generator capacity should be commensurate with load requirements. The original dual 15 KVA generators should be restored if only the VOR/DME facility is to be supplied. If other facilities are also to be furnished with power, in addition to the VOR/DME facility, then larger generators should be installed (e.g., San Jose and Lubang).

Insure that all sites are provided with operating "automatic-changeover" capability designed to minimize system outage time and to reduce the need for 24-hour staffing of generator plants at VOR/DME locations.

VOR/DME Equipment

Balesin Island. The Bureau of Air Transportation is considering the feasibility of establishing a VOR at Balesin Island to replace the existing VOR/DME at Jomalig. As a part of the BAT plan, the Alabat NDB would be discontinued, the White Airway 9 (W-9) would be rerouted direct to the Manila VOR, W-8 from Masbate VOR to Alabat NDB would be discontinued as would W-4 from Samat Intersection to Alabat NDB.

Before the current BAT plan is approved, it is strongly recommended that a detailed study be conducted to determine the impact of the proposed changes on air traffic, on Standard Terminal Arrival Routes, on Standard Instrument Departures and on radar procedures in the Manila Terminal Area.

If the Balesin Island facility is to be established, the following plan is recommended.

1) complete site ground survey;

2) complete site flight test;

3) remove old VOR/DME shelter at Manila International Airport and re-erect at Balesin Island;

4) insulate and paint interior;

5) install air conditioning equipment;

6) procure and install new VOR/DME equipment that meets FAA specification FAA-E-2678 a/1; and

7) engineer power system to insure proper sized generators with automatic changeover are installed to meet main/standby requirements.

It is recommended that any new NAVAID facility be equipped with the latest proven state-of-the-art solid state equipment. Use of the latest technology will increase the likelihood that a new facility will last at least 20 years. The systems in the current FAA specification incorporate modular construction. As such, a DME can be easily converted to a full TACAN should BAT and PAF enter into joint agreements in the future to co-locate VOR & TACAN (VORTAC) systems.

After commissioning the Balesin Island VOR/DME, the Jomalig facility should be decommissioned. The equipment from Jomalig, including the prefabricated structure, should be shipped to Manila. The solid-state 585 VOR should be serviced and used to replace older 485 equipment at an existing VOR site. The 496 DME equipment should be either overhauled or cannibalized for spare parts for use in other 496 systems.

Zamboanga. Insulate and paint the interior of the building. Install air conditioning. Repair, re-install, and commission the 585 VOR damaged by exposure to excessive heat. Remove the old VOR 485 unit and ship it to the Manila depot for overhaul and use at other locations.

Iloilo. Remove the decommissioned 485 VOR which at present is sitting in the VOR shelter. The VOR should be sent to Manila for overhaul and/or cannibalizing for parts to be used to restore other systems.

Manila. Remove the old VOR that is not being used. The old VOR should be sent to the Manila depot for cannibalization or restoration. The VOR shelter should be dismantled and shipped to Balesin Island.

Lubang. Order and expedite shipment of new 15-20 KVA generators to replace present equipment. The new installation should have automatic changeover capability. The existing generator units should be sent to the Manila depot. The generator should be scrapped or repaired for use at other locations. The 485 VOR equipment should be sent to the Manila depot to be used to supply parts for other systems or to be repaired, if possible, for use at other locations.

Lipa. Ship the old excess 485 equipment to the Manila depot for cannibalizing and spare parts.

Tuguegarao. Expedite shipment of spare parts to restore the 496 DME to service. The engine generator installation should be revamped, including automatic changeover. Insure generators have sufficient capacity (minimum of 15 KVA) to meet current and future power requirements. The present installation consists of one 15 KVA Kohler (original) and one 4 KVA standby generator. A 4 KVA generator cannot perform satisfactorily.

San Jose. The existing generators were intended to supply power for a dual VOR/DME facility with air conditioning. Present load requirements include other facilities on the airport during "brown outs". A detailed study of the current total load requirements was beyond the scope of the current effort. A study should be made to determine the load requirements and the extent of additional KVA capacity necessary to meet current and future power needs. The two existing 15 KVA Kohler generators have been well-maintained and operate satisfactorily, including the automatic changeover feature. The existing units could be shipped to another site requiring a power supply of this magnitude, such as Lubang or Tuguegarao.

Excess Equipment

A survey should be conducted to determine where excess 485 VOR and 496 DME equipment is located (e.g., Lubang and Iloilo). The excess units should be shipped to the Manila depot to be either restored or cannibalized for spare parts.

5.1.4.2 Instrument Landing System (ILS)

The ILS at Manila appears to be adequate to serve through 1986. The ILS at Mactan should be replaced with equipment consisting of: 1) a localizer with battery emergency power kit and far field monitor; 2) a glide slope; and 3) a middle marker. An outer marker should be added if it is geographically practical (i.e., if land, power, etc. are available). If it is not practical to add the outer marker, then the DME at the localizer should be replaced with a new solid state DME.

5.1.4.3 Non-Directional Beacon (NDB)

There are two locations for which early Phase I action is required.

1) Baguio - Replace existing NDB with either relocated equipment or new equipment.

2) Bacolod - Determine if an NDB is still a requirement. If it is, replace the existing system. If not required, decommission the existing facility and ship the equipment to the Manila depot for overhaul or disposal.

An extensive review of the NDB requirements throughout the Manila FIR should be conducted. The purpose of the review is to reduce or eliminate NDB requirements where VOR or VOR/DME facilities are already provided or where they are not needed for the TWEB program. No additional NDB equipment should be purchased until a comprehensive inventory of requirements and plan have been developed.

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After developing new NDB requirements, it is recommended that any systems in good condition that are to be decommissioned should be relocated to sites where a new requirement exists or where existing equipment requires replacement. Only after maximum use is made of existing equipment should the purchase of new equipment be considered during Phase I, with the exception of Baguio.

5.1.5 Flight Inspection and Related Activities

Noting the large investment that the Philippine government has made in the purchase of aircraft and employment of personnel to establish Flight Inspection and Rapid Response Support programs, the FAA team recommends that the following actions be given priority.

5.1.5.1 Repair/Restore BAT Aircraft

The necessary budgetary support funds should be provided to repair and restore the two flight inspection aircraft (Queen Air and Cessna 414) and four "quick reaction" Cessna 206 aircraft to optimum mechanical performance. The procurement of new equipment to replace the old NAV and COMM equipment in the four Cessna 206 aircraft should be expedited.

5.1.5.2 Avionics Laboratory

The design, procurement and installation of a standard avionics laboratory should be expedited. The development of the avionics laboratory should proceed in conjunction with the central maintenance laboratory of the BAT Air Navigation Section. The new laboratory should include all racks, benches, mock-ups, test and calibration equipment, power supplies (400 cycle, DC, etc.), regulators and a reliable "screen room", as well as the necessary tools and facilities to troubleshoot and repair printed circuit boards. The laboratory should be equipped to maintain and "precision calibrate" VOR, DME, TACAN, and ADF NAV components, as well as VHF, UHF, and HF air/ground transmitters and receivers and associated flight inspection recording equipment.

The test equipment required in a standard avionics laboratory are very expensive. Therefore, after completing the laboratory design and prior to the purchase of new test equipment, an inventory of all test and calibration equipment presently installed in the existing "electronic repair shop" should be checked to determine what is operable or can be economically repaired for use in the new avionics laboratory.

5.1.5.3 Avionics Training

Simultaneous with the planning for the standard avionics laboratory, a minimum of two well qualified electronic technicians should receive formal training on the maintenance and calibration of the various types of avionics equipment used in the flight inspection aircraft and console. The training should be provided at a recognized avionics training facility. The training should include the various types of specialized test equipment to be installed in the new laboratory.

5.1.5.4 Flight Inspection Training

Three complete crews of flight inspection personnel should be selected from the BAT staff. The crews should be trained and utilized for flight inspection work exclusively. Each crew should include two pilots, one panel operator, and one theodolite operator. Flight inspection activities should be conducted in accordance with ICAO Document 8071, Manual on Testing Radio Navigational Aids.

5.1.5.5 Terminal Instrument Procedures (TERPS) Specialist

The TERPS specialist is charged with the responsibility for the preparation, approval, and promulgation of terminal instrument procedures. The specialist must exercise sound judgement, common sense, and initiative, and must take appropriate action in recognizing both the capabilities and limitations of aircraft and navigational aid performance when developing terminal instrument procedures.

The TERPS specialist must conduct an analysis of individual group system performance, using appropriate flight check information. After developing terminal approach procedures for a given airport, the specialist will coordinate with the flight inspection unit and arrange for the new procedure to be flight checked. The flight check is to assure that the procedure complies with established obstacle clearance as well as approach and departure criteria. After the procedure has been certified acceptable by the flight inspection unit, the TERPS specialist recommends that the new instrument procedure be accepted and published in the AIP.

Considering the large number of airports and the number and variety of NDB, VOR, VOR/DME, and other NAVAID's operating in the Philippines, the need for developing safe and accurate instrument approach procedures is extremely important to flight safety.

B

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NOVEMBER 1985

Project Management Office - Feasibility Studies

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CHAPTER I - INTRODUCTION

1.1 Background of the Project

1.1.1 Importance of the Project

The improvement of transportation facilities is very important for the development of the Southern Tagalog region (Region IV-A) and the Bicol Region (Region V). The existing road network that connects the whole of Bicol and the South-east section of Quezon Province to the rest of Luzon is the Maharlika Highway. The Maharlika Highway plays an important role in the overall highway transport system of the country particularly in the Bicol Region and a portion of the Tagalog region where there are no alternative routes. The Highway links Region V to the northern provinces through a route which passes the towns of Camarines Norte.

The proposed Quirino Highway (Calauag-Tagkawayan-Sipocot) is the major road project within South Luzon. The Quirino Highway is in the unusual position of being potentially a major new access road and major new link in the existing trunk road system of South Luzon. The proposed Quirino Highway is expected to provide the infrastructure support to the agro-industrial development of the economically depressed Bicol Region. The completion of the highway will enable long distance traffic between the Bicol Region and the province of Quezon to shift from the existing Maharlika Highway to the proposed highway, thus, approximately shortening the route by 36-51 kms.The project road will not only make up the vital portion of the trunk road network of South Luzon and replace a very difficult section of the Maharlika Highway which passes through the hilly terrain between Sta. Elena and Daet in Camarines Norte but will also improve the land use pattern of the two regions. The implementation of the project must therefore be geared towards the most urgent use of various potentials conceived in the regions to attain the optimum economic and social development.

1/ NTPP estimated 39.8 kms. savings based on 105 kms. estimated length of Quirino Highway proposed for AC improvement.

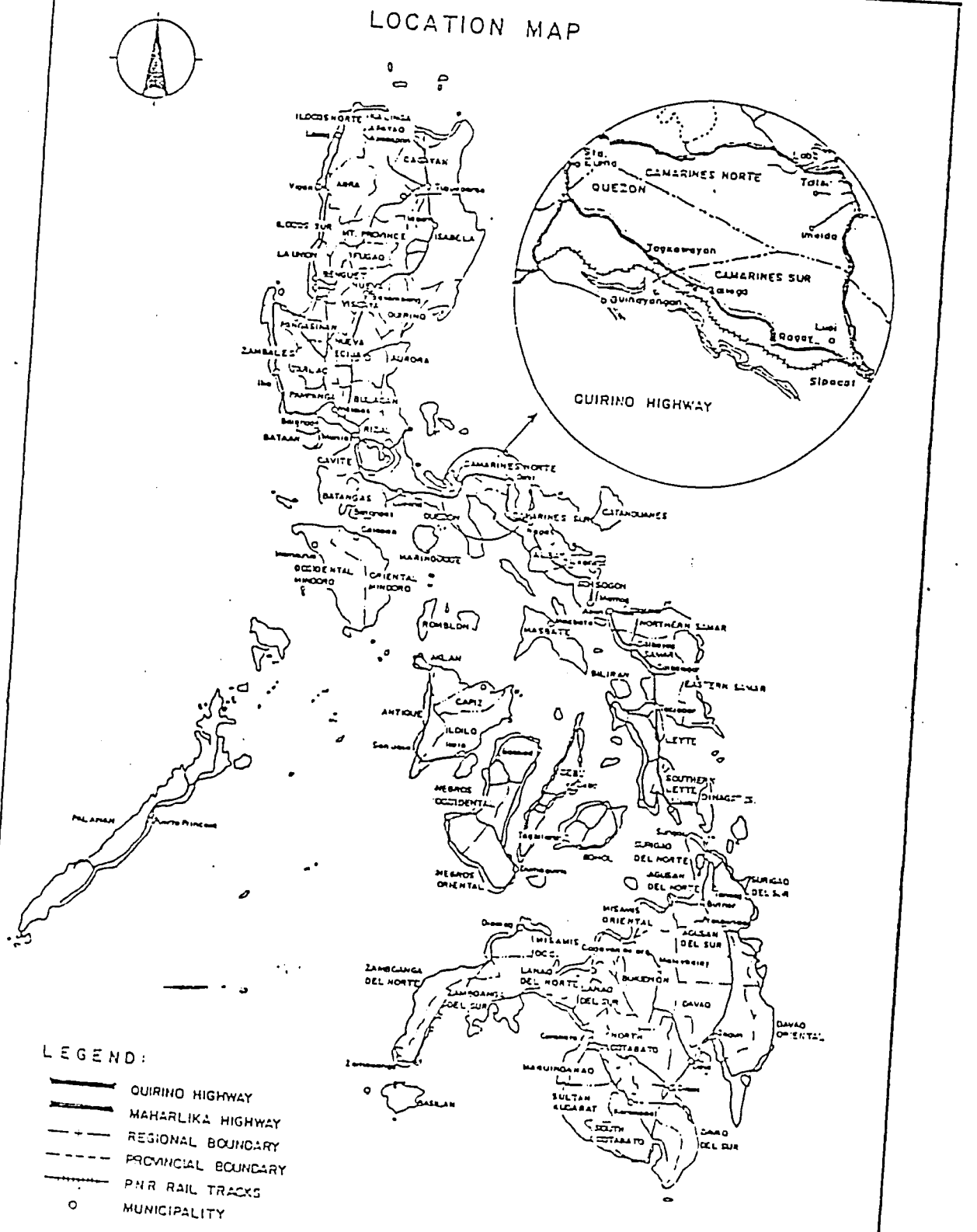

FIGURE 1 LOCATION OF QUIRINO HIGHWAY

In perspective, the final completion of the Quirino Highway will serve the following objectives:

a. To intensify production in the region by accelerating the acquisition of inputs required for agro-industrial production as well as the marketing of commodities produced by the municipalities of the region. The faster flow of commodities to and from the market centers in the north will be an incentive for an increased production not only in the municipalities along the Quirino Highway but also the municipalities of the Bicol River Basin Program Area.

b. To develop the economic potentials of the municipalities along the road corridor and thereby make the area attractive to intensive settlement instead of maintaining its present status of being an out-migration area.

c. To make the region more accessible to investors and tourists coming from the north. The lessened number of hours spent on every trip will motivate investors and tourists to go to the region. Much can be expected from such a situation since production plants and factories are, at the present time, slowly being constructed in areas outside Metro Manila.

d. To bring the inhabitants of the areas affected out of virtual isolation and bring them closer to the main urban centers so that they could benefit from the conveniences and the type of education these centers offer. This will mean that some values and norms which are constructive can be imbibed by them out of the frequent interaction with people from the urban centers.

e. To provide the inhabitants access to health facilities during times of emergency, without being duly dependent on train schedules.

1.1.2 Previous Studies on Quirino Highways

a. Department of Public Works Transportation and Communication (DPWTC) August 1973

Proposed Length of Construction : 95 km

Proposed Improvement : (width: 6.7 m
DBST-Shoulder: 1.5 m
thickness: 10 cm

Proposed Opening Year : 1976

Construction Cost (at 1973 prices): P61.38 M

Feasibility Indicators: (At 15% discount rate)

Net Present Value - P68,887,000

Benefit-Cost Ratio - 2.09

Internal Rate of Return - 29%

b. National Transportation Planning Project (NTPP) August 1982

Proposed Length of Construction : 105 km.

Proposed Improvement : AC width 6.7 m
Shoulder 1.5 m
Thickness 10 cm

Proposed Opening Year : 1987

Construction Cost (at 1981 prices): P146 M

Feasibility Indicators (At 15% discount rate)

First Year Rate of Return 1987 : 30%

Internal Rate of Return : 37%

c. Bicol River Basin Development Program (BRBDP) February 1983

Proposed Length of Construction : 95 km

Proposed Improvement : AC Width 6.7 m
Shoulder 1.5 m
Thickness 10 cm

Proposed Opening Year : No Specified Year

Construction Cost (At 1981 prices): P412.9 M (including ROW)

CHAPTER 2 - SUMMARY AND RECOMMENDATIONS

2.1 Description of the Project Road

The Quirino Highway is in the unusual position of being a potential major access road and through route in the existing trunk road system of South Luzon. The final completion of the highway into a major through route will provide an effective competition to Maharlika Highway and the Philippine National Railway's South Line because of the potential diversion of existing long-distance road and rail traffic particularly the Calauag-Sipocot section.

The proposed project consists of the Calauag-Tagkawayan road (Quezon side) and the Del Gallego-Ragay-Lupi-Sipocot road (Camarines Sur side) which forms the Quirino Highway.

The present alignment starts from Calauag along the Maharlika Highway and veers southeasterly towards Tagkawayan where it runs almost parallel to the Philippine National Railway (PNR) line until it joins the Maharlika Highway in Sipocot, Camarines Sur. The existing road length totals about 120.60 km.

The road is not yet passable throughout especially during the rainy season since there are still many unbridged river crossing within the Camarines Sur Section. Horizontal and vertical alignments are substandard.

2.2 Economy and Traffic

The base of the project area's economy is agriculture, with coconut as the leading commercial crop.

Presently, the PNR serves as the major transport system that connects the municipalities of Del Gallego, Ragay, and Lupi to adjoining market centers. To supplement the inadequate transport service in the area, a number of trips are done by means of rail skates.

The municipalities of Tagkawayan and Sipocot, the trade centers of these five municipalities are reached regularly by rail and road transport while the rest, save for the availability of rail transport, remain in isolation.

Table 2.2 Existing Traffic Volume by Vehicle Type, 1985

Type of Traffic	Traffic Volume (Vehicle/Day)				
	Car/ Van	Jeepney	Bus	Truck	Total
Divertible Traffic 1/	276	195	214	324	1009
Local Traffic 2/	14	10	8	11	43

1/ Source: PNO-FS Traffic Count July 1985 in Calauag, Quezon
2/ Jct. Tabogon-Tagkawayan

2.3 Alternative Road Alignment

A Detailed Engineering Study was undertaken in 1979 on the project road and it was designed as a high standard road with a total length of 92.77 km.

Since the completion of the final design, some improvements were already done on the road in the following sections:

1. Calauag- Tagkawayan section was reconstructed to an all weather gravel road following the alignments in Detailed Engineering design.

2. Sipocot - Lupi - Ragay section was constructed by MPWH Region V Regional Office following alignments deviating from the Detailed Engineering Design.

In this study, three (3) alternative alignments are considered for improvement. See Figure 2 for the alternative alignments considered for Quirino Highway.

Alternative I This is the alignment determined through Detailed Engineering Study undertaken in 1979 by PJHL Project Office and local consultants. The total length is 92.77 kms. Proposed bridges has a total length of 666 lineal meters.

Alternative II. Generally, the proposed road follows the alignments from the final design except on the section between Ragay and Sipocot where a new alignment is adopted following the recently constructed road from Manangle river to Pangaluan river. The total road length is 96.093 km. The proposed bridges has a total length of 573 lineal meters.

Alternative III. The proposed alignment differs from the final design in section between Ragay - Sipocot and Del Gallego provincial boundary while the rest of the length follows the original plan. The total length of the road is 108.404 km. Proposed bridges has a total length of 573 lineal meters.

2.3.1 Proposed Improvements

There are three (3) types of pavements being considered as level of improvements in this study namely gravel, dense graded bituminous macadam, and asphalt concrete pavements.

2.4 Traffic Forecast

The traffic distribution pattern in 1985 was formulated into an OD table by using the source data of NTPP in 1981. The growth of the traffic volume was studied from trends of population and per capita income. The following rates of growths were used to determine the control total of the overall traffic volume.

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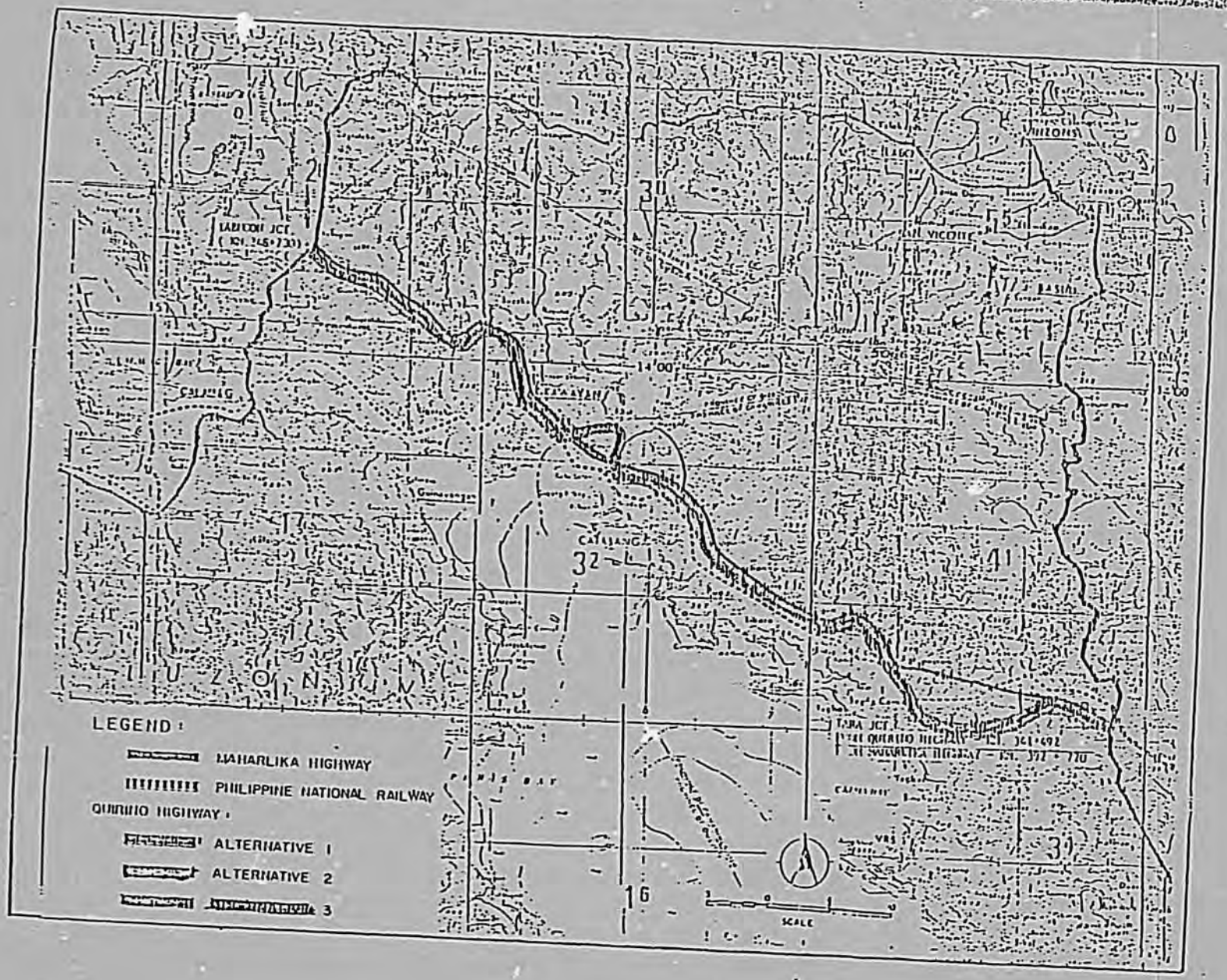
LEGEND :
MAHARLIKA HIGHWAY
PHILIPPINE NATIONAL RAILWAY
QUIRINO HIGHWAY :
ALTERNATIVE 1
ALTERNATIVE 2
ALTERNATIVE 3
SCALE

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Table 2.4 Traffic Forecast By Type of Traffic and By Vehicle Type

	Projected Annual Growth (%)			
	1985 1991	1991 2001	2001 2011	1985 2011
1) Divertible Traffic				
Passenger Vehicles	2.7	3.3	3.9	3.4
Cars	2.7	3.5	4.2	3.6
Vans	2.7	3.5	4.2	3.6
Jeepneys	2.7	3.0	3.5	3.1
Buses	2.8	3.1	3.5	3.2
Commodity Vehicles				
Trucks	11.5	5.1	6.3	7.0
All Vehicles	6.0	4.1	5.1	5.0
2) Local Traffic				
Passenger Vehicles	1.5	2.1	3.0	2.3
Commodity Vehicles	7.0	5.4	2.2	4.2

2.5 Project Cost

The investment cost for each alternative was estimated and shown in Table 2.5.1

Table 2.5.1 Project Cost

Alternative	(Kms.)		Investment Cost Economic (PM)	Financial (PM)
I	92.772	AC	297.5	346.0
		DGBM	244.5	290.0
		Gravel	186.5	210.0
II	96.093	AC	267.0	313.0
		DGBM	215.5	257.5
		Gravel	156.0	182.0
III	108.404	AC	271.5	316.5
		DGBM	218.5	262.0
		Gravel	151.0	177.0

Cost, such as tax and custom duty, which are only transfer payment within the national economy were not included in the economic study.

TABLE 2.6.1 SUMMARY OF THE ECONOMIC ANALYSIS-QUIRINO HIGHWAY

ALTERNATIVE	LENGHT (KMS)	PAVEMENT SURFACE	IMPROVEMENT COST (PM)		ASSUMP.	ECONOMIC INDICATOR (15 %)		
			FINANCIAL	ECONOMIC		B/C	NPV	IRR (%)
I	92.772	AC	346.5	297.5	HIGH	3.27	1,018.21	36.4
					MEDIUM	3.03	912.205	34.7
					LOW	1.78	349.04	24.9
		DGBM	290.0	244.5	HIGH	4.03	1115.99	41.8
					MEDIUM	3.70	993.12	38.9
					LOW	2.19	438.83	28.2
		GRAVEL	210.0	186.5	HIGH	1.15	41.91	17.7
					MEDIUM	1.05	5.705	15.6
					LOW	1.02	3.248	15.3
II	96.093	AC	313.0	267.0	HIGH	3.38	972.42	37.6
					MEDIUM	3.11	863.88	35.6
					LOW	1.85	348.42	25.6
		DGBM	257.5	215.5	HIGH	4.24	1055.26	42.9
					MEDIUM	3.93	954.64	40.8
					LOW	2.32	430.72	28.5
		GRAVEL	182.0	156.0	HIGH	1.34	79.71	19.8
					MEDIUM	1.13	30.12	17.6
					LOW	1.09	21.87	17.2
III	108.404	AC	316.5	271.5	HIGH	2.43	587.16	30.7
					MEDIUM	2.50	615.60	32.9
					LOW	1.40	162.48	21.1
		DGBM	262.0	218.5	HIGH	3.03	670.14	35.2
					MEDIUM	2.82	603.03	33.5
					LOW	2.03	340.30	29.4
		GRAVEL	177.0	151.0	HIGH	1.25	56.18	18.8
					MEDIUM	1.09	19.60	17.2
					LOW	1.01	3.09	16.4

Table 2.6.2

Result of Sensitivity Test By Assumption, By Alternative and Pavement Surface

Alternative			ASSUMPTION High	Medium	Low
I	AC	−20% Cost, +20% Benefit	46.2	44.1	32.3
		+20% Cost, −20% Benefit	28.2	26.9	18.7
	DGBM	−20% Cost, +20% Benefit	51.5	49.1	36.4
		+20% Cost, −20% Benefit	32.1	30.4	21.5
	Gravel	−20% Cost, +20% Benefit	22.9	20.5	20.1
		+20% Cost, −20% Benefit	13.1	11.3	11.1
II	AC	−20% Cost, +30% Benefit	47.7	45.3	33.3
		+20% Cost, −20% Benefit	29.1	27.6	19.3
	DGBM	−20% Cost, +20% Benefit	54.0	51.4	36.8
		+20% Cost, −20% Benefit	33.6	31.9	21.6
	Gravel	−20% Cost, +20% Benefit	25.4	22.8	22.3
		+20% Cost, −20% Benefit	14.9	12.7	12.7
III	AC	−20% Cost, +20% Benefit	39.5	43.1	27.9
		+20% Cost, −20% Benefit	23.4	24.7	15.5
	DGBM	−20% Cost, +20% Benefit	44.9	42.8	38.0
		+20% Cost, −20% Benefit	27.2	25.9	22.4
	Gravel	−20% Cost, +20% Benefit	24.2	22.3	21.3
		+20% Cost, −20% Benefit	14.1	12.6	12.5

2.6 Benefits and Economic Evaluation

The economic benefits realizable in the implementation of the project are the savings in the traffic cost and net value added from generated production which are quantified on the basis of the effectiveness of the proposed highway in the project influence area.

Each of the alternative alignment and road improvement options was subjected to economic analysis using the following:

- The opportunity cost of capital is 15 percent
- Project life is 20 years.
- No salvage value to the road structure after the study period.

This study judge it appropriate to use three level of assumptions, the level of which depend upon the benefit composition, to test the viability of Quirino Highway.

Table 2.6.1 shows the summary results of the economic analysis performed for each alternative and upgrading options on the basis of the methodology adopted and given in Chapter 6 of this report. Table 2.6.2 shows the sensitivity test, using (± 20%) on cost and (± 20%) on total benefits.

2.7 Conclusion and Recommendation

After a thorough engineering and economic studies, it is found that alternative II is the most economically viable alignment for Quirino Highway. The best estimate of IRRs for either AC, DGBM and gravel falls within the proposed Alternative II.

This study recommends that the proposed Quirino Highway be constructed into an asphalt concrete following the recommended alignment-alternative II. with a total length of 96.093 kms. Considering the urgency of the Project, it is recommended that the Government consider the loan negotiation at the earliest appropriate date.

2.8 Implementation Schedule and Annual Cash Requirement

Allowing for 6-9 months period for pre-construction activities and in accordance with the attached implementation plan, the total funding requirement on the basis of preliminary estimates is about ₱313 million broken down as shown below. The amount indicated for the first year 1986 represent mainly for the review of detailed engineering plans and for the preparation of bids and awards. Road-Right-of-Way acquisition is likewise expected to be completed on the first year prior to the actual construction phase to avoid unnecessary delays during the implementation.

The road project is envisioned to be implemented within five years starting with the review of detailed engineering plans prepared by local consultants and the preparation of bids and awards in 1986. Actual construction is anticipated to commence in mid of 1987 and is expected to be completed mid of 1991.

OVERALL IMPLEMENTATION SCHEDULE AND ANNUAL FINANCIAL REQUIREMENT
(P MILLION)

		1985	1986	1987	1988	1989	1990	1991	TOTAL
FEASIBILITY STUDY (THIS STUDY)									
REVIEW OF DETAILED DESIGN PLANS									
FINANCIAL ARRANGEMENT FOR IMPLEMENTATION									
TENDER (8 MONTHS) INCLUDING ROAD ROW ACQUISITION									
CONSTRUCTION (48 MONTHS)									
CONSTRUCTION SUPERVISION (48 MONTHS)									
FINANCIAL REQUIREMENT OCTOBER 1985 PRICE (UNIT: MILLION ₱)	FOREIGN COMPONENT		5.309	19.144	46.482	54.697	44.668	17.321	187.632
	LOCAL / TAX COMPONENT		3.539	12.763	30.995	36.464	29.779	11.547	125.087
	TOTAL		8.848	31.907	77.467	91.161	74.447	28.868	312.719

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CHAPTER 3 - PHYSICAL PROFILE OF THE PROJECT AREA

3.1 Location

The project area within the jurisdiction of Camarines Sur, is situated at the north western quadrant of the Province between 122°42.5' and 123°4' east longitude and between 13°14' and 14° north latitude. While the study area within the jurisdiction of Quezon Province lies within the south eastern quadrant of the province approximately between 122°19.4' and 122°32.3' east longitude and between 14°4.5' and 13°.57 north latitude. It is bounded by the land mass of Calauag in Quezon Province and Ragay Gulf on the north-northwest, the land territory of Camarines Norte and the Sierra de Culasi Mountain on the Northeast, the Libmanan-Cabusao on the Southeast and the Ragay Gulf on the South West.

The area is composed of five (5) railroad municipalities namely: Tagkawayan in Quezon Province, Del Gallego, Lupi, Ragay and Sipocot in Camarines Sur. It covers a land area of approximately 1707.04 km^2.

3.2 Physiography

Due to the inadequacy of records on the physical and hydrologic features of the study area, reference was made to the regional/provincial record to determine the project area's physical development constraints. It has also been assumed that the geologic feature of Tagkawayan in Quezon is similar with that of the four (4) municipalities within the jurisdiction of Camarines Sur because of their physiographic similarities.

3.2.1 Topography

The general topography of the area is characterized by the presence of several hills and mountain ranges.

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The slope ranges from fairly flat along the shorelines to gently undulating/steep slope in the northern portion of the mountain border. The highest elevation of the area is 1,109 meters above the sea level.

Table 3.2.1 shows the areas by slope category and by municipality.

Table 3.2.1 Area in Hectares by Slope Category and By Municipality

Municipality	Slope Category 0-3%	3-18%	18% up	Total
Sipocot	9,019.75	10,350.91	3,710.86	23,081.52
Lupi	1,645.21	15,850.81	4,215.48	21,711.50
Ragay	19,107.45	11,518.46	5,056.02	35,681.93
Del Gallego	12,434.28	4,252.83	7,793.30	24,520.41
Tagkawayan		NO DATA AVAILABLE		

SOURCE: Sipocot - Del Gallego Integrated Development Area
Bicol River Basin Development Program
December 1982

3.2.2 Soils

There are four types of soils identified in the project area. These are the Alimodian clay loam, the Faraon clay loam, Luisiana clay loam and the Bolinao clay loam. These types of soils are classified as soils of hills and mountains as shown in Table 3.2.2. The predominant soil is clay loam of the Alimodian series in Del Gallego and of the Luisiana series in Ragay. Soils of the Alimodian series were derived from shale and sandstone. The relief of the series is rolling to hilly and mountainous. External drainage is good to excessive. Internal drainage is fair. The native vegetation of the area consists mainly of coconut, vegetable, fruit, rice, cogon and talahib. There are small level areas between hill which constitute the ricelands. The clay loam surface soil of the Alimodian

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Table 3.2.2 - Type of Soil By Municipality

Type of Soil	Soil Series and Description	Municipality	Crops Grown
1. Alimodian clay loam	This type of soil belongs to the Alimodian series which were derived from shale and sandstone with rolling, hilly and mountainous relief. Characterized by its medium granular structure, this soil type is slightly fraible when moist, plastic when wet and hard and brittle when dry. The external drainage is from good to excessive while that of the internal drainage is fair. The native vegetation of the area consist of second growth forest, cogon and talahib.	Del Gallego Ragay Sipocot	Coconut, upland rice corn, banana & fruits trees
2. Faraon	This soil type belongs to Faraon series and were derived from coralline limestone. Unlike the Alimodian series, the internal drainage is poor while the external drainage is good to excessive. Characterized by its dark and heavy texture, cultivation is rather difficult due to presence of limestone rock on and in the surface layer.	Lupi Ragay Sipocot	Commercial and non= commercial forest
3. Luisiana	This soil type belongs to Luisiana series which were derived from igneous rocks. Characterized by its good moisture retentivity and good tilth the external drainage is good to excessive while the internal drainage is good. Soil loss through erosion are hardly realized by farmers because of the depth and excellent physical condition of the soil. U-less soil conservation measures are adopted immediately this favorable condition may not last longer.	Sipocot Lupi	Coconut, upland rice, corn, banana pasture land
4. Bolinao Clay loam		Tagkawayan	Coconut, pastureland

series is light brown to dark brown, reddish brown or grayish brown. It is of medium granular structures, slightly fraible when moist, plastic when wet, and hard and brittle when dry. In some places, gravel, two to three millimeters in diameter are present on the surface. The surface layer reaches to a depth of 25 centimeters. A smooth and abrupt boundary separates this layer with the subsoil.

Soils of the Luisiana series were derived from igneous rocks. They are deep, have good moisture retentivity of good tilth, and are generally red. The relief of the series is rolling to mountainous. External drainage is good to excessive. Internal drainage is good. Vegetation consists mostly of primary and secondary forests. Cultivated crops are upland rice, corn, bananas and root crops. The clay loam surface is brown to reddish brown. The soil is loose and fraible with a prismatic to columnar structure. The layer is 25 to 30 centimeters deep.

3.2.3 Geology and Geomorphology

As shown in Figure 3.2.3 the geologic feature in the project areas are made up of volcanic and metavolcanic rocks intercalated with volcanic sediments. The lowland is covered by alluvium and terrace gravel. These recent deposits are unconsolidated, predominantly of volcanic origin and stream deposited. The poor bedrock foundation in the project area is attributable to the poorly consolidated sediments. The compressive strength of the sediments renders these geologic structures unsuited for building. The highly suitable areas are the volcanic and metavolcanic diorite rocks while the moderately suitable bedrock foundation are the old sediments and pyroclastic. Hondagua silt is found between Lopez and Calauag along the railroad line and main highway. The formation consists chiefly of thin bedded gray silt; in the vicinity of Hondagua Railway Station many thin but massive beds are present.

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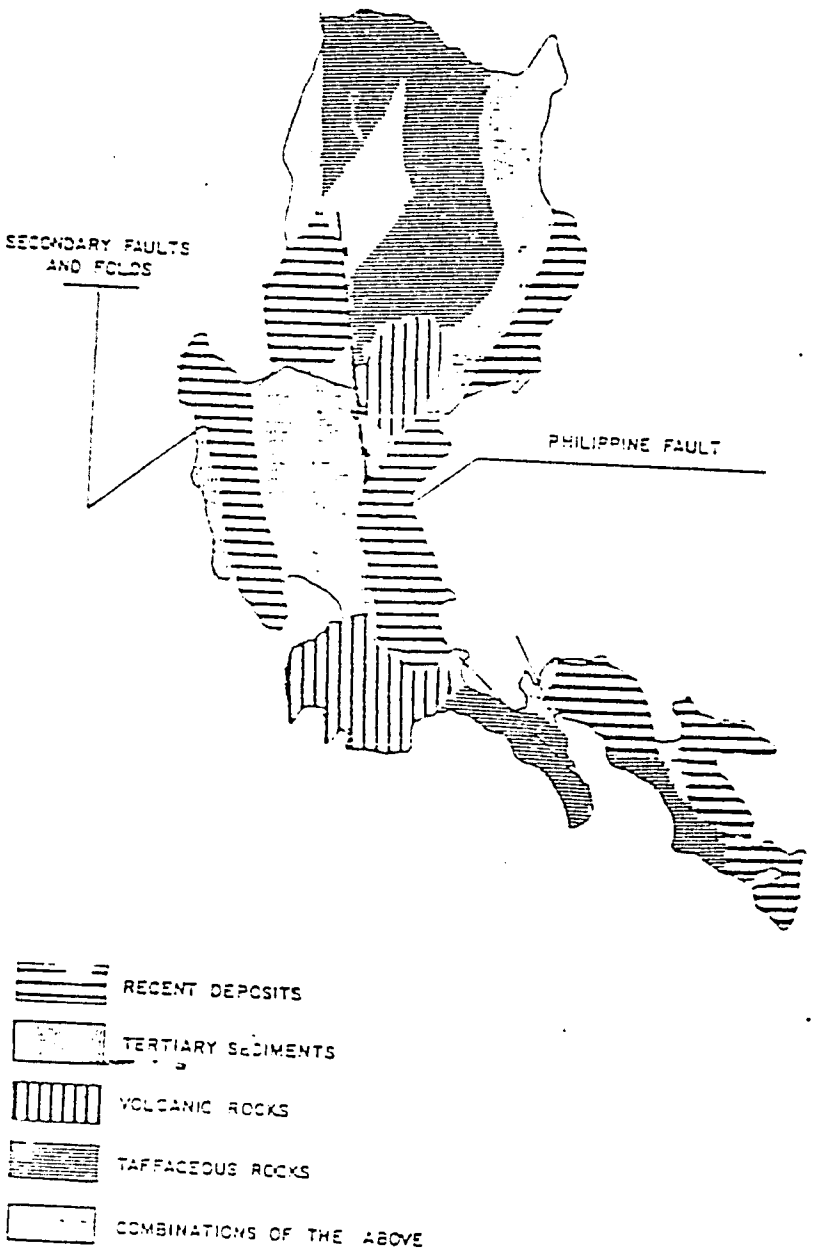


FIGURE 3.2.3 GEOLOGIC FEATURE

The Hondagua silt has an approximate thickness of 1000 meters. Its age is Tertiary Upper X and Y. Hondagua silt is overlain by Sumulong formation.

The basement rocks and the overlaying sequence of metamorphosed volcanics found in the western isthmus plunge under the sediments of eastern isthmus. A large syncline between Gumaca and Pitogo lies between two areas of basement rock. The folding is steep and minor crumpling is common. The southeast plunging syncline extends northwest to Arimonan. The structure between Pitogo and Guinayanan is that of an intensely folded through. A small fold maybe present on the Peninsular north of Hondagua.

Igneous rocks such as basalts and andosite diorite and other volcanic rocks are found in the mountains and hills in the central and northern portions of the province.

In Camarines Sur side, generally, the surface soil is deep and not underlain by clay pan or hard pan. The subsoil is moderately dense or compact. The underlying rock consists of diorite, peridotite, andesite and basalt. Around the vicinity of Ragay to Sipocot, coralline, limestone, calcareous shales and sandstone predominate. The rolling and mountainous areas in the eastern part of Sipocot, the northern part of Lupi, Ragay and the whole area of Del Gallego consist of volcanic rocks of basalt-andersites, agglomeratesm and tuff.

The major rivers, Kilbay, Catabangan, Paculago, and Cabatbatan flow into the Ragay Gulf and are thus affected by tides. These together with four other rivers originate in the mountains or hills within the proposed project area.

3.2.4 Hydrology

Flood plains are portions of a river valley adjacent to the river-channel which are built of sediments during

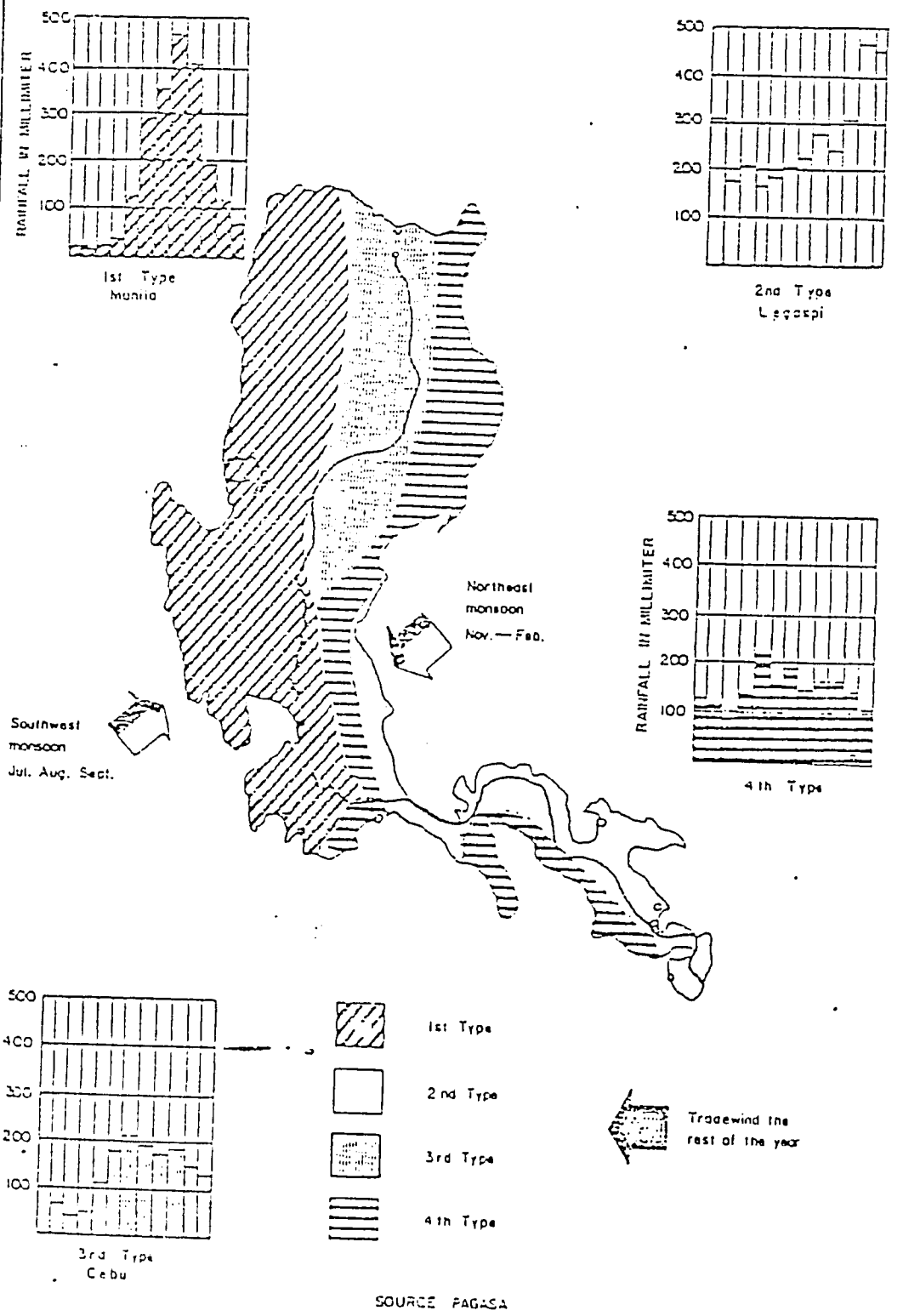
the present regime of the stream and are covered with water where the river overflows its banks at flood stages. It is predominantly level with slopes up to five percent. The river flood plain consists of alluvium of complex geological origin. The river flood plains in the region is predominantly used for wetland rice cultivation more than two-thirds of which is irrigated. Since the region is greatly affected by tropical storms and typhoons whose intensities are severe, the Bicol River Basin has extensive flood damage problems in the flood plains. The river flood plains while the estimated affected areas during periods of major floodings are 42,000 hectares mostly located in Camarines Sur.

There are four major rivers in the project within the jurisdic tion of Camarines Sur namely: the Sipocot River, Ragay River, Kilbay River and the Paculago River. Sipocot River which has a drainage area of 447 square kilometers meanders on the southeasterly direction until it meets the Bicol River eight kilometers from San Miguel Bay. It serves as a drainage way to a portion of Camarines Norte and the project area. Ragay river passes through the main urban core of the town with an average width of 375 meters. On the other hand, Kilbay river in the north-western portion has a maximum width of 300 meters on the mouth of Catabangan Bay while that of Paculago river has an average width of 50 meters. Except for Sipocot river, the three other rivers mentioned drain to the Ragay Gulf.

There are four small rivers in the Jct. Tabugon, Calauag-Tagkawayan side of the project area; the Gumiham, Umiik, Kabibihan and Kinatakutan rivers.

3.3 Climate

The climate and rainfall distribution in the study area is shown in Figure 3.3. The type of climate in the Philippines is classified according to rainfall



SOURCE PAGASA

FIGURE 3.3 TYPE OF CLIMATE AND RAINFALL DISTRIBUTION

characteristics.

First Type : Two pronounced seasons, dry from November
To April, wet during the rest of the year.

Second Type : No dry season with a very pronounced maximum rainfall from November to January.

Third Type : No very pronounced maximum rain period with relatively dry from November to April and wet during the rest of the year.

Fourth Type : No very pronounced maximum rain period and no dry season. Rainfall more or less evenly distributed throughout the year.

The study area falls within the second type and fourth type of climate.

The climate in Quezon Province is classified into two distinct types depending upon the characteristics of rainfall received in the particular place during the different months of the year.

The first type of climate is characterized by no dry season with pronounced maximum rain period. The places that fall within this type of climate are the southeastern portions of the mountain ranges. It is represented by weather data from Infanta, Calauag, and Lucena. Infanta has a record for 28 years, Calauag for 11 years and Lucena City for 33 years. The maximum rain period occurs from October to January.

The second type of climate is characterized by more or less even distribution of rainfall throughout the year.

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The regions affected by this type are the northern and southern portions of the province. It is represented by weather data from Baler, Casiguran and Aurora. Baler has 50 years record. Casiguran 14 years and Aurora 12 years.

The dividing line of this types of climate runs north to south. This is due to the fact that most of the mountain ranges in the province run north and south.

Temperature in the province ranges from 23.7°C to 28.7°C. This is more or less a mild temperature. The cool months occur from December to February and the warm period from April to August.

There are several distinct prevailing wind directions in the province. The northeast monsoon sets in from May to November. This monsoon blows between north and northeast with tendency to go easterly direction at the end of the season. It has normal average velocity of 4 to 7 miles per hour. This monsoon brings the heaviest rainfall on the eastern side of the province facing the Pacific Ocean.

After the northeast monsoon comes the southwest monsoon which blows during the months of June to September reaching a mean average velocity of 5 to 7 miles per hour. This southwest monsoon brings also torrential rains but not evenly distributed. The east northeast monsoon blows in Baler area from January to May and November with tendency to go east at the end of the season. The rest of the months have the westerly winds. In the other areas there are also the southerly and westerly winds. The southerly wind blows from May to September, followed by northwinds, This is true to the northernmost portions of Quezon.

When the northeast and southeast winds blow, the

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sea becomes very rough which make navigation difficult. The west and southwest winds affect the western side of the province, while the northeast and east northeast winds affect the east side of the province, Quezon is frequently visited by typhoon because of its geographical location.

Climate in the province of Camarines Sur is generally tropical. The climatic control over the area are two air stream systems which produce distinctive variations in the climate. These air stream systems are the monsoons and the Pacific tradewinds.

The northeast Monsoon, associated with the northern hemisphere winter, extends from October to March, bringing significant amounts of rain to the Bicol area, including the project area. The south east Monsoon, originating in the Indian Ocean, affects the project area during the southern hemisphere winter from May to October. During this period the area is warm and very humid with increasing rates of rainfall.

The north Pacific tradewinds prevail during April and May, raising the temperature significantly. The south Pacific tradewinds coincide with the southwest monsoons from May to July.

The rainfall distribution in the area is influenced by the air streams, tropical cyclones, the Inter-tropical convergence Zone and the topography. The mean annual rainfall in the area ranges from 2,000 to 4,000 mm. The period from May to January is generally the rainy season. The lower amounts of rainfall in this area may be due to the sheltering effect of the hills and the mountains surrounding it. The high rainfall over the mountains is caused by organic effects. Large amount of rainfall occur in the project area during the typhoon season. The mean monthly range of temperature is from 23.4°C in December to 27.4°C in June.

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CHAPTER 4 - SOCIO-ECONOMIC PROFILE

4.1 General

The Quirino Highway is in the unusual position of being a potential major access road and through route in the existing trunk road system of South Luzon. The potential investments for Quirino Highway can be considered mainly within the framework of traffic related appraisal methodology. The Quirino Highway can be considered not only as a cost reducing investments for traffic passing between the Bicol region and the rest of Luzon island but also as a primary access road. The final completion of the highway into a major through route will provide an effective competition to Maharlika Highway and the Philippine National Railway's (PNR) South Line because of the potential diversion of existing long-distance road and rail traffic, particularly the Calauag-Sipocot section.

One of the appraisal methodologies that could be used for this type of project is to separate the analysis and decisions upon the access road and the through route for long-distance traffic[1/]. It could be argued that for the socio-economic development of the area a minimum level of road access is essential. If such a decision were to be made, then the Quirino Highway at a higher standard can be assessed purely on the basis of the benefits of traffic diversion from the Maharlika Highway and benefits to estimated local traffic of standard above the all-weather access road. Since the Quirino Highway was deemed to be economically feasible as a paved road during 1981-1982 NTPP Study, on the basis of cost/benefit analysis that included favorable assumptions on the traffic volume and operating effeciency of PNR, the present study will reevaluate all the cost/benefits components of the proposed highway reflecting all the adjustments made as a result of low economic performance and revision of economic growth targets.

1/ NTPP

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4.3 The Quirino Highway As An Access Route

4.3.1 Role

The Quirino Highway, if constructed with a hard, all weather surface, would end the relative isolations of the 5 railroad municipalities; namely, Tagkawayan, Del Gallego, Ragay, Lupi and Sipocot, and its consequent peace and order problem. The new road alignment will straight away provide all the important railroad towns the facility of road travel, both for local short trips and long distance travel[1/] towards Manila and Naga. The proposed highway as an access road is expected to give rise to short distance bus/jeepney shuttles predominantly between Calauag and Sipocot and perhaps to some extend up to Lucena and Naga. The project road would help divert the large flow of passengers and commodities now using "skates" as a means of transportation on the rail line. The whole provinces of Camarines Sur and Quezon are delineated as the road's direct influence areas. See Figure 4.1 for roads direct influence area.

4.3.2 Socio-Economic Features of the Road Influence Area.

4.3.2.1 Population

The population of the Project Area presently served by the South Luzon rail line totals approximately 202,376 in 1980. It represent almost 9 percent of the total population of the provinces of Quezon and Camarines sur.

Table 4.2.2.1 shows the present and past populations of the municipalities of Project Area together with the provinces of Quezon and Camarines Sur. It also give the average population densities and the annual rates of growth for the intersensal periods 1960-1970, 1970-1975 and 1975-1980. The five municipalities along Quirino is an

1/ At present Superlines Bus Company provide 2 trips daily for Manila bound passengers in Tagkawayan.

out migration area as shown by the annual growths rates which is declining. This would be perhaps attributed to peace and order situation and depressed economic conditions aggravated by lack of transport facilities, particularly roads.

Table 4.3.2.1 Population of Project Area (1960-1980)

Province/ Municipality	Population				Annual Rate of Growth (%)		
	1960	1970	1975	1980	1960-1970	1970-1975	1975-1980
Quezon	653,426	983,324	1,115,962	1,145,147	4.2	2.6	0.5
Calauag	37,101	49,113	54,035	57,907	2.8	1.9	1.04
Tagkawayan	28,664	32,697	32,187	31,381	1.3	-0.3	-0.5
Camarines Sur	819,565	948,436	1,023,819	1,102,723	1.5	1.5	1.5
Del Gallego	11,820	12,664	13,754	13,476	0.7	1.7	-0.4
Lupi	16,981	18,419	19,682	21,216	0.8	1.3	1.5
Ragay	27,925	32,635	32,798	34,891	1.6	0.1	1.2
Sipocot	32,650	38,153	39,457	43,505	1.6	0.7	2.0

SOURCE: National Census and Statistics Office, Manila

Figure 4.3.2.1 shows the 1980 population distribution in the project area.

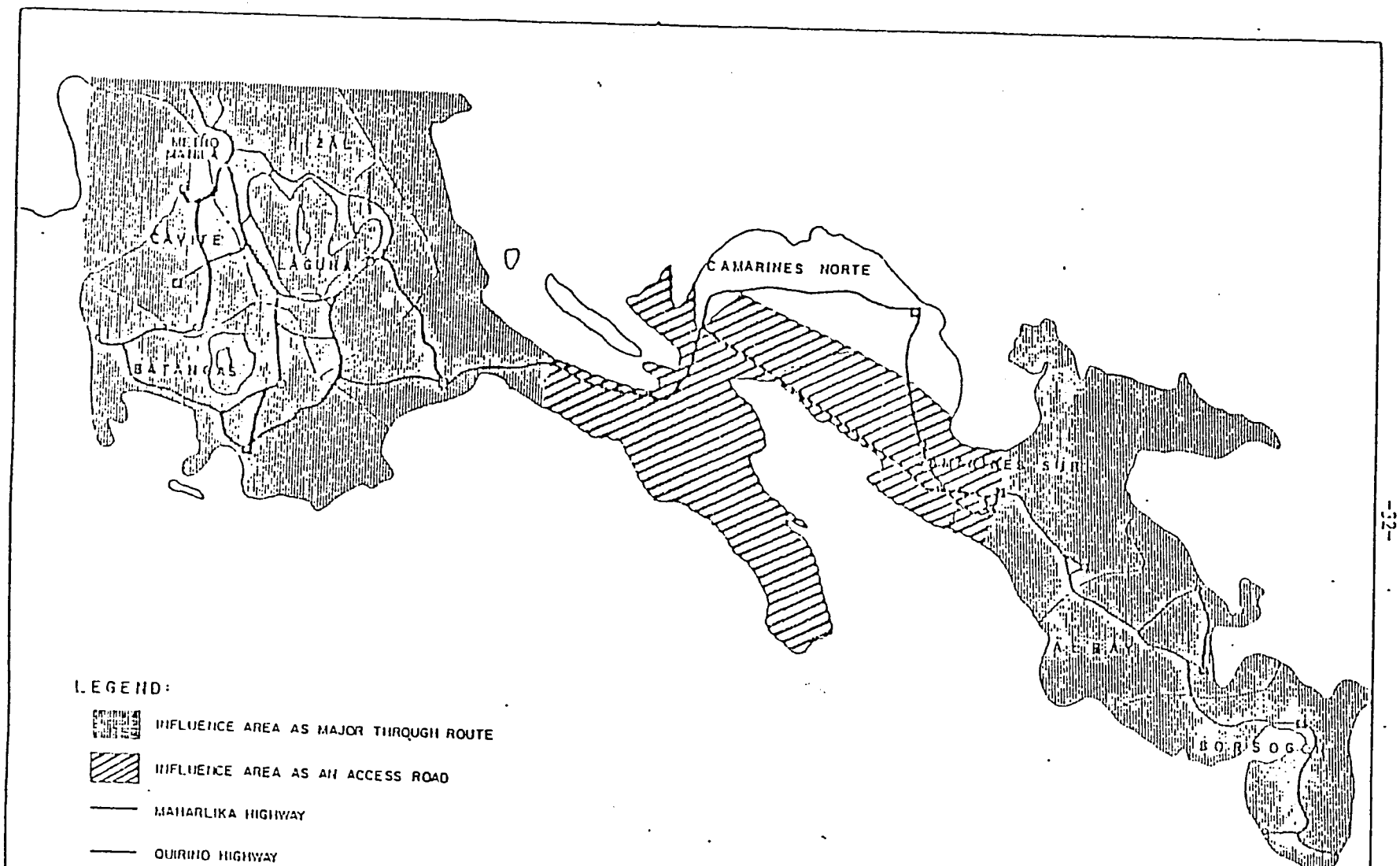

FIGURE 4.1 INFLUENCE AREA OF QUIRINO HIGHWAY

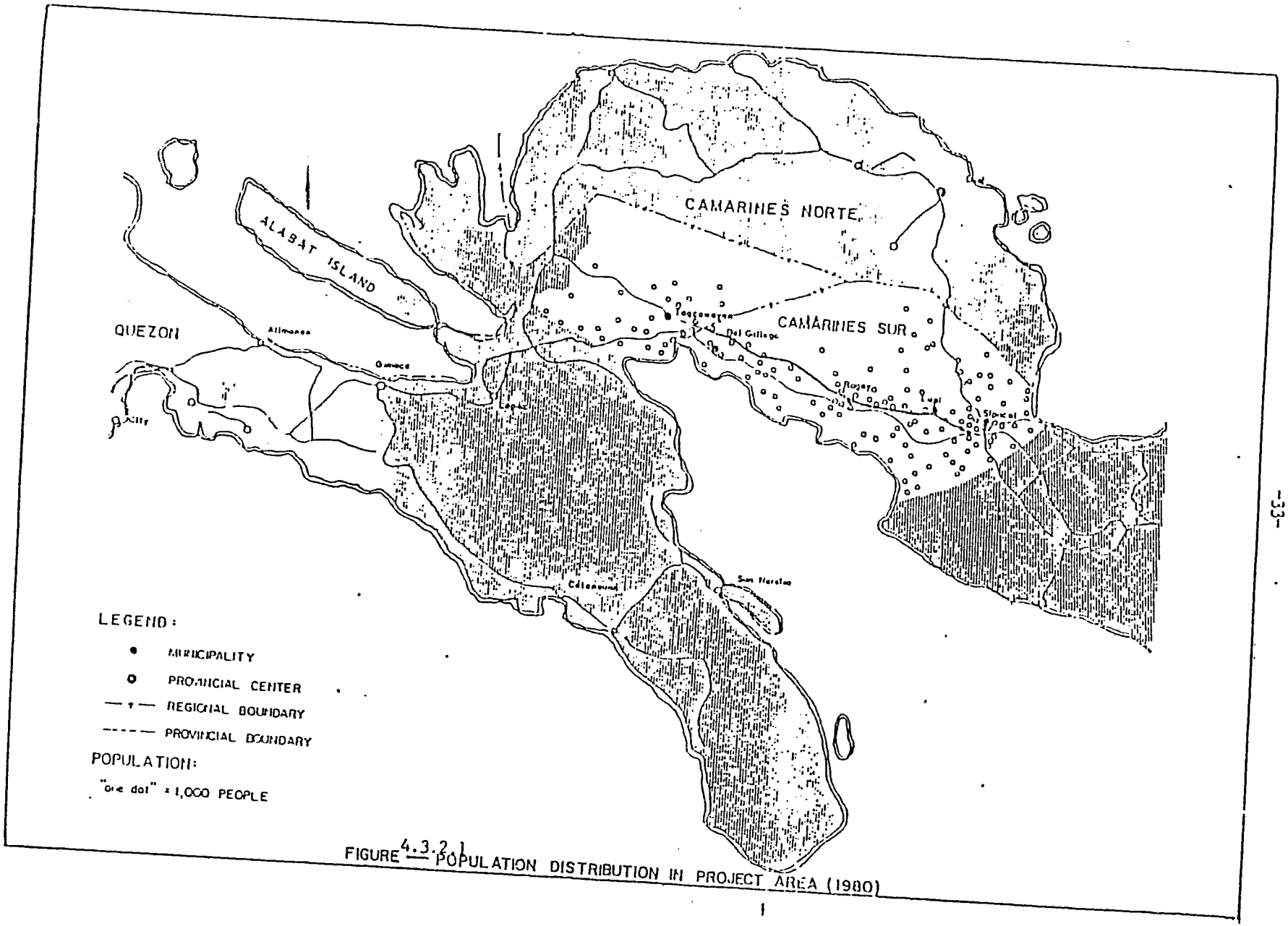

FIGURE 4.3.2.1 POPULATION DISTRIBUTION IN PROJECT AREA (1980)

4.3.2.2 Existing Land Use

Land Use Pattern

The project area covers a total of 170,956.6 hectares An estimated 169,367.7 hectares have been classified while 1,333.5 hectares are unclassified in terms of land use. Table 4.3.2.2 shows the land use pattern in the project area.

Agricultural land use account for 51.00 percent or about 87,188 hectares which are classified into temporary crops, 13.79 percent or 23,575 hectares; and permanent crops, 63,613 hectares or about 37.21 percent. Built-up areas comprised of the residential, commercial and industrial zones account for 1.56 percent or about 2,667 hectares.

Forest and parks account for 52,484 hectares or 30.70 percent of the project area. About 1.72 percent of 2,940 hectares are mangroves and swamps area while pastures and open grasslands cover a total of 12.78 percent or 21,848.2 hectares. The fishpond areas which are developed, abandoned and unproductive cover an aggregate total of 2,240 hectares. The remaining 256.4 hectares are devoted to miscellanoues land uses which include waterways, land transport, power and right of ways.

Figure 4.3.2.2 shows the land use classification on the project area.

Table 4.3.2.2 Land Use Pattern, Project Area 1980

	Area (Hectares) 170,956.5	Percent 100.00
Agriculture Zone	87,188.0	51.00
Fishponds	2,240.0	1.31
Mangroves, swamps/ marches	2,940.5	1.72
Pastures and Open Grasslands	21,848.8	12.78
Forest and Parks	52,484.0	30.70
Built-up Area	2,667.0	1.56
Miscellaneous Land Uses	254.7	0.15
Unclassified Land Area	1,333.5	0.78

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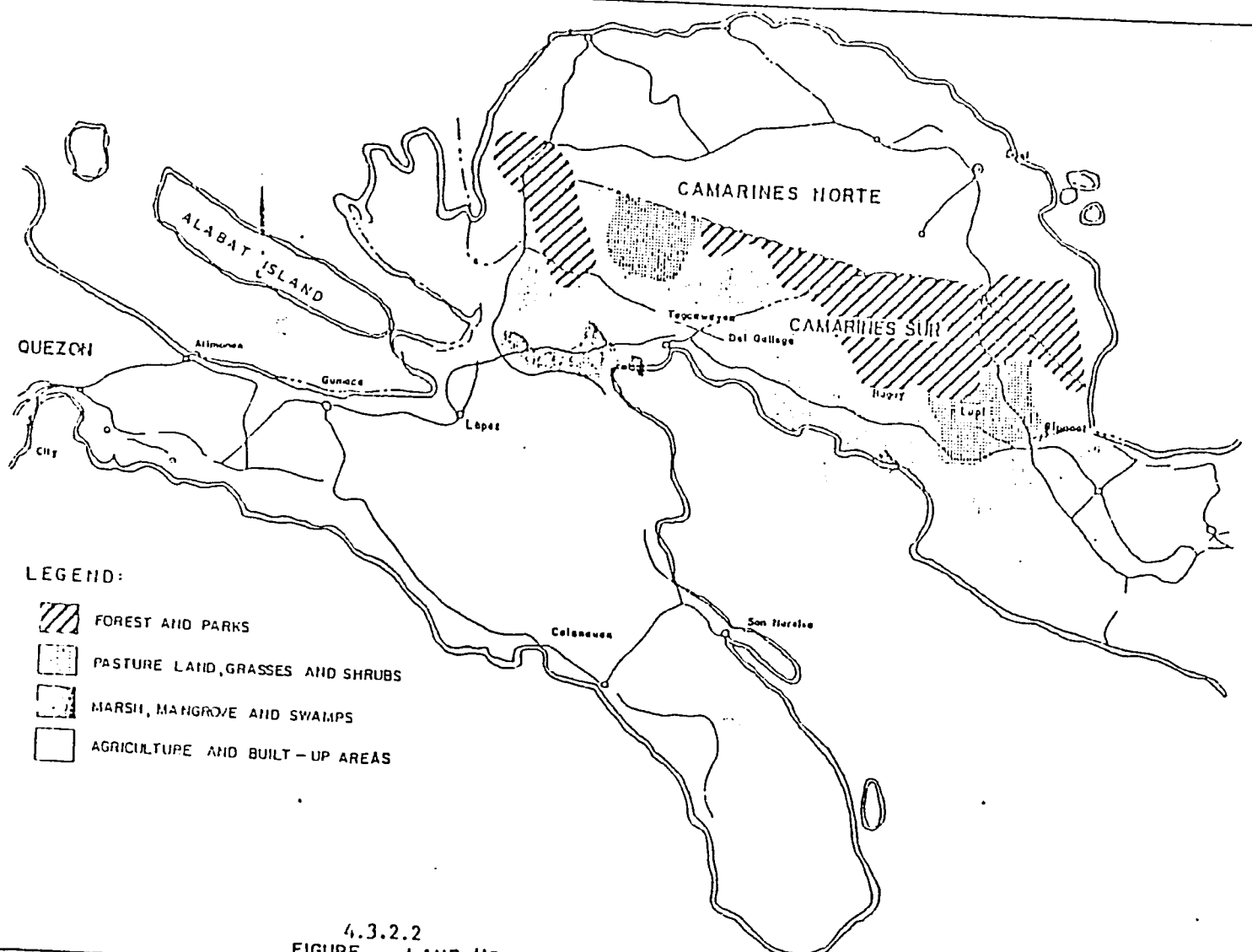

4.3.2.2
FIGURE — LAND USE MAP OF TAGKAWAYAN — SIPOCOT AREA

4.3.2.3 Major Economic Activities

a. Crop Production

Coconut

Coconut is the leading commercial crop in the road influence area. Of the total crop area of 64,079 has. in the Sipocot-Del Gallego area, and 38,820 has. in Tagkawayan, 33,690 has. and 21,000 has., respectively are planted to coconuts. Out of 10,503,166 coconut trees, 9,535,386 (90.79%) are bearing. Average nut yield/tree/year ranges from a little more than 2000 in Tagkawayan to about 7000 in Ragay. In 1984, bearing trees produced an estimated aggregate production of 43 billion nuts, 99.8% of which was used in the production of 12.2 million metric tons[1/] of copra. (See Table 4.3.2.3-1).

At present, a total of 212,86 has. is being cultivated for hybrid coconut in the influence municipalities with the support of the Philippine Coconut Authority. It is envisioned that after four to five years this variety would yield an average of from 2-4 metric tons of copra/ha./year.

Palay

Palay production in the project area is low compared to other rice producing municipalities in Camarines Sur and Quezon which can be attributed to its mountainous, hilly terrain. Most rice farms are rainfed/upland. In 1984 with the total effective area of about 8,000 has., palay production was placed at 21,686 metric tons. Average yields/ ha. were 4.0 metric tons for irrigated and 3.0 metric tons for rainfed/upland. There were 1,235 has. irrigated farms; 2,484 has. rainfed and 3,098 has. upland. (See Table 4.3.2.3-1).

1/ Using the Philippine Coconut Authority's prescribed conversion of 3.5 nuts = 1 kg. copra.

Table 4.3.2.3-1
AGRICULTURAL PRODUCTION
Major Crops, 1984
Quirino Highway Project Area

CROP/AREA/PRODUCTION	Proj. Area I*	Proj. Area II**	Proj. Area I	Proj. Area II
Total Crop Areas (has.)	64,079	38,820		
Coconut				
Area (has.)			33,690	21,000
Production				
Nuts			33,267,570,840	9,481,200,000
Copra (m.t.)			9,502,244.9	
Palay				
Area (has.)				
Irrigated			835	400
Rainfed			1,984	500
Upland			2,998	100
Yield (m.t./ha.)				
Irrigated			4.0	4.0
Rainfed			3.0	3.0
Upland			3.0	3.0
Rootcrops				
Area (has.)			1,542	
Yield (m.t./ha.)			5.0	

SOURCE:

Philippine Coconut Authority
Municipal Development Offices of the Project Area

*Refers to Sipocot, Lupi, Ragay and Del Gallego
**Refers to Tagkawayan

NOTE: Palay and rootcrop yields were estimated as the average of the influence municipalities.

Rootcrops

Farms cultivated to rootcrops in the Sipocot-Del Gallego area totals 1,542 has.. Rootcrops grown are cassava, sweet potato, gabi and ubi species with an aggregate production of 7,710 metric tons in 1984 Average yield was placed at 5.0 m.t. per hectare. Based on 1984 farmgate prices of the Bureau of Agricultural Economics, total value of rootcrops production was estimated at ₱7.4 million which suggests positive returns if these crops are produced in commercial quantities. (See Table 4.3.2.3-1).

Other Crops

Although crops such as corn, vegetables, fruits and nuts, sugarcane and abaca are grown in the influence municipalities, there were limited data obtained on the volumes and values of production of these crops. They are generally cultivated on a backyard scale.

b. Livestock and Poultry

As of 1980, livestock inventory in the Sipocot-Gallego area showed some 39,572 heads, of which 30,618 were hogs, I,247 cattle and 6,326 carabaos. The remaining 1,381 heads were goats and horses. Poultry population during the same year was estimated at 91,692, of which 89,851 were chickens and 2,539 were ducks and other fouls.

In Tagkawayan, livestock and poultry raising are usually operated on a backyard scale, primarily for home consumption. In 1982, there were 2,492 heads of cattle and 3,560 heads of carabaos. Swine and chicken totalled 36,506.

c. Fishing

There are three major fishing grounds within the road influence area in Camarines Sur, namely: San Miguel

Bay, Ragay Gulf and Calma Bay. Fish landed by commercial fishing in 1980 reached a total of 457.1 metric tons of fresh fish. Inland fishing on the other hand, yielded 194.67 metric tons. Municipal/ sustenancefish production was estimated at 2,574.22 metric tons.

Fishing is one of the major sources of livelihood in Tagkawayan. As of 1981, fishpond areas alone cover 824.21 has. of which 544.22 has. are developed while the remaining 299.99 has. considered underdeveloped are also being eyed as potential fishing grounds.

d. Forestry

As of 1980, there was a total of 26,399.81 hectares of timberland in the project area with a production of 54,576.09 cubic meters of timber or an average yield of 2.07 cubic meters/hectare. There were four timber licenses producing logs within the influence area.

4.3.2.4 Income

Based on the NCSO data, per capita income in 1975 ranged from as low as P933 in Ragay to P1,398 in Del Gallego. Table 4.3.2.4 shows average household and per capita income in the project area.

Table 4.3.2.4: Income
Per Household and Per Capita
Quirino Highway Project Area
1975

Municipality	Income Per Household (P)	Income Per Capita (P)
Camarines Sur	5,284	852
Sipocot	7,987	1,316
Lupi	7,523	1,205
Ragay	5,576	933
Del Gallego	8,388	1,398
Tagkawayan	5,563	962
Calauag	8,747	1,467
Quezon	6,178	1,072

SOURCE: National Census and Statistics

The data, however, would have been more significant if total family households, belonging to the low-income or high-income categories have been indicated. The family and per capita income in the project area are higher than the provincial average. In this case, family and per capita income do not show the true condition in the area with regards to poverty levels and distribution of income. This might be attributable to the following factor.:

1. The project area is sparcely populated compared to other town in Quezon and Camarines Sur.
2. The sample size for the income data by municipality was likely to be very small.

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4.3.2.5 The Existing Transport System

a. The Road Facilities

The municipality of Tagkawayan is linked by a gravel road to Maharlika Highway but this road is only of immediate benefit to those living around the poblacion, the rest of the population live along the line of rail, which is the maximum, approximately 6 kms. away from the proposed road as shown in Figure 4.3.2.5-1 1/.

While there is a 30 km. gravel road up to Tagkawayan and a track, motorable only by four-wheel drive vehicle to Del Gallego, there is no good road access to the towns between Tagkawayan and Sipocot. The main mode of transport serving the Calauag-Tagkawayan-Sipocot segment is rail, a distance of 97 kms.

Sipocot's poblacion has a commercial advantage in its locations in respect to the Maharlika Highway and PNR. The navigable Sipocot River flows into the Bicol River, which in turn empties into San Miguel Bay. Inter-municipality transportation routes include the national Highway, the railroad line motorboats connecting Sipocot coastal barangays to Sipocot's neighboring municipalities and a system of trail and barangays farm-to-market roads. However, the barangays in the western part region of the municipality, on or near the Ragay Gulf coastline, are very difficult to reach and have poor communication with the municipal government located in the poblacion. Travel to these barangays is usually by way of railroad to Ragay and from there by hiking or by motorboat. Hence, most trading activities in these part of Sipocot are negotiated in the neighboring municipalities of Ragay or Lupi, rather than in the town's own market in the poblacion.

1/ This road is well away from the rail alignment and is not much use for barangays of Sumulong, Aloneros and Kinatakutan.

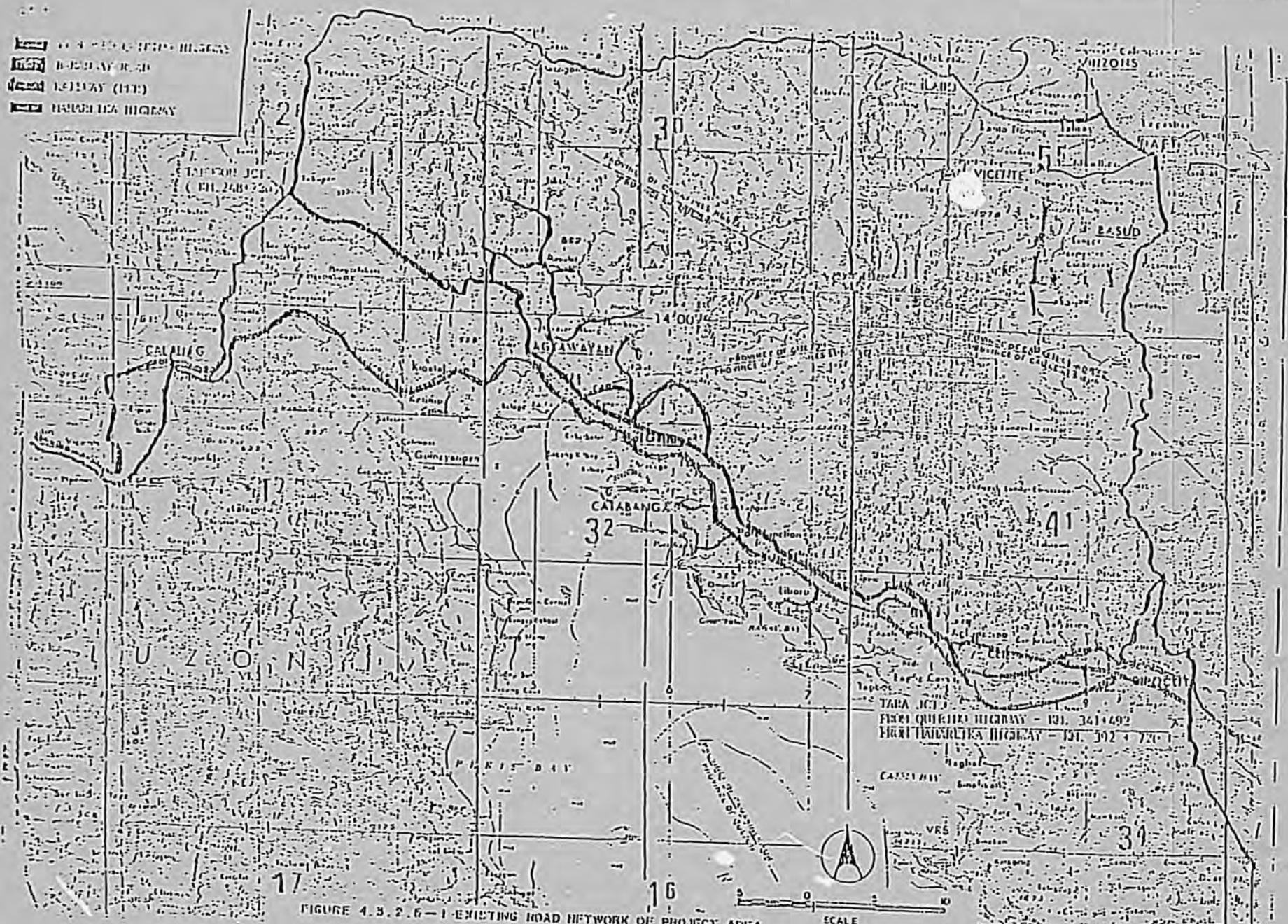

FIGURE 4.3.2.6—1 EXISTING ROAD NETWORK OF PROJECT AREA

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Lupi is linked with Maharlika Highway through a trail via Sooc. (Refer to Figure 4.3.2.5-1). However, accessibility to this municipality using this trail is possible only during summer/dry season.

At present, there are existing road links within each municipality but no major road link connects the four (4) towns of Del Gallego, Ragay, Lupi and Sipocot. Existing road links in the area has a total length of about 395.368 kilometers . With a total land area of 930.630 square kilometers the road density computed is 0.42km/km^2. However, roads passable all year round has a total length of 213.952 kms. or a road density of 0.229km/km^2. This road density is relatively lower compared to the national average of 0.6 km/km^2.

b. The Rail Facilities

Presently, the PNR serves as the major transport system that connects the 5 municipalities to adjoining market centers. Three (3) Manila-bound trips cater to the passengers in these municipalities daily. To supplement the inadequate transport service in the area, a number of trips are done by means of rail skates which usually occur in between train schedules. Skates, are light manually propelled trolleys made from wooden platforms with small ball bearing wheels; they are easily lifted on and off the track. These skates, which operate between 5 A.M. to 7 P.M. are mostly for short-distance passenger (and bagged grains) trips of less than seven kms.

Skate operations in the study area are dominated by motorized units. Longer passenger trips are made by either bus or train.

The present railway transport system, however, is being hampered by poor maintenance of its single railroad tracks coupled with flooding and landslides during heavy rains and typhoons.

The municipalities of Tagkawayan and Sipocot, the trade centers of these five (5) municipalities are reached regularly by rail and road transport while the rest, save for the availability of rail transport remain in isolation.

Passenger fares for the longer skate trips average around ₱0.51 per km., approximately double the normal bus/jeepney fare. Motor skates can carry up to 12 passengers and have a much higher occupancy than manual skates, that can accomodate only from four to six persons. The maximum loading capacity is 30 bags/skate. For long distance trips of 7-9 kms. passengers are already using bus/train when available. Given the low level of rail service and the non-availability of buses, it might be hypothesized that many longer distance trips are suppressed, particularly in the interior municipalities.

4.4 The Quirino Highway As A Major Through Route

4.4.1 Role

The Quirino Highway functioning as a major through route will shorten the travel distance between the Manila Bicol route by approximately 32-51kms.The proposed highway will replace a very difficult section of the Maharlika Highway which passes through the hilly Terrain of Camarines Norte. Quirino Highway which is expected to be ready by 1991 will be able to provide the re-routed buses a travel time of 7 hours and 45 minutes to Naga and 11 hours and 15 minutes to Legaspi. The present scheduled road average travel time to Naga by the present route via Daet is 9 hours and

and 30 minutes and 13 hours to Legaspi due to poor condition of the Highway in certain stretches.

4.4.2 Socio-Economic Features of the Road Influence Area

4.4.2.1 Past and Present Population Trend

Between censuses of 1960 and 1980 the population rose from 27.1 million to 48.1 million, at an average annual growth of 2.9 percent. Metro Manila and the adjoining regions of Central Luzon (Region III) and Southern Tagalog (Region IV) are heavily populated as shown in Tables 4.4.2.1-1 & 2 This area has an even greater economic importance than the population figures alone suggested.

During the 1960's the national population growth was over 3 percent per year. The rate has dropped to 2.7 percent from 1970 to 1980. Metro Manila had the highest population growth followed by Southern Tagalog region.

Table 4.4.2.1-1 Past Population Trend (1960-1980)

	Population				Annual Growth Rate(%)		
	1960	1970	1975	1980	1960-1970	1970-1975	1975-1980
NCR	2,462	3,967	4,970	5,925	4.9	4.6	3.6
Region IV	3,081	4,457	5,214	6,119	3.8	3.2	3.2
Region V	2,363	2,967	3,194	3,477	2.3	1.5	1.7
Rest of Luzon	6,155	8,297	9,412	10,559	3.0	2.6	2.3
Mindanao/Samar Leyte	7,425	10,345	11,747	13,704	3.4	2.6	3.1
Rest of Visayas	5,601	6,651	7,533	8,313	1.7	2.5	2.0
Philippines	27,088	36,684	42,071	48,089	3.1	2.8	2.7

Note:

Population is in thousand

Table 4.4.2.1-2 Population Distribution (1960-1980)

	Land Area Km²	%	% Distribution of Population 1960	1970	1975	1980	Population Density (Person/Km.²) 1960	1970	1975	1980
Metro Manila	636.0	0.2	9.1	10.8	11.8	12.3	3,871.8	6,236.9	7,814.5	9,317.4
Region IV	14,924.1	15.6	11.4	12.1	12.4	12.7	65.7	95.0	111.1	130.4
Region V	17,632.5	5.9	8.7	8.1	7.6	7.2	134.0	168.3	181.1	197.2
Rest of Luzon	76,202.3	25.4	22.7	22.6	22.4	22.0	284.1	383.5	435.6	488.5
Mindanao/Samar Leyte	123,430.5	41.1	27.4	28.2	27.9	28.5	315.4	432.7	487.1	566.4
Rest of Visayas	37,855.7	11.7	20.7	18.2	17.9	17.3	320.9	381.8	431.5	477.1
Philippines	300,000.0	-	100.0	100.0	100.0	100.0	90.3	122.3	140.2	160.3

4.4.2.2 Past Economic Performance
GNP and GRDP

The economic performance of the country until the second half of the 1970's was approximately level with official GNP targets. Since then, the economic growth has fallen well short of the target set, as shown in Table 4.4.2.2-1 , mainly because of a sharp deterioration in terms of trade caused by rising oil prices and the subsequent world recession.

Table 4.4.2.2-1 Growth in Gross National Product
(In Constant 1972 prices)

	1978	1979	1980	1981	1982	1983	1984
GNP (In Billion P)	83.1	88.7	92.6	96.0	98.7	100.0	94.5 2/
Real Increase (%)	6.8 1/	6.7	4.4	3.7	2.8	1.3	-5.5
Population (In M)	45.6	46.8	48.1	49.3	50.5	51.7	53.0
Per Capita (In P)	1822	1895	1925	1947	1954	1934	1783
Real Increase (%)	4.0 1/	4.0	1.6	1.1	0.4	-1.0	-7.8

1/ Based on 1977 GNP 2/ Based on projected GNP Growth

SOURCE: 1983 Philippine Statistical Yearbook

The GNP growth target under 5-year Development Plan 1978-1982 was set at 7% per annum. Actual GNP growth was only 3.5% from 1978-82. The early part of 1980's reflected a more pronounced economic slowdown compared with the 1970's, wherein in the real increase in total and per capita GNP were contracting towards negative rate. The cumulative effect of many trends such as the dramatic increase in the Philippine trade and current account deficits, successive domestic currency devaluations in 1983 and 1984 retarding growth of the export sector was the acute financial crisis which developed in the later half of 1983.

There was a distinct wide disparities in the levels of development and rates of growth between NCR, Region IV and Region V as shown Table 4.4.2.2-2 .

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Metro Manila (NCR) and the adjoining Region IV contributed 45 percent of the total GDP, thus showing the relative economic importance of these two regions in the nationwide level. Region V has been identified as one of the depressed areas, wherein the base of the regional economy is dependent on agriculture. The region's economy experienced a slump beginning 1978 when the gross value added in agriculture, particularly in the coconut industry, decreased. The decline in the GVA of coconut industry is attributable to the retarding export growth of coconut oil and other coconut products due to the depressed international prices coupled with adverse climatic condition which affect coconut production.

Table 4.4.2.2-2 The Regional Economic Performance (1978-1984)
(In Million Pesos at Constant 1972 Prices)

	1978	1979	1980	1981	1982	1983 1/	1984 2/
Philippines (GDP)	82,784	87,963	92,637	96,210	99,004	100,068	95,498
Metro Manila	25,729	27,476	29,224	30,521	31,511	32,358	30,164
Region IV	11,886	12,265	12,951	13,239	13,520	13,868	13,421
Region V	2,773	2,901	3,161	3,258	3,046	3,088	2,993
Rest of Luzon	12,296	13,201	13,831	14,861	15,195	15,104	14,399
Mindanao/Samar Leyte	17,113	18,441	19,101	19,370	20,322	20,264	19,731
Rest of Visayas	12,987	13,679	14,369	14,961	15,410	15,386	14,791

1/ Advanced estimate of July 8, 1985

SOURCE: National Economic and Development Authority

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CHAPTER 7 - PRELIMINARY ENGINEERING

7.1 General

The proposed project consists of the Calauag-Tagkawayan road (Quezon side) and the Del Gallego - Ragay - Lupi - Sipocot road (Camarines Sur side) which forms the Quirino Highway.

The present alignment starts from Calauag along the Maharlika Highway and veers southeasterly towards Tagkawayan where it runs almost parallel to the Philippine National Railway (PNR) line until it joins the Maharlika Highway in Sipocot, Camarines Sur. The existing road length totals about 120.60 km.

The road is not yet passable throughout especially during the rainy season since there are still many unbridged river crossing within the Camarines Sur section. Horizontal and vertical alignments are substandard.

A Detailed Engineering Study was undertaken in 1979 on the project road and it was designed as a high standard road with a total length of 92.77 km.

Since the completion of the final design, some improvements were already done on the road in the following sections:

1. Calauag - Tagkawayan section was reconstructed to an all weather gravel road following the alignments in the Detailed Engineering design.
2. Sipocot - Lupi - Ragay section was constructed by MPWH Region V Regional Office following alignments deviating from the Detailed Engineering design.

In this study, three (3) alternative alignments are considered for improvement. See Figure 7.1.1, Figure 7.1-2 and Figure 7.1-3 for the alignments.

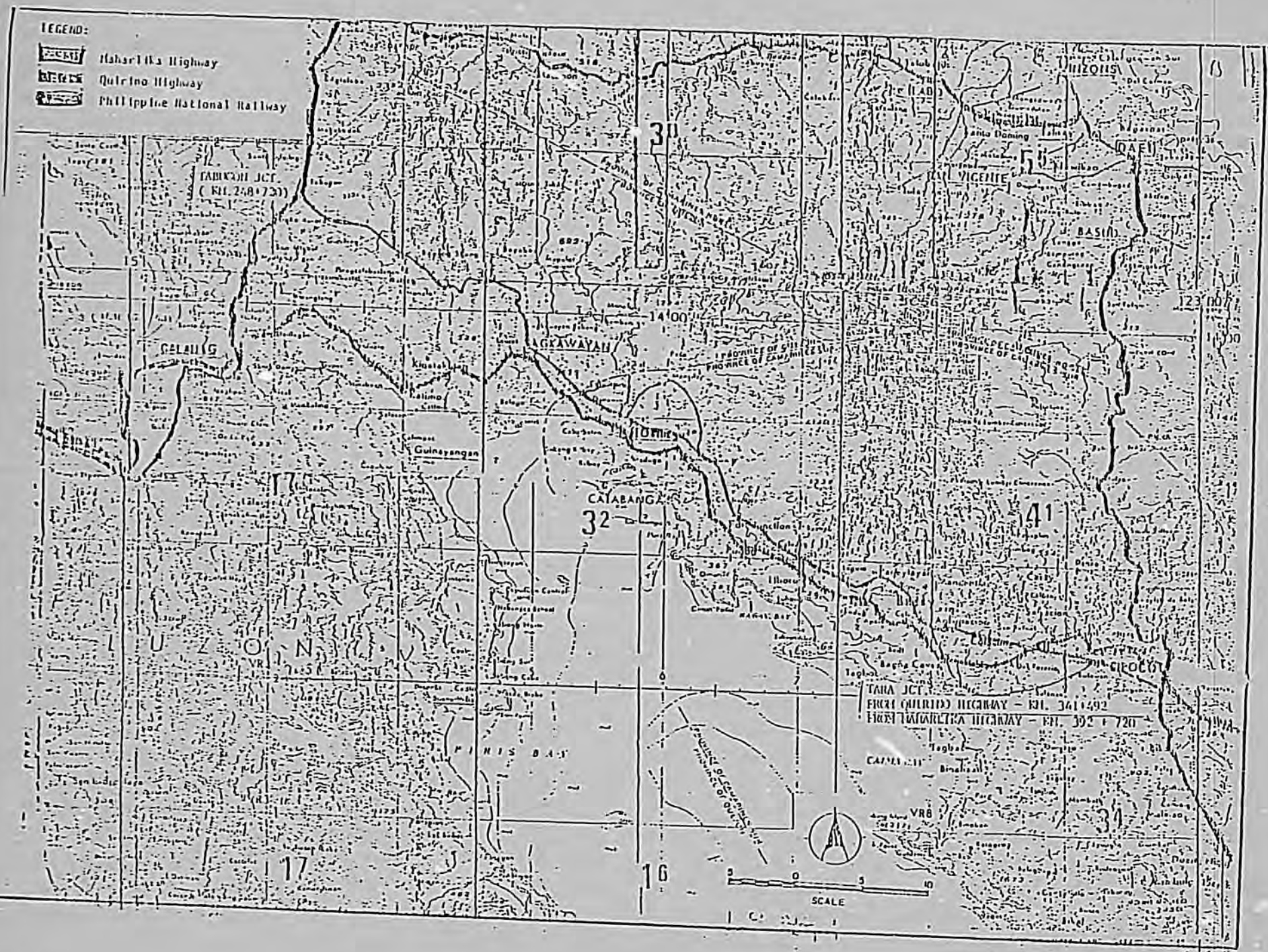

LEGEND:
Naharlika Highway
Quirino Highway
Philippine National Railway
TABUCOH JCT.
(KM. 248+730)
GALUIG
AGKAWAYAN
Guinayangan
CALABANGA
VICENTE
BASIN
DAET
TARA JCT.
FROM QUIRINO HIGHWAY - KM. 341+492
FROM NAGARLIKA HIGHWAY - KM. 302 + 720
SCALE

Figure 7.1-1

7.2 Description of Project Road

7.2.1 Existing road condition at Quezon side

This section starts at junction Tabugon, km. 248+720 of the Maharlika Highway after the town of Calauag. It is actually an old existing logging road leading to Tagkawayan town until the provincial boundary with a total length of 33.30 km.

It passes mostly through rolling terrain except on some short stretch of mountainous section before Tagkawayan. Horizontal and vertical alignments have since then been improved although it needs further corrections to desired standards.

Roadway width is 6.0 m. wide with 1.0 m. shoulders. The subgrade has been prepared to the desires compaction and provided with a well graded gravel surfacings.

There are seven (7) existing bridge structures classified as follows: four (4) permanent bridges (RCDG Type) with total length of 127 lineal meters; and three (3) temporary bridges with a total length of 33 lineal meters.

The alignment from the Detailed Engineering Design almost follows the existing road except on substandard sections where minor realignments and correction of curves were recommended. Based on the Design, the improved length is 31.42 km.

7.2.2 Existing condition at Camarines Sur side

From the boundary, the existing road continues eastward traversing a circuitous route via a barangay road about 30 km. long passing through the town of Del Gallego until the bounday with Ragay. This long route apparently avoided the swampy area near the boundary and the wide river crossing at Kilhay river.

There is a proposed alignment to traverse on a shorter route along the said areas nearer to the railway line and to become part of the national road system.

The road then proceeded in an easterly direction almost parallel to the railway line at barangay Banga Caves to follow the recently constructed road until Manangle and finally connection to the Maharlika Highway at Tara junction in Sipocot. The total existing length is 87.30 km.

The terrain is mostly rolling to hilly planted mostly to coconuts interspersed with open grassland. Horizontal and vertical alignments are very substandard.

Roadway width is 4 m. to 5 m. wide with 1.0 m. shoulders. The surface is mostly earth in bad to very bad condition. It is hardly passable during rainy season. A short stretch of about 8 km. from the Tara Junction has been subgraded and provided with gravel surfacing in fair condition.

There are eigth (8) existing temporary bridges with total lengthof 138 lineal meters; two (2) concrete spillways with total length of 90 lineal meters; and eight (8) river crossings still to be bridged with a total length of 187 lineal meters.

The section between Del Gallego boundary and Ragay almost follow the detailed design alignment while the rest of the length follow different route. The resulting length based on the detailed design is 61.35 km.

7.2.3 Proposed Improvements

There are three (3) types of pavements being considered as level of improvements in this study namely gravel, dense graded bituminous macadamm, and asphalt concrete pavements.

Three (3) alternative alignments are also being considered follows:

Alternative I. This is the alignment determined through Detailed Engineering Study undertaken in 1979 by PJHL Project Office and local consultants. The total length is 92.77 km. Proposed bridges has a total length of 666 lineal meters.

See Figure 7.1-1 for alignment

Alternative II. Generally, the proposed road follows the alignments from the final design except on the section between Ragay and Sipocot where a new alignment is adopted following the recently constructed road from Manangle river to Pangaluan river. The total road length is 96.093 km. The proposed briges has a total length of 573 lineal meters. See Figure 7.1-2 for alignment.

Alternative III. The proposed alignment differs from the final design in section between Ragay - Sipocot and Del Gallego provincial boundary while the rest of the length follows the original plan. The total length of the road is 108.404 km. Proposed bridges has a total length of 573 lineal meters. See Figure 7.1-3 for alignment.

7.3 Geology

The predominant soil is clay loam of the Alimodian series in Del Gallego and of the Luisiana series in Ragay.

Soils of the Alimodian series were derived from shale and sandstone. The native vegetation of the area consists mainly of coconut, vegetable, fruit, rice, bogon and talahib. There are few level areas between hills which constitute the ricelands. The clay loam surface soil of the Alimodian series is light brown to dark brown, reddish brown, or grayish brown. In some places, gravels, two to three centimeters in diameter are present on the surface. The surface layer reaches to a depth of 25 centimeters.

Soils of the Luisiana series were derived from igneous rocks. They are deep, have good moisture retentivity and good tilth, and are generally red. Cultivated crops are upland rice, corn, bananas, and root crops. The clay loam surface is brown to reddish brown. The layer is 25 to 35 centimeters deep.

7.4 Road Standards

The proposed geometric standards are similar to those that have been adopted in similar studies and to the standards being used by the Ministry of Public Works and Highways.

The geometric design standards adopted were tabulated as shown in Table 7.4.

A minimum average design speed of 70 kph. is the basic factor of the geometric design.

7.4.1 Horizontal Alignment

Generally, the horizontal alignment follows the direction of the existing road except in some portions where curves have to be improved, realignment on the swampy area to attain shorter length and realignment on flooded section in Ragay.

7.4.2 Vertical Alignments

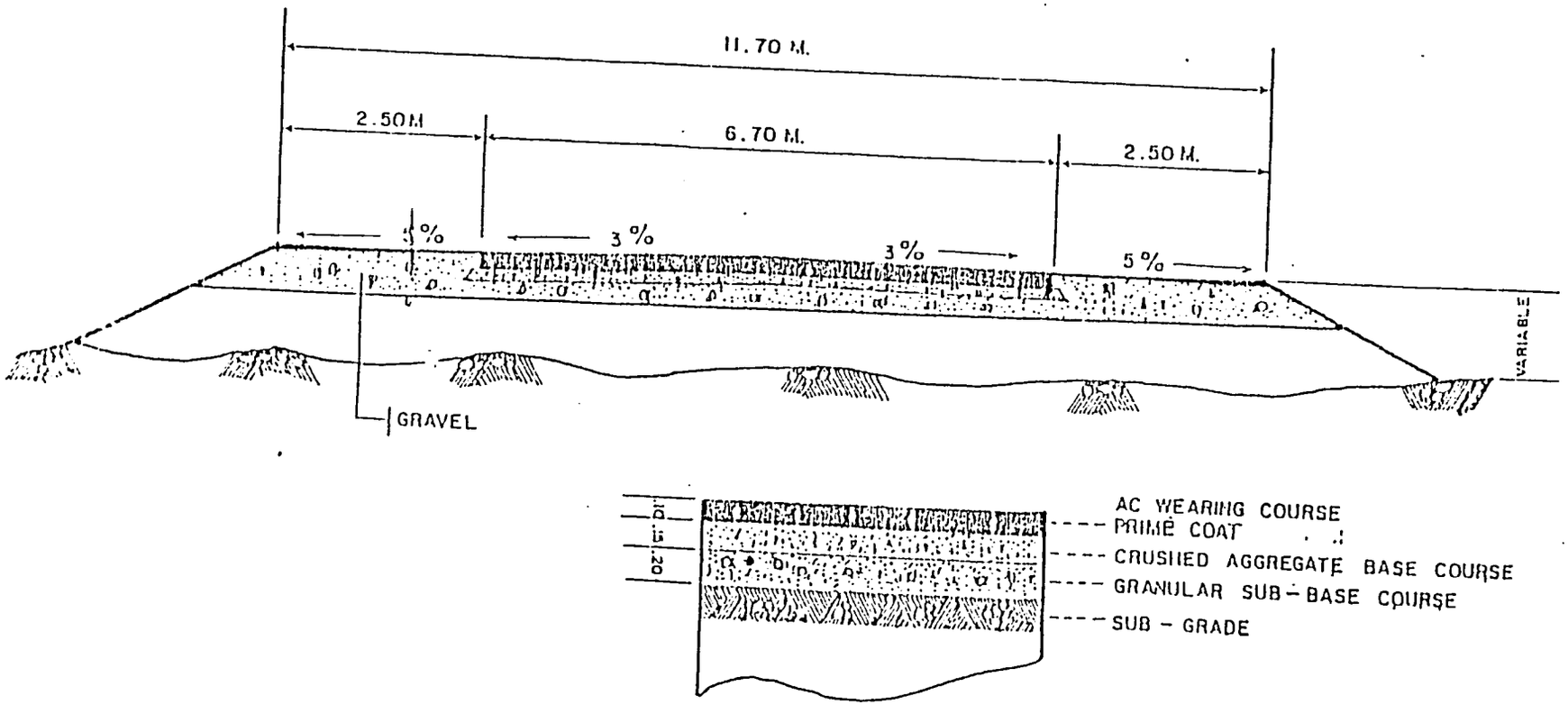
The vertical alignments were controlled by maximum flood elevations computed for bridges, drainage requirements and mainly by balance design.

7.4.3 Typical Roadway Sections

The road cross section consists of 6.70 m. paved travelled way and two 2.50 m. wide shoulders. Embankment slope is 1½ to 2 horizontal to 1 vertical. Cut slope varies from 1 to 2 horizontal to 1 vertical depending upon the type of soil and depth of cut.

See Figure 7.4.3a to 3c

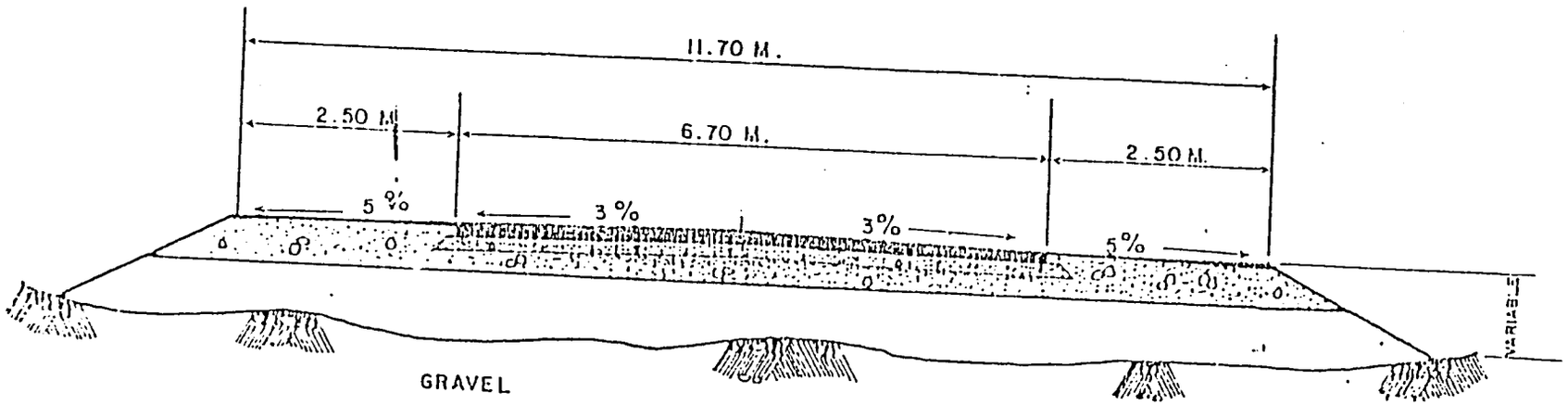
FIGURE 7.4.3 b

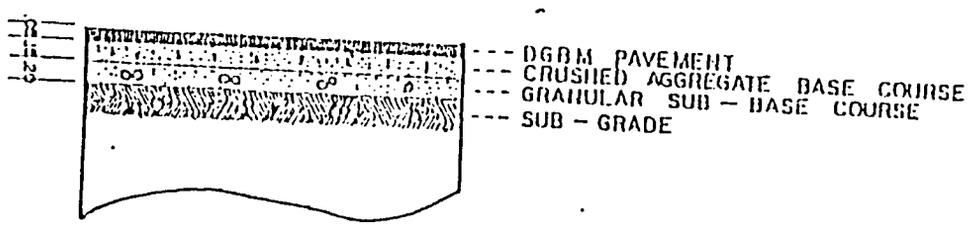


AC PAVEMENT DETAIL

ASPHALT CEMENT CONCRETE PAVEMENT

FIGURE 7.4.3 c





DGBM PAVEMENT DETAIL

DENSE GRADED BITUMINOUS MACADAM PAVEMENT

Table 7.4
Geometric Design Standards

Terrain	Flat	Rolling	Mountainous
Design Speed (Kph)	80	60	40
Min. Horizontal Radius	200	120	50
Max. Gradient (%)	7*	8*	9*
Min. Length of Vertical Curve (m)	100	80	60
Stopping Sight Distance (m)	110	80	50
Passing Sight Distance (m)	450	350	140
Right-of-Way Width (m)	60	60	60
Pavement Width (m)	6.70	6.70	6.70
Shoulder Width (m)	2.50	2.50	2.50
Pavement Type	AC/PCC	AC/PCC	AC/PCC

NOTE: * On Straight Tangent

7.4.4 Earthworks

In mountainous sections the established alignment resulted in deep cuts and high fills due to the improvement of horizontal geometry to attain the minimum average design speed of 70 kph.

Generally, the vertical alignments were established considering a balance design.

7.4.5 Right-of-Way

The road right of way is 60 m. throughout the whole length of the project road. However, the roadway section shall be within the 20 m. recommended construction limits. Rigth-of-way for the non-existing alignments between Ragay - Lupi section and in Del Gallego with a total length of about 29.60 km. have to be acquired.

7.5 Pavement Design

7.5.1 General

Pavement design procedures were undertaken adopting the method found in TRRL Road Note 29 - A Guide to the Structural Design of Pavement for New Roads.

Design Criteria:

Design Life = 20 years

Equivalent Standard Axles:[1/]

Light

Vehicles = 0.02

Buses = 0.45

Trucks = 2.8

Subgrade Mean CBR= 4.5%

1/ Based from Pavement and Axle Load Study September 1983

7.5.2 Traffic Data

Based on figures from AADT from Table 7.5.2 types of traffic data were tabulated from 1991 up to 2011. On this analysis the assumed opening year of traffic is 1991 and the design life of the road is 20 years.

7.5.3 Design Analysis

Total cummulative number of Standard Axle is calculated as shown below.

	Light Vehicles	Buses	Trucks
Total Cummulative No, of Vehicles (20 years)	6651	4895	28363
x	x	x	x
Equivalent Standard Axle	0.02	0.045	2.8D
x	x	x	x
365 days	365	365	365
Total Cummulative Equivalent Standard Axles in both directions	0.05×10^6	0.80×10^6	28.98×10^6

Total Cummulative Equivalent Standard Axles

Both Directions : 29.83×10^6

One Direction : 14.91×10^6

Table 7.5.2
Traffic Projection

Year	Diverted Traffic			Induced Traffic		Generated Traffic	TOTAL		
	LV	Buses	Trucks	LV	Buses	Trucks	LV	Buses	Trucks
1991	208	171	309	27	8	546	235	179	855
1992	215	176	324	28	8	604	243	184	928
1993	223	182	341	28	8	669	251	190	1010
1994	230	187	358	29	9	708	259	196	1066
1995	238	193	376	29	9	750	267	202	1126
1996	246	199	395	30	9	795	276	208	1190
1997	255	205	415	31	9	842	286	214	1257
1998	263	212	436	31	9	892	294	221	1328
1999	273	218	459	32	10	908	305	228	1367
2000	282	225	482	32	10	908	324	235	1390
2001	292	232	506	33	10	925	325	242	1431
2002	304	240	538	34	10	943	338	250	1481
2003	317	249	572	35	11	961	352	260	1533
2004	330	257	608	36	11	979	366	268	1587
2005	344	266	646	37	11	997	381	277	1643
2006	358	276	687	38	11	1016	396	287	1703
2007	373	286	730	40	12	1035	413	298	1765
2008	388	296	777	41	12	1054	429	308	1831
2009	404	306	826	42	12	1074	446	318	1900
2010	421	317	878	44	13	1094	465	330	1972
Total Cummulative No. of Vehicles							6651	4895	28363

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7.6 Drainage and Hydrology

The mean annual rainfall in the area ranges from 2000 mm. to 4000 mm. Large amount of rainfall occur during typhoon season. The distribution of rainfall throughout the year is not even. Generally, the period of February through May sometimes extending well into September is the dry season.

When rain falls, a certain percentage of it is absorbed by the soil. Another portion is evaporated into the atmosphere and some are intercepted by vegetal cover. The remaining water is held in temporary detention on the surface until a sufficient depth is built up to cause the water to flow overland toward defined drainage channels. The run-off waters found their way into the rivers within the project area.

The major rivers, Kilbay, Catabangan, Paculago, and Cabatbatan flow into the Ragay Gulf and are affected by tides. These together with the four other rivers originate in the mountains or hills. See Table 7.6 for the list of existing bridges.

Thorough field investigation conducted from people living around gathered information like highest flood elevations and others pertaining to the existing drainage structures.

Field drainage survey determined the details of existing culverts, waterways, flow direction and land use.

Knowing the design discharged from each particular drainage area and the capacity of the existing structures, additional drainage pipes or improvement of existing structures is determined.

Table 7.6

List of Existing Bridges

Station (Km.)	NAME	Bridge Type	Span Length (m)	Width (m)	Cond.
	QUEZON SIDE				
251 + 330	Gumihan Bridge	RCDG	22.00	7.32	Good
256 + 420	Umiik Bridge	RCDG	16.00	7.32	Good
256 + 750	Kabibihan Bridge	RCDG	60.00	7.32	Good
258 + 880	Bulo Bridge I	Timber	6.50	4.10	Bad
259 + 184	Bulo Bridge II	Timber	15.24	4.10	Bad
264 + 680	Mangalas Bridge	Bailey	11.25	4.10	Bad
265 + 120	Kinatakutan Bridge	RCDG	30.00	7.32	Good
	CAMARINES SUR SIDE				
	Cabatbatan Bridge	Bailey	24.00	4.00	Bad
	Mansalaya	Spillway	65.00	-	Fair
	Tabion-San Pablo	Timber	6.00	4.00	Bad
308 + 700	Katabangan Bridge	Timber	18.00	4.00	Bad
309 + 202	Malabog	Creek	12.00	-	No Bridge
310 + 895	Paculago I	River	54.00	-	-do-
311 + 909	Paculago II	River	23.00	-	-do-
315 + 250	Kanagnagan	River	22.00	-	-do-
	Bulongbulongan	River	12.00	-	-do-
	Amlongan	River	12.00	-	-do-
318 + 255	Hideng Bridge	Timber	36.00	4.00	Bad
321 + 414	Panatayan	River	27.00	-	No Bridge
322 + 940	Ragay Bridge	Bailey	120.00	4.00	Bad
[illegible] + 000	Pangaluan Bridge	Bailey	18.00	4.00	Bad
32 + 040	Saugan Bridge	Timber	18.00	4.00	Bad
3S + 601	Bulawan Bridge	Timber	18.00	4.00	Bad
[illegible] + 468	Manangle	Concrete Spillway	25	-	Poor
[illegible] + 000	Gaungan	River	25	-	No Bridge

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7.7. Pavement and Soil Investigation

7.7.1 General

Basically, the results of the studies undertaken during the Detailed Engineering Design were adopted.

This includes alignment soils investigation, material sources investigation and others.

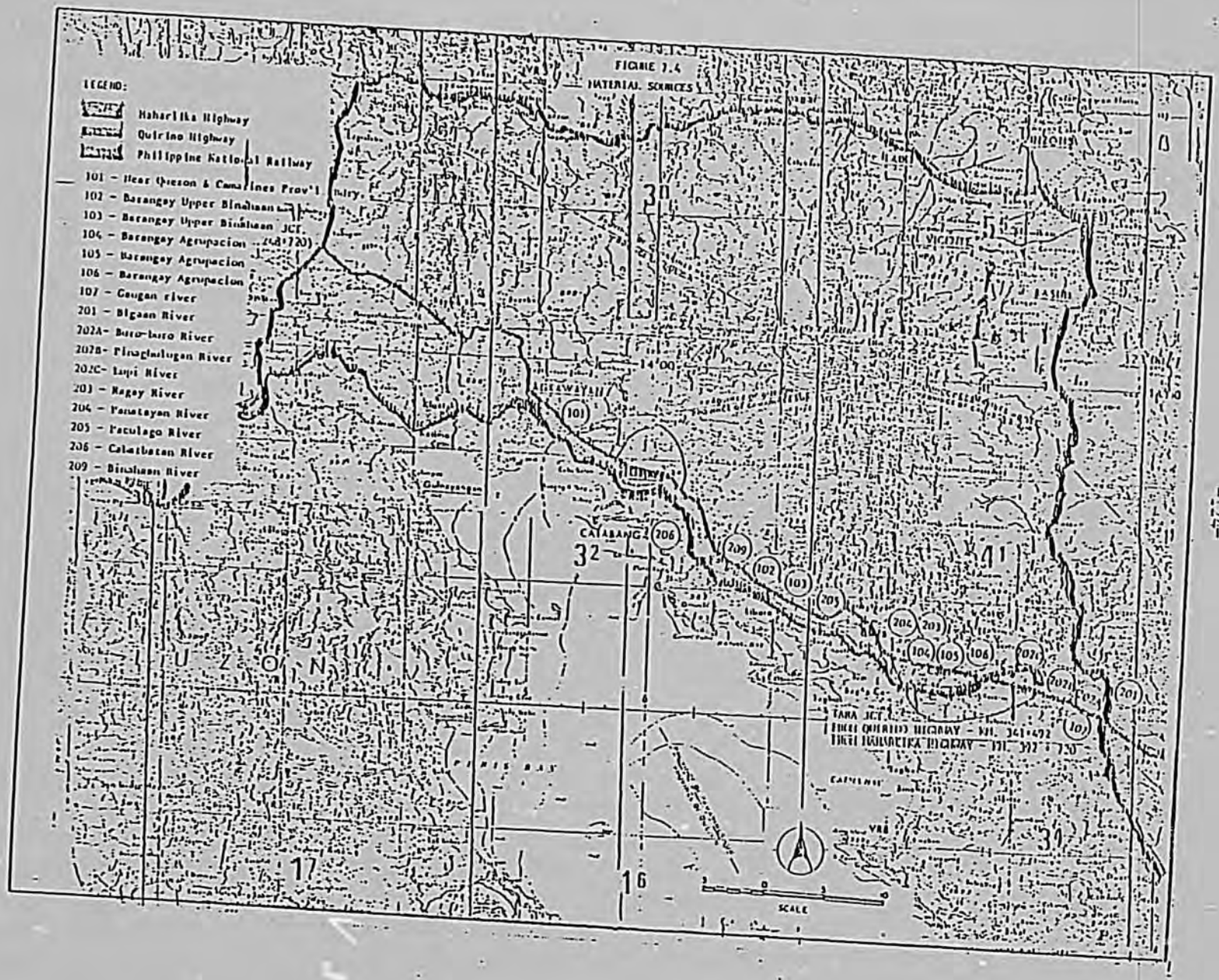
7.7.2 Alignment Soil Investigation

Regular auger borings and sampling of all types of soil encountered up to a depth of 1.50 meters at intervals of 250 lineal meters were undertaken throughout the alignment. Test pits for CBR sampling, also 1.50 m. deep were made at intervals of three (3) kilometers with one to three soil types being encountered along the alignment.

7.7.3 Material Sources Investigation

Test pittings and sampling of borrow and other material sources were accomplished. All the materials sources for fine and coarse aggregate are within five (5) kilometers from the project line and can be reached by constructing temporary roads in open and rolling terrain.

The location of the material sources are shown in Figure 7.4 .


LEGEND:
Maharlika Highway
Quirino Highway
Philippine National Railway
101 - Near Quezon & Camarines Prov'l
102 - Barangay Upper Binahaan
103 - Barangay Upper Binahaan JCT.
104 - Barangay Agrupacion
105 - Barangay Agrupacion
106 - Barangay Agrupacion
107 - Gaugan river
201 - Bigaan River
202A- Buro-buro River
202B- Pinaglalugan River
202C- Lapi River
203 - Ragay River
204 - Panatayan River
205 - Paculago River
206 - Calatbatan River
209 - Binahaan River
FIGURE 7.4
MATERIAL SOURCES
CATABANG
TARA JCT.
SCALE

7.7.4 Findings Based on Test Results

Alignment Soil

From the detailed test results reflected in Table 7.7.4-1 to 4 it can be seen that predominantly, the upper 0.50 m. layer consists of silty clay with classification of A6 and soaked CBR values (based on 95% MDD) ranging from a minimum of 3.9% to a maximum of 10.5%.

The bottom layer (from 0.50 m to 1.50 m.) generally falls under group A7 with soaked CBR values ranging from 3.25% to 9.65%

Borrow and Material Sources

Borrow sources have samples tested to fall under group A4 to A6 and A75 with CBR values (based on 95% MDD) of 12% and 10.8%. Approximate quantity is 230,000 cu.m.

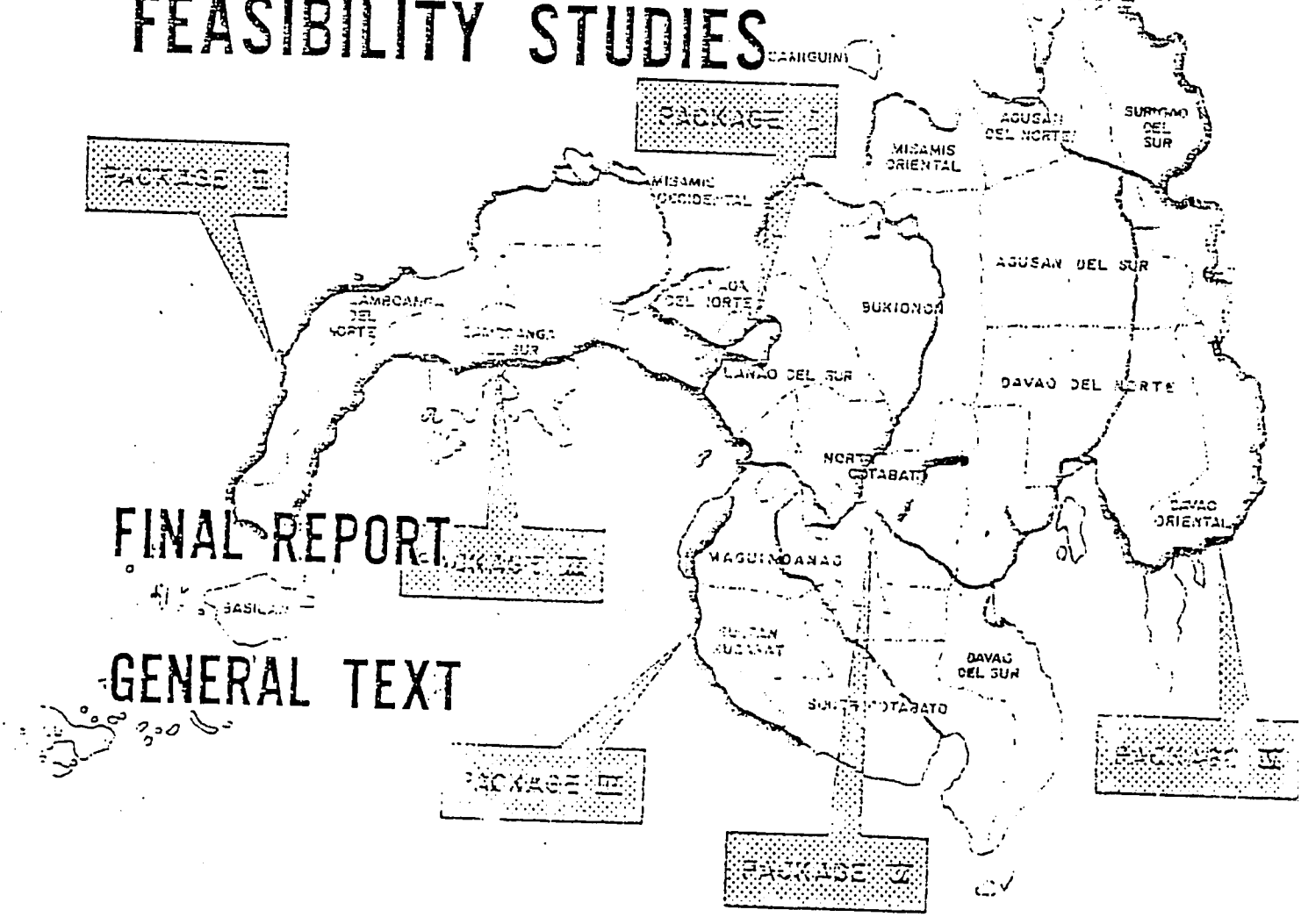
Material sources, all being river sources are uniformly clean and hard CBR values (based on 95% MDD) is 30% and maximum dry density of 2.1 gm/cm.^{3}. Approximate available quantity is 240,000 cu.m.

TEST PIT NO	STATION LIMITS	DEPTH CM	AASHO CLASS	GROUP INDEX	NATURAL WATER CONTENT	ATTERBERG LIMIT PL	LL	PI	95% CBR OF MAX DRY DENSITY	OPTIMUM MOISTURE CONTENT %	MAXIMUM DRY DENSITY	% SWELL	SIEVE ANALYSIS % PASSING 1½"	1"	¾"	⅜"	NO 4	NO 10	NO 40	NO 200
1	253+800	0+050	A-6	6	25	34	48	14	3.22	23.74	1.51	253			100	97	95	91	72	53
		50+150	A-6	4	13	34	49	15	3.14	25.73	1.42	2.71			100	99	96	93	73	46
2	254+800	0+070	A-7-[illegible]	4	31	39	57	18	3.31	25.01	1.61	3.43			100	92	91	89	80	42
		70+150	A-7-[illegible]	9	23	30	57	22	4.01	24.11	1.33	2.62			100	98	96	95	67	52
3	256+800	0+050	A-7-[illegible]	9	40	46	72	26	3.17	22.23	1.34	2.37			100	97	95	94	71	47
		50+150	A-7-[illegible]	9	24	26	46	20	3.32	22.39	1.54	2.42		100	95	94	93	92	63	55
4	257+720	0+050	A-7-5	7	15	27	42	15	3.11	25.12	1.42	3.34			100	97	95	91	57	61
		50+150	A-7-5	10	18	38	55	17	3.15	27.61	1.35	2.55			100	99	92	82	66	60
5	258+900	0+020	A-7-5	5	26	30	49	19	4.12	24.73	1.52	2.66			100	95	93	86	68	46
		20+150	A-7-5	4	15	28	41	13	3.21	25.38	1.44	3.09			100	99	90	71	54	47
6	260+700	0+050	A-6	5	29	28	40	12	3.27	21.60	1.35	2.31		100	97	93	92	82	73	57
		0+150	A-7-5	7	40	30	45	15	3.01	27.40	1.41	3.35		100	99	97	91	76	69	52
7	261+500	0+050	A-7-5	8	26	33	47	14	3.53	25.21	1.40	3.31			100	98	95	90	82	61
		50+150	A-7-5	5	17	24	41	17	3.04	24.22	1.42	2.61			100	99	94	86	69	46
8	262+700	0+060	A-7-5	11	37	38	54	16	3.41	23.34	1.35	2.24			100	98	90	75	67	57
		60+150	A-7-5	9	19	27	51	24	4.05	24.04	1.54	3.37		100	99	96	93	87	74	52
9	263+500	0+150	A-7-5	5	41	28	41	13	3.75	24.31	1.40	2.18			100	97	92	86	68	51
10	264+500	0+080	A-7-5	12	18	29	54	25	3.35	22.70	1.32	2.35				100	97	95	79	53
		80+150	A-7-5	7	24	28	42	14	3.23	25.72	1.53	3.23					100	99	80	59
11	265+700	0+150	A-7-5	5	35	27	43	16	3.10	26.47	1.41	3.14			100	99	95	89	75	51
12	266+700	0+050	A-7-5	5	37	30	42	12	3.07	24.51	1.57	2.51			100	98	92	87	61	57
		50+150	A-7-5	9	22	29	51	22	3.17	23.45	1.31	2.44			100	99	91	86	63	52
13	267+800	0+050	A-7-5	9	28	26	48	22	3.37	25.41	1.35	3.15			100	97	93	87	70	58
		0+150	A-7-5	11	25	32	53	21	3.21	24.22	1.42	2.41			100	95	92	89	64	62
14	269+900	0+050	A-6	3	35	37	49	12	6.23	26.02	1.29	2.80			100	96	91	87	73	46
		50+150	A-7-5	6	26	28	45	17	5.90	26.85	1.27	2.74			100	99	97	90	81	51

Republic of the Philippines

MINISTRY OF PUBLIC WORKS AND HIGHWAYS

SOUTHERN PHILIPPINES HIGHWAY NETWORK DEVELOPMENT FEASIBILITY STUDIES



FINAL REPORT

GENERAL TEXT

February 1983

DCCD Engineering Corporation
In Association With
Phil. Consult, Transport Planning Consultants, Inc.

GENERAL VOLUME

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INTRODUCTION

1.1 GENERAL

The Southern Philippines Highway Network Development Feasibility Studies is being carried out in accordance with the Agreement dated January 5, 1982, between the Ministry of Public Works and Highways and DCCD Engineering Corporation in association with Phil. Consult, Transport Planning Consultants, Inc.

The Terms of Reference included five road Packages with a total length of 1,292 km. in the studies and another 692. km. of roads for review and updating. In the Consultant's proposal, 500 km. of minor roads were included for initial screening and identification and 300 km. for in-depth economic evaluation.

During the course of the study, it was agreed with the MPWH that the section from Marawi-Wao-Carmen be deleted and in lieu, an in-depth economic evaluation of the 500 km. of minor roads will be conducted. The Consultant has decided also to conduct an independent feasibility study for the sections originally scheduled for review and updating.

The packaging of the road segments in the Terms of Reference has been revised and is shown in Table 1-1. The list of minor roads are also tabulated in Table 1-2.

TABLE 1-1

ROADS UNDER STUDY
(Major Roads)

PACKAGE I - LANAO ROADS		
a -	Marawi-Malabang Road	67.6 km.
b -	Lake Lanao Circumferential Road	71.2 km.
c -	Tubod-Ganassi Road	51.0 km.
PACKAGE II - ZAMBOANGA WEST COASTAL ROAD		
a -	Zamboanga City-Liloy Road	248.3 km.
PACKAGE III - COTABATO COASTAL ROAD		
a -	Awang-Lebak Road	193.0 km.
PACKAGE IV - SURIGAO-DAVAO COASTAL ROAD		
a -	Lahi-Lingig Road	282.2 km.
b -	Bacuag-Lingig Road	341.5 km.
PACKAGE V - NORTH COTABATO-BUKIDNON ROAD		
a -	Paco-Roxas-Arakan Valley Road	76.8 km.
b -	Kabacan-Kibawe Road	79.2 km.
PACKAGE VI - COTABATO-ZAMBOANGA ROAD		
a -	Cotabato City-Pagadian-Zamboanga City Road	448.8 km.
TOTAL		1,859.6 km.

TABLE 1-2

ROADS UNDER STUDY
(Minor Roads)

DAVAO ORIENTAL/DAVAO DEL NORTE	
Mati-Montevista	114.9 km.
DAVAO ORIENTAL	
Cateel-Compostela	52.5 km.
Lupon-Mati Road Jct-San Isidro-Gov. Generoso	30.0 km.
NORTH COTABATO	
Alamada Valley (Libungan-Dado)	38.3 km.
SULTAN KUDARAT	
Isulan-Lebak	107.8 km.
NORTH COTABATO	
Malatab-Sarayan-Arakan	17.0 km.
ZAMBOANGA DEL NORTE/ZAMBOANGA DEL SUR	
Sibuco-Curuan	26.5 km.
Siraway-Guilinan	30.5 km.
Siraway-Siocon	20.0 km.
ZAMBOANGA DEL NORTE	
Labason-Gatas	27.5 km.
BUKIDNON-LANAO DEL SUR	
Maramag-Wao	54.0 km.
TOTAL	519.0 km.

1.2 ORGANIZATION OF THE REPORT

This report consist of 15 physical volumes as follows:

General Text Volume

Text Volumes and Drawing Volumes for each of the following Packages:

I	-	LANAO ROADS
II	-	ZAMBOANGA WEST COASTAL ROADS
III	-	COTABATO COASTAL ROAD
IV	-	SURIGAO-DAVAO COASTAL ROAD
V	-	NORTH COTABATO-BUKIDNON ROAD
VI	-	COTABATO CITY-PAGADIAN-ZAMBOANGA CITY ROAD

Minor Roads

Other supplementary reports include the following:

1. Environmental Impact Study
2. Seismic Evaluation of the Area
3. Structural Photo Albums
4. Highway Photo Albums

The General Volume contains ten chapters described as follows:

Chapter 1 - gives the background information of the study and lists the road sections covered by this report.

Chapter 2 - is a summary of the findings and recommendation of the study.

Chapter 3 - deals with the population of the country and the population growth rates.

Chapter 4 - gives the general economic background, income trends and discusses the assessment of development benefits.

Chapter 5 - contains a description of the Traffic Surveys, Future Normal Traffic, Sea and Air Traffic and discusses the model applied for diverted traffic.

Chapter 6 - gives the basic vehicles operating costs and dL values used in the study.

Chapter 7 - is a description of the methods of engineering studies, highway engineering, soils investigation, hydrology and hydraulics, structural design and cost estimates.

Chapter 8 - describes the method in computing the road maintenance cost.

Chapter 9 - describes a method of evaluating various road and bridge design standards on the basis of economic criteria.

Chapter 10 - contains a description of the economic evaluation procedure and the computer programs used.

The text volume for each package is organized in a similar manner. Discussed in these volumes are the details of the population, economic activities, traffic and engineering aspects of the various packages. The assessment of each package by road section is presented and the economic evaluation is made of the different alternative levels of improvement.

2. SUMMARY OF FINDINGS AND RECOMMENDATIONS

2.1 GENERAL

The total length of major roads covered in the study amounted to 1,860 kms. Of these, 1,443 kms. are found feasible and recommended for improvement. The financial cost of the recommended road section is ₱1,830.4 Million.

On the basis of the Internal Rate of Return, Package I, the Lanao Roads, is found to be the most attractive. This is closely followed by the Cotabato-Pagadian-Zamboanga City Road with IRR exceeding 20%. In the Zamboanga Coastal Road, the new alignment from Labuan to Liloy is not feasible. The existing sections are however, recommended for improvement.

For the Cotabato Coastal Road, only the segment from Awang to Kalamansig is recommended for improvement. The returns for the Surigao-Davao Coastal Roads are on the low side ranging from 11 to 16%. Construction of this road is however, recommended to provide an all weather road for this region.

The Paco-Roxas-Arakan Valley Road is feasible with an IRR of 21%. The Kabacan-Kibawe Road has a marginal IRR of 14%. This is due mainly to the realignment of the bridge crossing at Carmen. This road is recommended for construction, this being a link to the on-going Sayre Highway Project.

The summary of recommendations is shown in Table 2.1-1. The details of the recommendations per package are discussed in the next section.

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TABLE 2.1-1

SUMMARY OF RECOMMENDATIONS

	Package	Improved Length	Recommended Imp. Level	Financial Cost 1/ ₱ Million	Eco. Return % w/ Gen. Benefits	Eco. Return % w/o Gen Benefits
	TOTAL FOR ALL PACKAGES	1,443.1		1,830.4		
I.	LANAO ROADS	189.8		214.7	-	-
a.	Marawi-Malabang	67.6	6M DBST	70.1	29	18
b.	Lake Lanao Circumferential	71.2	6M DBST	79.7	40	32
c.	Tubod-Barakanas	16.0	6M DBST	18.8	13	10
	Barakanas-Ganassi	51.0	6M GRAVEL	46.1	24	6
II	ZAMBOANGA WEST COASTAL ROAD	54.1		81.2	-	-
a.	Zamboanga City-Ayala	14.8	7M PCC	31.1	35	33
b.	Ayala-Labuan	17.9	6M DBST	28.6	17	14
c.	Labason-Liloy	21.4	6M GRAVEL	21.5	13	11
III.	COTABATO COASTAL ROAD	93.6		101.8		
a.	Awang-Kalamansig	93.6	6M GRAVEL	101.8	12	3
IV.	SURIGAO-DAVAO COASTAL ROAD	521.8		686.0		
a.	Lahi Bridge-Mati	77.9	6M AC	128.2	15	13
	Mati-Tarragona	29.0	6M DBST	40.8	11	8
	Tarragona-Lingig	164.2	6M GRAVEL	190.6	13	-
b.	Bacuag-Claver	17.1	6M DBST	21.4	16	14
	Cantilan-Madrid	10.5	6M PCC	22.2	11	9
	Madrid-PICOP Gate 1	189.3	6M DBST	245.9	14	11
	Through Mangagoy	13.9	6M PCC	35.6	11	9
	PICOP Road-Lingig	19.9	Bridges Only	1.3	12	-

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	Package	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
V.	NORTH COTABATO-BUKIDNON ROADS	156.0		167.6	-	-
a.	Paco-Roxas-Arakan Valley Road	76.8	6M GRAVEL	69.3	21	8
b.	Kabacan-Kibawe Road	79.2	6M DBST	98.3	14	5
VI.	COTABATO CITY-PAGADIAN-ZAMBOANGA CITY ROAD	427.8		579.1	-	-
603	Polloc Port-Parang	3.1	6M PCC	5.1	31	27
604-6071	Parang-Tukuran	134.0	6M DBST	134.6	25	12
6072	Tukuran-Labangan	9.9	6M AC	17.6	30	23
608	Labangan-Pagadian	5.2	7M AC	10.2	12	11
609	Pagadian City	3.8	AC OVERLAY	2.8	14	14
610	Pagadian-Dumalinao	11.0	AC OVERLAY	3.5	21	21
611	Dumalinao-Buug	50.5	AC OVERLAY 2/	37.9	NA	NA
612-615	Buug-Kabasalan	51.9	6M PCC	94.4	22	17
616-618	Kabasalan-Sangali	130.8	6M PCC	219.7	24	17
619-620	Sangali-Boalan	20.6	7M PCC	41.0	25	22
621	Boalan-Zamboanga City	7.0	7M AC	12.3	31	31

1/ Financial Improvement Costs include R-O-W, Construction, Engineering and Supervision.

2/ Included are 3.9 km. of AC paving of existing gravel section. The remaining DBST road condition should be observed during the design phase for eventual re-evaluation for an AC overlay.

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2.2 RECOMMENDATION PER PACKAGE

Package I - LANAO ROADS

Ia - Marawi-Malabang Road

The Marawi-Malabang Road (67.6 km.) consists of 11.9 km. PCC pavement in good condition and 55.7 km. gravel in bad to very bad condition. Upgrading of this section to 6.0 m. DBST pavement with 2 x 2.0m. shoulders and the construction of 9 double lane bridges and 13 box culverts is recommended. The total financial cost is ₱70.1 Million with the overall return (IRR best estimate) of 29%.

Ib - Lake Lanao Circumferential Road

The Lake Lanao Circumferential Road (71.2 km.) consists of 5.3 km. PCC in good condition and the rest, gravel in poor to very bad condition. Recommended improvement consists of 6.0 m. DBST and the construction of 11 double lane bridges and 8 box culverts. The total financial cost is ₱79.7 Million with the overall return (IRR best estimate) of 40%.

Ic - Tubod-Ganassi Road

The Tubod-Ganassi Road (51.0 km.) consist of 27 km. of gravel in bad condition. The remaining 24 km. is non-existing and traverses throughout mountainous terrain. The recommended improvement consists of 6.0m. DBST between Tubod and Barakanas and 6.0m. gravel between Barakanas and Ganassi. Also proposed for construction are 2 double lane bridges, 7 single lane bridges and 6 box culverts. The total financial cost is ₱64.9 Million with the overall return (IRR best estimate) equal to 21%.

The summary of recommendation per section is shown in Table 2.2-1.

TABLE 2.2-1

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
Ia - Marawi-Malabang Road						
111	Marawi-Ilian	7.3	Existing PCC	0.3	-	-
112	Ilian-Balindong	7.6	6M DBST	6.6	24	21
113	Balindong-Madamba	18.4	6M DBST	19.1	37	24
114	Madamba-Ganassi	3.3	6M DBST	4.6	40	30
115	Ganassi-Jct. Cotabato-Zamboanga Road	31.0	6M DBST	39.5	24	12
TOTAL FOR ROAD Ia . .		67.6		70.1	29	18
Ib - Lake Lanao Circumferential Road						
121	Marawi-Molumdo	20.9	6M DBST	24.9	35	27
122	Molumdo-Jct. Marawi-Malabang Road	50.3	6M DBST	54.8	42	34
TOTAL FOR ROAD Ib . .		71.2		79.7	40	32
Ic - Tubod-Ganassi Road						
131	Tubod-Barakanas	16.0	6M DBST	18.8	13	10
132	Barakanas-Ganassi	35.0	6M GRAVEL	46.1	24	6
TOTAL FOR ROAD Ic . .		51.0		64.9	21	7

Package II - ZAMBOANGA WEST COASTAL ROAD

The Zamboanga City-Liloy Road is 248.3 km. long of which only 61.6 is existing. The overall IRR for this Package is only 9%. Therefore, sections which have very low returns are not recommended for improvement. The recommended improvement for the Zamboanga City to Ayala Section is 7.0m. PCC pavement. From Ayala to Labuan, the proposed level of improvement is 6.0m. DBST. Beyond Labuan up to Labason, the returns are too low and no improvement is recommended. From Labason to Liloy, the recommended improvement is 6.0m. gravel. Also included in this recommendation are the construction of 11 double lane bridges, 6 single lane bridges and 10 box culverts. Total financial cost for the recommended sections is ₱81.2 Million. The summary of recommendations for the various sections are shown in Table 2.2-2.

TABLE 2.2-2

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
II.	Zamboanga City-Liloy Road					
201	Zamboanga City-Ayala Bridge	14.8	7M PCC	31.1	35	33
202	Ayala Bridge-Labuan	17.9	6M DBST	28.6	17	14
203	Labuan-Limpapa	7.0	No. Imp.	-	-	-
204	Limpapa-Sibuco	32.0	Not feasible	-	-	-
205	Sibuco-Siocon	74.3	Not feasible	-	-	-
206	Siocon-Labason	80.2	Not feasible	-	-	-
207	Labason-Liloy	21.4	6M GRAVEL	21.5	13	11
		248.3				
TOTAL FOR SECTIONS 201, 202, 207				81.2	-	-

Package III - COTABATO COASTAL ROAD

The Awang-Lebak Road is 193 km. long with 52 km. from Awang to Timawan existing. The overall IRR of Package III is not a very convincing 9.4%. Thus only the sections 301 to 304 from Awang to Kalamansig is recommended for improvement with 6M gravel and single lane bridges. For this segment, the IRR is about 12% including development and diversion traffic. To improve the return further, it is recommended that the design standards be lowered to that of a minor roads by reducing the roadway width and reducing the design speed. The total financial cost for the recommended segment is ₱101.8 Million. Table 2.2-3 shows the summary of recommendations on various sections in this Package.

TABLE 2.2-3

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
III.	Awang-Lebak Road					
301	Awang-Upi	28.2	6M GRAVEL	30.0	8	5
302	Upi-Timanan	24.0	6M GRAVEL	21.9	5	3
303	Timanan-Lebak	31.8	6M GRAVEL	36.8	19	-
304	Lebak-Kalamansig	9.6	6M GRAVEL	13.1	12	-
305	Kalamansig-Malisbong	82.5	Not feasible	-	-	-
306	Malisbong-Maitum	17.0	Not feasible	-	-	-
		193.0				
TOTAL FOR SECTIONS 301-304				101.8	12	-

Package IV - SURIGAO-DAVAO COASTAL ROAD

IVa - Lahi-Lingig Road

The Lahi to Lingig Road (282 km.) consist mostly of gravel surfacing in poor to very bad condition. Several unbridged waterways are present in this segment which makes the road unpassable during the rainy season. The overall return for the proposed improvement of this sub-package is 14%. The recommeded improvement from Lahi to Mati is 6M AC including the construction of double lane bridges. The return for this segment is 15%. From Mati to Tarragona, 6M DBST is proposed including single lane bridges. Gravel surfacing is recommended between Tarragona and Lingig. The total financial cost for the recommended level is ₱359.6 Million.

IVb - Bacuag-Lingig Road

The Bacuag to Lingig Road (341.5 km.) consist mostly of gravel surfacing is bad condition. The overall return for the subpackage is 12%. The Bacuag-Claver Section is viable for DBST surfacing with a return of 16%. The Cantilan-Madrid Section is recommeded for PCC pavement with a return of 11%. The sections from Madrid to the PICOP Gate is recommended for 6M DBST surfacing. The return is estimated at 14%. The sections through Mangagoy is proposed for PCC pavement (IRR of 11%) because of the heavy axle loads in this area. From the PICOP Road to Lingig, only the replacement of bridges is recommended. The total financial cost for the recommended level of improvement is ₱326.4 Million.

The summary of recommendations for this package is shown in Table 2.2-4.

TABLE 2.2-4

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost P Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
IVa - Lahi-Lingig Section						
411	Lahi-Lupon	41.5	6M AC	62.5	17	15
412	Lupon-Jct. Gov. Generoso	8.4	6M AC	23.2	9	8
413	Jct. Gov. Generoso-Start of PCC (Mati)	28.0	6M AC	42.5	17	15
414	Start of PCC Mati-End of PCC at Mati	-	Existing Pavement			
415	End of PCC at Mati-Tarragona	29.0	6M DBST	40.8	11	8
416	Tarragona-Baganga Bridge	87.6	6M GRAVEL	101.8	13	-
417	Baganga Bridge-Cateel River Bank	35.6	6M GRAVEL	39.4	13	-
418	Cateel River Bank-Boston	19.0	6M GRAVEL	22.5	13	-
419	Boston-Lingig Bridge	22.0	6M GRAVEL	26.9	13	-
TOTAL FOR SECTION IVa		282.0		359.6	14	7
IVb - Bacuag-Lingig Section						
421	Bacuag-Claver	17.1	6M DBST	21.4	16	14
422	Claver-Cantilan	61.1	Not feasible	-	-	-
423	Cantilan-Madrid	10.5	6M PCC	22.2	11	9
424	Madrid-Tandag Bridge	58.0	6M DBST	91.5	11	10
425	Tandag Bridge-Cagwait	37.9	6M DBST	43.2	14	11
426	Cagwait-Marihatag	15.6	6M DBST	20.9	16	14
427	Marihatag-Lianga	42.0	6M DBST	54.4	15	12
428	Lianga-Barobo	15.9	6M DBST	16.5	13	10
429	Barobo-PICOP Gate I	19.9	6M DBST	19.4	11	7
430	PICOP Gate I-Gate 2	-	Existing	-	-	-
431	PICOP Gate 2-[illegible]3	13.9	6M PCC	35.6	11	9
432	[illegible] Gate 3-Jct. to Davao Rd.	-	Existing	-	-	-
433	Jct. to Davao Rd.-Lingig Bridge	19.9	Bridges Only	1.3	12	8
TOTAL FOR SECTIONS 421, 423-433		341.5		326.4	-	-

Package V - NORTH COTABATO-BUKIDNON ROADS

Va - Paco-Roxas-Arakan Valley Road

The Paco to Arakan Road (76.8 km.) has 42.8 km. of gravel surfacing in poor to very bad condition. The rest of the road will be on new alignment. The recommended level of improvement is 6M gravel with single lane bridges. The return for this package is 21%. The financial cost for the proposed improvement level is ₱69.3 Million.

Vb - Kabacan-Kibawe Road

The Kabacan-Kibawe Road (79.2 km.) is an existing gravel road in poor to bad condition. The recommended level of improvement for this segment is DBST surfacing with double lane bridges. A realignment is proposed at the Pulangi River Crossing to site the proposed bridge to a better location. The return for the total road segment including a new bridge at Carmen is 14%. The total financial cost for the proposed improvement level is ₱98.3 Million.

The summary of recommendations for this package is shown in Table 2.2-5.

TABLE 2.2-5

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
Va	Paco-Roxas-Arakan Valley Road					
511	Paco-Pres. Roxas	13.8	6M GRAVEL	17.1	20	8
512	Pres. Roxas-Doroluman	29.0	6M GRAVEL	21.5	18	7
513	Doroluman-Jct. Davao-Bukidnon Road	34.0	6M GRAVEL	30.7	24	9
TOTAL FOR ROAD Va . .		76.8		69.3	21	8
Vb	Kabacan-Kibawe Road					
521	Kabacan-Carmen	10.1	No improvement on existing alignment			
522	Carmen-Kibudtungan	12.5	6M DBST	14.8	12	2
523	Kibudtungan-New Damulog	41.0	6M DBST	43.2	16	5
524	New Damulog-Kibawe	13.4	6M DBST	13.5	22	12
525	Kabacan-Carmen (New Alignment)	12.3	6M DBST	26.8	-	-
TOTAL FOR SECTIONS 522-525		79.2		98.3	14	5

Package VI - COTABATO CITY-PAGADIAN-ZAMBOANGA CITY ROAD

The Cotabato City to Zamboanga City Road is 448.8 km. long consisting mainly of gravel and DBST surfacing in poor to bad condition. The short stretches before Parang is recommended for PCC pavement with an IRR of 31%. From Parang to Tukuran, DBST surfacing is recommended with an IRR of 25%. From Tukuran to Pagadian, AC pavement is recommended while AC overlay is proposed for the existing pavement in Pagadian up to Dumalinao. No improvement will be done between Dumalinao and Buug except paving of 3.9 km. with AC. From Buug to Sangali, PCC pavement is recommended with a return of 23%. The segment from Bangali to Zamboanga is also feasible for 7M PCC and AC.

The overall return of the road package for the recommendations is 22%. The total financial cost is ₱593.7 Million.

The summary of recommendations for the package is shown in Table 2.2-6.

TABLE 2.2-6

SUMMARY OF RECOMMENDATIONS PER SECTION

	Section	Improved Length	Recommended Imp. Level	Financial Cost ₱ Million	Eco. Return % W/ Gen. Benefits	Eco. Return % W/O Gen. Benefits
VI.	Cotabato City-Pagadian-Zamboanga City Road					
601	Cotabato-Simuay Bridge	-	Existing PCC	-	-	-
6021	Simuay Bridge-Jct. to Marigalupa	-	Existing PCC	-	-	-
603	Jct. Polloc Port-Parang	3.1	6M PCC	5.1	31	27
604	Parang-Malabang	53.3	6M DBST	47.0	29	12
605	Malabang-Jtc. to Marawi	5.2	6M DBST	4.7	26	6
606	Jct. to Marawi-Dobliston	58.4	6M DBST	53.5	18	-
6071	Dobliston-Jct. Tukuran	17.1	6M DBST	29.4	12	-
6072	Jct. Tukuran-Labangan	9.9	6M AC	17.6	29	21
608	Labangan-Jct. Pagadian Airport Road	5.2	7M AC	10.2	12	11
609	Jct. Pagadian Airport Road-Pagadian Poblacion	3.8	AC Resurfacing	2.8	14	14
610	Pagadian Poblacion-Dumalinao	11.0	AC Resurfacing	3.5	21	21
611	Dumalinao-Buug	50.5	AC Resurfacing	37.9	-	-
612-615	Buug-Kabasalan	51.9	6M PCC	94.4	22	17
616	Kabasalan-Ipil	21.6	6M PCC	36.7	27	21
617	Ipil-Surabay	19.9	6M PCC	34.2	30	14
618	Surabay-Sangali	89.3	6M PCC	148.8	24	17
619	Sangali-Cabaluay	11.8	7M PCC	22.9	31	26
620	Cabaluay-Boalan	8.8	7M PCC	18.1	22	18
621	Boalan-Zamboanga Proper	7.0	7M AC	12.3	31	31
TOTAL	. . . . .	448.8		579.1	22	14

3. POPULATION

The 1980 Population Census gave the result that the Philippines had a total population of 49 million with an average density of 163 persons per square kilometer.

Of the total population in the country, 22 per cent comprise the population of Mindanao (Regions IX, X, XI and XII) equivalent to 10.9 million.

The national average annual growth rate from 1975-1980 was 3.1 per cent. In Mindanao the highest annual growth rate was recorded in Region XII with 5.9 per cent while the lowest was in Region X with 0.4 per cent. Both Regions IX and XI recorded an average annual growth of 4.3 per cent.

Population developments of relevant provinces is shown in Table 3-1.

The thirteen study provinces comprise 66.5 per cent of the total population of the Mindanao Regions and 72.9 per cent of the land area.

The overall growth of population of influence provinces over the past five years was 3.3 per cent a year, slightly faster than the national growth rate.

Table 3-1

POPULATION DEVELOPMENT OF INFLUENCE PROVINCES 1980

	Population 1980 (000)	Population Density Persons/Sq. Km.	Average Annual Growth Rate (% p.a.) 1960-70	1970-75	1975-80
Philippines	48,984	163	3.1	2.8	3.1
Region IX	2,529	131	3.3	1.8	4.3
Region X	2,271	97	4.2	3.5	0.4
Region XI	3,347	104	5.0	4.3	4.3
Region XII	2,759	95	3.4	1.3	5.9
Zamboanga del Norte	588	97	3.8	3.7	3.7
Zamboanga del Sur	1,184	119	4.2	2.4	3.4
Bukidnon	632	76	7.9	5.2	3.5
Surigao del Norte	363	133	2.0	4.5	4.0
Davao del Norte	725	89	5.3	5.9	4.2
Davao Oriental	340	66	6.5	3.8	2.6
South Cotabato	770	98	4.7	4.7	5.6
Surigao del Sur	378	83	4.6	3.1	4.5
Lanao del Norte	461	149	2.6	1.7	3.9
Lanao del Sur	405	105	1.9	1.9	(3.5)
Maguindanao	537	90	2.9	2.2	2.3
North Cotabato	565	81	5.3	0.2	3.6
Sultan Kudarat	304	58	6.1	0.1	4.9

Source: Philippine Year Book 1981
1980 Population Census, NCSO
Interim Report on Mindanao, Main Volume 4, NTPP

4. ECONOMIC ACTIVITY

4.1 AGRICULTURE

As of 1981 the total area in the Philippines devoted to crops was estimated at 12.2 million hectares, 3.5 million hectares or 28.4% was devoted to palay and 3.4 million hectares or 28.1% was devoted to corn. Coconut was planted on some 3.2 million hectares or 25.6% and sugarcane was produced on 421,000 hectares or only 3.5% of the land area planted to both food and commercial crops.

Total areas of palay, corn, coconut, sugarcane and rubber production in Mindanao are distributed as shown in Table 4.1-1.

Out of the total crop production of almost 30 million metric tons, around 7.7 million metric tons or 25.8% were rice and 3.2 million tons or 10.8% were corn. Coconut production was estimated at 4.6 million tons or 15.4%. Table 4.1-2 shows agricultural production in 1981 by kind of crop.

The forecast production by project influence area is shown under each Road Package Volume.

4.2 FORESTRY

As of 1980, the land classification of the country was as follows (000) hectares):

Classified Alienable & Disposable Land	13,269
Unclassified Forest Land	7,025
Classified Forest Land	9,705

The commercial forest of the country comprises 7.04 million hectares, of which 92.8 per cent or 6.53 million hectares are located in the forest lands while 7.2 per

Table 4.1-1

AGRICULTURAL LAND UTILIZATION BY KIND OF CROP, 1981

Crops	Philippines (hectares)	Western Mindanao		Northern Mindanao		Southern Mindanao		Central Mindanao	
		Area (hectares)	Per Cent	Area (hectares)	Per Cent	Area (hectares)	Per Cent	Area (hectares)	Per Cent
. Crops	12,187,590	927,590	7.6	968,390	8.0	1,674,310	13.7	1,162,160	9.5
d crops	8,521,010	479,240	5.6	553,100	6.5	1,085,690	12.8	811,010	9.5
ay ugh rice)	3,459,130	139,440	4.0	129,950	3.8	1,085,920	5.4	262,220	7.6
n (shelled)	3,426,000	266,420	7.8	241,340	7.0	748,650	21.9	464,730	13.6
mercial Crops	3,936,590	448,350	11.4	415.290	10.6	558,620	14.2	351,150	8.9
onut	3,162,250	410,500	13.0	368,140	11.6	559,380	1.8	319,180	10.1
arcane	420,630	10	0.01	12,010	2.9	4,560	1.1	4,960	1.2
ber	53,880	27,300	50.7	5,240	9.7	4,150	7.7	17,190	31.9

Table 4.1-2

AGRICULTURAL PRODUCTION, BY CROP AND BY REGION, 1981

Crops	Philippines	Western Mindanao		Northern Mindanao		Southern Mindanao		Central Mindanao	
	Metric Tons	Metric Tons	Per Cent	Metric Tons	Per Cent	Metric Tons	Per Cent	Metric Tons	Per Cent
ll Crops	29,976,964	1,437,958	4.8	2,919,192	9.7	4,340,269	14.5	3,478,878	11.6
ood Crops	21,874,353	1,029,501	4.7	2,357,957	10.8	3,514,928	16.1	3,059,084	14.0
Palay	7,722,748	296,879	3.8	321,227	4.2	489,695	6.3	714,604	9.3
Corn	3,247,210	179,600	5.5	212,820	6.6	1,001,665	30.8	212,820	6.6
mmercial Crops	8,102,611	408,457	5.0	561,235	6.9	825,341	10.2	419,794	5.2
Coconut	4,629,772	354,897	7.7	426,416	9.2	753,966	16.3	366,639	7.9
Sugarcane	3,193,053	2	-	113,400	3.6	29,646	0.9	30,838	1.0
Rubber	71,992	43,058	59.8	5,003	7.0	7,719	10.7	16,212	22.5

cent o: hectares are in alienable and disposable lands. hically, of the 6.53 million hectares of commerc:t, 56 per cent or 3.92 million hectares are lo:indanao[1].

Forestmber processing is a fairly significant industmst all of the influence provinces namely:

- oanga del Sur
- oanga del Norte
- gao del Norte
- o Oriental
- gao del Sur
- indanao

Total lmber production of the country are shown in Tabl:

Table 4.2-1

IMBER PRODUCTION, 1980
in 000 cu.m.)

g	Lumber	Plywood	Veneer
PHILIPPI52	1,529	553	660
Region30	55	47	6
Region03	352	100	197
Region70	472	207	314
Region56	87	136	86

Source:ilippine Forestry Statistics.

4.3 FISHING

The totarch of the Philippines is estimated at 1.4 millbf which 88 per cent come from sea fishing and der from inland sources. The bulk of fish catcmed near the landing areas and little is used fsing.

1) 1980 Philippine Statistics.

Total fish production in tons (by type of fishing) of the country in 1980 is as follows:

Municipal	762,405
Commercial	488,478
Inland	176,231
Total	1,427,114

4.4 MINING

Mining activity in Mindanao is very limited[1]. There are at present only three activities of any significance.

The Marinduque Mining and Industrial Corporation produces nickel and cobalt on Nonoc Island near Surigao. The actual output is relatively small amounting to 26,000 tons in 1980 as recorded by the Bureau of Mines but the fuel and chemical input requirements are much higher at 780,000 tons in 1980.

International Industrial Management Corporation at Malangas in Zamboanga del Sur had an estimated output of 51,000 tons of coal in 1980 compared to an output of 14,000 and 4,000 tons in 1979 and 1978 respectively.

Copper concentrates are produced by Sabena in Davao del Norte. The production is relatively low at 39,000 tons in 1980 and 28,000 tons in 1979.

The mining companies use private port facilities close to their mines. Marinduque Mining have their own private berth on Nonoc Island where the average ship size is 6,500 DWT.

1) Excerpts from the Interim Report on Mindanao Main Volume A, National Transportation Planning Projects.

The Davao copper concentrates are transported from Hijos Plantation's private berth (31,000 tons of concentrates were exported from that Berth in 1980).

The coal, which so far has been shipped out via Malangas public port (36,000 tons in 1980), is to be shipped out of a new private berth in the future.

Another coal development is expected near Bislig where exploration is currently taking place, but the National Coal Authority envisages private out-loading terminals at all such mines.

To summarize, the mining sector in Mindanao is small and uses private facilities. No significant demands on public transport facilities seem likely in the near future.

4.5 INCOME

Table 4.5-1 shows that the average family income of the country increased by 15.2 per cent per year for the period 1970-1975. Among the regions within the influence area, Region XI had the highest family income, even exceeding the country's average income. On the other hand, average family income of Region X was 10.9 per cent below that of the nation

Table 4.5-1

AVERAGE FAMILY INCOME 1971-75

	Average Family Income 1971	1975	Average Annual Increase %
PHILIPPINES	3,736	6,567	15.2
Region IX	3,062	6,404	20.00
Region X	3,577	5,937	13.5
Region XI	-	6,595	-
Region XII	-	6,190	-

Income distribution in 1971 revealed that the majority of the total households of the country have an income below the average income bracket comprising 41.3 per cent. However, the proportion went down to 13.7 per cent in 1975, see Table 4.5-2.

Table 4.5-2

INCOME DISTRIBUTION 1971-1975

Income Class	Percentage of Household 1971	1975
Below 2,000	41.3	13.7
2,000 - 4,999	37.7	49.2
5,000 - 5,999	5.0	9.5
6,000 - 9,999	10.0	16.8
10,000 - 19,999	4.8	8.3
20,000 - over	1.2	2.5

Source: Special Release No. 190
National Census & Statistics Office

4.6 ASSESSMENT OF DEVELOPMENT BENEFITS

Of the two conventional ways of assessing the development impact of road investments, estimates of generated traffic and the producer surplus method, the latter is conceptually preferable and makes more explicit the judgments inherent in the former method. The producer surplus methods has been adopted for the evaluation in this study wherever there is prima facie evidence that agricultural development benefits are likely to be significant.

Development benefits attributable to road investment are expressed in terms of the net value added (NVA) in agriculture: that is the value of the net increase in crop production induced by road improvement less the costs (other than those of road construction) associated with

achieving that increase. This may be expressed theoretically as follows:

$$NVA = (PRODW \times (FPW-CPW) - (PRODWO - (FPW-CPWO)^{1}$$

It should be noted that the potential transport cost savings attributable to 'normal' marketed agricultural production[2] (i.e., that not dependent on road investment) are included in the VOC (vehicle operating cost) side of the model and are explicitly excluded from the NVA component here, to avoid double counting.

In principle, development benefits may be attributed to productive sectors of the economy other than crops. In practice, potential non-agricultural developments in the zones affected by the roads under study are rarely so significant as to warrant treatment other than in terms of conventional generated traffic.

Changes in agricultural production over time, with and without the road project, may be expressed in differential response in four main components of farm management:

(i) Extension of the area cultivated onto idle cultivable land (i.e., increases in the net or physical crop area);

(ii) Intensification: (a) increases in unit yields per crop per hectare through more intensive use of farm inputs or labour or through improved management;

---

1 Where PROD = Crop production in tons; FP = Farmgate price per ton; CP = Cost of production per ton; W = With road project; WO = Without road project.

2 i.e., effectively: (PRODWO x FPW) - (PRODWO x FPWO)

(b) increases in cropping intensity (i.e., increases in the number of crops harvested from the same area in one year: the gross or effective crop area)

(iii) Diversification: changes in the choice of crops grown as a result, for example, of relative price changes or following improvement in marketing and transport arrangements which stimulate commercial production of more perishable crops such as fruit and vegetables.

The forecast changes in crop area, yield and production over the study period, with and without the road project, are presented for each project or road section in a standardized tabular format in each Road Package Volume.

The yield potentials for various crop types have been adopted from the recently completed Rural Roads Study under the MLG. Similarly, the very extensive work carried out under that study on prices and production costs has been utilized but adjusted to market prices and updated for the May 1982 price levels.

For palay the farmgate prices, on the average, is set at ₱1,700/ton for transport on an improved road. The production costs are estimated as follows (x = cost in Pesos per metric ton and y = yield in metric tons per hectare):

irrigated palay : $x = 650 + 930/y$

upland/rainfed palay: $x = 775 + 100/y$

The corn price at the farmgate was found to be ₱1,600/ton, while the production cost models are as follows:

y more than or equal to 0.8: $x = 923 - 96/y$

y less than 0.8 : $x = 518 + 226/y$.

The farmgate price for copra (long-term price adjusted for seasonal fluctuations) is assumed at ₱2.00/kg. and the costs of production is as follows:

y: less than 1.0: $x = 494 + 790/y$

y: 1.0 - 1.5 : $x = 1,284$

y: more than 1.5: $x = 1,562 - 70y$ (hybrid)

Rubber potentials exist in the southern part of Mindanao and the farmgate price of latex is assumed to be ₱5.00/kg. while the production costs would be around ₱3.07/kg.

The cassava (raw) price ex-farm would be about ₱304/ton over a production cost of ₱158/ton.

Sugarcane has been valuated at ₱140/ton over average production costs of ₱69/ton.

5. TRAFFIC

5.1 LAND TRAFFIC SURVEYS

Three different types of traffic surveys were conducted on the major road packages which covered the months of March to May 1982 comprising manual classified volume counts, vehicle origin-destination roadside interviews and pedestrian origin-destination interviews. The standard formats for each survey type is given in Appendix 5.1-1. Classified volume counts were undertaken for a 24-hour period for 7 consecutive days at the control stations and over 12 daylight hours for 2 consecutive weekdays at coverage stations. Hourly and daily expansion factors obtained from the nearest control stations were applied to update the survey data to Weekly Average Daily Traffic (WADT), which further was updated to Annual Average Daily Traffic (AADT) utilizing the seasonal factors obtained from the Nationwide Traffic Count Program of the MPWH. The corresponding expansion factors for each survey station are presented in the appendices of the package volumes. Vehicle together with pedestrian origin-destination interviews were usually undertaken for 12 daylight hours from 6 AM to 6 PM, for 2 consecutive weekdays, the survey period usually being concurrent with associated classified counts relating to the same project package.

Vital information regarding the general traffic characteristics such as vehicle type, occupancy rate, fuel type, purpose of travel, type and weight of commodities carried, etc., which are all input to the estimates of basic vehicle operating costs, have been gathered as part of the vehicle OD interviews. The pedestrian OD interviews on the other hand, yielded information on the daily pedestrian and goods traffic along road links inaccessible to vehicular traffic, and their walking dis-

tances to/from the nearest available vehicle transport mode.

The zonal movement has been derived after dividing the respective study areas into traffic zones, with each municipality comprising one zone in the project road's direct influence area. In the case of pedestrian OD, each barangay has been considered to comprise one zone.

Along impassable roads, normal traffic has been simulated through the use of assumptions on trip rates per thousand inhabitants, usually arounds 30 person trips per day, and converted into vehicle trips on improved roads. On improved roads the trip rates were assumed to be around 50 to 100 per thousand inhabitants, depending on the present trip characteristics in the study area.

The results of some traffic surveys conducted by the National Transportation Planning Project (NTPP) in January, 1982, and the findings published in their Interim Report on Mindanao, have been utilized to futher supplement the surveys and informations gathered by the consultants. The survey locations and results are indicated in the package volumes as NTPP counts.

In cases where the consultants did not find the spot count station results as representative for the homogeneous stretch of highway, the traffic volumes were calculated on the basis of a weighted average of the traffic volumes of each vehicle type at two or more count stations, with the road lengths representative of each spot count station results as weights. In some instances where intermediate traffic breaks were not known, a straight line variation between spot traffic count stations were assumed, with the effect of the two spot counts which bracket a homogeneous road section as the inverse ratio of the distances between each count station

and the center of that homogeneous section.

Throughout the study, some 45 separate traffic stations were operated. A breakdown of survey type is given in Table 5.1-1 below. About 49% of all stations were classified volume counts, 38% were combined classified counts with vehicle OD Surveys and 13% were pedestrian OD surveys.

Table 5.1-1

TRAFFIC SURVEYS BY TYPE, 1982

Type of Survey	Number
Classified Volume Count	22
Classified Volume Count plus Vehicle OD Interviews	17
Pedestrian OD Interviews	6
Total	45

5.2 FUTURE NORMAL TRAFFIC

5.2.1 Future Passenger Transport By Land

The normal growth of road traffic were estimated on the basis of forecast development in population and real per capita income growth rates, and the transport demand-income elasticity coefficient using the model:

$$TGR \text{ (in per cent)} = \left[\left(\frac{I \times E}{100} + 1\right) \cdot CP - 1\right] 100$$

Where:

TGR = the traffic growth rate in per cent per annum

I = the growth rate for per capita real income

E = traffic transport demand-income elasticity coefficient

CP = the compound population growth rate in per cent per annum.

The growth rate for per capita real income (I) in Mindanao has been estimated at 2.0% per annum and the transport demand-income elasticity E for each vehicle type as follows:

Vehicle Type	Coefficient E
Private cars, jeeps	1.5
Jeepneys	1.2
B u s e s	1.4
Motor-tricycles, motorcycles	1.2

Vehicle growth rates by road section were estimated using the TGR model above and the arithmetic average of the population growth rates at the end zones of the section. Where a road is inaccessible or non-existent at present, growth in passengers have been estimated utilizing the above model with an elasticity coefficient of 1.4.

5.2.2 Future Commodity Transport By Land

The normal annual increase in truck traffic has been determined through the increase in total cargo volume within the road influence area. The normal production growth rates for each agricultural product were applied to the present volume (in metric tons, AADT 1982) obtained from the origin-destination interviews, to estimate the future volume in periods of 5 years up to 20 years, end of the planning period. Annual growth rates for consumer goods and other related non-agricultural products were estimated using the traffic growth rate model mentioned above, with the elasticity coefficient E equal to 1.0, and the arithmetic average of the population growth rates. The annual increase in the total commodity volume

therefore has been utilized as the truck growth rates, on the assumption that all bulky cargo in the future will be transported by truck.

Due to time constraint and/or peace and order situation, the ideal number of count and interview stations has not been fully realized. Assumptions therefore, had to be made using the consultant's best judgment on specific situations.

In the forecast of commodity transport therefore, it was assumed that the present commodity volumes observed along a road section where an OD survey was conducted, would be more or less similar for the neighboring road sections.

In the absence of an OD survey or all other data, the weights based on transportable surplus agricultural production has been utilized to adjust the commodity growth rates, and the total adjusted commodity tonnages were assumed as truck growth rates.

5.3 SEA TRAFFIC

5.3.1 Sea Traffic Surveys

5.3.1.1 Introduction

Sea traffic surveys were carried out for four out of the six road project packages of this study where competition between road and sea transport would likely occur.

Once location of surveys required for each particular area had been determined, the port managers of the relevant ports or the mayors in the case of small docking areas, were notified and briefed about the purpose of the survey. The hiring and training of survey enumeration staff were personally undertaken by the consultants using

students or clerical staff drawn from neighbouring population centers in order to minimize transport difficulties and gain the benefit of local knowledge of municipalities, barangays etc.

5.3.1.2 Surveys Types

Passenger origin-destination surveys were carried out as interview surveys with various questions to the passengers of departing vessels whose next port of call was within the project influence area. In cases where the volume of traffic was small, both departing and arriving passengers were interviewed. Normally, the surveys were undertaken for 12 to 14 hours, (6 AM to 8 PM) for 7 days.

At some of the survey stations, where there were no existing records of cargo traffic flows, cargo origin/destination surveys were carried out for two days. Commodity types and weights were also recorded.

5.3.1.3 Processing

All processing was accomplished by manual methods and a set of standard summary forms was designed to facilitate computations. The survey generated considerable additional information including person age, mode of transport used in going to and from the pier or the docking stations, porterage fees paid and purpose of journey.

The AADT was calculated according to the method mentioned under Section 5.1.

5.3.1.4 Results

The results of the sea traffic surveys conducted are detailed in the appropriate package volumes. Throughout the study eleven sea traffic stations were operated and

the percentages of the interviews obtained were as follows:

Port/Station	% of Interviews Obtained
Package II	
1) Zamboanga	85
2) Labuan	100
3) Labason	100
Package III	
1) Cotabato	80
2) Cawa	100
3) Maguling	100
Package IV	
1) Mati	85
2) Lambajon	85
3) Caraga	100
4) Cateel	100
5) Lingig	100
Package VI	
1) Zamboanga	84
2) Cotabato	82

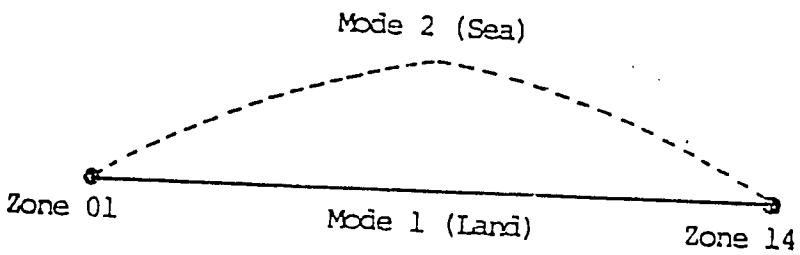
5.3.2 Diverted Traffic (Sea and Air to Road)

The diversion of passenger and cargo traffic by sea transport and air passenger traffic to land transport was based on transport costs. Passenger transport costs by sea include the actual fare, the value of sailing time and waiting time, the average porterage fees paid at both the port of origin and port of destination, the land transport costs incurred in going to the pier of origin and from the pier of destination to the ultimate destination, and the corresponding value of travel time by land. The value of time was assumed at ₱1.60 per hour, refer to Chapter 6 of this Volume for further explanation.

By air, passenger transport costs include the airfare, the value of flying time and terminal time. Terminal time was assumed at 90 minutes per passenger. The passenger transport costs by land include the value of travel time, and fare assumed at ₱0.12 and ₱0.15 per passenger-kilometer on good paved roads and good gravel roads, respectively. The land transport fare on passable existing roads is assumed to be 30% higher, on the average.

The traffic assignment model used in the study is shown, in principle in Figure 5.3.2-1.

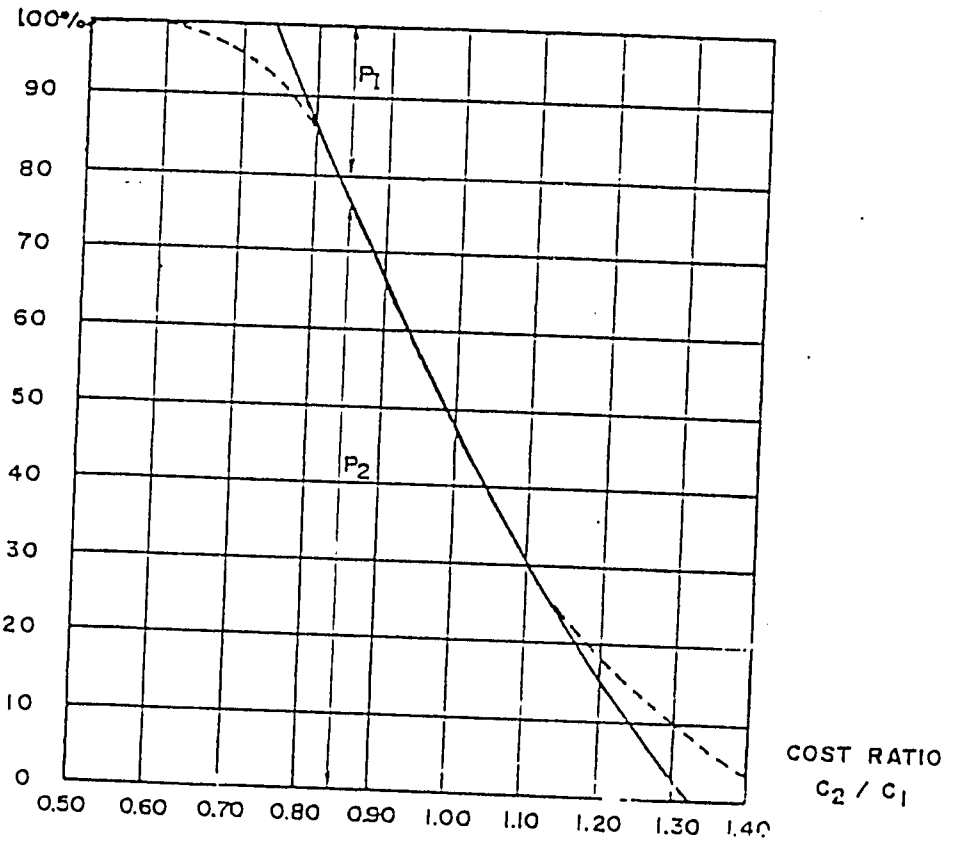
An example will illustrate the function of the model:



We assume that mode 1 is less expensive in transport costs than mode 2. Mode 1 costs ₱10.00 per passenger and mode 2 costs ₱12.00. The cost ratio C2/C1 is, thus 12.00 over 10.00 equal to 1.20. An imaginary vertical line is then drawn upwards from the point 1.20 on the x-axis to intersect with the curve, and from that intersection point a horizontal imaginary line is drawn to the intersection with the y-axis. That intersection point is 15%, indicating that mode 2 will be assigned 15% of the total passenger traffic between the 2 zones, while 85% will be assigned to mode 1.

TRAFFIC ASSIGNMENT MODEL

FIG. 5.3.2-1



Key: C_1 = Traffic Cost on Mode 1, C_2 = Traffic Cost on Mode 2
P_1 = % of Traffic Assigned to Mode 1, P_2 = % to Mode 2
——— Adopted Model - - - ——— - - - Theoretical Model

Based on: "The Economic Benefits of Road Construction and Improvements by Lionel Odier

Diversion of cargo traffic from sea transport to land was also based on transport costs. The cargo transport cost by sea include the fare and the stevedoring charges at both the port of origin and destination. By land, the cargo transport cost is assumed to be ₱0.50 per ton-kilometer on good paved roads and ₱0.60 on good gravel roads. The model used for diverted cargo traffic is the same as the one used for the diverted passenger traffic.

5.3.3 Traffic Forecasting Methods

The traffic forecasting methodology used is the same as the one used for the land traffic forecast. Specifically, the traffic growth rates by bus were used to forecast future passenger traffic.

For the commodity traffic forecast by sea transport the truck traffic growth rates were used.

6. ROAD USER COSTS

6.1 GENERAL

This section defines the Basic Traffic Cost and the Actual Traffic Cost concepts to be used in this Report for the estimation of traffic cost savings for road users.

The vehicle types used in the cost estimation are those observed during the traffic surveys carried out in the course of this study: car/jeep, jeepney, bus (small and large), motor-tricycle, motorcycle, medium and heavy truck; and in addition to these motorized vehicles: boat (banca) carabao sledge and head loading or pedestrian.

The basis for the estimates in this section is work carried out by MPWH consultants, over the past 5 years. This section contains a brief description of the traffic cost estimation system applied here, while more detailed discussions are presented in Highway Planning Manual, Volumes 4 and 5, MPWH August 1982 and May 1982.

The price level date for the estimates is May, 1982 Prices.

All costs used for economic evaluation purposes are expressed in economic terms, i.e. excluding taxes and custom duties which are regarded as transfer income.

During the course of the study it was found that elements of traffic costs varied amongst the study areas in Mindanao and compared to the Luzon price level but the variations seem to offset each other in such a way that the total running or fixed or time costs remained the same. Therefore, the same set of uniform traffic cost

figures per representative vehicle type are used for all study areas.

Basic Traffic Costs are defined as the costs which would be incurred by vehicles using roads under conditions as follows:

- reasonably good paved surface as found on some of the new asphalt concrete surfaces financed with local funds;
- at least 6.0 meters carriageway width with shoulder widths of more than or equal to 2 x 2.0 meters;
- gradients below 1 per cent;
- design speeds of no less than 70 kph for cars and 60 kph for buses and trucks;
- minimum roadside friction and traffic volumes with no effect on driver behavior (free flow conditions); and
- average Filipino driver behavior.

Actual Traffic Costs are defined as the costs which apply to specific road segments incorporating road and traffic elements which deviate from the above described ideal basic concept.

6.2 BASIC TRAFFIC COSTS

6.2.1 Definition

The Basic Traffic Costs can be divided into groups as follows:

1. Vehicle Operating Costs (VOC)
   a. Running Costs
   b. Fixed Costs
2. Time Costs

Running costs are defined as the part of vehicle operating costs which vary in direct proportion to the number of kilometers operated. Fixed costs are related to the part of the vehicle operating costs which depend on the operating time (running and waiting time).

Time costs are the term for the value of person's time, including the time value of drivers of private cars.

Accident costs are not included as part of the traffic costs in this study as the road improvement mostly would be from deteriorated gravel to gravel or paved surface in good condition which as a matter of fact might imply an increase in the number of accidents per km. due to higher speed possibility.

6.2.2 Representative Vehicles

The representative vehicles typical of the project areas are shown in Table 6.2.2-1. It is assumed that most trucks will be diesel powered in the future indicating the trend of the truck fleet distribution structure with diesel trucks plying regional and national trunk routes with relatively high load factors. Gasoline powered medium trucks, which are cheaper to purchase, are then reserved for secondary hauls and feeder roads with implied relative reduction in kilometrage and load factor. The depreciation element thus dominates the decision on choice of vehicle type over the variable cost reduction by using diesel for relatively low kilometrage, say 30-40,000 kilometers. The same aspect seems to apply to the jeepney group, which for the study roads, is dominated by the Fiera type which now already is becoming diesel dominated. All buses are diesel powered now and are assumed to remain so also in the future.

Table 6.2.2-1

TYPICAL REPRESENTATIVE VEHICLES

		Shares	Typical Make and Model
VT 1	Car/jeep	85%	MacArthur Jeep (gas)
	Van	15%	Hi-Lux, KC-20, Courier (diesel)
VT 2	Jeepney	70%	Ford Fiera 1600 (diesel)
		30%	MacArthur (diesel)
VT 3	Small Bus		Isuzu TLD 5303 (diesel)
VT 4	Motor-tricycle		Kawasaki 100 with Timbol sidecar (gas)
VT 5	Motorcycle		Kawasaki KC-125
VT 6	Large bus	20%	Int. Harvester S1754 (diesel)
		80%	Mitsubishi Fuso FM 215 LWL(diesel)
VT 7	Truck	40%	Medium 2-ax, diesel, Toyota DIISL, Isuzu TXD 50
		42%	Heavy 2-ax, diesel, Isuzu Tb-72, Mitsubishi Fuso
		14%	Heavy 3-ax, diesel, Isuzu TMK 78
		4%	Semi-trailer, diesel, Mercedes Benz 1924, 4 axles

Source: Consultants' Selection.

On most Mindanao study roads the private vehicle type typically noted is the jeep which has been selected to represent the car/jeep group.

The future vehicle types and their traffic composition shares to be encountered on the study roads are assumed to be identical - from a performance point of view - as the selected types in Table 6.2.2-1.

6.2.3 Vehicle Characteristics

Vehicle and tire prices have been gatnered from local manufacturers and dealers and in the case of tires, re-capping frequencies have been considered. Table 6.2.3-1 shows the assumed and observed performance characteristics of the representative vehicles.

The fuel consumption in liters per kilometer for different vehicle categories is derived from multi-national vehicle manufacturers' test programs, presented in their manuals, for economically driving on good paved level tangent roads at speeds as follows:

Cars, vans, jeepneys	70 kph
Buses and trucks	60 kph
Motorcycles and Motor-tricycles	40 kph

Ten percent has been added to the test results to reflect the average condition on a relatively good Philippine road. This percentage is broken-down as follows: five per cent has been added because of older vehicles than used in the test runs, and further five per cent has been added because a vehicle under normal driving conditions uses 5 per cent more fuel than indicated by ideal test results.

The lubricant consumption figures are likewise taken from results of test runs and similarly 10 per cent is added to the ideal consumption. The figures include normal consumption in gear box, differential and engine, and grease around moving parts. Also oil change is included for every 5,000 kilometers.

The annual operating distance figures are assumptions made on the basis of rather limited data but checked

...ICS OF REPRESENTATIVE WEIGHTED VEHICLE TYPES AND PRICES, MAY 1982

VEHICLE CLASS R = REGULAR P = PREMIUM G = GAS D = DIESEL	VEHICLE WEIGHTED RETAIL PRICE		WEIGHTED TIRE SET RETAIL PRICE 1)		FUEL CONSUMPTION	OIL CONSUMPTION 1)	ANNUAL OPERATING DISTANCE	TOTAL VEHICLE LIFE		TIRE SET LIFE 3)
	INCLUDING TAX PESOS	EXCLUDING TAX PESOS	INCLUDING TAX PESOS	EXCLUDING TAX PESOS	LTS./KM.	LTS./1000KM	1,000 KMS	1,000 KMS	IMPLIED YEARS	1,000 KMS
LIGHT CAR PG	69,070	52,490	1,320	1,160	0.10	0.7	15	150	10	35
MEDIUM CAR PG	81,240	61,740	1,510	1,330	0.12	1.0	17	170	10	40
HEAVY CAR D	99,500	79,600	2,804	2,468	0.12	1.1	20	300	15	50
JEEP RG	46,380	39,420	2,154	1,896	0.12	1.0	20	300	15	45*
JEEPNEY FIERA TYPE D	61,300	52,100	1,868	1,644	0.09	0.9	60	300	5	30*
JEEPNEY MAC ARTHUR D	59,520	50,590	2,154	1,896	0.09	1.0	60	420	7	40*
MOTORCYCLE RG	10,400	9,360	212	186	0.032 G 0.001 Oil	1.5 2)	15	150	10	20
MOTOR-TRICYCLE RG	12,250	11,025	326	287	0.035 G 0.001 Oil	1.5 2)	30	180	6	20
VAN D	73,400	62,390	2,681	2,359	0.08	0.8	25	250	10	35*
SMALL BUS D	140,630	124,650	4,584	4,034	0.16	2.5	70	420	6	50*
LARGE BUS D	332,990	291,970	15,028	13,225	0.24	3.0	80	640	8	60*
SMALL TRUCK D	111,310	95,780	4,584	4,034	0.14	2.0	30	360	12	40*
MEDIUM TRUCK D	203,260	174,640	11,796	10,380	0.26	3.0	45	540	12	50*
HEAVY TRUCK (2-AXLE) D	268,950	230,710	15,028	13,225	0.28	3.5	50	600	12	60*
HEAVY TRUCK (3-AXLE) D	356,000	305,240	25,047	22,041	0.32	4.0	50	600	12	60*
HEAVY TRUCK(2-AXLE)D -TRAILER(2-AXLE)	435,000	369,750	52,568	46,260	0.42	4.0	60	600	10	60*

1) INCLUDING OIL CHANGE EVERY 5,000 KMS.
2) INCLUDING OIL CHANGE EVERY 3,000 KMS.
3) ORIGINAL TIRE SET
* EXCLUDING RECAPPING WHICH WILL EXTEND THE TIRE LIFE BY 50% OF THE ORIGINAL LIFE AT 85% USE OF ORIGINAL LIFE

Source: Highway Planning Manual Volume 4 and Consultants' Findings.

with the 1969 Transport Survey Report's figures and with results from other ASEAN countries. BLT and BOT staff have also been consulted. In addition the RPDP II consultants carried out a limited survey in Bohol (May 1981) to verify the annual kilometrage and operating time figures. The survey was part of the traffic surveys over 14 days. The results, upscaled to an annual basis, were reasonably close to the assumptions made prior to the survey, as follows:

	Annual Km.-distance	Annual Operating Hours/Lifetime
Jeep	15,367	1800/6
Jeepney	48,767	2100/7
B u s	63,641	2100/7
Tricycle	15,127	1800/6

The estimates of vehicle life time in kilometers and in years have been made on the basis of interviews with operators, with second-hand dealers and with junk yard operators. The term implied years indicates that life time kilometers and years do not always complement each other. In certain cases the life time measured in kilometers will occur before the life time measured in years has been reached and vice versa. Even without use, a vehicle would not last forever because of corrosion of the materials. The life time assumed for different vehicles is, of course, closely correlated with the average maintenance and repair costs assumed per kilometer.

The determination of the proportions of depreciation is made as the best available estimate on the basis of observations of local operations of different vehicles, as follows:

	Distance Related (Per cent)	Time Related (Per cent)
Light and Medium Car	50	50
Heavy Car, Jeep, Van	65	35
Jeepney, Bus, Motorcycle	85	15
Truck	65	35

Tire set life times vary according to vehicle type and to the policy of recapping. It appears, that car tires seldom are being recapped while tires on commercial vehicles seem to be recapped once on the average per new tire. Recapping normally takes place at 85% of the original life time of the new tire. The recapping procedure is assumed to extend the tire life by 50%. Retreading of a tire costs approximately 30% of the cost of a new tire.

6.2.4 Basic Running Costs

Basic running costs are composed of elements as follows:

- Fuel costs
- Lubricant costs
- Tire costs
- Maintenance and repair costs
- Part of depreciation costs

The May 1982 petroleum product prices in Metro Manila were as follows:

	Taxes & Duties	Pesos/Ltr.
Premium Gasoline	Incl.	5.25
	Excl.	3.37
Regular Gasoline	Incl.	5.05
	Excl.	3.25
Diesel Oil	Incl.	3.11
	Excl.	2.51
Lubricants:		
Cars, Jeepneys (10W)	Incl.	10.30
	Excl.	8.55
Motorcycles, Tricycles (SAE 40)	Incl.	10.50
	Excl.	8.75
Buses & Trucks (HD 90)	Incl.	11.70
	Excl.	9.95

The tire costs per kilometer are calculated as the cost of the tire set, excluding the spare tire which is considered as a part of the vehicle itself, divided by the tire life kilometrage.

Maintenance and repair costs are split into a labour component and a spare part component. The latter is related to the retail price of the vehicle itself including the spare tire, but reduced by the cost of the tire set mounted on the wheels. The annual costs of spare parts are in line with international experience estimated as follows:

Vehicle	Spare Part Costs in % of Vehicle Retail Price
Light, Medium Car, Motorcycle	2-1/2%
Heavy Car, Jeep	5%
Jeepney	10%
Large Bus	8%
Van	5%
Small Truck, Heavy Truck 3-axle	6%
Medium & Heavy Trucks 2-axle and Semi-Trailer	7%

Estimates of labour hours required for annual maintenance and repairs are made on the basis of manufacturers' manuals adjusted by local information from workshops and operators. This local information has been modified to conform with the basic cost criteria. The labour hours would be as follows:

Vehicle	Average No. of Labour Hours per Year
Light Car, Motor-tricycle (gas)	60
Motorcycle (gas)	30
Medium Car (gas)	70
Heavy Car, Jeep, Van	100
Jeepney (diesel)	200
Small Bus (diesel)	250
Large Bus (diesel)	300
Small Truck (diesel)	125
Medium Truck (diesel)	250
Heavy Trucks (diesel)	300
Semi-Trailer (diesel)	350

The retail labour rate in Luzon would be about ₱15.00 per hour. This rate includes not only salaries, allowances and social benefits but also cost of tools, equipment, workshop building depreciation and rent of yard, and overhead and profit.

The maintenance and repair costs per kilometer are calculated as follows:

Cost of parts : Per cent of retail price reduced by cost of tire and divided by annual operating distance.

Cost of labour: Retail labour rate times annual number of labour hours divided by the annual operating distance.

The distance related depreciation costs per kilometer are calculated as the distance related share in per cent of the retail vehicle price, reduced by the cost of the tire set in use, divided by life time kilometrage.

The Basic Running Costs by vehicle type are shown in Table 6.2.4-1.

6.2.5 Basic Fixed Costs

The basic fixed costs consist of the following elements:

- Time determined depreciation
- Opportunity cost of capital
- Crew costs
- Overhead and licences
- Insurance costs.

Through interviews with commercial vehicle operators, it is estimated that the average annual operating hours, excluding repair and other idle days, would be as follows:

Table 6.2.4-1: BASIC RUNNING COST PER VEHICLE-KM IN CENTAVOS

LUZON MAY 1982

	LIGHT CAR		MEDIUM CAR		HEAVY CAR		JEEP		AVERAGE CAR	
	IT 1)	ET 2)	IT	ET	IT	ET	IT	ET	IT	ET
FUEL	52.50	33.70	63.00	40.44	37.32	30.12	60.60	39.00		
OIL	0.72	0.60	1.03	0.86	1.13	0.94	1.03	0.86		
TIRES	3.77	3.31	3.78	3.33	5.61	4.94	4.61	4.06		
MAINT. : PARTS	11.29	8.56	11.73	8.88	24.17	19.28	11.06	9.38		
LABOR	6.18	6.00	6.36	6.18	7.73	7.50	7.73	7.50		
DEPRECIATION	22.58	17.11	23.45	17.77	20.95	16.71	9.58	8.13		
TOTAL	97.04	69.28	109.35	77.46	96.91	79.49	94.61	68.93		

	VAN		AVERAGE CAR / VAN		JEEPNEY FIERA TYPE (D)		JEEPNEY MAC ARTHUR (D)		AVERAGE JEEPNEY	
	IT	ET	IT	ET	IT	ET	IT	ET	IT	ET
FUEL	24.88	20.08			27.99	22.59	27.99	22.59		
OIL	0.82	0.68			0.93	0.77	1.03	0.86		
TIRES	7.38	6.49			6.00	5.28	5.19	4.56		
MAINT. : PARTS	14.14	12.01			9.91	8.41	9.56	8.12		
LABOR	6.18	6.00			5.15	5.00	5.15	5.00		
DEPRECIATION	18.39	15.61			16.84	14.30	11.61	9.85		
TOTAL	71.79	60.87			66.82	56.35	60.53	50.98		

	MOTORCYCLE		MOTOR - TRICYCLE		SMALL BUS DIESEL		LARGE BUS DIESEL		AVERAGE BUS	
	IT	ET	IT	ET	IT	ET	IT	ET	IT	ET
FUEL	17.21	11.28	18.72	12.25	49.76	40.16	74.64	60.24		
OIL	1.58	1.31	1.58	1.31	2.93	2.49	3.51	2.99		
TIRES	1.06	0.93	1.63	1.44	8.83	7.77	24.12	21.23		
MAINT. : PARTS	1.70	1.53	0.99	0.89	19.44	17.23	31.80	27.87		
LABOR	3.09	3.00	3.09	3.00	5.52	5.36	5.79	5.63		
DEPRECIATION	5.77	5.20	5.63	5.07	27.53	24.41	42.23	37.02		
TOTAL	30.41	23.25	31.64	23.96	114.01	97.42	182.09	154.98		

1) IT = Including taxes and custom duties

2) ET = Excluding taxes and custom duties

Table 6.2.4-1

BASIC RUNNING COST PER VEHICLE – KM IN CENTAVOS

LUZON May 1982

	SMALL TRUCK (D)		MEDIUM TRUCK DIESEL		HEAVY TRUCK 2-AXLE DIESEL		HEAVY TRUCK 3-AXLE DIESEL		TRUCK-SEMI TRAILER D,(II-2)		AVERAGE TRUCK	
	IT[1]	ET[2]	IT	ET	IT	ET	IT	ET	IT	ET	IT	ET
FUEL	43.54	35.14	80.86	65.26	87.08	70.28	99.52	80.32	130.62	105.42		
OIL	2.34	1.99	3.51	2.99	4.10	3.48	4.68	3.98	4.68	3.98		
TIRES	11.04	9.71	22.72	19.99	24.12	21.23	40.20	35.37	84.37	74.24		
MAINT.: PARTS	21.35	18.35	29.78	25.55	35.55	30.45	39.71	33.98	44.62	37.74		
LABOR	6.44	6.25	8.58	8.33	9.27	9.00	9.27	9.00	9.01	8.75		
DEPRECIATION	19.27	16.57	23.05	19.77	27.51	23.56	35.85	30.68	41.43	35.04		
TOTAL	103.98	88.01	168.50	141.89	187.63	158.00	229.23	193.33	314.73	265.17		

1) IT = Including taxes and custom duties
2) ET = Excluding taxes and custom duties

	Operating Hours	
	Per Day	Per Year
Car, Motorcycle	6-1/2	2,000
Jeepney, Bus	10	3,000
Van, Small Truck	8	2,400
Medium Truck	9	2,700
Heavy Truck	10	3,000
Semi-Trailer	12	3,500

The time related depreciation costs are the residual of the total depreciation costs when the distance dependent part is removed. The time dependent component is divided by the product of vehicle life time in years and annual operating hours to get the component expressed per vehicle-hour.

The opportunity cost of capital or the interest of the invested capital can approximately be calculated, in accordance with an assumed straight line depreciation, as 15% of half the retail vehicle price divided by the annual operating hours.

Crew costs and crew sizes per vehicle have been discussed with local operators. The estimated crew costs per hour and crew sizes for the project areas are as follows:

Vehicle	Driver	Conductor	Helpers
Jeepney	1 x ₱3.50		
Small Bus	1 x ₱3.50	1 x ₱2.00	
Large Bus	1 x ₱3.50	1 x ₱2.00	
V a n	1 x ₱3.50		
Motor-tricycle	1 x ₱2.00		
Medium Truck	1 x ₱3.50		2 x ₱2.00
Heavy Truck	1 x ₱3.50		2 x ₱2.00

Data on overhead costs indicate that these costs in study on the average amount to about as follows:

	₱/Hour
Jeepney	3.00
Van	2.50
Bus, Small/Large	6.00/8.00
Truck	8.00

Insurance costs have been excluded in this study as they are substituted by accident costs at ₱25,000 per accident with personal injuries.

In principle, fixed costs would be saved if road improvements would result in time savings which could be converted into real fleet reductions.

It is assessed that the conversion of time savings into fleet reduction depends on whether time saving cumulation can be utilized in such a way that the same number of trips can be carried out with fewer vehicles.

The assumptions on fleet reduction factors are quite arbitrarily determined but within confidence limits of reasonable indicative estimates and with due consideration to each vehicle type, its function and operational characteristics.

The utilization of saved time will probably be highest for vehicles characterized by traditionally short and frequent trips, such as jeepneys and motor-tricycles. In the truck group, it is assumed that the heavier types would be able to utilize time saved more productively than the smaller units.

The reduction factors, which are shown in Table 6.2.5-1 are composed of a fleet reduction factor and a commercial use reduction factor. The latter is 0.3 for motorcycles and 0.4 for jeeps, the residual being considered to be purely private without any economic value for the society.

The Basic Fixed Costs are presented in Table 6.2.5-1.

6.2.6 Basic Time Costs

Basic time costs are as indicated above defined as those costs which are incurred by drivers of private cars and passengers in these and in public transport vehicles — (jeepneys, motor-tricycles, buses and to a lesser degree trucks) as well as pedestrians.

Statutory minimum daily wages (as per PD 1751) which integrated previous specific cost of living allowances) effective from January 1, 1981 are given below; they represent an across the board increase of ₱4 on previous levels:

Non-Agricultural Workers	₱/day
(a) Within Metro Manila	18
(b) Outside Metro Manila	17
Agricultural Workers	
(a) Plantation	15
(b) Non-Plantation	14

Field work suggests considerable Provincial variation in the prevailing local market rate for farm labourers, quotes commonly being in the ₱8 to ₱15 per day range. With regard to project appraisal, for reasons of both equity and practical convenience, it would, however,

Table 6.2.5-1 BASIC FIXED COSTS IN PESOS PER VEHICLE HOUR MAY 1982 PRICES LUZON

VEHICLE CLASS	TIME DETERMINED CAPITAL COSTS		OPPORTUNITY COST OF CAPITAL[1]		CREW COSTS	OVERHEAD, TAXES & LICENCES		INSURANCE		TOTAL FIXED COSTS		REDUCTION FACTORS		BASIC FIXED COSTS EXCL. INSURANCE	
	IT	ET	IT	ET		IT	ET	IT	ET	IT	ET	COM'L. USE	FLEET[2]	IT	ET
LIGHT CAR PG	1.69	1.28	2.59	1.97	-	0.28	0.00	1.24	1.20	5.80	4.45	0.30	1.00	1.37	0.98
MEDIUM CAR PG	1.99	1.51	3.09	2.32	-	0.66	0.00	1.49	1.45	7.19	5.28	0.30	1.00	1.71	1.15
HEAVY CAR D	1.13	0.90	3.73	2.99	-	2.60	0.00	2.28	2.21	9.74	6.10	0.60	1.00	4.48	2.33
JEEP RG	0.52	0.44	1.74	1.48	-	0.24	0.00	1.13	1.10	3.63	3.02	0.40	1.00	1.00	0.77
JEEPNEY FIERA TYPE D	0.59	0.50	1.53	1.30	3.50	3.09	3.00	1.93	1.87	10.64	10.17	1.00	0.90	7.84	7.47
JEEPNEY MAC ARTHUR D	0.41	0.35	1.49	1.26	3.50	3.09	3.00	1.91	1.85	10.40	9.96	1.00	0.90	7.64	7.30
MOTORCYCLE RG	0.08	0.07	0.39	0.35	-	0.08	-	0.26	0.25	0.81	0.67	0.30	1.00	0.17	0.13
MOTOR-TRICYCLE RG	0.15	0.13	0.46	0.41	2.00	0.13	-	0.19	0.18	2.93	2.72	1.00	0.90	2.47	2.29
VAN D	1.03	0.88	2.29	1.95	3.50	2.57	2.50	1.10	1.07	10.49	9.90	1.00	0.40	3.78	3.53
SMALL BUS D	1.13	1.01	3.52	3.12	5.50	6.24	6.00	2.02	1.96	18.41	17.59	1.00	0.80	13.11	12.50
LARGE BUS D	1.99	1.74	8.32	7.30	5.50	8.24	8.00	2.66	2.58	26.71	25.12	1.00	0.70	16.84	15.78
SMALL TRUCK D	1.30	1.12	3.48	2.99	5.50	2.78	2.50	0.84	0.82	13.90	12.93	1.00	0.40	5.22	4.84
MEDIUM TRUCK D	2.07	1.77	5.65	4.85	7.50	8.58	8.00	1.52	1.48	25.32	23.60	1.00	0.60	14.28	13.27
HEAVY TRUCK (2-AXLE) D	2.47	2.11	6.72	5.77	7.50	8.77	8.00	1.69	1.64	27.15	25.02	1.00	0.75	19.10	17.54
HEAVY TRUCK (3-AXLE) D	3.22	2.75	8.90	7.63	7.50	9.10	8.00	1.69	1.64	30.41	27.52	1.00	0.75	21.54	19.41
TRUCK-SEMI TRAILER (II-2)	3.82	3.23	9.32	7.92	7.50	10.10	8.00	1.69	1.64	32.43	28.29	1.00	0.75	23.06	19.99

1) 15 % P.A.

2) GENERAL, MAY VARY ACCORDING TO REGION AND AREA.

appear preferable to adopt a single standard rate of some ₱14 per day. Taking an 8 hour average working day this suggests a basic man hour rate of ₱1.75.

From the viewpoint of a national income analysis, a strict distinction is usually made between business and other trip proposes. It is common to postulate a business time valuation similar to the relevant average wage level but allow only 50% of that value for commuting trips. Education, medical and 'other' trips are conservatively assigned a zero value on the grounds that any significant time savings would not be directly used for productive services. This appears to err on the side of pessimism. For rural passenger and pedestrian movements it is considered that a stronger case can be made in favour of adoption of a willingness to pay approach that attempts to quantify the consumption value of time saved. Given prevailing rural income constraints a high proportion of passenger journeys tend to be essentially multi-purpose, with consequent joint social and economic welfare implications. The basic ₱1.75 per hour estimate is therefore taken as constant irrespective of reported primary trip purpose.

On the other hand, it does seem reasonable to make some allowance for age distribution viz the lower alternative cash employment opportunities available for children and senior citizens in rural areas. It is suggested therefore that non-adul passenger time values be valued at a lower rate, say ₱1.00 per hour.

The resulting time value for passengers and pedestrians would therefore be <u>₱1.60 per person-hour</u> (₱1.75 x 0.83 + ₱1.00 x 0.17). This value is used for pedestrian trips and trips diverted from coastal shipping/air transport to land transport.

For normal (excluding diverted traffic from other modes) motorized land traffic the time value system adopted in Highway Planning Manual 4 is used, as shown in Table 6.2.6-1.

Table 6.2.6-1

MAY 1982 MINDANAO
UNIT TIME VALUE IN PESOS PER HOUR PER PERSON

	In Work	To/From Work	Leisure
Car: Driver, Owner[1)]	13.05	6.53	0
Driver otherwise[2)] and Passenger	4.95	2.48	0
Jeepney Passenger	1.80	0.90	0
Bus Passenger	2.70	1.35	0
Motorcycles: Owner	3.60	1.80	0
Passenger	1.80	0.90	0
Motor-Tricycles Passenger	1.80	0.90	0

1) 80%
2) 20%

6.2.7 Total Basic Traffic Costs

Table 6.2.7-1 presents the weighted values of the economic (excluding taxes and custom duties) basic running and fixed costs using the observed average vehicle appearances in Mindanao.

Table 6.2.7-1

ECONOMIC BASIC TRAFFIC COSTS

Vehicle Type	Weights	Running Costs in Centavos per Vehicle Km.	Fixed Costs in Pesos per Vehicle Hour
1. Jeep/Van			
Jeep	85%	67.72	1.18
Van	15%	68.93	0.77
2. Jeepney		60.87	3.53
Fiera Type	70%	54.74	7.42
MacArthur Type	30%	56.35	7.47
3. Small Bus	-	50.98	7.30
4. Motor-Tricycle	-	97.42	12.50
5. Motorcycle	-	23.96	2.29
6. Large Bus	-	23.25	0.13
7. Truck		154.98	15.78
Medium 2-axles	40%	160.79	16.19
Heavy 2-axles	42%	141.89	13.27
Heavy 3-axles	14%	158.00	17.54
Semi-Trailer	4%	193.33	19.41
		265.17	19.99

The basic time costs per vehicle hour are estimated on the basis of average study observations as follows:

Vehicle	No. of Passengers per Vehicle	Trip Purpose		
		Business	To/From Work	Others
Jeep[1]/Van[2]	4.3	40	30	30
Jeepney[2]	12.00	30	30	40
Small Bus[2]	20.00	30	30	40
Large Bus[2]	42.00	30	30	40
Motor-tricycle[2]	1.5	20	40	40
Motorcycle[1]	1.5	20	60	20

1) Including driver.
2) Excluding driver and conductor (buses)

On this basis and the time values in Table 6.2.6-1 above the time values per vehicle-hour would be as follows:

Vehicle	Time Value per Vehicle-Hour
Jeep/Van	₱15.28
Jeepney	₱ 9.72
Small Bus	₱24.30
Large Bus	₱51.03
Motor-tricycle	₱ 1.08
Motorcycle	₱ 2.25

6.3 ACTUAL TRAFFIC COSTS

Actual traffic costs for specific project roads with road and traffic elements which deviate from the above described ideal basic concept are calculated according to the dl-system concerning running costs and the dt-system with regard to fixed and time costs.

The dl-system, which only affects the actual running cost calculations, simulates the extra running costs

incurred by vehicles operating on roads with substandard road surfaces and conditions, and/or substandard geometric characteristics or with other features which imply substandard conditions compared to the basic concept referred above. Such extra costs are transformed into imaginary road lengths called dl, which actually express the extra running costs as a per cent over the basic running costs. The imaginary lengths are added up after allocation of a dl-value for each substandard element and the actual road length (L) and the dl-values over that road segment are combined into the composite expression, L+dl (kms.), which then simply is multiplied by the basic running costs to give actual running costs by various improvement levels, including the "do nothing" existing levels, refer to Table 6.3-1/2.

The SCCN index in Table 6.3.2 has been applied to the observed road elements recorded during the Road Inventory within each homogeneous section, defined as one with uniform existing and future traffic, and with a specific improvement level, say gravel surfacing throughout.

The relevant dl-systems can be found in the Highway Planning Manual's Volume 7.

As indicated in Table 6.3-1 the pavement condition rating is based on subjective observations made during the road inventory (rating: good, good/fair, fair, etc.) but it is also based on the Consultants' experience from use of bump integrator measurements of surface roughness in the Philippines (1979), see Volume 7 of the Highway Planning Manual for details. It is emphasized that the subjective rating can only be done with some empirical knowledge of construction of the surface roughness index which is a discontinuous function with increasing values from step to step.

Table 6.3-1

DL-VALUES[1] IN KM. PER ACTUAL KM.

Pavement Type and Condition	STYP	SCON	All Vehicles (VT 1-7)	Surface Roughness in inches per km. (R)	Range of Roughness
Paved Good	1	1	0.00	80	50-90 (Bituminous pavements)
Paved Good/Fair	1	2	0.05	100	91-120
Paved Fair	1	3	0.17	150	121-170
Paved Fair/Bad	1	4	0.29	205	171-210
Paved Bad	1	5	0.43	265	211-300
Paved Bad/ Very Bad	1	6	0.58	330	301-350
Paved Very Bad	1	7	0.89	465	351-600
Gravel Good	2	1	0.29	205	190-220
Gravel Good/ Fair	2	2	0.41	255	221-320
Gravel Fair	2	3	0.60	340	321-350
Gravel Fair/ Bad	2	4	0.72	390	351-400
Gravel Bad	2	5	0.87	455	401-480
Gravel Bad/ Very Bad	2	6	1.01	515	481-550
Gravel Very Bad	2	7	1.20	600	551-600
Earth Bad/ Very Bad	3	7	1.20[2]	600	551-600

1) Calculated as: R x 0.0023 - 0.18. The factor 0.18 refers to R.80 and the factor 0.0023 expresses the increase in running cost per R.1. Level tangent roads.

2) Assumed.

Table 6.3-2

INDEX OF DL-VALUES (FOR LEVEL TANGENT ROADS)
All Motorized Vehicles

Pavement Type and Condition	STYP	SCCN	
Paved Good	1	1	100
Paved Good/Fair	1	2	105
Paved Fair	1	3	117
Paved Fair/Bad	1	4	129
Paved Bad	1	5	143
Paved Bad/Very Bad	1	6	158
Paved Very Bad	1	7	189
Gravel Good	2	1	129
Gravel Good/Fair	2	2	141
Gravel Fair	2	3	160
Gravel Fair/Bad	2	4	172
Gravel Bad	2	5	187
Gravel Bad/Very Bad	2	6	201
Gravel Very Bad	2	7	220
Earth Bad/Very Bad	3	7	220

The overall formula for the dl system related to surface condition is as follows:

dl = 0.0023 per Rl - 0.18;

Where: R is the surface roughness in inches per km.; The factor 0.18 expresses the fact that the "ideal" base case is defined as having a roughness figure of 80..

The dt-system simulates travel times on various road elements and under various traffic conditions. For each road type, surface condition, gradient and roadside friction basic operating speeds are determined dependent on vehicle type, under free traffic flow conditions. The basic operating speed is estimated as the average speed of the speed distribution by vehicle type through actual speed studies carried out by the MPWH in 1977 and in 1979. In other reports, such as the Highway Capacity Manual, Washington D.C. 1965, the operating speed is determined as that speed which corresponds to the 85% vertical fractil line in a speed distribution.

Travel speed under various traffic volume - road capacity conditions is calculated on the basis of the basic operating speed for a specific combination of road elements and various levels of traffic volume - road capacity relationships which have a reducing influence on basic speed.

The actual operating speeds used in this Study are shown by vehicle type in Table 6.3-3.

Table 6.3-3

OPERATING SPEED KM./HOUR[1)]

STRP/SCOR	Car/Jeep/Van	Jeepney/Bus	Motor-Tricycle	Motor-Cycle	Truck
1/1	65	65	40	60	65
1/2	60	60	40	55	60
1/3	55	55	35	50	55
1/4	45	45	30	30	45
1/5	30	30	20	20	30
1/6	25	25	15	15	25
1/7	20	20	10	10	20
2/1	60	60	35	50	60
2/2	55	55	35	45	55
2/3	50	50	30	40	50
2/4	40	40	25	30	40
2/5	30	30	20	20	30
2/6	25	25	15	15	25
2/7	20	20	10	10	20
3/7	20	20	10	10	20

1) Flat terrain.

6.4 ACTUAL TRAFFIC COSTS FOR OTHER MODES

Apart from the above-mentioned land transport motorized vehicles, the study includes the following other modes:

- carabao sledge/horse
- head loaded pedestrian
- pedestrian without load
- banca (pump boat)

The costs for these modes related to ton-kilometers carried out are taken as the actually recorded average transport rates. It is felt that the rates can be taken as economic shadow costs as, apart from the actual costs involved, they reflect the opportunity use of the transport resources as well as the inconvenience encountered by using these modes.

A carabao can usually haul a sledge loaded with 150 kgs. corresponding to 3 sacks of rice, copra or corn. A horse would be able to carry the same load. The transport rate converted into pesos per ton-kilometer would reach an average figure of ₱20.

Head loading is more expensive at ₱25 per ton-kilometer on the average, reflecting the hard, strenuous and unpleasant job of carrying a maximum of 50 kgs. on the head along difficult trails in often hilly to mountainous terrain.

The banca or boat transport rate for passengers or cargo is recorded individually by project area.

The cost of walking or riding on horseback or in a horse-drawn calesa or on a carabao sledge has been subject to a shadow price analysis reflecting the opportunity cost. The time value per person-hour has been set

at ₱1.60 as discussed above. The travel speed on an average winding and rolling earth trail would be about 3 kilometers per hour for a pedestrian and 5 kilometers per hour for a horse or carabao. The corresponding costs per passenger-kilometer would be ₱0.53 for a pedestrian and ₱0.32 per person on horseback, carabao sledge or in a calesa.

PHILIPPINES

PROVINCIAL PORTS PROJECT *

I. THE TRANSPORT SECTOR

A. The Transport System

1.1 The Philippines transport system is composed of about 740 km of railways, over 161,000 km of roads, 131 national ports, 265 private ports, and some 400 loading points and 219 airports, of which 82 are national and 137 private. The system is predominantly bimodal, with road and sea transport generally complementing rather than competing with each other. Road transport handles 90% of the country's passenger movement and 65% of freight movement, while sea transport handles 7% of passengers and 35% of freight. Railways and air transport handle only relatively small volumes of passenger and freight traffic. Due to the development patterns of towns along road corridors and the Government's policy of extending the feeder roads to the hinterlands, road transport is likely to continue as the dominant mode of transport in the foreseeable future.

1 2 During the 1970s, the transport sector grew at about 9% p.a., faster than the GDP growth of about 6%. During the economic recession from 1980-84, the sector's contribution to the economy declined to about 5%, as both it and the GDP experienced a decline. Despite this, Government transport outlays have remained at a level of about P 4.0 billion p.a. Between 1977 and 1981, total outlays amounted to P 18 billion. The National Transportation Planning Project (NTPP) estimated the 5-year (1983-87) capital investment needs to be P 23.82 billion, principally in highways. A recently updated (October 1986) Public Investment Program (PIP) proposed P 65.7 billion for 1986-92 for infrastructure investment which aims at supporting the economic recovery program and agro-industrial development. The highway subsector usually gets the biggest share or about 80%, followed by the ports subsector with 14%.

B. Transport Planning

1.3 The Department of Transport and Communications (DOTC) is responsible for transport policy, regulation and administration. However, planning for the transport sector is the joint responsibility of DOTC, for all modes other than highways, the Department of Public Works and Highways (DPWH), for national and barangay roads, and the Department of Local Government (DLG), for provincial, city and municipal roads. DPWH is also responsible for construction and maintenance of roads and bridges in the country. The National Economic and Development Authority (NEDA) plays a coordinating role in the planning process through the National Transportation Planning Project (NTPP) group which has representatives from NEDA, DOTC, DPWH, the Philippine National Railways (PNR), the Philippine Ports Authority (PPA) and the Maritime Industry Authority (MARINA).

* Extract of the World Bank report on the GOP's Provincial Ports Project.

1.4 NTPP prepares five-year transport programs listing priority projects by mode and their investment requirements. It submits each program to the National Investment Committee for consideration and inclusion in the Public Investment Program (PIP). The transport program is updated semiannually to accommodate the interim changes.

C. Transport Issues in the Maritime Subsector

1.5 Some of the issues facing the maritime subsector are as follows:

(a) regulatory policies on route licensing;

(b) the age of liner ships and a poor safety record;

(c) customs involvement in domestic trade; and

(d) infrastructure maintenance.

1.6 Regulatory policies for domestic liner ships relate to route franchising and tariffs. However, the policies appear to be only partially enforced. A recent NTPP study on shipping regulation has pointed out the inefficiencies of the regulatory system, which has resulted in high tariffs and restriction of market entry for small shipping companies. The study recommends economic deregulation in the shipping industry. MARINA, the agency in charge of shipping regulation, has lately allowed the shipping lines to determine themselves which line would operate which route and then formally approved the agreed arrangements. The Bank supports steps towards economic deregulation of shipping. The Government should, however, retain the power to monitor and regulate shipping safety and to intervene to prevent predatory competition. A transport sector review by the Bank during 1987 will address these matters further.

1.7 The average age of vessels belonging to the top ten domestic shipping companies is between 20 and 25 years. Although the Philippine Coast Guard (PCG) is responsible for the registration and inspection of ships, safety standards are not strictly enforced, resulting in a high incidence of accidents and casualties. The Government is aware of this problem and considers the rejuvenation of the inter-island fleet as one of the priorities in the maritime industry. MARINA is attempting to find appropriate financing channels to attract shipowners to finance their ship improvements. During negotiations, agreement was reached that the Government would, by June 30, 1988, develop, and thereafter implement, a plan of action to improve safety of operations in domestic shipping.

1.8 Customs clearance procedures for international trade are complicated and time consuming. Furthermore, for domestic trade, it appears that the Bureau of Customs is unnecessarily involved in ships' clearance which disrupts cargo handling operations. During negotiations, agreement was reached that the Government would, by June 30, 1988, complete a review of the role of the Bureau of Customs in domestic shipping and cargo clearances and based on the results of such review produce a plan of action satisfactory to the Bank to facilitate domestic shipping and cargo clearances.

1.9 The present condition of many port facilities is not good. During the economic and financial difficulties in the early 1980s, insufficient funds were released by the Government for maintenance expenditures, which has resulted in deterioration of port infrastructure and equipment. Problems include insufficient dredging, dilapidated piers, badly maintained access roads, and lack of lighting and communication systems. Considering the importance of infrastructure maintenance for efficient port operation, it is important to insure that PPA will have the necessary budget to carry out the required maintenance works to arrest further deterioration of port infrastructure (para. 2.4).

D. Bank Involvement in the Sector and the Subsector

1.10 One of the Bank's principal objectives in transport sector lending in the Philippines has been, and continues to be, to improve the infrastructure of the country. The Bank has also assisted in strengthening the institutions dealing with the sector, especially in establishing an appropriate framework for planning and policy development. As a result, an important component in several recent loans has been technical assistance for national transport planning. Continued assistance in attaining these objectives is needed in the context of the country's constrained economic conditions. The Bank also expects to continue assisting the Government in formulating sector priorities and investment programs in the context of reviewing the Public Investment Program.

1.11 The Bank Group has assisted the transport sector since 1961, starting with the First Port Loan (290-PH), which amounted to US$8.5 million and financed procurement of dredging equipment. Since then, additional projects including two ports, one shipping, five highways and two rural roads improvement projects, have been processed. The total lending for highways and rural roads projects has been US$517 million and for ports and shipping projects US$101.6 million, of which US$81.6 million has financed port infrastructure improvements under three completed ports projects.

1.12 The Bank has thus had a long association with the Philippine ports subsector and was instrumental in the creation of PPA. It is important that the Bank maintain this close collaboration with PPA now that the organization has completed work in the major ports and is moving to improve secondary and tertiary ports in the provinces. This is in line with the new Government's and the Bank's focus on alleviating the conditions in some of the more underdeveloped areas of the country.

1.13 The three completed ports projects have financed, among other things, dredging equipment, assistance in the expansion of two important ports in Mindanao and the construction of container handling facilities in the ports of Cebu, Cagayan de Oro, Iloilo and Zamboanga. The First Shipping Project was intended to help modernize the old inter-island fleet and to improve its safety standards, and increase its efficiency. However, the objectives were achieved only partially. The project changed from financing mostly secondhand ships for established companies to construction of new ships for recently created companies. The safety standards of the existing fleet were thus not

improved and the introduction of new ships resulted in some idle capacity in the fleet. There was also a problem with the Development Bank of the Philippines as financial intermediary. The Project Performance Audit Report (PPAR No. 4910, January 1984) of the project commented that a thorough review should have been carried out at the time of appraisal to find an alternative financial intermediary. This could have kept project implementation closer to the original objectives.

1.14 The Project Performance Audit Report (PPAR No. 5698, June 7, 1985) for the Second Ports Project observed that facilities at some project ports were underutilized. For instance, PPA storage facilities were not used in some ports because of high storage charges and because the major shipping companies had their own storage areas and sheds on or adjacent to the ports. The audit commented that, in light of private competition, PPA should reduce storage charges and have more modest storage facilities. The Third Ports Project (Loan 1855-PH) was completed satisfactorily in late 1986. The proposed port project includes expansion of six ports and rehabilitation/maintenance of 16 other ports. The technical assistance component would further strengthen PPA's institutional capability in both the financial and technical areas. Because of the importance of shipping to an archipelago country like the Philippines, it is also important that the Bank assist with improvement/development of the maritime sector. The project would provide a vehicle to reduce barriers to domestic trade in the form of unnecessary customs procedures and to improve safety of ships in inter-island traffic.

II. THE PHILIPPINE PORTS AUTHORITY

A. Organization

2.1 PPA is a corporate body created by presidential decree in 1974. An amending decree in 1975 widened PPA's powers and functions, which include the authority to develop, maintain, operate, supervise and regulate services and facilities of national ports in the Philippines. The Minister of Transport and Communication is the Chairman. PPA, according to its charter, is empowered inter alia to fix rates and charges, determine terms and conditions of service for its employees that are broadly consistent with civil service rules and regulations, adopt recurrent income and expenditure budgets and capital expenditure budgets, invest surplus funds in government securities, and borrow money after consultation with the Central Bank and the Ministry of Finance and with the approval of the President. Dues, defined in the enabling decree as including harbor fees, tonnage and wharfage dues, berthing charges, port dues, and any other dues or fees imposed by virtue of existing law or the decree, are increased or decreased by the President, on PPA's recommendation, to reflect the costs of providing the services.

2.2 PPA is a decentralized organization divided into a headquarters or a central office and nineteen Port Management Units (PMUs). The PMUs serve as the operating divisions of PPA. Each of the PMUs is located at a major national port and each exercises control over the neighboring minor national ports. In total, there are 131 ports within PPA. The 265 private ports are

specialized cargo handling facilities owned by large enterprises such as oil and mining companies.

2.3 In November 1977, Presidential Decree No. 1234 (PD 1234) resulted in fundamental changes to PPA's financial autonomy by requiring PPA to: (i) remit all revenues to the national treasury for crediting to a Special Account in the Government's general fund; (ii) obtain, in advance, quarterly budget allotment authorization from the Government's Budget Commission to enable PPA funds to be released by the national treasury to meet recurrent and capital expenditures; and (iii) maintain financial records in accordance with Government budget-accounting rules. The application of these regulations has frequently resulted in the Budget Commission reducing PPA's spending powers below the levels approved by PPA's own board. For the first few years, the application of this decree caused few serious problems for PPA. However, when the Philippines began to encounter economic and financial difficulties in the early 1980s, the Government started to release less funds than was required for operations and the capital investment program. Since cuts in the operating budget primarily affect maintenance, port infrastructure and equipment began to deteriorate and the harbors and approach channels silted-up to the point where rehabilitation and dredging work is now required. Also, since 1982 no new releases have been made for investment projects, including foreign-assisted ones. This has led to temporary stoppage on all projects except the Bank financed Third Ports Project, for which local counterpart funds were available from prior years savings. PPA was also able to gain some relief from these budgetary constraints by using releases for capital projects issued before 1982 and from savings realized under those projects. They were also able to make use of funds which they had accrued prior to December 31, 1977. However, all of these savings were exhausted in early 1985 and, as a result, many local contractors were not paid until the budget was finally approved in November 1985. The Budget Commission did not reduce PPA's 1986 capital-expenditure budget and has released funds for capital expenditures throughout the year despite the fact that the budget has not been formally approved.

2.4 On April 13, 1987, an executive order (EO 159) was signed which exempts PPA from PD 1234 and allows it to operate as an independent corporation which not only has control over its operations but over its financial resources as well. The exemption from PD 1234 allows PPA to make the expenditures necessary to properly maintain its infrastructure and equipment and to make those capital investments deemed essential by its board of directors. During negotiations, PPA agreed to furnish the Bank by February 1 each year a draft of PPA's annual expenditure plan for comment, and to furnish by August 1 each year the final plan to the Bank.

B. Management and Staffing

2.5 PPA's board of directors is composed of seven directors, five of whom are cabinet ministers. The private sector is represented by one director, appointed by the President. PPA's general manager is ex-officio vice chairman of the board of directors. The general manager exercises day-to-day control over the organization. Chart 1 presents PPA's organization. The general manager is assisted by assistant general managers for operations; fi-

nance, legal and administration; and planning and engineering. He is also supported by 19 managers of the PMUs, a permanent staff of approximately 1,960 and a staff of 674 casual employees. PPA'S management has done a commendable job of operating the country's national port system during a period of very poor economic conditions and has developed PPA into a basically efficient organization.

2.6 As a result of a hiring freeze that was in effect from 1983 to 1985 the number of permanent employees declined by 165 or 8% from 1982 levels. The freeze not only prevented the hiring of new people but also prevented the internal promotion needed to fill vacancies created by departing employees. Consequently, many PPA officials perform duties at one level but receive the compensation for a lower one. In addition, there are many casual (nonpermanent, full-time) employees performing the duties that should be done by permanent staff. PPA recognized these problems and, starting in 1986, has been attempting to correct the staffing inequities by formally confirming the staff in the positions in which they are actually working.

2.7 The Port Personnel Training Center (PPTC) was established in 1975 and is performing adequately. The school has geared its programs towards professionalizing the port labor force in order to improve cargo handling services. PPTC has provided training courses in the areas of Port Operations, Equipment, Maintenance and Operations, Port Equipment Maintenance and Management Training (for supervisors, checkers, and dockworkers). PPTC has been providing about 100 courses a year with 15-20 participants per course since it started.

2.8 One of the services PPTC currently provides is accrediting port equipment operators to insure that only qualified and accredited equipment operators are allowed to operate within the port area. For this purpose, all existing equipment operators are subject to the test and accreditation program and only those who pass them are authorized to operate cargo handling equipment. PPTC courses are accredited with the Asian Institute for Distance Education (AIDE), thereby contributing to the professionalization of the port industry. Furthermore, AIDE, in coordination with PPA, is offering a baccaleaurate degree/associate degree in port administration. PPA has also trained various local and foreign participants from Kenya, India, and Malaysia in the management of container terminal operations under a UNDP/UNCTAD project.

C. Operation and Maintenance

2.9 PPA is directly responsible for operating the national ports and oversees the planning, development and operation of all other ports in the Philippines. PPA operates its 131 national ports through 19 Port Management Units (PMU) consisting of 23 base ports. Each of these base ports operates several subports. Each of the PMUs are primarily landlords responsible for the construction and maintenance of the port infrastructure and for dredging the approach channels. Loading/unloading of ships are handled by stevedoring companies while the storage of goods is handled by storage companies (arrastre). Both the stevedoring and arrastre companies for each port are

chosen by bidding and a two year contract is then signed between the companies and PPA. The stevedoring and arrastre companies are responsible for providing the necessary cargo handling equipment and its maintenance. The only exceptions are the container terminals where PPA has purchased the heavy equipment such as quay cranes and transtainers and leased it to the stevedoring and arrastre companies.

2.10 Passenger and cargo traffic flows are often mingled at the berths which lead to less than the desirable levels of efficiency and safety. Separation of the passenger traffic from cargo traffic can be accomplished by reorganization of the land area behind the berths. During negotiations, agreement was reached that PPA would establish procedures, by June 30, 1988, to separate passenger and cargo traffic in order to improve port safety and efficiency. At the same time the role of PPA in port operations should be reviewed and in particular the current revenue collecting procedures which rely mainly on reports from the stevedoring and arrastre companies without adequate means of checking by PPA. During negotiations, agreement was reached that PPA would develop a plan, by December 31, 1987, which will address PPA's role in port operations and review the current revenue collecting procedures.

2.11 Maintenance of civil works is carried out by PPA through maintenance contractors, but only when PPA has the budget for it. The PMUs are responsible for reporting the need for maintenance of civil works and other infrastructure such as water supply, power supply, sewerage, etc. PPA prepares the designs and requests for the budget to carry out the required work. Lately, budget allocations have been constrained and maintenance has had to be deferred to a certain extent. The proposed project addresses the most urgently required maintenance needs in the ports. The stevedoring and arrastre companies are responsible for maintaining their own equipment. However, since their contracts are short (only two years at a time) little new equipment is provided because the revenues in this short time would not be enough to pay for the equipment and there is no guarantee that the company will be hired again. PPA plans to increase the contract time to five years in order to address this problem. During negotiations, agreement was reached that PPA would prepare an inventory of additional rehabilitation/maintenance needs by December 31, 1987, submit an action plan for such work satisfactory to the Bank, by June 30, 1988 and report on the maintenance activities of the previous year by March 31, 1989 and each March 31 thereafter.

D. Traffic

2.12 In 1981, the Philippines' ports handled a total of 67.8 million tons of cargo, 50% domestic and 50% foreign (Table 1). The traffic increased to 72.1 million tons in 1982 but declined until 1986 when a slight growth of 1.3% was projected.

2.13 The overall traffic downtrend in the past five years (1981-85) has been a reflection of a depressed economy during this period. Based on the recovery program planned for the next five years, the economy is expected to grow at an annual rate of 5%. PPA conservatively projects overall port traffic to grow from 62.9 million tons in 1986 to 73 million tons in 1990, or an average annual rate of 4%.

2.14 About 40% of the cargo traffic in 1985 was handled by PPA ports, up from 37% in 1981. The balance of the traffic was handled by private ports. Of the total traffic handled by PPA ports, about 75% was domestic and 25% foreign. For private ports, 60% was foreign with 40% domestic (Table 1).

2.15 Containerized cargo grew modestly between 1981 and 1983 at PPA ports. Growth declined in 1984 as did other cargo movements, but was up again in 1985 at 7.49 million tons. Private ports started to handle containerized cargo in 1984 with 72,000 tons and increased to 292,000 tons in 1985.

2.16 The passenger traffic, shown in Table 1, exhibited a pattern more or less similar to the growth trend of the economy and of the cargo traffic, i.e. a slight increase of about three million passengers from 1981 to 1983, then declining to 16.7 million in 1985, just above the 1981 level of 16.2 million passengers.

PROJECT PROPOSAL

A. Project Title: NATIONWIDE FEEDER PORTS DEVELOPMENT PROGRAM

B. Description of Program

(1) Objectives

Development of municipal ports located in isolated areas where land or air transport facilities are inappropriate for obtaining essential commodites, gaining access to basic public services, reaching markets and acquiring necessary production and technology inputs.

(2) Location:

Isolated islands in Regions II (Batanes Province and Calayan Island), V (Masbate Province and Catanduanes Island) and VIII (Small Islands off Samar and Leyte Islands) (Refer to Attachment 1)

(3) Executing Agency:

Department of Public Works and Highways, Project Management Office-Fishing/Feeder Ports with DPWH regional/district offices involved in project implementation.

(4) Scope of Work:

(i) Construction of feeder ports

(ii) Procurement of equipment and material needed for project studies, construction and construction supervision of feeder ports

(iii) Consultancy services

(Detailed Scope of Work: see Attachment 2)

C. Cost Estimates

Category	Total Cost (Thousand Pesos)
1. Equipment and Material	6,000
2. Civil Works	130,000
3. Physical and Price Contingency for 1 & 2	30,000
4. Consultancy Services	25,000
Total	191,000

Base Year used in estimating cost: May 1987

D. Implementation Schedule

The Implementation Schedule for the Program is detailed in Attachment 3. This schedule was drawn up on the assumption that actual project activities will start by last quarter of 1987.

E. Estimated Annual Fund Requirements

Calendar Year	Total Cost (Million Peso)
1987	3
1988	25
1989	30
1990	45
1991	45
1992	43
Total	191

Attachment 1

The candidate ports under the Feeder Ports Program are located in the areas which include but are not limited to the following:

Region II

Batanes

Basco
Itbayat
Sabtang

Cagayan

Calayan

Region V

Masbate

Milagros
Mandaon
Cataingan
San Pascual
Aroroy
Claveria
Cawayan
Balud
San Jacinto

Catanduanes

Panganiban

Region VIII

Samar

San Antonio
Daram
Almagro
Zumarraga
Sto. Niño

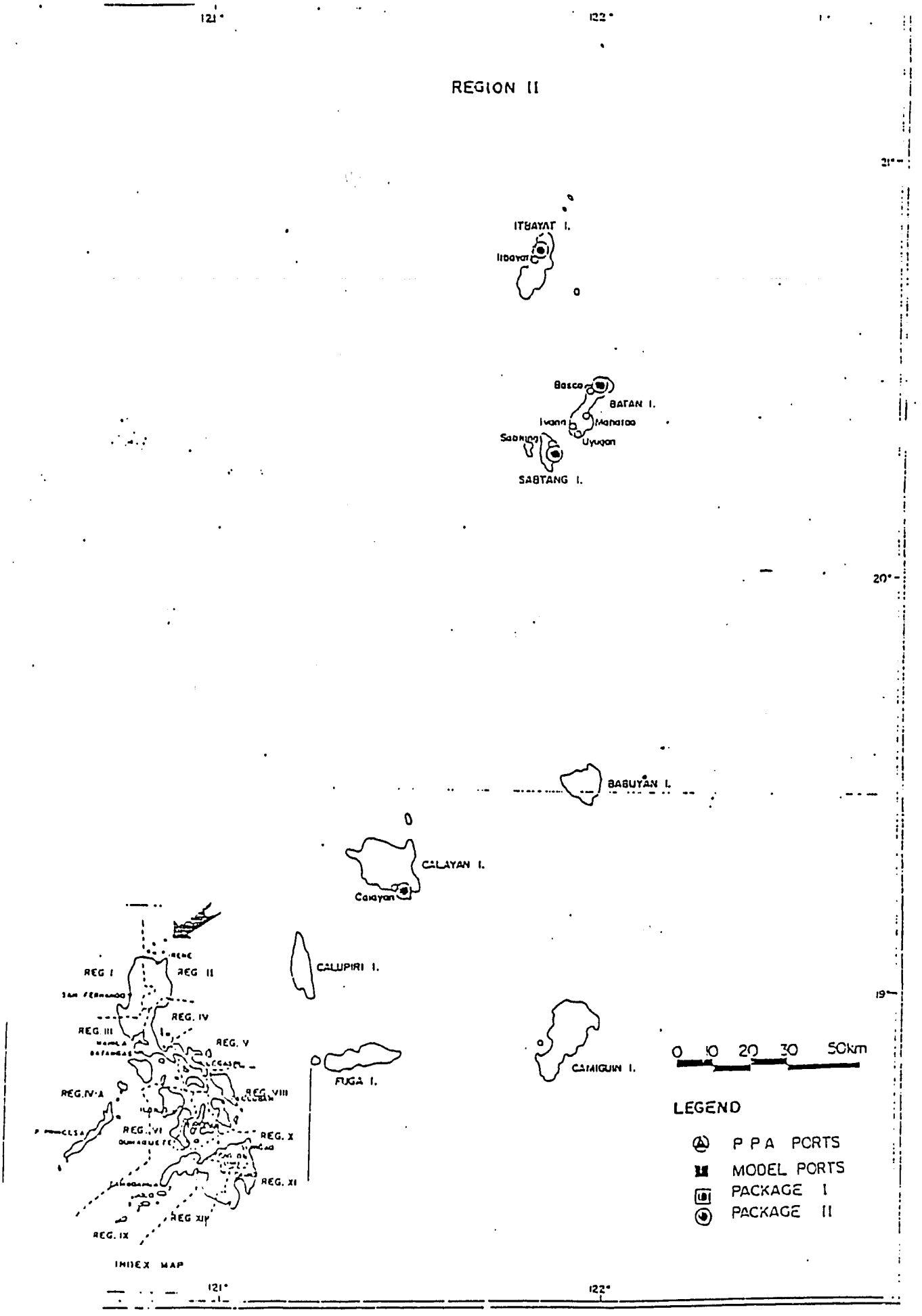
Southern Leyte

Liloan
Hinunangan
San Ricardo

Leyte

Cabucgayan
Kawayan
Maripipi

REGION II



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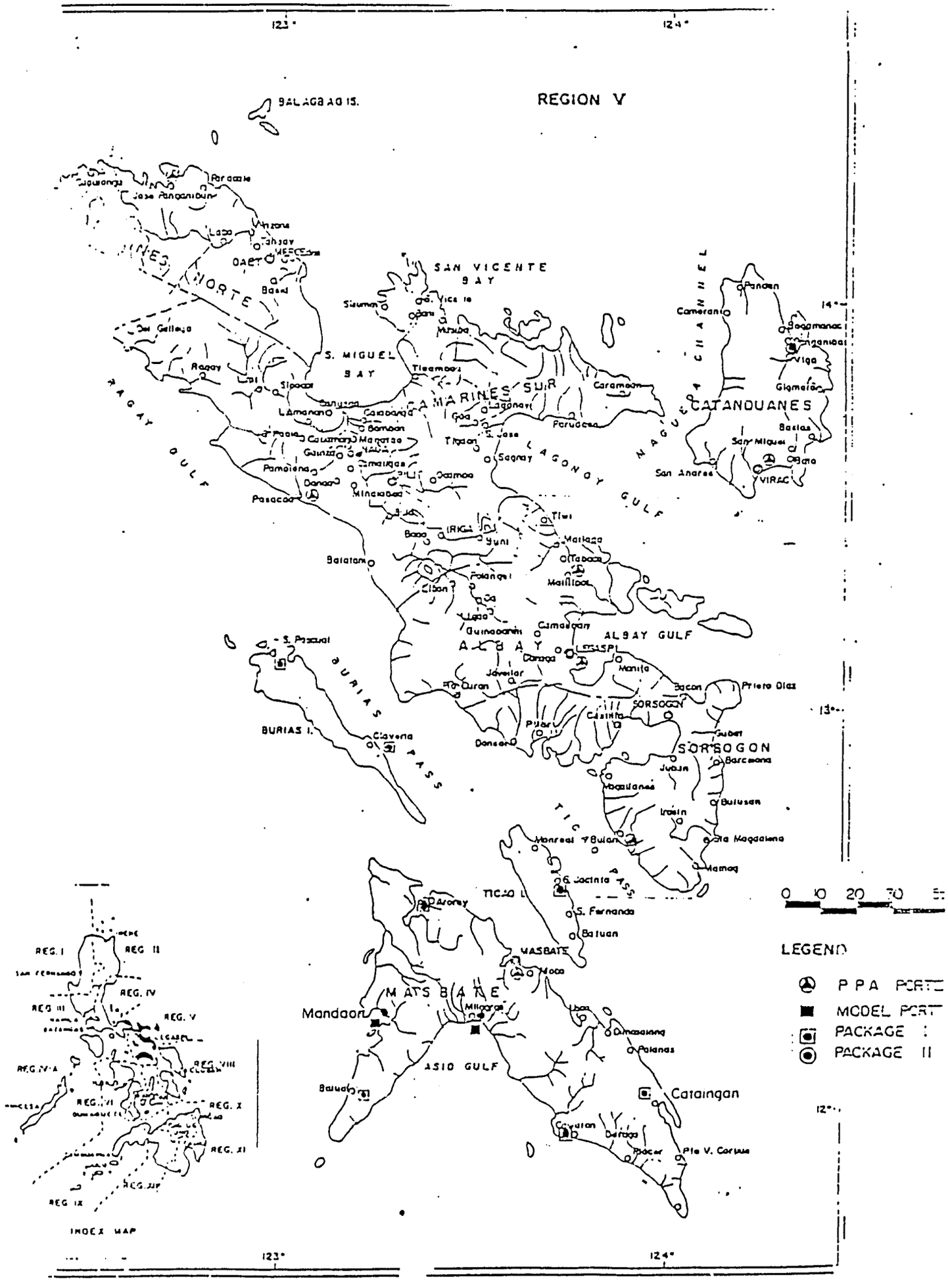
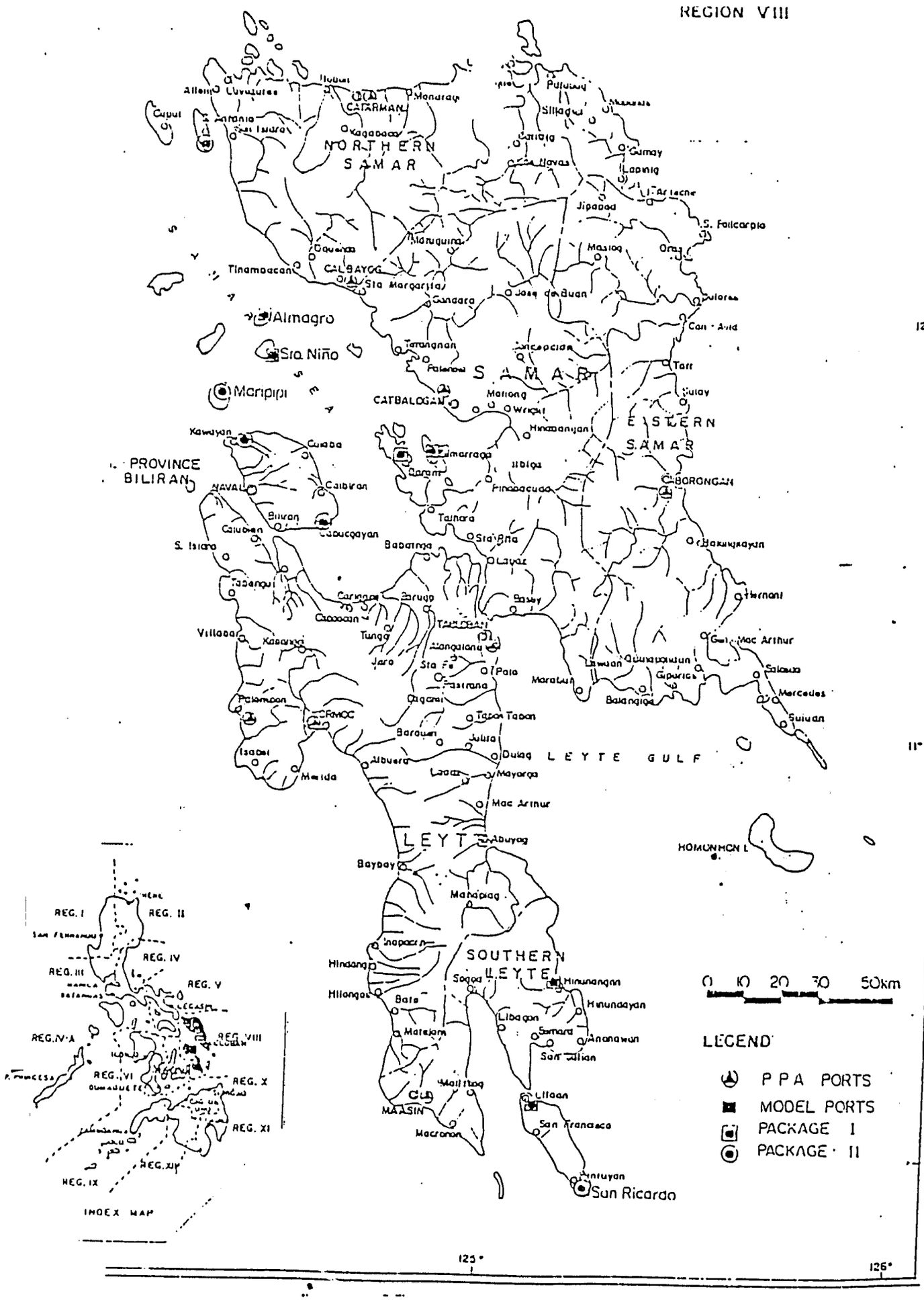
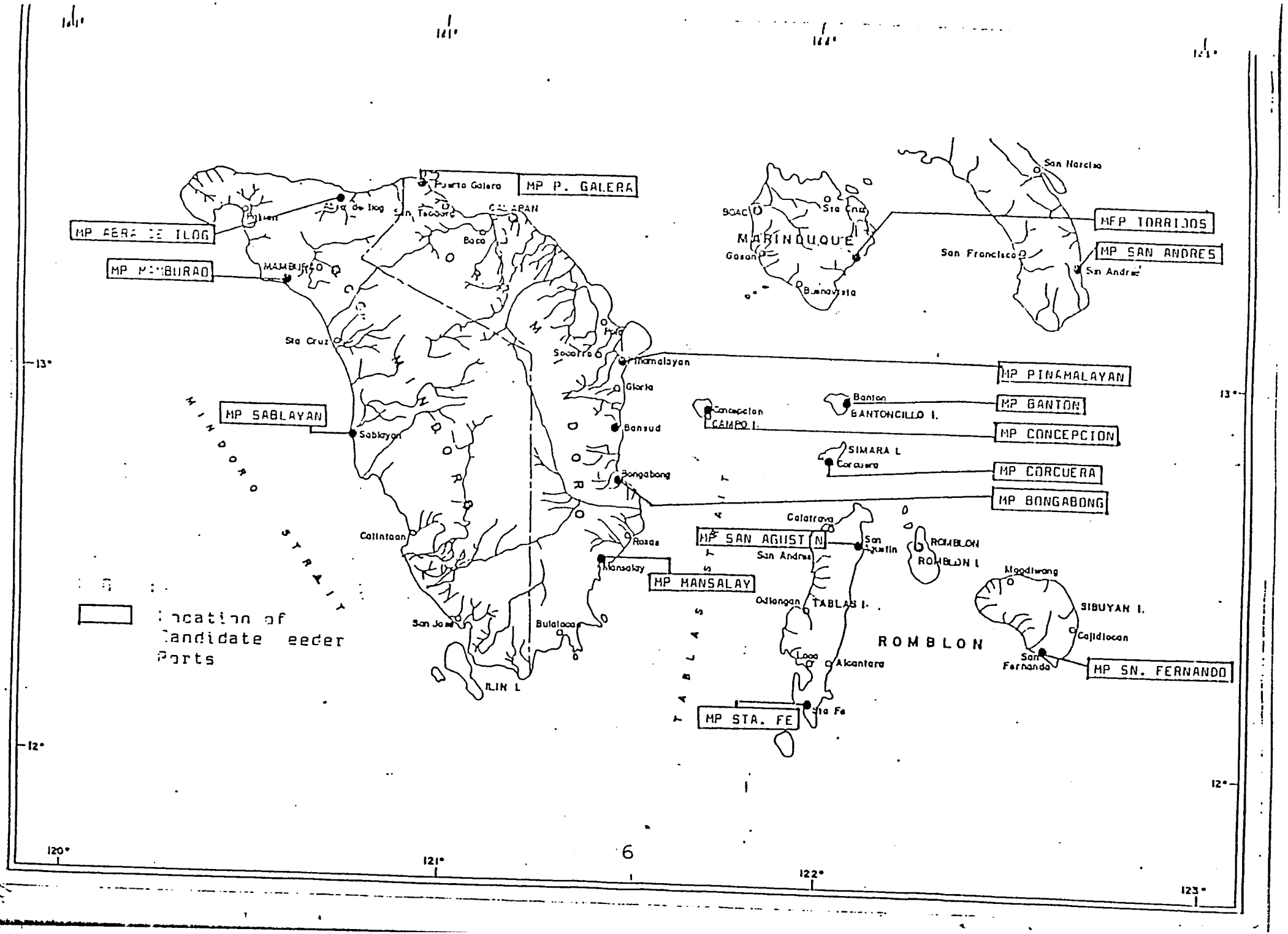

REGION V
BALAGBAG IS.
123°
124°
14°
13°
12°
CAMARINES NORTE
CAMARINES SUR
SAN VICENTE BAY
S. MIGUEL BAY
LAGONOY GULF
NAGUEA CHANNEL
CATANDUANES
VIRAC
San Andres
ALBAY GULF
ALBAY
SORSOGON
BURIAS PASS
BURIAS I.
TICAO PASS
TICAO I.
MASBATE
MATS BATE
ASID GULF
Mandaon
Cataingan
Pio V. Corpuz
LEGEND
PPA PORT
MODEL PORT
PACKAGE I
PACKAGE II
0 10 20 30
INDEX MAP
REG. I
REG. II
REG. III
REG. IV
REG. V
REG. VI
REG. VII
REG. VIII
REG. IX
REG. X
REG. XI
REG. XII

301


REGION VIII
NORTHERN SAMAR
CATARMAN
CALBAYOG
Almagro
Sta. Niño
Maripipi
CATBALOGAN
EASTERN SAMAR
BORONGAN
PROVINCE BILIRAN
NAVAL
TACLOBAN
LEYTE GULF
LEYTE
SOUTHERN LEYTE
MAASIN
HOMONHON I.
San Ricardo
LEGEND
PPA PORTS
MODEL PORTS
PACKAGE I
PACKAGE II
0 10 20 30 50km
INDEX MAP
REG. I
REG. II
REG. III
REG. IV
REG. V
REG. VIII
REG. X
REG. XI
REG. XII
REG. IX
125°
126°
12°
11°

304


MP P. GALERA
MP FERRE DE ILOG
MP MAMBURAO
MP SABLAYAN
MP PINAMALAYAN
MP BANTON
MP CONCEPCION
MP CORCUERA
MP BONGABONG
MP SAN AGUSTIN
MP MANSALAY
MP STA. FE
MFP TORRIJOS
MP SAN ANDRES
MP SN. FERNANDO
MARINDUQUE
ROMBLON
MINDORO STRAIT
TABLAS STRAIT
Puerto Galera
Baco
Mamburao
Sta Cruz
Sablayan
Pinamalayan
Gloria
Bansud
Bongabong
Calintaan
Roxas
Mansalay
San Jose
Bulalacao
ILIN I.
Concepcion
CAMPO I.
Banton
BANTONCILLO I.
SIMARA I.
Corcuera
Calatrava
San Agustin
San Andres
ROMBLON
ROMBLON I.
Odiongan
TABLAS I.
Looc
Alcantara
Sta Fe
Magdiwang
SIBUYAN I.
Cajidiocan
San Fernando
San Narciso
San Francisco
San Andres
BOAC
Sta Cruz
Gasan
Buenavista
Location of Candidate Feeder Ports
120°
121°
122°
123°
13°
12°

Attachment 2

Detailed Scope of Work

1. Types of Feeder Ports Development

TYPE I - Minimal Scale Feeder Port (Facilities: Causeway, Stairlanding, Transit-Shed)

- o Used only by small vessels (less than 5 GT)
- o Functions similar to a fishery port
- o Functions as a distribution/collection center to/from nearby isolated coastal barangays

TYPE II - Ordinary Scale Feeder Port (Facilities: Causeway, Pier (11 m x 33 m), Stairlanding, Transit-Shed)

- o Used by small and medium sized vessels
- o Similar to an isolated island port but with small hinterland.
- o Similar to a busy port but is located near a big port.

TYPE III - Ordinary Scale Feeder Port (Facilities: Causeway, Pier (11 m x 33 m or more), Stairlanding, Transit-Shed, Supporting-Land)

- o Used by every kind of vessel
- o Similar to an independent port (far distance from other ports) and with a rather big hinterland.
- o Functions as a big distribution/collection center to/from other isolated island/area ports (like TYPE II).

2. Scope of Work

1. Planning, Detailed Engineering and Construction of Feeder Ports.

The candidate ports include but are not limited to the following:

1.1 Model Ports

Mandaon, Masbate
Milagros, Masbate

1.2 Package I

Type I

Daram, Samar
Almagro, Samar
Sto. Niño, Samar

Type II

Balud, Masbate
Liloan, Southern Leyte
Hinunangan, Southern Leyte
Zumarraga, Samar

Type III

Cataingan, Masbate
San Pascual, Masbate
Aroroy, Masbate
Claveria, Masbate
Cawayan, Masbate
San Jacinto, Masbate

1.3 Package II

Type I

San Ricardo, Southern Leyte
San Antonio, Samar
Kawayan, Leyte
Maripipi, Leyte

Type II

Itbayat, Batanes
Sabtang, Batanes
Calayan, Cagayan
Panganiban, Catanduanes

Type III

Cabucgayan, Leyte
Basco, Batanes

3. Procurement of Equipment and Materials for the construction of Feeder Ports

8 sets of surveying equipment each consisting of the following:

- 2 units transit
- 1 unit automatic level
- 3 sets 100 meter steel tape

3 units echo sounder with accessories

192 pieces rubber fenders, each with 150 H x 1000mm

Underwater inspection gear consisting of:

- 2 sets underwater camera

Attachment 3

Implementation Schedule for the Project

Items	1987	1988				1989				1990				1991				1992			
	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Model Ports (Mandaon & Milagros Port)																					
a. Review of Plan & D/D																					
b. Preparation of T/D																					
c. PQ for Construction																					
d. Tendering and Contract																					
e. Construction																					
2. Package I (13 Ports)																					
a. Planning																					
b. D/D Preparation of T/D																					
c. PQ for Construction																					
d. Tendering and Contract																					
e. Construction																					
3. Package II (10 Ports)																					
a. Planning																					
b. D/D																					
c. PQ for Construction																					
d. Tendering and Contract																					
e. Construction																					

MINISTRY OF PUBLIC WORKS AND HIGHWAYS
NATIONWIDE FEEDER PORTS DEVELOPMENT PROGRAM
STAGE I PRIORITIZATION
SORTED MASTER LIST BY REGION

RUN DATE : JUNE 19, 1987

RANK	RC	PC	DC	PN	DESCRIPTION	POP'TION-PTS		PER.CAP.IN-PTS		AGR.POT-PTS		%INC.MA/TO-PTS		BONUS-PTS		TOT.P
37	02	03	02	94	MP CALAYAN, CAGAYAN	6,739	0.50	951	0.60	42,579	2.00	0.00	0.20	0.00	0.00	3.
86	02	02	02	143	MFP CLAVERIA, CAGAYAN	23,245	1.25	1,953	0.30	2,083	0.25	4.76	0.20	0.00	0.40	2.
139	02	01	02	4	MP BASCO, BATANES	4,384	0.25	1,239	0.50	922	0.25	0.00	0.20	0.40	0.00	1.
147	02	03	02	91	MP BICOBIAN, PALANAN, ISABELA	9,335	0.50	1,614	0.40	3,535	0.25	0.82	0.20	0.00	0.00	1.
148	02	01	02	93	MP ITBAYAT, BATANES	3,583	0.25	751	0.60	1,979	0.25	0.00	0.20	0.00	0.00	1.
149	02	01	02	92	MP SABTANG, BATANES	1,616	0.25	1,024	0.60	620	0.25	0.00	0.20	0.00	0.00	1.

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MINISTRY OF PUBLIC WORKS AND HIGHWAYS
NATIONWIDE FEEDER PORTS DEVELOPMENT PROGRAM
STAGE I PRIORITIZATION
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RANK	RC	PC	DC	PN	DESCRIPTION	POP'TION-PTS		PER.CAP.IN-PTS		AGR.POT-PTS		%INC.MA/TO-PTS		BONUS-PTS		TOT.PTS
12	05	05	05	31	MFP CALASUCHI,MILAGROS,MASBATE	24,616	1.25	1,093	0.50	26,793	2.00	0.22	0.20	0.00	0.00	3.95
14	05	03	05	34	MP RAGAY, CAM. SUR	32,357	1.75	933	0.60	17,747	1.25	0.13	0.20	0.00	0.00	3.80
16	05	05	05	33	MP CATAINGAN, MASBATE	37,279	1.75	1,457	0.40	11,790	1.00	0.00	0.20	0.40	0.00	3.75
18	05	01	05	41	MFP PIO DURAN, ALBAY	33,497	1.75	745	0.60	8,068	0.75	0.54	0.20	0.00	0.40	3.70
19	05	05	05	32	MP SAN PASCUAL, MASBATE	32,841	1.75	675	0.70	14,644	1.00	0.07	0.20	0.00	0.00	3.65
20	05	05	05	38	MP AROROY, MASBATE	26,334	1.50	525	0.70	18,722	1.25	0.35	0.20	0.00	0.00	3.65
28	05	05	05	113	MP CLAVERIA, MASBATE	33,935	1.75	837	0.60	12,054	1.00	0.20	0.20	0.00	0.00	3.55
31	05	06	05	39	MP BACON, SORSOGON	27,697	1.50	1,133	0.50	6,461	0.50	26.88	1.00	0.00	0.00	3.50
33	05	05	05	42	MFP MANDAON, MASBATE	21,339	1.25	940	0.60	14,392	1.00	0.11	0.20	0.00	0.40	3.45
34	05	03	05	29	MP CARAMOAN, CAM. SUR	30,534	1.75	1,071	0.50	13,194	1.00	1.42	0.20	0.00	0.00	3.45
35	05	05	05	40	MP CAWAYAN, MASBATE	25,595	1.50	1,070	0.50	17,196	1.25	1.80	0.20	0.00	0.00	3.45
53	05	05	05	35	MP BALUD, MASBATE	22,564	1.25	857	0.60	8,233	0.75	7.48	0.40	0.00	0.00	3.00
56	05	01	05	37	MP RAPU RAPU, ALBAY	22,125	1.25	541	0.70	7,556	0.75	3.31	0.20	0.00	0.00	2.90
57	05	03	05	115	SFP TINAMBAC, CAM. SUR	35,002	1.75	664	0.70	1,982	0.25	1.38	0.20	0.00	0.00	2.90
66	05	05	05	36	MP SN JACINTO, MASBATE	20,986	1.00	786	0.60	6,232	0.50	0.15	0.20	0.40	0.00	2.70
69	05	03	05	141	MP PRESENTACION,CAMARINES SUR	12,625	0.75	573	0.70	4,523	0.50	15.00	0.60	0.00	0.00	2.55
75	05	03	05	112	MFP BALATAN, CAM. SUR	12,863	0.75	691	0.70	2,810	0.25	2.30	0.20	0.00	0.60	2.50
84	05	03	05	145	MP SANGAY, CAMARINES SUR	19,281	1.00	598	0.70	5,517	0.50	0.00	0.20	0.00	0.00	2.40
96	05	03	05	144	MP SIRUMA, CAMARINES SUR	10,691	0.75	810	0.60	8,170	0.75	1.09	0.20	0.00	0.00	2.30
120	05	02	05	30	MP SN VICENTE, CAM. NORTE	6,287	0.50	620	0.70	4,061	0.50	0.88	0.20	0.00	0.00	1.90
122	05	04	05	114	MP PANGANIBAN,CATANDUANES	7,591	0.50	530	0.70	2,583	0.25	7.50	0.40	0.00	0.00	1.85

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MINISTRY OF PUBLIC WORKS AND HIGHWAYS
NATIONWIDE FEEDER PORTS DEVELOPMENT PROGRAM
STAGE I PRIORITIZATION
SORTED MASTER LIST BY REGION

RUN DATE : JUNE 19, 1987

RANK	RC	PC	DC	PN	DESCRIPTION	POP'TION-PTS		PER.CAP.IN-PTS		AGR.POT-PTS		%INC.MA/TO-PTS		BONUS-PTS	TOT
55	08	01	08	57	MP ORAS, E.SAMAR	19,767	1.00	798	0.60	8,287	0.75	0.15	0.20	0.40	0.00
59	08	03	08	58	MP ALMAGRO, SAMAR	17,049	1.00	1,047	0.60	3,258	0.25	0.06	0.20	0.00	0.80
63	08	03	08	151	MP DARAM, SAMAR	26,233	1.50	651	0.70	4	0.25	0.06	0.20	0.00	0.00
71	08	04	08	59	MFP LILOAN, S. LEYTE	15,346	1.00	498	0.70	3,057	0.25	0.00	0.20	0.00	0.40
81	08	04	08	124	MP HINUNANGAN, S.LEYTE	18,981	1.00	455	0.70	4,917	0.50	0.77	0.20	0.00	0.00
91	08	03	08	60	MFP ZUMARRAGA, SAMAR	11,509	0.75	415	0.70	2,087	0.25	3.55	0.20	0.00	0.40
98	08	02	08	125	MP PAMBUJAN, N.SAMAR	12,658	0.75	204	0.80	6,894	0.50	0.32	0.20	0.00	0.00
100	08	02	08	55	MP PALAPAG, N.SAMAR	20,104	1.00	1,283	0.50	6,367	0.50	1.19	0.20	0.00	0.00
121	08	02	08	139	MP STO.NINO, SAMAR	10,687	0.75	472	0.70	2,160	0.25	4.00	0.20	0.00	0.00
124	08	01	08	127	MP GIPORLOS, E.SAMAR	8,442	0.50	782	0.60	4,843	0.50	0.00	0.20	0.00	0.00
131	08	04	08	126	MP SN RICARDO, S. LEYTE	6,362	0.50	203	0.80	0	0.25	0.80	0.20	0.00	0.00
133	08	05	08	61	MP CABUCGAYAN, LEYTE	13,146	0.75	1,705	0.30	3,137	0.25	6.42	0.40	0.00	0.00
135	08	02	08	62	MP SAN ANTONIO, N.SAMAR	5,201	0.50	457	0.70	2,343	0.25	0.00	0.20	0.00	0.00
138	08	06	08	56	MP KAWAYAN, LEYTE	14,053	0.75	1,457	0.40	2,709	0.25	2.02	0.20	0.00	0.00
146	08	01	08	128	MP MERCEDES, E.SAMAR	3,563	0.25	411	0.70	1,327	0.25	3.75	0.20	0.00	0.00
150	08	05	08	149	MP.MARIPIPI, LEYTE	7,988	0.50	1,834	0.30	1,459	0.25	2.58	0.20	0.00	0.00

Continued on next page .....

TYPE I PORT

	Unit	Quantity	ITEM COST Local	Foreign	Total
1. CAUSEWAY: (100 LM)					
1.1 Rockworks	m^3	5,130	765,134.37	910,257.95	1,675,392.[illegible]
1.1.1 Materials			591,945.57	394,650.03	986,595.[illegible]
1.1.2 Equipment			128,906.64	515,607.92	644,514.[illegible]
1.1.3 Labor			44,282.16	-	44,282.[illegible]
1.2 Concrete Pavement	m^3	1:5	91,315.00	84,861.00	176,176.[illegible]
1.2.1 Materials			61,073.25	49,967.75	111,041.[illegible]
1.2.2 Equipment			8,723.75	34,893.25	43,617.[illegible]
1.2.3 Labor			21,518.00	-	21,518.[illegible]
1.3 Concrete Curb	L.M.	155	82,928.10	66,977.05	149,905.[illegible]
1.3.1 Materials			60,915.00	49,841.80	110,756.[illegible]
1.3.2 Equipment			4,284.20	17,135.25	21,419.[illegible]
1.3.3 Labor			17,728.90	-	17,728.[illegible]
TOTAL FOR 1 CAUSEWAY			939,377.47	1,062,096.00	2,001,473.47
2. STAIRLANDING					
2.1 Materials			23,999.76	15,999.84	39,999.60
2.2 Equipment			2,130.42	8,521.65	10,652.[illegible]
2.3 Labor			4,521.00	-	4,521.00
TOTAL FOR 2 STARLANDING			30,651.18	24,521.49	55,172.67
3. MULTI-PURPOSE SHED					
3.1 Footing/Column			23,415.20	17,561.40	40,976.60
3.1.1 Materials			11,707.60	17,561.40	29,269.00
3.1.2 Labor			11,707.60	-	11,707.60
3.2 Concrete Pavement			6,147.00	4,610.25	10,757.25
3.2.1 Materials			3,073.50	4,610.25	7,683.75
3.2.2 Labor			3,073.50	-	3,073.50
3.3 Roof Framing			34,196.66	25,647.50	59,844.16
3.3.1 Materials			17,098.33	25,647.50	42,745.83
3.3.2 Labor			17,098.33	-	17,098.33
TOTAL FOR 3 MULTI-PURPOSE SHED			63,758.86	47,819.15	111,578.01
GRAND TOTAL			1,033,787.51	1,134,436.64	2,168,224.15

TYPE II PORT

	Unit	Quantity	ITEM COST LOCAL	FOREIGN	TOTAL
MULTI-PURPOSE PIER					
.1 Casting of Piles					
1.1.1 Materials	LM	816	309,195.46	463,793.18	772,988.
.2 Driving of Piles					
1.2.1 Equipment			-	172,412.60	172,412.[illegible]
1.2.2 Labor			7,984.00		7,984.[illegible]
.3 Cutting of Pile Butt					
.3.1 Equipment				26,878.30	26,878.[illegible]
.3.2 Labor			6,008.00		6,008.[illegible]
.4 Pile Cap	m^3	.22			
.4.1 Material			20,510.56	30,765.84	51,276.[illegible]
.4.2 Labor			15,856.25		15,856.[illegible]
.4.3 Equipment				9,175.00	9,175.[illegible]
.5 R.C. Fender Block	m^3	20			
.5.1 Materials			13,604.83	20,407.24	34,012.[illegible]
.5.2 Equipment				8,441.00	8,441.[illegible]
.5.3 Labor			11,220.00		11,220.[illegible]
.6 R.C. Beams	m^3	65			
.6.1 Materials			259,724.20	389,586.30	649,310.[illegible]
.6.2 Equipment				13,642.22	13,642.[illegible]
.6.3 Labor			53,892.00		53,892.[illegible]
.7 R.C. Slabs	m^3	74			
.7.1 Materials			110,813.52	166,220.30	277,033.[illegible]
.7.2 Labor			39,930.00		39,930.[illegible]
.7.3 Equipment				24,240.27	24,240.[illegible]
.8 R.C. Curb	75 LM				
.8.1 Materials			3,968.09	5,952.13	9,920.[illegible]
.8.2 Equipment				2,107.14	2,107.[illegible]
.8.3 Labor			2,250.94		2,250.[illegible]
9 Rubber Fender					
9.1 Material				355,133.00	355,133.00
TOTAL FOR MULTI-PURPOSE PIER			854,957.85	1,688,754.52	2,543,712.37
CAUSEWAY (100 LM)*			939,377.47	1,062,096.00	2,001,473.47
STAIRLANDING*			30,651.18	24,521.49	55,172.[illegible]
MULTI-PURPOSE SHED*			63,758.86	47,819.15	111,578.01
TOTAL			1,888,745.36	2,823,191.16	4,711,936.52

to: *Refer to Type I Port for Details

TYPE III PORT

	Unit	Quantity	ITEM COST LOCAL	FOREIGN	TOTAL
1. PIER**			854,957.85	1,688,754.52	2,543,712.37
2. CAUSEWAY*			939,377.47	1,062,096.00	2,001,473.47
3. STAIRLANDING*			30,651.18	24,521.49	55,172.67
4. MULTI-PURPOSE SHED*			63,758.86	47,819.15	111,578.01
5. REVETMENT					
5.1 ROCKWORKS					
5.1.1 MATERIALS			556,119.10	576,037.90	1,132,157.00
5.1.2 EQUIPMENT			459,551.55	306,367.70	765,919.25
5.1.3 LABOR			67,417.55	269,670.20	337,087.75
5.2 CONCRETE CURB			29,150.00	-	29,150.00
5.2.1 MATERIALS			38,667.08	47,860.75	86,527.83
5.2.2 EQUIPMENT			22,659.03	33,988.55	56,647.58
5.2.3 LABOR			3,468.05	13,872.20	17,340.25
			12,540.00	-	12,540.00
TOTAL FOR 5 REVETMENT			594,786.18	623,898.65	1,218,684.83
6. RECLAMATION					
6.1 COMMON BORROW					
6.1.1 MATERIALS			145,268.18	287,846.82	433,115.00
6.1.2 EQUIPMENT			102,066.37	153,099.56	255,165.93
6.1.3 LABOR			33,686.81	134,747.26	168,434.07
			9,515.00	-	9,515.00
6.2 RUBBLE CONCRETE					
6.2.1 MATERIALS			13,653.31	21,930.52	35,583.83
6.2.2 EQUIPMENT			11,137.17	16,705.76	27,842.93
6.2.3 LABOR			1,306.14	5,224.76	6,530.90
			1,210.00	-	1,210.00
6.3 CONCRETE PAVEMENT					
6.3.1 MATERIALS			105,066.42	159,846.34	264,912.76
6.3.2 EQUIPMENT			64,308.54	96,462.81	160,771.35
6.3.3 LABOR			15,845.88	63,383.53	79,229.41
			24,912.00	-	24,912.00
TOTAL OF RECLAMATION			263,987.91	469,623.68	733,611.59
TOTAL			2,747,519.45	3,916,713.49	6,664,232.94

NOTE: *Refer to Type I Port for Details
**Refer to Type II Port for Details

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Operation and Maintenance

Feeder Ports as shown in the Site Selection and Design Guidelines (Appendix A) are developed with due consideration to efficiency safety, economy, durability and easy maintenance of facilities.

As such, the routine and regular maintenance of built facilities will not require complex or costly care or highly qualified personnel, and can readily be undertaken from time to time on a regular basis through the available staff of the municipal government. In addition, the regulations discussed in the attached Memorandum of Agreement with the Municipal/City Government where the port is located are designed to minimize risk of damage, misuse or inefficient use. Thus, it can be seen that the main concerns of port management are not in maintenance which are routinary and simple but in the efficient and orderly operations of the port facilities, and as shown in the said Memorandum of Agreement are also simple and easy to implement.

For the long-term utility of the port, the maintenance guidelines also include an inspection check-list for structural evaluation and which can be conducted every three years or so. The said maintenance guidelines can also serve as a damage report due to unforseen events such as earthquake, strong typhoon or other extraordinary natural phenomenon which affects port structures.

Structural evaluation and the corresponding remedial measures may require complicated techniques, equipment and highly qualified personnel. As such, said activities that affect the long term structural soundness of facilities can best be undertaken by the MPWH at its own cost. However, as shown in the Design Guideline, these are expected to be infrequent.

Details of activities during the operation and maintenance phase of the port facilities are described below.

1.0 Overall Management

In the preceding discussion, it was shown that the main responsibilities of over-all management and care of the feeder ports, rests with the Ministry of Public Works and Highways, since it is responsible for the structural soundness of port facilities. It shares its over-all responsibility with municipal government, where the ports are located by entrusting to them the day-to-day and routine operation and maintenance works of said facilities, through a set of simple and commonly accepted procedures.

The MPWH also has supervision authority over the maintenance of feeder ports, in view of the limitation of municipalities in maintaining ports on their own. Furthermore, the

hinterlands of ports often go beyond a municipality's boundaries. thus the MPWH has the responsibility of maintaining or assuring the availability at all times of port facilities to all users.

2.0 Responsibilities of Municipal Governments

The responsibilities of municipal governments comprise the following categories:

2.1 Organization of a Port Management Staff

i. Municipal/City Organization

Based on the Philippine Local Government code, the following officials are mandatory for every municipal or city government:

- Municipal Government

a. One Mayor
b. One Vice-Mayor
c. Members of the Sangguniang Panglunsod
d. One Municipal Secretary
e. One Municipal Treasurer
f. One Municipal Assessor
g. One Municipal Budget Officer
h. One Municipal Planning and Development Officer

- City Government

a. One Mayor
b. One Vice-Mayor
c. Members of the Sangguniang Bayan
d. One City Secretary
e. One City Treasurer
f. One City Assessor
g. One City Engineer
k. One Budget Officer
i. One City Planning and Development Officer

Also under the office of the mayor is included the Special Service Office, positions for which are to be determined and filled on a case-to-case basis. The Port Management Staff will be organized under this Office.

ii. Port Management Staff

A Port Management Staff shall be constituted and will be headed by the Planning and Development Coordinator, who will act as port administrator in behalf of the Mayor. Other members will include the following:

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- the treasurer, who will be in charge of the collection, disbursing and accounting of all funds earned from port operations and required for routine operation and maintenance.

- the Budget Officer, who shall be charged with the preparation of budgetary requirements for routine port operation and maintenance.

The Planning and Development Coordinator shall coordinate with the two said officials.

All activities and costs required for port maintenance and operation shall be approved by the Sangguniang Bayan and executed by the Mayor.

A staff member from the municipal general services office in the case of municipalities, and from the Engineer's Office in the case of cities, will be permanently assigned to assist the port administrator in the day to day and regular maintenance and operation of port facilities.

2.2 Scope of Responsibilities

The topics discussed below, comprise the scope of commitments of municipal/city governments for feeder ports.

1. Authority to Operate and Manage Feeder Ports

a. Enactment of Municipal/City Ordinance

The municipality/city shall enact an ordinance authorizing itself to maintain and operate a specific port. This ordinance shall spell out the municipality's or city's acceptance of said port and the accompanying responsibilities associated with port management, the scope of which are described under this section. This ordinance shall also include the establishment and staffing of a Port Management Staff as described earlier and describe the regulations, controls, charges/fees, and other powers or activities that will be implemented for the proper use of port facilities.

b. Port Reservation and Harbor Zoning

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The municipality/city shall establish an exclusive port zone on the foreshore areas contiguous to the port site and harbor, which shall serve as port reservation and back-up area. The harbor shall consist of a basin and fairway to facilitate efficient navigation and over-all port operation; and, a future expansion area for additional port facilities. The back-up area at the land side on the other hand, is intended to provide adequate space for expected port-related and other compatible activities. A comprehensive plan shall be prepared and duly reflected in land use and zoning regulations of the municipality/city. The municipality/city will not allow non-related or conflicting uses within this zone.

The responsibilities of the municipality/city or city during the post construction stage under this Program are described in this section, shall be applicable within this port reservation and harbor zone and will _be duly reflected in the ordinance mentioned.

c. Agreement of Port Maintenance and Operation

A Memorandum of Agreement for Port Maintenance and Operation shall be executed by the city/municipality with the Ministry of Public works and Highways (MPWH). The Agreement shall incorporate the responsibilities of the city/municipalities and the MPWH, as described in this report.

A draft Memorandum of Agreement is Attached to this Appendix.

ii. Port Facility Record

This record serves to document the port's existing and as-built (newly-constructed) structures, including a record of port development, from planning to completion and all related correspondence. It shall include the port's design calculations and costings as well as the natural conditions at the port site (e.g. wave, tide, wind). This record shall be continuously updated, reflecting in it maintenance works, expansion of facilities and/or rehabilitation/reconstruction undertaken within the port and harbor zone. Significant or out of the ordinary events will also be duly noted, examples of which include strong typhoons, high waves, very large traffic volume or vessels.

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iii. Routine Operation and Maintenance

a. Approval of Facility Utilization

Use of berthing facilities is for the public on a first come-first-served basis. However, municipal/city government shall approve and serve as the sole authority in allowing the use of port facilities over a certain period of time (e.g. yearly). This prior submission of information by users is necessary, so as to enable the city/municipality to formulate general rules acceptable to users of berthing priorities and usage, thereby minimizing possible misunderstanding or inefficiency in the future.

The use of storage facilities or sheds however, will be on a prior notice basis to facilitate control, space preparations, revenue collection and recording purposes.

b. Supervision of Daily Port Use

The municipality/city will implement daily through the approved Port Management Staff, the ordinance containing port regulations and local government responsibilities based on the signed Memorandum of Agreement.

c. Control

The city/municipality has the authority to control the use of port facilities entrusted to it by the national government. It therefore has the right to prohibit uses that will lead to damages to the facility, e.g., excessive cargo and vehicle weight; cargo posing danger to public health and property (e.g. explosives); those that are detrimental to the proper use of facilities and, illegal uses.

d. Removal of Obstacles/Prohibition of Improper/ Illegal Uses

The city/municipality will cause or direct the removal of obstacles to navigation or port traffic and other prohibited/illegal cargo and other improper uses at the expense of the owner or shipmaster. If the owner or master cannot be identified, unable, or unwilling to remove obstacles or prohibited uses, the city/municipality will immediately inform appropriate agencies and request their assistance.

e. Maintenance of Order

The municipality/city will immediatel correct and take action against unlawful acti vities at the port, and other activities detr mental to efficient port operations, includin those described in the preceding section remove abandoned cargo; prohibit transfer o rights of approved users; prohibit activitie that disturb normal port operation; and control use of equipment.

f. Regular Inspection of Facilities

The municipality/city shall conduc regular inspection of facilities to identif: those that require immediate maintenance an to forward said report to the MPWH. A: example of the said report is shown in th: Memorandum of Agreement.

g. Cleaning of Facilities

The municipality/city government shal: maintain the cleanliness of port facilities and require users to maintain the same.

h. Collection of Charges

The municipality/city shall implement the collection of authorized charges and fees through a procedure agreed upon with users. Among the options for collection are as follows:

i. direct collection and issuance of receipt at the site through a collection clerk;

ii. the charging of a fixed weekly, monthly, quarterly or yearly fee, individually or through an association or cooperative.

iii. the payment by users and issuance of the correponding receipt at the municipal hall.

iv. issuance of tickets to be redeemed by cash or bank deposit by users.

i. Ordinary Maintenance

Ordinary maintenance refers to the continued effort of maintaining the condition of facilities at time of completion. This may start a few years after construction but will

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have to be undertaken on a continued basis to overcome normal wear and tear. This does not include damage from abnormal natural phenomena (e.g. strong typhoon), structural repair, rehabilitation or reconstruction.

Ordinary maintenance means work that require one day's labor by a male adult.

iv. Calamity Reports

In case calamities affect the port, the municipality/city shall make a report to the MPWH as outlined in the attached Memorandum of Agreement.

Coordination with other Agencies

The municipality/city is expected to be fully responsible for the proper use of port facilities as well as, enable the facilities to be more effective in providing better transport service. The municipality will therefore take the necessary measures and undertake all necessary coordination and correspondence with agencies to realize these responsibilities. Part of this responsibility includes, the submission of the apropriate proposals to the MPWH for the further expansion of port facilities and services whenever necessary. These proposals will be based on the Port Development Guidelines (Appendix A) and the Model Port Studies prerapared as a separate volume to this Implementation Program.

3.0 Responsibilities of the MPWH

3.1 Organization of Port Maintenance Staff

The MPWH shall constitute an Office which together with the various Ministry bureaus, services and regional and district offices, shall undertake the maintenance of completed feeder ports.

The MPWH has supervision authority over the maintenance of feeder ports in view of the limitation of municipalities in maintaining ports on their own. Furthermore, the hinterlands of ports often go beyond a municipality's boundaries, thus the MPWH has the responsibility of maintaining or assuring the availability at all times of port facilities to all users.

3.2 Scope of Responsibilities

a. Periodic Inspection

The MPWH will be responsible, in the interest of assuring the continued safe and efficient use by

persons, cargo and vessels of port facilities, for the regular inspection of main structures as shown in the Attachment to the Memorandum of Agreement and Port Planning Guidelines.

This inspection will also be conducted after the occurence of abnormal natural conditions that affect port structures.

b. Major Maintenance and Rehabilitation/Reconstruction

This mainly involves rehabilitation/reconstruction works required arising from findings of periodic maintenance.

This responsibility of the MPHW starts when maintenance works go beyond the scope of ordinary maintenance by local governments.

c. Consulting with Related Agencies

In the maintenance of feeder ports, the MPWH shall continously consult with various agencies regarding its management arrangements with local government units.

d. Monitoring and Further Development of Ports

The MPWH shall periodically monitor port usage to improve transport services at the port facility and also to determine other infrastructures needs in the port hinterlands.

If expansion of port facilities is required, the MPWH shall undertake the necessary development studies and the necessary funding for construction.

e. Further Assistance to Municipal Governments

The MPWH shall endeavor to facilitate the execution of responsibilities of local governments under this Program. For example, it could assist in the delineation of harbor and reservation zones, assist in the preparation of the port record and maintain copies of it, and arrange training for the staff of the municipality/city Port Management Staff.

3.3 Organization of Program Management Office

The Ministry will organize an Office which together with the MPWH bureaus, services and district and regional offices, will undertake the implementation of the Feeder Ports Development Program. Its responsibilities will cover Master Planning, Project Evaluation, Programming, Detailed Design, Port Construction Supervi

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sion, Maintenance of Equipment and Port Maintenance requiring MPWH participation.

This Office shall be supported by an inter-agency group in view of the many sectors served by port facilities. The Offcie will essentially have three support staff i.e., Administrative, Planning and Detailed Design and Construction and Maintenance Support. Construction Supervision will be undertaken by area engineers which may be drawn from the MPWH Project Manager's Pool or the Regional and District Offices and who will be responsible for projects within a given geographic area. Eventually, they may be called upon for major port maintenance works with the assistance of the office expressly organized to manage the development of Feeder Ports Nationwide.

MEMORANDUM OF AGREEMENT

KNOWN ALL MEN BY THESE PRESENTS:

THIS AGREEMENT, KNOWN AS THE INTERIM MANAGEMENT AGREEMENT F THE PORT OF _____, ENTERED INTO AND EXECUTED AND BETWEEN:

The Ministry of Public Works and Highways, with offic at Port Area, Manila, represented herein by the Honorac _____ hereinafter referred to as MPW

The Municipality/City Government of _____ (Name of Municipality/Ci _____ with offices at _____, represen Province) (Address) herein by the Honorable Mayor, _____, hereinaf (Name of Mayor) referred to as the Municipality/City Government (M/CG).

- W I T N E S S E T H -

WHEREAS, the Government attaches high priority and importar to the physical improvement, maintenance and management of fee (municipal) ports in view of their vital social and developme function particularly for the many isolated coastal or isl communities which have no alternative access to goods, servic and markets;

WHEREAS, the Government through the MPWH has formulated implementation program for the development of feeder ports wh includes the port of _____.

WHEREAS, the port of _____ is presently being operated and maintained by any other agency or off specifically the Philippine Ports Authority (PPA) and t Philippine Fisheries Development Authority (PFDA), which are d authorized port management agencies of the government;

WHEREAS, the facilities so developed at (barangay (municipality/city) will require the implementation of cert operation and maintenance guidelines for their proper, safe efficient use by the public, prevent damage and assure longterm utility of facilities until such time that either PPA PFDA assumes responsibility for the said port;

WHEREAS, the MPWH and the Municipal/City government _____ agree and are willing and able to assume joint in the interim the responsibilities of port management, operat

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and maintenance as set forth under this Agreement to provide adequate, safe, efficient use of developed facilities;

NOW, THEREFORE, for and in consideration of the above-mentioned premises, both parties hereto agree of the following:

ARTICLE 1 - OBLIGATION OF PERFORMANCE

Both parties shall faithfully perform the responsibilities stated in this Agreement.

ARTICLE 2 - APPOINTMENT OF MUNICIPAL/CITY GOVERNMENT (M/CG)

The MPWH shall designate the Municipal/City Government with the latter accepting formally to manage government-owned port and harbor facilities located in (barangay), (municipality/city), (province according to the agreed responsibilities and port regulations shown as Attachment 1 of this Agreement.

ARTICLE 3 - RESTRICTION ON THE USE OF THE PROPERTY .

The M/CG shall make the facilities stated in the previous article available for the free use by the public, subject to the collection of fees by the municipal/city government necessary to recover expenses incurred by M/CG under this agreement and as authorized under existing laws and required procedures.

ARTICLE 4 - EFFECTIVITY OF AGREEMENT

This management agreement shall be effective from the date of signing until the port covered under this Agreement becomes one of the ports within PPA or PFDA systems or when cancelled.

ARTICLE 5 - PROHIBITION OF ASSIGNMENT OF RIGHT

The right to use government-owned port and harbor facilities whose management is assigned to municipal/city government as Article 2 stipulates (hereinafter called Managed Facilities) may not be assigned or subleased to third party or mortgaged, unless expressly approved by the MPWH.

ARTICLE 6 - OBLIGATIONS FOR MANAGEMENT

1. The M/CG shall take charge of Managed Facilities to be used by the general public.

2. The M/CG shall take charge of Managed Facilities with

care and make efforts to maintain the said facilities according to the herein stipulated responsibilities.

3. If Managed Facilities are lost or damaged wholly or partially, the municipal/city government shall promptly take necessary temporary measures to maintain safety, efficiency and the proper use of managed facilities; undertake the appropriate restoration works within its responsibility; and, submit a report concerning the following items (details in Attachment 2);

   a. Name and quantity of the lost or damaged facilities;
   b. Causes(s) of loss or damage;
   c. Degree of seriousness of damages and estimated cost of restoration; and
   d. Outline of temporary measures taken.

4. In the event that the municipal/city government is responsible for loss or damage, it shall restore the lost or damaged facilities into their original condition at its own cost. However, when the restoration is exceedingly difficult, the MPWH shall waive the obligation of restoration by the M/CG and undertake the necessary restoration works.

ARTICLE 7 - CHANGE OF USES ON ORIGINAL CONDITIONS

When the municipality/city government intends to change or improve facilities or further utilization of Managed Facilities, it shall submit for approval a written report stating reasons to MPWH.

Any change of uses or original condition of Managed Facilities shall be reported to MPWH without delay.

ARTICLE 8 - USES FOR OTHER PURPOSES

When the municipal/city government uses Managed Facilities for other uses, purposes, makes profits, or lets a third party use or make profits from the said Facilities for a long term, but does not disturb the original uses or purposes of Managed Facilities or inconvenience the public, the M/CG shall submit a written document carrying the items described below to MPWH for approval.

a. Name, structure, quantity and value of the said Managed Facilities, and the scope of the said Managed Facilities that are the objects of use or profits;

b. When third party uses or makes profits, his name and address;

c. The purpose and the way of use or making profits;

d. The term of use and making profits;

e. The estimated amount of revenue for municipality government by use or making profits;

f. The condition of use or making profits when the lets the third party use Managed Facilities or profits from them; and

g. Other necessary items.

ARTICLE 9 - COST OF MANAGEMENT

ThÄe Municipality/City government shall bear the cos the operation and maintenance of Managed Facilitie accordance with the scope of responsibilities attache this Agreement.

The profits accruing from Managed Facilities sha the revenue of Municipality/City Government

ARTICLE 10 - CANCELLATION OF THIS AGREEMENT

The MPWH may cancel this Agreement when:

a. Managed Facilities are considered unnecessary offered to the general public;

b. Managed Facilities are to be transferred or leas other parties or agencies under existing laws; and

c. Municipality/City Government does not perform obligation stipulated in Article 5 or Artic! Paragraph 1.

ARTICLE 11 - RETURN OF MANAGED FACILITIES

In the event this Agreement expires or MPWH cancels Agreement according to Article 10, the Municipality Government shall restore Managed Facilities into the ori state and return them tr MPWH by the date the MPWH speci With the approval of MPWH, however, the municipality government may return the said Facilities partially re or without any restoration to the original condition.

ARTICLE 12 - COMPENSATION FOR DAMAGE

In the event that municipality/city government su

damages from the cancellation of this Agreement, Municipality/City Government may not claim compensation from MPWH.

ARTICLE 13 - ABANDONMENT OF THE RIGHT TO DEMAND EXPENSES

In the event this Agreement is cancelled as set forth in Article 10, M/CG shall not demand refund for management expenses including those for improving Managed Facilities.

ARTICLE 14 - PORT RECORD

Municipality/City Government shall keep Port Report, as shown in Attachment 2 of this Agreement stating the following:

a. Name of Managed Facilities
b. Location
c. Structure, Quantity and Value
d. Date of Management Agreement
e. Other Necessary Items

Whenever there are changes concerning the items described in the previous paragraph, M/CG shall enter the said changes in the port record.

ARTICLE 15 - REPORT AND ON-THE-SPOT INSPECTION OF MANAGED FACILITIES

Municipal/City government shall report the management situation of Managed Facilities to MPWH every year within one month after the said year.

The MPWH in so far as it is necessary to achieve the purpose of this Agreement, may inspect Managed Facilities from time to time, or request or give necessary management instruction to the city/municipal government.

ARTICLE 16 - FUNDING

Wages, salaries, travelling allowances, per diems and other incidental expenses incurred by authorized personnel and all expenses related to the execution of responsibility under this Agreement shall be borne separately and independently by each Party in accordance with each's responsibilities.

ARTICLE 17 - OTHER TERMS

1. Any modification of this Agreement shall be subject to the mutual agreement by both Parties;

2. This Agreement may be terminated anytime upon mu consent of the Parties to this Agreement.

IN WITNESS WHEREOF, we have hereunto affixed our signa this _____ day of _____, 19 __ at Manila.

FOR THE MINISTRY OF PUBLIC WORKS AND HIGHWAY

_____

FOR THE MUNICIPAL/CITY GOVE MENT OF _____

_____
Mayor
Municipality

WITNESSES:

_____

_____

ATTACHMENT 1

Port of _____, _____

Rountine Operation and Maintenance of Feeder Ports

1. Approval of Facility Utilization

Use of berthing facilities is for the public on a first come-first-served basis. However, municipal/city government shall approve and serve as the sole authority in allowing the use of port facilities over a certain period of time (e.g. yearly). This prior submission of information by users is necessary so as to enable the city/municipality to formulate general rules acceptable to users of berthing priorities and usage thereby minimizing possible misunderstanding or inefficiency in the future.

The use of storage facilities or sheds however will be on a prior notice basis to facilitate control, space preparations, revenue collection and recording purposes.

2. Supervision of Daily Port Use

The municipal/city will implement daily through the approved Port Management Staff the ordinance containing port regulations and local government responsibilities based on the signed Memorandum of Agreement.

3. Control

The city/municipality has the authority to control the use of port facilities entrusted to it by the national government. It therefore has the right to prohibit uses that will lead to damages to the facility, e.g., excessive cargo and vehicle weight; cargo posing danger to public health and property (e.g. explosives); those that are detrimental to the proper use of facilities and, illegal uses.

4. Removal of Obstacles/Prohibition of Improper/Illegal Uses

The city/municipality will cause or direct the removal of obstacles to navigation or port traffic and other prohibited/illegal cargo and other improper uses at the expense of the owner or shipmaster. If the owner or master cannot be identified, unable, or unwilling to remove obstacles or prohibited uses, the city/municipality will immediately inform appropriate agencies and request their assistance.

5. Maintenance of Order

The municipal/city will immediately correct and take action against unlawful activities at the port as other activities detrimental to efficient port operations, including those described in the preceding section; remove abandoned cargo; prohibit transfer of rights of approved users; prohibit activities that disturb normal port operation; and, control use of equipment.

6. Regular Inspection of Facilities

The municipal/city shall conduct regular inspection of facilities to identify those that require immediate maintenance and to forward said report to the MPWH. An example of the said report is shown in the Memorandum of Agreement as Attachment 2.

7. Cleaning of Facilities

The municipal/city government shall maintain the cleanliness of port facilities and require users to maintain the same.

8. Collection of Charges

The municipality/city shall implement the collection of authorized charges and fees through a procedure agreed upon with users. Among the options for collection are as follows:

i. direct collection and issuance of receipt at the site through a collection clerk.

ii. the charging of a fixed weekly, monthly, quarterly or yearly fee, individually or through an association or cooperative.

iii. the payment by users and the issuance of the corresponding receipt at the municipal hall.

iv. issuance of tickets to be redeemed by cash or bank deposit by users.

9. Ordinary Maintenance

Ordinary maintenance refers to the continued effort of maintaining the condition of facilities at time of completion. This may start a few years after construction but will have to be undertaken on a continued basis to overcome normal wear and tear. This does not include damage from abnormal natural phenomena (e.g. strong typhoon), structural repair, rehabilitation or reconstruction.

Ordinary maintenance means work that require one day's labor by a male adult.

10. Calamity Reports

In case calamities affect the port, the municipality/city shall make a report to the MPWH as outlined in the attached Memorandum of Agreement.

11. Coordination with other agencies

The municipality/city is expected to be fully responsible for the proper use of port facilities as well as enable the facilities to be more effective in providing better transport service. The municipality will therefore take the necessary measures and undertake all necessary coordination and correpondence with agencies to realize these responsibilities. Part of this responsibility includes the submission of the appropriate proposals to the MPWH for the further expansion of port facilities and services whenever necessary. These proposals will be based on the Port Development Guidelines (Appendix A) of Implementation Program and the Model Ports Studies.

12. Authority to Operate and Manage Feeder Ports

a. Enactment of Municipal/City Ordinance

The municipality/city shall enact an ordinance authorizing itself to maintain and operate a specific port. This ordinance shall spell out the municipality's or city's acceptance of said port and the accompanying responsibilities associated with port management, the scope of which are describe under this section. This ordinance s all also include the establishment and staffing of a Port Management Office as described earlier and describe the regulations, controls, charges/fees, and other powers or activities that will be implemented for the proper use of port facilities.

b. Port Reservation and Harbor Zoning

The municipality/city shall establish an exclusive port zone on the foreshore areas contiguous to the port site and harbor which shall serve as port reservation and back-up area. The harbor shall consists of a basin and fairway to facilitate efficient navigation and over-all port operation; and, a future expansion area for additional port facilities. The back-up area at the land side on the other hand, is intended to provide adequate space for expected port-related and other compatible

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activities. A comprehensive plan shall be prepared and duly reflected in land use and zoning regulations of the municipality/city. The municipality/city will not allow non-related or conflicting uses within this zone.

The responsibilities of the municipality or city during the post construction stage under this Program are described in this section shall be applicable within this port reservation and harbor zone and will be duly reflected in the ordinance mentioned.

Attachment 2

INQUIRY SHEET FOR ENGINEERING AND TECHNICAL DATA FOR NATIONWIDE FEEDER PORT DEVELOPMENT PROGRAM

PORT: _____
PROVINCE: _____
REGION: _____

DISTRICT ENGINEER: _____
PREPARED BY: _____
DATE ACCOMPLISHED: _____

A. PORT FACILITIES

PIER / WHARF																			
PILES		SUPERSTRUCTURE							STAIRLANDING			CAUSEWAY			REVETMENT			OTHERS
a. TYPE: _____ b. DIMENSION: _____ c. ELEVATION: _____ d. OTHERS: _____		a. TYPE: _____ b. DIMENSION: _____ c. ELEVATION: _____ d. OTHERS: _____							a. DIMENSION: _____ b. ELEVATION: _____ c. NO. OF RISERS: _____ d. OTHERS: _____			a. DIMENSION: _____ b. CROWN HEIGHT: _____ c. WT. OF ARMOUR: _____ d. SIDE SLOPE: _____ e. BERM: _____ f. DEPTH AT THE TIP: _____ g. SEABED GRADIENT: _____			a. DIMENSION: _____ b. CROWN HEIGHT: _____ c. WT. OF ARMOUR: _____ d. SIDE SLOPE: _____ e. BERM: _____ f. OTHERS: _____			
Existing Condition \ Structure	Pile	Beam	Slab	Pavement	Mooring Bitt	Concrete Curb	Fender	Timber Rubbing Fender	Treads	Risers	Wall	Berm	Side Slope	Crown Pavement	Berm	Side Slope	Crown Pavement	
Good																		
Fair																		
Bad																		
Damages																		
1. Scaling																		
2. Slip Off																		
3. Cracks																		
4. Peeled Off																		
5. Fatigue/ Seismic Resistance																		

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INQUIRY SHEET FOR ENGINEERING AND TECHNICAL DATA FOR NATIONWIDE FEEDER PORT DEVELOPMENT PROGRAM

PORT : _____
PROVINCE : _____
REGION : _____

DISTRICT ENGINEER : _____
PREPARED BY : _____
DATE ACCOMPLISHED : _____

A. PORT FACILITIES

PIER / WHARF									STAIRLANDING			CAUSEWAY			REVETMENT			OTHER
PILES		SUPERSTRUCTURE																
a. TYPE _____ b. DIMENSION _____ c. ELEVATION _____ d. OTHERS _____		a. TYPE _____ b. DIMENSION _____ c. ELEVATION _____ d. OTHERS _____							a. DIMENSION _____ b. ELEVATION _____ c. NO. OF RISERS _____ d. OTHERS _____			a. DIMENSION _____ b. CROWN HEIGHT _____ c. WT OF ARMOUR _____ d. SIDE SLOPE _____ e. BERM _____ f. DEPTH AT THE TOE _____ g. SEABED GRADIENT _____			a. DIMENSION _____ b. CROWN HEIGHT _____ c. WT OF ARMOUR _____ d. SIDE SLOPE _____ e. BERM _____ f. OTHERS _____			
Structure / Existing Condition	Pile	Beams	Slabs	Pavement	Mooring Bitt	Concrete Curb	Fender Piles	Timber Rubber Fender	Thread	Riser	Wall	Berm	Side Slope	Crown Pavement	Berm	Side Slope	Crown Pavement	
6. Settlement																		
7. Blow Ups																		
8. Abrasion																		
9. Eroded																		
10. POT Holes																		
11. Split																		
12. Corroded																		
13. Scoured																		
14. Spalling																		
15. Others																		

B. EXISTING FUNCTIONAL FACILITIES (CHECK)

STRUCTURE / EXISTING CONDITION	WAREHOUSE								OFFICE BUILDING							
	a) DIMENSIONS b) TYPE c) DESCRIPTION								a) DIMENSIONS b) TYPE c) DESCRIPTION							
	ROOFING	ROOF FRAMING	COLUMNS	WALLS	WINDOWS	DOORS	FLOORING	CEILING	ROOFING	ROOF FRAMING	COLUMNS	WALLS	WINDOWS	DOORS	FLOORING	CEILING
GOOD																
FAIR																
BAD																
DAMAGES:																
1. CORRODED																
2. RUSTED																
3. DETERIORATED																
4. Peeled off																
5. CRUMPLED																
6. SPLIT																
7. CRACKS																
8. SLIP OFF																
9. SCOURED																
10. SPALLING																
11. BLOW UPS																
12. SCALING																
13. ABRASION																
14. ERODED																
15. POT HOLES																
16. OTHERS																

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B. EXISTING FUNCTIONAL FACILITIES (CHECK)

STRUCTURE / EXISTING CONDITION	MARKETHALL a) DIMENSIONS b) TYPE c) DESCRIPTION								OTHERS a) DIMENSIONS b) TYPE c) DESCRIPTION							
	ROOF-ING	ROOF FRAM-ING	COLUMNS	WALLS	WIN-DOWS	DOORS	FLOOR ING	CEIL-ING	ROOF-ING	ROOF FRAM-ING	CO-LUMNS	WALLS	WIN-DOWS	DOORS	FLOOR-ING	CEIL-ING
GOOD																
FAIR																
BAD																
DAMAGES:																
1. CORRODED																
2. RUSTED																
3. DETERIORATED																
4. Peeled Off																
5. CRUMPLED																
6. SPLIT																
7. CRACKS																
8. SLIP OFF																
9. SCOURED																
10. SPALLING																
11. BLOW UPS																
12. SCALING																
13. ABRASION																
14. ERODED																
15. POT HOLES																
16. OTHERS																

C. STRUCTURAL DESIGN (DESIGN CONDITIONS USED FOR BERTHING FACILITY) (CHECK)

DESCRIPTION	PIER		CAUSEWAY/GROIN				REVETMENT/ BREAKWATER			
MAIN MATERIALS	PILES	SUPER STRUCTURES	AR-MOUR	CORE	PAVE-MENT	CURB	AR-MOUR	CORE	PAVE-MENT	CURB
a) TIMBER										
b) ROCK/ STONES										
f) STEEL										
g) OTHERS										

(SUPPLY THE DATA)

DESIGN CONDITION \ STRUCTURE	PIER WHARF	CAUSEWAY	GROIN	REVETMENT	OTHERS	OBSERV	ESTIMA-
A. TIDAL RANGES							
a) HTL							
b) MHHW							
a) (H 1/3)							
b) TIME (T 1/3)							
C. SURCHARGE:							
a) DEADLOAD							
b) LIVELOAD							

D. SUPPLY DATA

D.1 PENETRATION RESISTANCE AND SOIL PROPERTIES

KINDS OF SOIL	DEPTH (m)	NO. OF BLOWS/ FEET (N)	RELATIVE DENSITY/ CONSISTENCY
		0 - 4	VERY LOOSE
		4 - 10	LOOSE
		10 - 30	MEDIUM
		30 - 50	DENSE
		OVER 50	VERY DENSE

KINDS OF SOIL	DEPTH (m)	NO. OF BLOWS/FEET (N)	CONSISTENCY
2.0 CLAY		Below 2	Very Soft
		2 - 4	Soft
		4 - 8	Medium
		8 - 15	Stiff
		15 - 30	Very Stiff
		Over 30	Hard

D.2 MAJOR CONSTRUCTION MATERIALS :

DESCRIPTION	SOURCE	DISTANCE TO JOB SITE	UNIT	UNIT COST	QUANTITY		
					LIMITED	UNLIMITED	Not Avail. (State Source)
1. CEMENT							
2. SAND							
3. GRAVEL							
4. RE-BARS							
5. LUMBER							
6. PLYWOOD							
7. COBBLES							
8. RUBBLES							
9. ROCKS							
a) Class I (1000 kg or more)							
b) Class II (500-1000 kg)							
c) Class III (500kg or less)							
10. Others							

REMARKS:

D.3 MAJOR CONSTRUCTION EQUIPMENT :

DESCRIPTION	OWNERSHIP			CAPACITY	RENTAL RATE
	LOCAL	NATIONAL	PRIVATE		
1. DUMP TRUCKS					
2. PAY LOADER					
3. WATER TRUCK					
4. CRAWLER CRANE					
5. DYNAPAC ROLLER					
6. PLATE COMPACTOR					
7. MOTOR GRADER					
8. CRAWLER TRACTOR w/ DOZER PILE DRIVER					
9. DIESEL-22 DROP HAMMER					
10. BULLDOZER					
11. BARGES					
12. CONCRETE MIXER					
13. CONCRETE VIBRATOR					
14. SERVICE TUB BOAT					
15. WHEEL-BARROW					
16. BOGGIES					
17. OTHERS					

E. NATURAL CONDITIONS: (OCEANOGRAPHIC / WIND DATA)

(CHECK AND SUPPLY DATA)

7/8

DESCRIPTION	PORT SITE								OFF SHORE							
A. WAVE DATA		OBSERVED			ESTIMATED					OBSERVED			ESTIMATED			
(a) Wave Ht(H1/3)																
(b) Period(T1/3)																
(c) Prevailing Direction	N	S	E	W	NE	NW	SE	SW	N	S	E	W	NE	NW	SE	SW
B. CURRENT DATA		OBSERVED			ESTIMATED					OBSERVED			ESTIMATED			
(a) Maximum Velocity																
(b) Prevailing Direction	N	S	E	W	NE	NW	SE	SW	N	S	E	W	NE	NW	SE	SW
C. WIND DATA		OBSERVED			ESTIMATED					OBSERVED			ESTIMATED			
(a) Maximum Velocity																
(b) Prevailing Direction	N	S	E	W	NE	NW	SE	SW	N	S	E	W	NE	NW	SE	SW
D. TIDAL RANGE		OBSERVED			ESTIMATED					OBSERVED			ESTIMATED			
(a) MHHW																
(b) MLLW																
E. SLOPE OF SEABED																
F. MOMENT DISTANCE																
(a) From shore to (-)2m depth																
(b) From 1.00m (+)																
G. SHORE ELEVATION																

II. SUB-SOIL DATA: (CHECK)

	SAND
	SILT
	ROCK (SOFT/HARD)
	CORAL FINGERS
	SILTY SAND
	SANDY SILT
	CLAYEY SAND
	SANDY CLAY
	CORAL ROCKS
	GRAVELLY CLAY
	SLATE
	CALCITE
	SHALE
	ORGANIC MATERIALS
	OTHERS

H. EVALUATION OF DAMAGES

(a) DAMAGE STRUCTURES (SKETCH/DESCRIBES) INCLUDE PRIVATE STRUCTURES:

(b) CAUSES OF DAMAGES (ESTIMATES/DESCRIBES):

(c) IMPROVEMENTS NEEDED/PROPOSED (ESTIMATE/DESCRIBE):

I. OTHER INFORMATION (SITE AND VICINITY): (Sketch plan at the back)

:AUSES OF DAM

GENERAL

Port facilitierelatively structures comparednd facilit exposed to waves arents, an the soft sea bed. fore, it analyze causes whctures of damaged by actual observat measures can be aken to assure structures.

These guideline prepared to make field surveys an analysis of the dastructures clearer and more effective. However, the contof these guidelines may not be complete thus it may be necesor users to add more check items during the conduct of fielcys and analysis.

1.A ROCK CAUSEWAY

1. Scouring atdge of slope

When aeway is constructed on soft seabed or sand seabee edge of the slope will be subject to gradual sc by wave attack and wave withdrawal especially e velocity is strong.

2. Slips down Surface of Slope

If thent of armour rocks at the surface of slope of theway or revetment is less than the wave force, a of rocks together with the filling materials e sucked up and displaced by strong waves.

3. Slip Circle lure at the Slope

If causis constructed on soft cohesive sub-soil, the slll effectuate a slip circle of failure partially orthe entire area.

1.B CROWN

1. Overtopping at the Shoulder of Crown

When theier portion of the crown is exposed to overtopping scouring on the crown and slope of the causeway'etment will result.

1.C ROAD PAVEMENT

1. Drop into VoiRoad Pavement on the Crown

aves and currents
tment, the lower
o voids these
age the road

ability
will

3/12

When there are many voids where waves and currents can penetrate in a rock causeway or revetment, the lower base of the pavement will drop down into voids these voids may cause a big hole that will damage the road pavement.

2. Non-Uniform Settlement of the Structure

If the settlement of a structure has no stability due to the consolidation of cohesive sub-soil, it will result in a drop down of the Road Pavement.

1.D R.C. PILES/PIERS

1. When the wave height is higher than the level of the pier, the uplift of waves acts under the pier/wharf floor.

2. Fatigue Breaking or Senility Breaking

Piles supporting the pier are swinging everytime there is a small wave force. The connection parts of piles and floor are prone to fatigue breaking or senility breaking especially in case of wooden beams and plates.

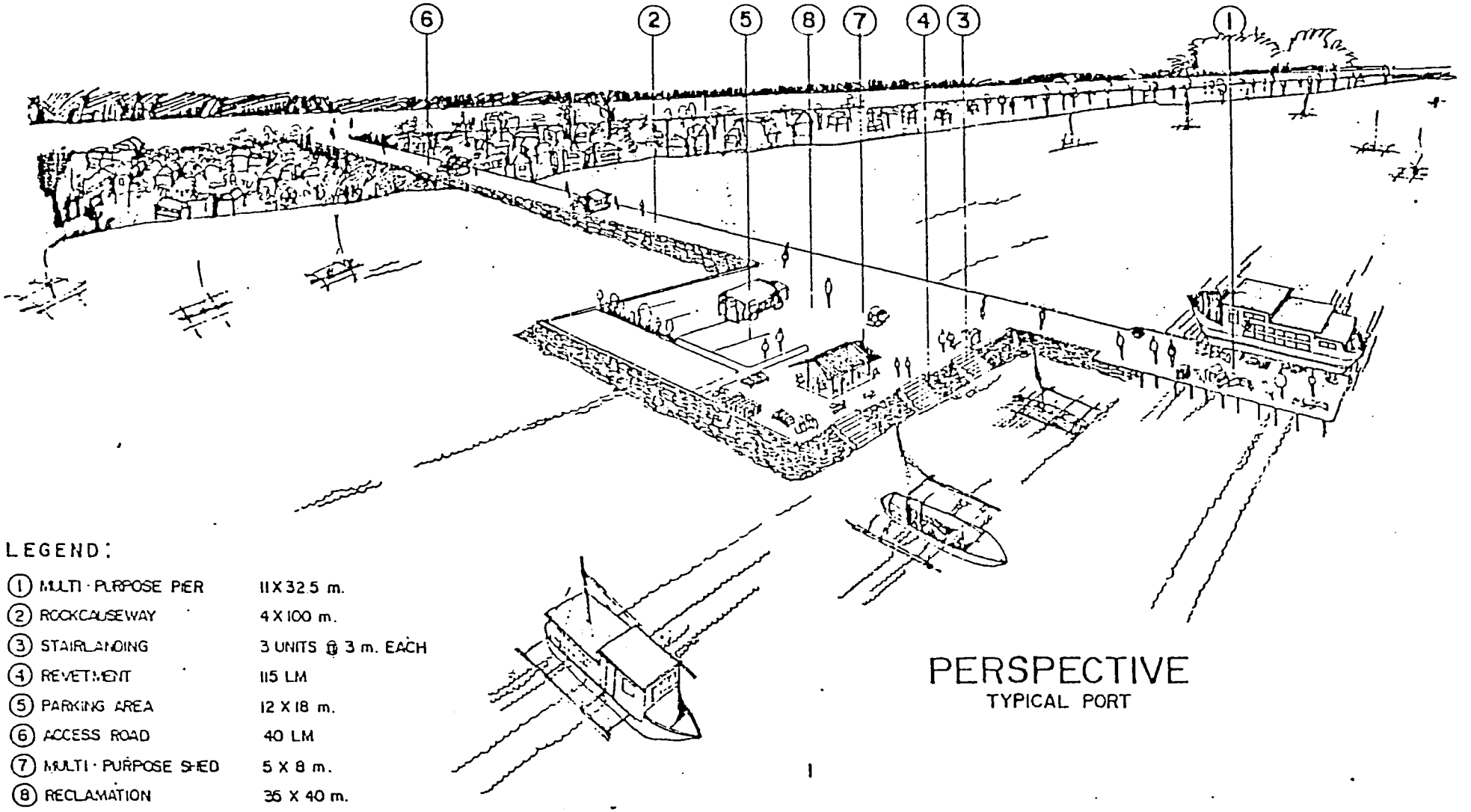
3. Settlement of Vertical Piles

Where there is inconsistency of bearing capacity or negative friction of foundation on cohesive soils, an unexpected settlement of vertical piles in the same row will damage the superstructure.

4. Eccentric Horizontal Force

When calculation of eccentric horizontal force acting on one block of superstructure is inconsistent, then the R.C. Piles are destroyed.

APPENDIX D - ADDITIONAL DRAWINGS OF TYPICAL FEEDER PORT FACILITIES

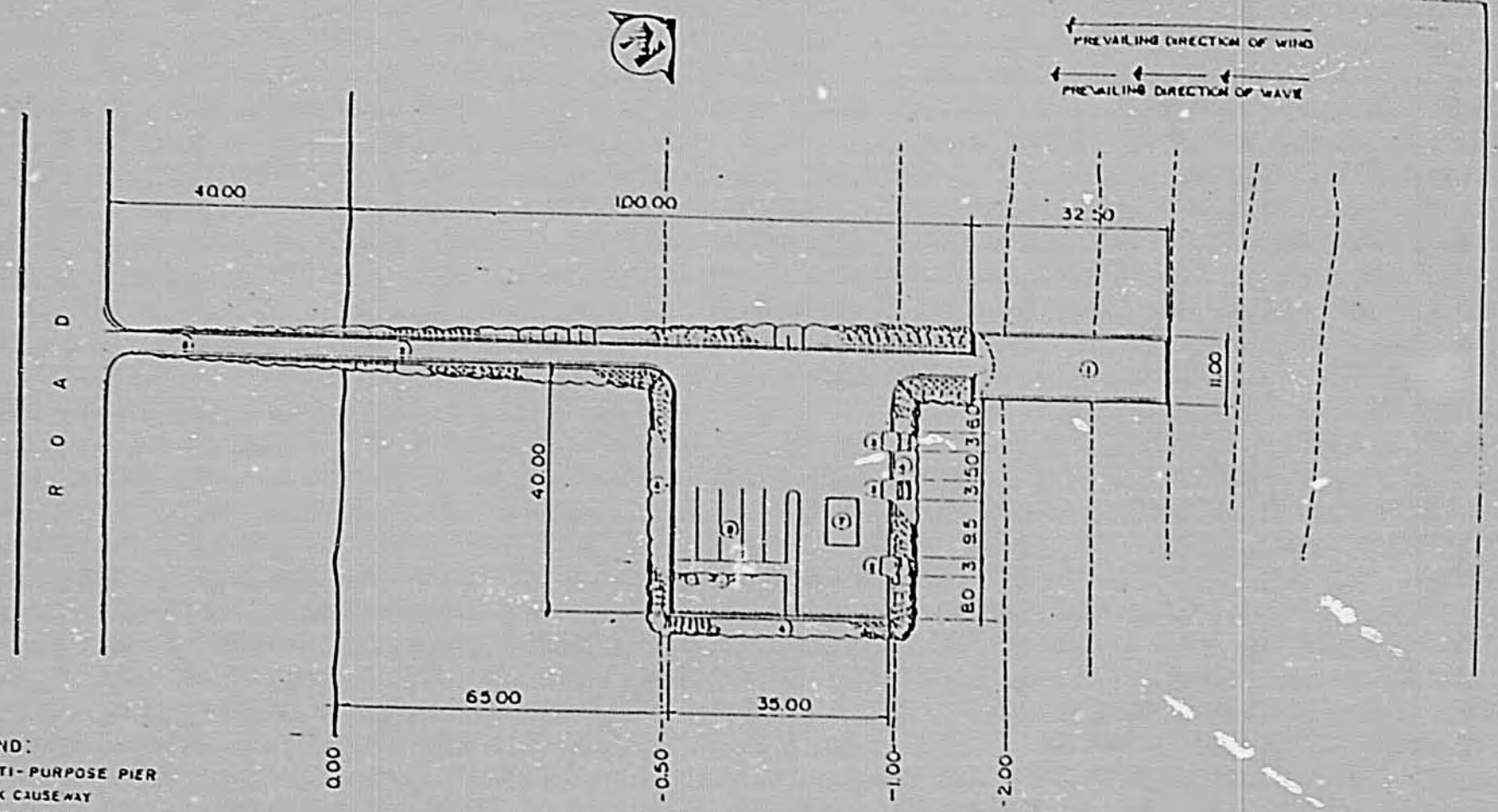


LEGEND:

1	MULTI-PURPOSE PIER	11 X 32.5 m.
2	ROCKCAUSEWAY	4 X 100 m.
3	STAIRLANDING	3 UNITS @ 3 m. EACH
4	REVETMENT	115 LM
5	PARKING AREA	12 X 18 m.
6	ACCESS ROAD	40 LM
7	MULTI-PURPOSE SHED	5 X 8 m.
8	RECLAMATION	35 X 40 m.

PERSPECTIVE

TYPICAL PORT



LEGEND:

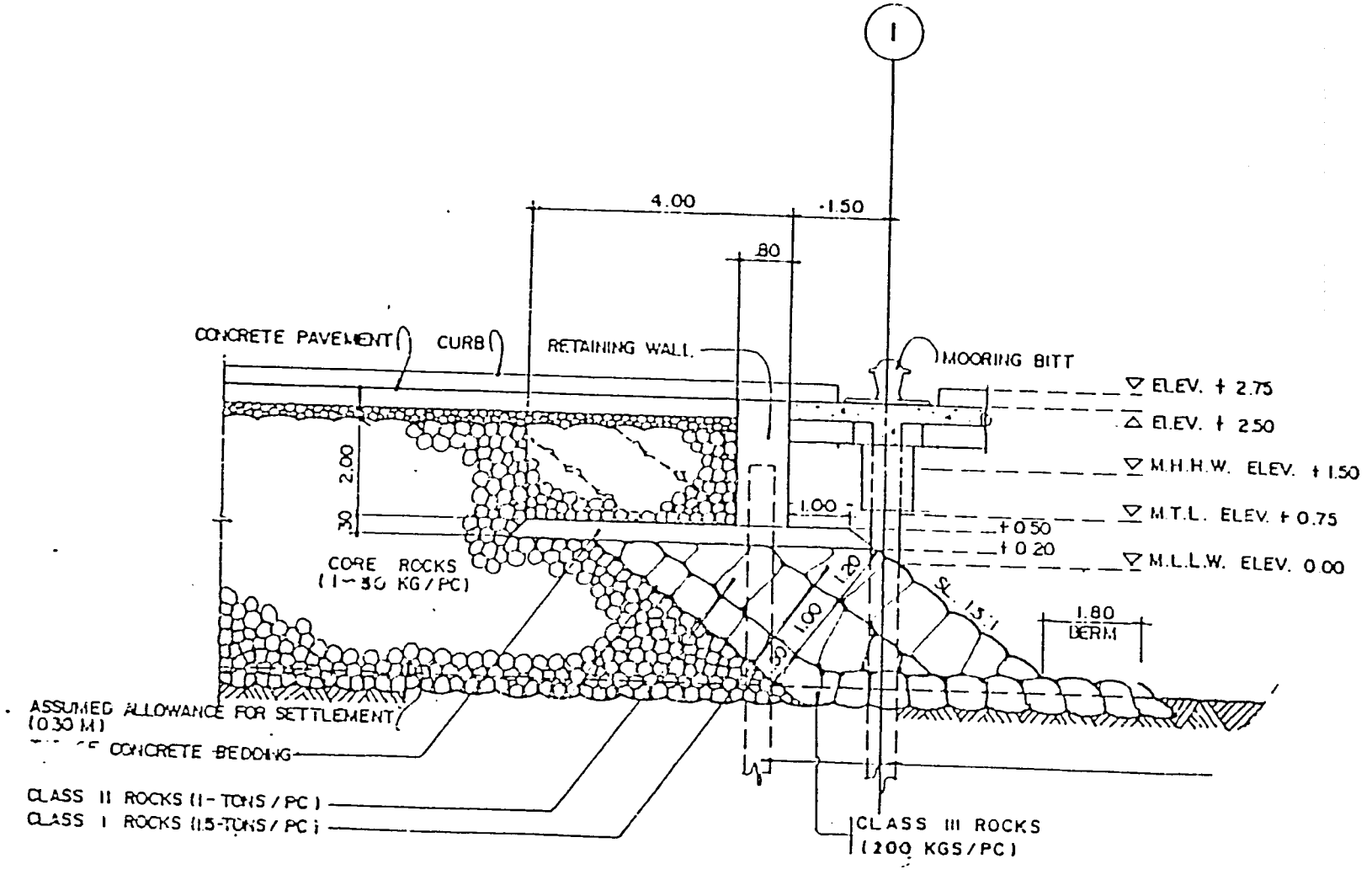
1. MULTI-PURPOSE PIER
2. ROCK CAUSEWAY
3. STAIRLANDING
4. REVETMENT
5. PARKING AREA
6. ACCESS ROAD
7. MULTI-PURPOSE SHED
8. RECLAMATION

PORT PLAN

SCALE 1:800 M.

2

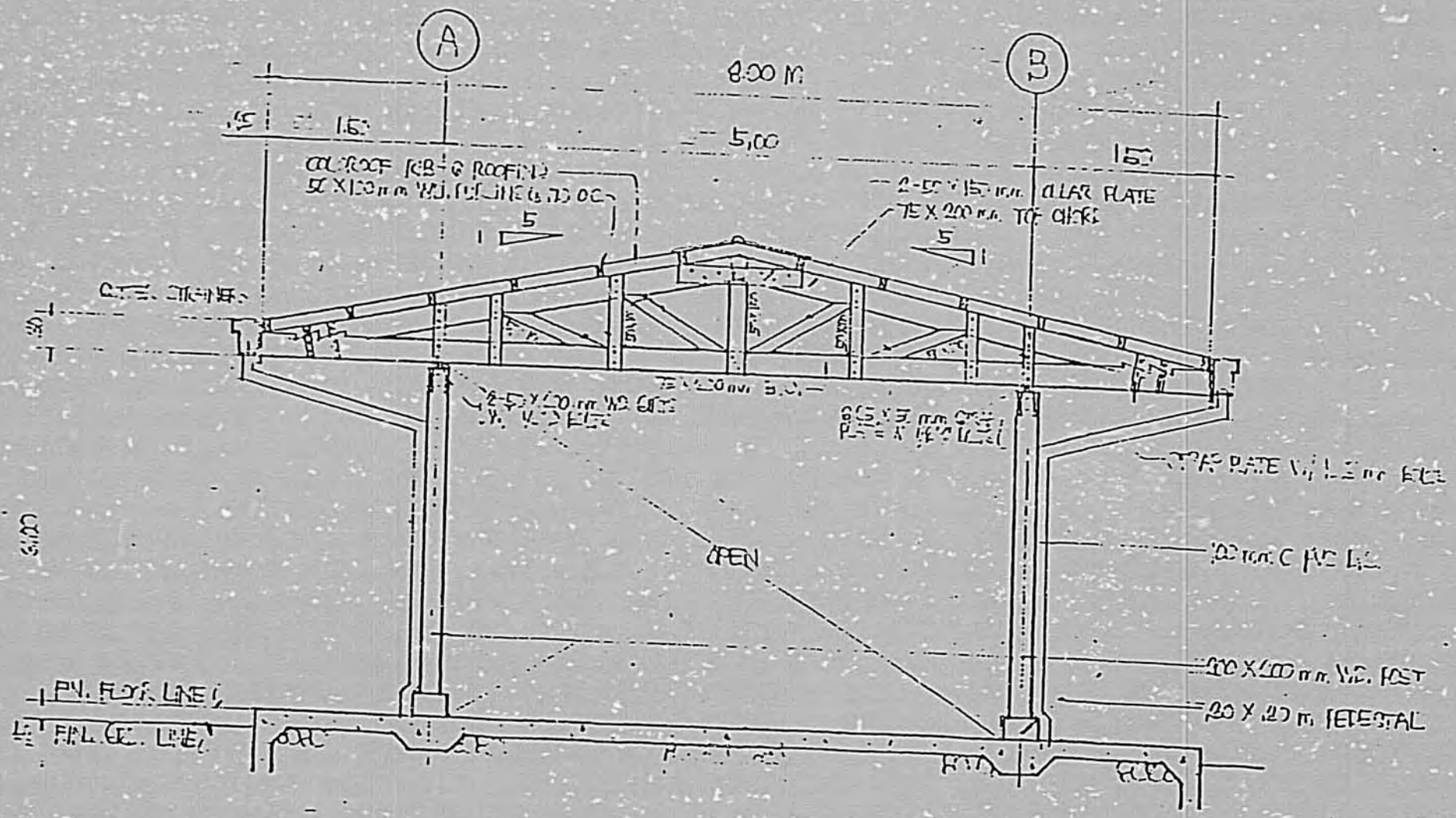
3/6



RETAINING WALL & MULTI
DETAILED CON'

SCALE :

6



TYPICAL SECTION

SCALE 1:50

• MULTI - PURPOSE SHED •

NATIONWIDE FEEDER (MUNICIPAL) PORTS DEVELOPMENT PROGRAM
IMPLEMENTATION PROGRAM
FOR
MASBATE ISLAND

I. BRIEF DESCRIPTION OF THE OVER-ALL PROGRAM

A. OUTLINE OF THE PROGRAM

1.0 Purpose of the Program

a. Objectives

a.1 General Objective

The Program involves the identification and selective development of municipal ports located in isolated areas whose inhabitants depend on water-based transport for sustaining a modest level of daily living.

This Program is especially needed in island communities and other areas where land or air transport facilities are inappropriate to the general public for obtaining essential commodities, gaining access to basic services such as health and education, reaching the most lucrative markets and acquiring the necessary production and technology inputs, among others.

a.2 Specific Objective

The development of feeder ports nationwide will allow many of the presently isolated areas to be within half a day's travel time to or from at least a provincial center and the principal shipment points such as major ports and main highways.

Port facilities are to be developed in accordance with the standards common to all types of transport infrastructure, i.e., availability to any user on a 24-hour basis; are adequate; and, are efficient, safe, economical, durable and easy to maintain.

2.0 Program Rationale

In the early part of 1982, it was realized that there was no definite over-all development program for small ports handling annual cargo traffic of

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10,000 to 20,000 MT or below, and those ports not being operated and maintained by the Philippine Ports Authority (PPA) and the Philippine Fisheries Development Authority (PFDA), the agencies mandated to manage all public ports throughout the country.

The Ministry of Public Works and Highways (MPWH) presently manages the development (including the construction and rehabilitation) of municipal ports. On the other hand, the municipal governments operate the majority of municipal ports. On the whole however, the avaialable facilities in municipal ports are way below the accepted norms of usefulness and convenience. Though fees are collected by municipal governments from port users such income are insufficient even for routine operation and maintenance. Further, as many port projects as possible are accommodated within the limited budget of the MPWH and as a result each municipal port project is alloted only very minimal amounts.

Based on the results of the latest survey in which data are available for 391 municipal ports throughout the country, only causeways are available in 169 small ports or 43 percent of surveyed ports. Only 30 percent have piers or wharves. Many of the causeways are not even completed and are already damaged and dilapidated. In addition, a large number of existing piers and wharves are in bad condition. The condition of existing facilities in the various municipal ports is shown in Table 1.

Within this over-all situation a program was initiated to develop municipal ports on a selective basis to make them more useful.

Initially the main thrust was to concentrate development efforts on small ports that directly contribute to the increase in the level of activity in PPA ports. However it was observed that the shortest and safest route over water was preferred by users of municipal ports in gaining access to goods and services not generally available in their respective communities. Though some of these routes link municipal ports to PPA ports, a large number link only the small ports with one another or to main roads. This is understandable considering that PPA ports are few in number and widely dispersed throughout the country. If the feeder ports were to be developed mainly as a

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support network for PPA ports it can be seen that many areas in the country would continue to have the same poor level of port facilities described earlier but which serve as their only means of access to outside areas.

As a result, the development thrust for the program was expanded so as to allow the development of all small ports as serving the only or main means of communities in islands and other similarly isolated areas to have access to any market or destination of their choice (including the PPA ports). On this basis, wherever port facilities are the most appropriate means of access compared to land and air transport so as to respond to the problem of isolation of many communities common to an archipelagic country such as the Philippines, the development of feeder ports will be undertaken.

There has and will always be a port development program in whatever form or content for the country intended especially for the improvement of small ports. This is due to the need to transport ever-increasing passenger and cargo volumes from the many islands as a result of population growth, increase in incomes and production, and the corresponding increase in demand for various commodities and services. This Program therefore is only one attempt to develop a more effective nationwide maritime transport network especially at the local level and to implement improved procedures for the identification, formulation and implementation of port projects. There are other nationwide port development programs that may still be proposed especially for small ports and among these are the development of small fisheries ports and ferry networks.

3. IMPLEMENTATION STRATEGY

The over-all Program consists of the following stages of planning and implementation:

Stage 1: the preparation, adoption and implementation of a Nationwide Feeder Port Development Master Plan;

Stage 2: the preparation of a Master Plan and Development Program for each of the candidate feeder ports identified in the Nationwide Master Plan;

Stage 3: the subsequent construction of planned facilities in each feeder port; and,

Stage 4: the management and operation of development facilities.

1.0 Nationwide Feeder Ports Master Planning

This involves the preparation of the Nationwide Feeder Ports Master Plan which consists of the following:

a. Identification of candidate feeder ports;

b. Estimation of the probable level of public investment required for the implementation program. This is based on a typical port development plan determined from the study of eight (8) model ports which represent the various types of candidate feeder ports. One typical port development plan is shown as Appendix F.

The Master Planning of the Model Ports and the other identified feeder ports are based on the Port Planning Guidelines as shown in Appendix A which essentially lead to the formulation of port plan embodying the principal standards required for feeder ports. These standards are common to all types of transport facilities and include the following:

i. availability for use on a 24-hour basis;

ii. sufficiency for present needs and provision of adequate space for expansion;

iii. efficiency of lay-out and dimension of each facility;

iv. safe use;

v. economy in construction (and where port development will not be undertaken in areas that will require dredging and the construction of breakwater); and,

vi. durability and ease in maintenance.

c. The formulation of institutional arrangements and responsibilities starting with preconstruction activities, to the actual construction of feeder ports and most especially, the management and maintenance of completed feeder ports.

d. Preparation of Port Planning Guidelines (Appendix A) specifying the requirements and procedures for the master planning and preliminary engineering of each of the candidate feeder ports identified in the Nationwide Master Plan so as to start the development process for these ports.

These Guidelines include procedures for the generation of data for port site selection, assessment of present and future traffic, determination of port facility requirements, layout of facility, structural design and costing at preliminary engineering or feasibility study level.

2.0 Master Planning of Individual Candidate Feeder Ports

Each candidate feeder port included in the Nationwide Master Plan will be developed according to a master plan prepared following the Port Planning Guidelines. An example of a Feeder Port Master Plan prepared under said Guidelines is shown in Appendix F.

3.0 Construction of Individual Feeder Ports

Following detailed design, an example of which will be issued separately following the approval of the Nationwide Master Plan, feeder ports will be constructed according to the pertinent rules and regulations of the Ministry.

4.0 Management and Operation of Developed Facilities

Kindly refer to Appendix C.

C. NATIONWIDE FEEDER PORTS DEVELOPMENT PLAN

1.0 Identification of Candidate Feeder Ports

There are 150 municipal ports proposed to be developed as feeder ports. They are distributed among the regions as follows:

Region	No. of feeder ports identified
I	5
II	6
III	2
IV	40
V	21

VI	8
VII	13
VIII	15
IX	18
X	9
XI	8
XII	5
	150

The proposed locations of the candidate feeder ports are shown in Table 2 and Figure 1.

Details of the process of identifying candidate feeder ports in the various regions together with the criteria used are shown in Appendix B.

In addition, site conditions to determine suitability of port improvements, orientation and lay-out of facilities will be evaluated. The procedures for determining suitability, type and scale and over-all development plan for port improvements are described in the Port Development Guidelines shown as Appendix A.

d.2 Existing Facilities and Current Use

The following describes the condition in the candidate feeder ports which this Program proposes to improve. The existing facilities discussed below reveals a striking contrast to proposed development under this Program.

Of the 150 candidates feeder ports, data on existing facilties and type of traffic are available for 89 ports. Of these ports, causeways are the only available landing facilities in half (43 ports) of the reported candidates feeder ports. Another 29 ports (30 percent) have piers or wharves while 16 ports (18 percent) have stairlanding facilities for the use of seacraft. Causeways serve only to link landing facilities and the shoreline and do not have sufficient depth and as such are not classified as landing facilities. In the reported facilities almost 20 percent are considered severly damaged, 40 percent are moderately damaged while 20 percent have minimal damages.

In up to 40 percent of the reported candidate feeder ports, cargo and passenger vessels require piers or wharves with water depth of down to -2.00 meters. In up to 85 percent of reported ports, stairlanding

facilitided to accomodate the large pumpboats (vessels with outriggers) that useities. This comparison of requireding facilities show the inadequalities in feeder ports. Details ing facilities in the candidatrts are shown in Tables 1a, 1b and 2.

A. PO

1.
2.

3.0 Prioritizatiorment

3.

The proper of priority for port development vith master planning and feasibility will be the port rankings shown in Tabppendix B. This ranking is based on the criteria also described in Appendix B.

4.

The 150 ports can be grouped into 20 to about 25 ports per group following the port ranking as possible every region must be repr at least one candidate feeder port group. Subsequently, feasibility in be undertaken on a per group basis.

5

6

7

The orderuction will then coincide with the reR of each proposed port project.

8

9

4.0 Scheme of Port Develoament

1

a. Descriptioties to be Developed

The flescribe the type and level of develisioned for feeder port facilities

The a for each of the facilities described depend on site conditions, traffic factors affecting the port master plails of procedures for determinipe and scale of required facilition in Appendix A. Additional drawings Port facilities described hereunder n Aopendix D.

B.

A. Civil Works

This cost item consist of the labor, materials and equipment costs required for constructing facilities. It also includes mobilization and demobilization, or the bringing in and bringing out respectively of labor, materials and equipment to the project sites, contractor's profit and contractor's tax.

Two (2) Types of Port development are proposed under this Program (details shown in Table 5) are proposed as follows:

TYPE II, Ordinary Scale Feeder Port (Facilities: Causeway, Small Pier (11 m x 33 m) Stairlanding, Transit-Shed)

- o [Used by small and medium sized vessels
- o Similar to an isolatedd island port but_with small hinterland.
- o Similar to a busy port but is located near a big port

Project Cost Estimate for Type II Ports

Description	Quantity	Unit Cost	Total Cost
1. Pier	357.50 m^2	₱ 7,394	₱ 2,543,740
2. Causeway	100 LM	20,015	2,001,477
3. Stairlanding	3 units	18,391	55,173
4. Multi-Purpose Shed	40 m^2	2,789	111,578
		TOTAL	₱ 4,711,958 4.7 MILLION PESOS

The port of Cawayan, Aroroy, Balud represents this type of port development. These ports can also be considered as average Type II ports with cargo handling of almost 1,000 MT or more with vessels using the port approximately 15 GT to 40 GT.

TYPE III, Ordinary Scale Feeder Port (Facilities: Causeway, Pier (11 m x 33 m or more), Stairlanding, Transit-Shed, Supporting-Land)

- o [Used by every kind of vessel]
- o Similar to an independent port (with far distance) and with a rather big hinterland
- o Functions as a big distribution/collection center to/from other isolated island/area ports [like type II]

Project Cost Estimate for Type III Ports

	Descripstion	Quantity	Unit Cost	Total Cost
1.	Pier	357.50 m^2	₱ 7,394	₱ 2,543,740
2.	Causeway	100 LM	20,015	2,001,477
3.	Stairlanding	3 units	18,391	55,173
4.	Multi-Purpose Shed	40 m^2	2,789	111,578
5.	Revetment	115 LM	10,597	1,218,679
6.	Supporting Land	2506 m3		733,612
			TOTAL	₱ 6,664,249. 6.7 MILLION PESOS

The port of Cataingan represents this type of port development. These ports can also be considered as average Type III ports with cargo handling of almost 6,000 MT and above with 120-350 GT calling at the port. The range of cargo handling for type III ports is from 2,000 MT to more than 30,000 MT.

B. Supervision

This consists of expenses incurred by the government for the staff supervising construction works.

C. Detailed Engineering

This involves the expertive, labor, materials and equipment needed to undertake feasibility studies and detailed designs to determine the desireability and practicality of developing a port in a particular site.

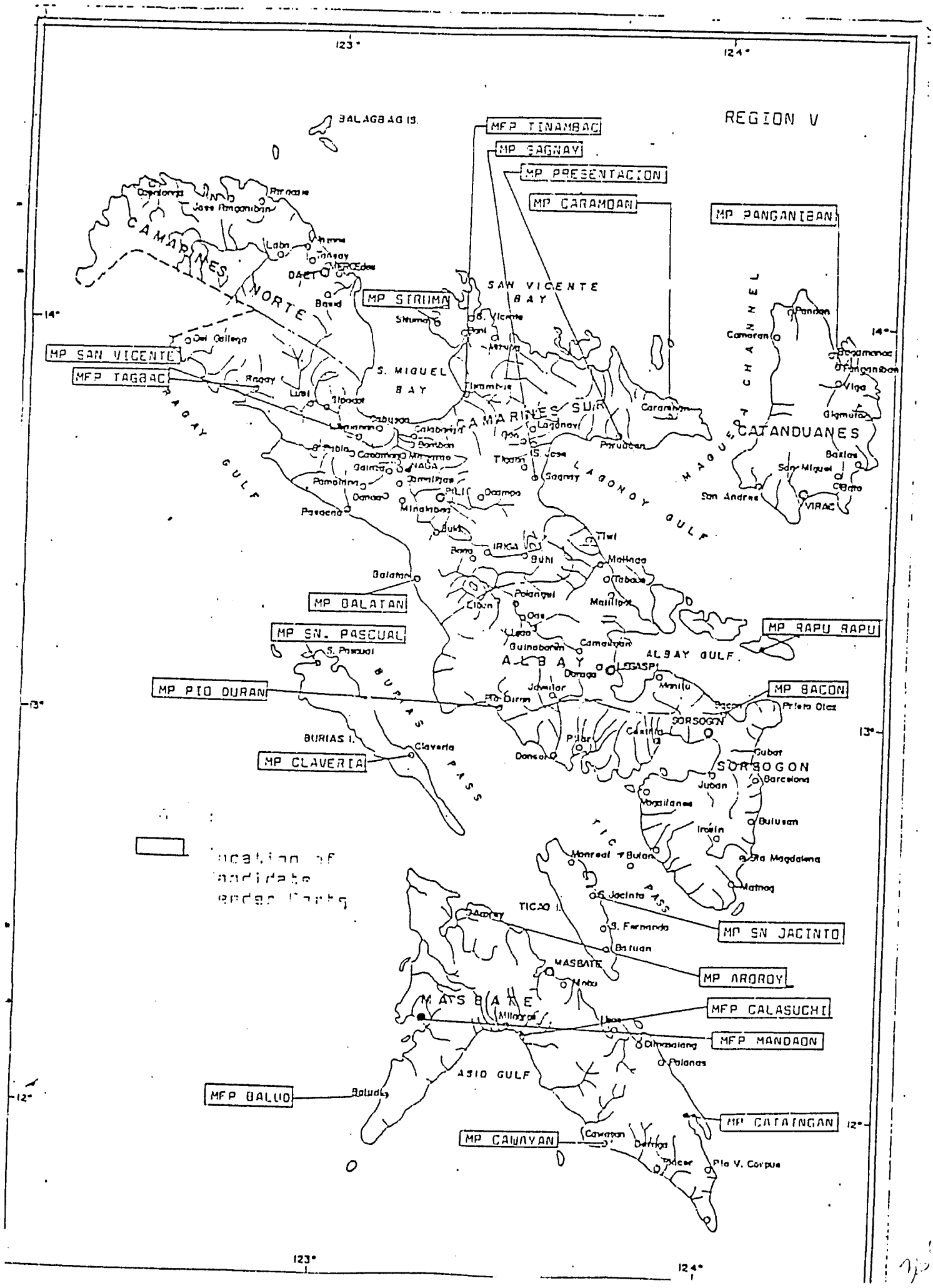
D. Equipment/Materials

This includes the proposed equipment and materials needed so as to hasten completion of the various port projects so that the ports can immediately be used. The equipment and materials proposed to be obtained under this Program will also helo in ensuring the quality of work thus the durability and long use of port facilities.

E. Contingencies

This involve an allowances of 15 percent error in estimating work requirements.

The estimated cost described above are only budgetary in nature and may be revised depending on actual requirements as indicated in the feasibility studies and detailed design of each port project.


REGION V
123°
124°
14°
13°
12°
BALAGBAG IS.
MFP TINAMBAC
MP SAGNAY
MP PRESENTACION
MP CARAMOAN
MP PANGANIBAN
MP STRIUMA
MP SAN VICENTE
MFP TAGBAC
MP BALATAN
MP SN. PASCUAL
MP PIO DURAN
MP CLAVERIA
MP RAPU RAPU
MP BACON
MP SN JACINTO
MP ARORAY
MFP CALASUCHI
MFP MANDAON
MFP BALIO
MP CATAINGAN
MP CAWAYAN
CAMARINES NORTE
CAMARINES SUR
CATANDUANES
SAN VICENTE BAY
S. MIGUEL BAY
LAGONOY GULF
MAQUEDA CHANNEL
ALBAY GULF
ALBAY
SORSOGON
BURIAS PASS
TICAO PASS
MASBATE
ASIO GULF
BURIAS I.
TICAO I.
Location of candidate areas

MUNICIPAL PORT OF BABAK

I. INTRODUCTION

The Municipal Feeder Ports Develoomen Program involves the development of municipal commercial and fishing ports throughout the country. The Government attaches high priority and importance to this program in view of its vital social and developmental function in an archipelagic country consisting of small islands while many isolated coastal or island communities have no alternative means of access to goods, services and markets.

Initial program actvities include the study of the entire feeder ports system to systematically rationalize, prioritize, evaluate and select for funding the most meritorious ports. Among the factors to be considered in determining priority development are present traffic, population served, economic benefits, future potentials, physical/engineering features, and availability of alternative means of access.

Subsequently a 10-year nationwide investment program within a 20-year masterplan for the selected feeder ports will be prepared incorporating as well the required administrative, institutional, operational and financial arrangements for the construction and management of these smaller ports.

II. PLANNING POLICY/OBJECTIVES

The long-range objective of this undertaking is to formulate a fully consistent program for the development of the municipal port network in the country, to enable the isolated islands/areas to develop at a reasonable growth rate.

Observations from surveys conducted have indicated that activities in municipal ports are directly proportional to their proximity to large urban areas and the relative richness of their resources.

In a national level, the goal of municipal ports development should be to integrate growth of the small islands and isolated areas with the main stream of development of the nation. But it must be understood that to achieve this ideal many factors are involved and among the major contributors to growth and economic development are cheap and fast transportation.

II. PLANNING FRAMEWORK

A. Physical Aspects

The Samal Island forms part of the province of Davao del Norte in Region XI. It consists of three municipalities namely Babak, Samal and Kaputian, comprising a total land area of 280 sq.kms.

The Samal Island is separated from the western shore of the Davao Gulf by the Pakiputan Strait.

The municipal port of Babak is accessible within 15-30 minutes by small motor launch from Davao City. It is located at the northern portion of the island. It is about 9 km north of Samal (Peñaplata) port. The Babak Port is situated north of the Linna Point.

B. Social Aspects

Davao del Norte had a population of 725 thousand in 1980, Samal Island represented 62 thousand of the provincial total. Babak had a population of 21 thousand , Kaputian 22 thousand while Samal had about 19 thousand.

The provincial average household income in 1975 was ₱5,766. The island's average was ₱3,429 with the municipalities having the following figures: Kaputian - ₱4,427, Samal - ₱3,949 and Babak - ₱1,911.

About 209 thousand of the provincial population were gainfully employed in 1980. Seventy-seven percent or 161 thousand were employed in the primary sector (Agriculture, fishery, forestry) about 94 percent of this sector were engaged in agricultural crop production. Only two percent were in the manufacturing division, almost 3 percent in transportation and 9 percent were in the services sector.

C. Economic Aspect

In 1980, 284 thousand hectares of the total provincial land area was planted to crops. About one third (36 percent) was planted to corn, twenty nine percent planted to coconut and twenty percent devoted to palay.

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The lands devoted to corn produced 46 thousand metric tons, the coconut lands produced 54 thousand metric tons, while the palay lands yielded 73 thousand metric tons.

With regards to livestock, cattle was recorded at 9 hundred thousand heads in 1980. Hogs also registered about 17 thousand heads.

Based on the Physical Infrastructure Planning Study (PIP) of the MPWH, the province had an additional 756.1 square kilometers of land that may be utilized for agricultural production.

In 1975, 67 percent of the establishments in the province were engaged in trading (wholesale or retail) while some 13 percent were involved in manufacturing. The municipality of Babak had 216 establishments, 71 percent of which were engaged in either wholesale or retail trading.

In 1980, 5 thousand oersons were gainfully employed in the manufacturing sector in the province of Davao. Of this total 35 percent were engaged in the manufacture of textile, wearing aoparel and leather products and 32 percent were engaged in the manufacture of wood products.

D. Transportation Aspect

Land Transportation:

As of 1975, Davao del Norte had a total road kilometerage of 2,952. About 91 percent or 2,690.48 km. were gravel surfaced. Only six percent or 177 km. were concrete. Less than 1 percent or 16 km. were asphalt covered, while 2.3 percent were earth roads.

Almost 60 percent of the roads were barangay roads (1,746 km.) and all of these were gravel type roads. About 19 percent or 551 km were classified as provincial roads.

Samal Island had a total road kilometerage of 323. About 27 percent are provincial and 32 percent barangay roads. All were either gravel surfaced or earth surfaced.

Marine Transportation:

The major link with the mainland and the rest of the country is sea transportation. Port activities in the other two ports in Samal Island (Kaputian and Samal (Peñaplata) are described below:

a. The municipal port of Kaoutian is located at the southern portion of the Samal island or 10 km. south of Samal. The port handles annual total cargo traffic of 7 hundred MT both incoming and outgoing. Cargo loaded comprised mainly copra with a volume of 4 hundred MT. Cargo unloaded totalled to 3 hundred MT mostly rice and general cargo.

Passengers reached 16 thousand annually for both incoming and outgoing.

Vessels that call at the port are mostly pump boats. Each vessels have an approximate gross tonnage of 6 GT and a length of 18 m. Those vessels with outriggers and without outriggers measure 9 m and 2 m in width, respectively. These vessels call at the port at least once a day. Cargo traffic are handled manually.

b. The municipal port of Samal (Peñaplata) is located at the middle portion of the island, about 9 km. south of Babak. Combined cargo loaded and unloaded volume reached about 3 thousand MT annually. Cargo which are shipped to Sta. Ana pier, located in Davao City, reached a volume of one thousand MT, is composed mostly of agricultural crops, empty bottles and live animals. Incoming cargo from Sta. Ana Pier, with a volume of 1.5 thousand MT, is composed chiefly of corn, bottled cargo and rice.

Number of passengers reached a combined incoming and outgoing of 200 thousand annually. Passengers are transported to adjacent barangays and Davao City and vice-versa.

Vessels that utilize the port are pumpboats, bancas, and motor launches. Each pumpboat and banca have a gross tonnage of 2 GT and 6 GT, respectively. A motor launch on the other hand, has a gross tonnage of 1 GT.

Cargo handling in the pier takes about 1 hour for each type of vessel. Arrastre and

Table 1. Comparative Table of Cargo Traffic Handling, Samal Island Ports

	KAPUTIAN	SAMAL (PENAPLATA)	BABAK
LOADED			
Empty Bottles		165	92
Live Animals		57	
Copra	376	990	564
Sub-Total	376	1,212	656
Passenger	82,500	59,400	297,000
UNLOADED			
Bottled Cargo		259	145
Plywood & Veneer		24	—
Rice	47	825	176
Corn		268	235
Sugar		47	
Animal Feeds		38	
Cement			
General Cargo	282		198
Ice		-	50
Sub-Total	329	1,485	804
Passenger	82,500	59,400	297,000
GRAND TOTAL (CARGO)	705	2,697	1,460
(PASSENGER)	165,000	138,800	594,000

stevedorrvices are utilized. A gang is composed oximately 15 persons.

Existthing facilities are comoosed of a pier anseway. The pier has a length of 29 m and:h of 7 m. The wooden deck pier is constron R.C. piles. The earthfilled causeway ength of 175 m. A storage facility is amposed of a transit shed with a floor are3 sq.m. and a warehouse with a floor areasq.m.

E. Hinterlands

The hinteserved by the port seems to be confined at nicipality of Babak. The other two ports insland serve the municipalities within which te located.

IV. LOCATION AND FUNCT

The municipalof Babak is situated in the northwestern poof Samal Island. There are presently two ng points at Babak. One is privately owned :ated at the town proper and the other, the goverowned port is located half a kilometer south private facility. The private facilities consiswooden walkway extending more or less 70 m. from te and suitable only for one way flow of passennd hand carried cargo. The government port coof a 154 m by 6 m rock causeway and a 7 m by 12 m wier with R.C. piles..

The private pawned and operated by a group or an association ofwners presently using the port. The vessels call private port since the pier at the government ps an elevation that is too high for the convenie: of vessels. Cargo traffic volume, both incom outgoing, reached 1.5 thousand MT annually. Unl cargo consists mostly of corn, rice and generab shipped to Sasa, Davao City. Cargo with a volt 7 hundred MT shipped to Davao City consist mostlyty bottles and copra.

Passengers ar transported to and from the mainland. Numbenmbined loaded and unloaded passengers reached .

Vessels are l to motor launches . Each ship has an aopproximatss tonnage of 1 GT and a length

and width of 10 m and 2 m respectively. The vessels call at the port at least 50 times a day. At present, the vessels do not call at the government port since the pier has an elevation of +2.75 m while that of the motor launch is +2.25m making cargo handling activities cumbersome.

V. PORT FACILITIES PLANNING

This chapter translates the projected traffic into port facility requirements so as to provide adequate handling facilities at the subject port. A port lay-out which incorporates computed facility requirements and typical structural designs is prepared, the latter at preliminary engineering level, to indicate the develoopment requirements of an adequate, efficient, safe, economical, durable and easy to maintain port facility at Babak.

1 Time Frame

Projected traffic will serve as a basis for determining the scale and type of facilities to be developed at the port. Under this program, the facilities to be constructed at the port of Babak, will be the requirements based on 1990 traffic.

2 Procedure for Traffic Projection

Future cargo handling is calculated on the following bases:

2.1 Loaded

i. Agricultural, Fishery and Forestry Products

Present traffic is allowed to increase following the projected growth rate estimated for a particular crop/sub-section for a region.

ii. Consumer Goods (Food, Apparel/Foot-wear, Leather and Furniture)

Present traffic is allowed to increase at the pace of the region's growth for the sector affected, except bottled cargo

(Beverage) which will be based on growth of per capita income.

iii. Intermediate Goods (Wood, Chemicals)

Present traffic is allowed to expand at the rate of the estimated growth rate of a particular sector in a region.

iv. Capital Goods (Metals, Non-Metals)

Present traffic is expected to rise at the level of the growth rate of a particular sector in a region.

v. Passenger

Present traffic is allowed to increase at the level of the region's population growth rate

2.2 Unloaded

i. Agricultural, Fishery and Forestry

These types of traffic are made to increase at the rate of the region's population growth rate.

ii. Consumer Goods

These types of traffic were made to increase the rate of the region's per capita income growth.

iii. Intermediate Goods (Wood, Chemicals)

Present traffic is allowed to expand at the rate of the estimated growth rate of a particular sector in a region.

iv. Capital Goods (Metals, Non-Metals)

Present traffic is expected to rise at the level of the growth rate of a particular sector in a region.

v. Passenger

Present traffic is allowed to increase at the level of the region's populationn growth rate

The following table indicate the various growth rates for Region XI used in calculating future traffic:

Table 2. Growth Rates Used for Projecting Port Traffic, Port of Babak

	1980-1990	1990-2000
Palay	2.8	1.6
Corn	2.9	1.7
Coconut	2.22	1.25
Population	2.77	2.47
Per Capita Income	(.94)	1.17

Source: 1985 Center for Research and Communication (CRC) Report

3 Projected Traffic

3.1 Cargo

The following table shows the Projected Cargo Traffic:

Table 3. Projected Annual Cargo (In Metric Tons) and Passenger Traffic 1990-2000

	1990	1995	2000
LOADED			
Empty Bottles	88	93	99
Copra	629	669	712
TOTAL	717	762	811
Passenger	340,477	334,655	434,565
UNLOADED			
Corn	269	303	343
Bottled Cargo	138	146	155

	1990	1995	2000
Gen. Cargo	189	200	212
Ice	48	51	54
Rice	202	219	237
TOTAL	846	919	1,001
Passenger	340,477	334,655	434,565
GRAND TOTAL (CARGO)	1,563	1,681	1,812
(PASSENGER)	680,954	769,310	869,130

3.2 Ship Calls

Future Vessel Traffic is calculated as follows:

1990 No. of Ship Calls/day

$$= \text{1985 No. of ship Calls/day Po} \times \frac{\text{1990 Total Passenger}}{\text{1985 Total Passenger}}$$

$$= 47 \text{ ship calls} \times \frac{680,954}{594,000}$$

$$= 47 \text{ ship calls} \times 1.15$$

$$= 54$$

4 Landing Facilities

i. 1990

Based on the projections of ship calls earlier presented, landing facilities proposed for the port are calculated on the basis of the following vessel operating characteristics:

Berthing Requirements:

Sailing days/year	=	330
Average no. of ship calls/day	=	54
Service time (hrs/day)	=	0.25 hrs
Ave. Ship Dimension (ASD)(m)	=	10
Port Operating Hours (POH) (hrs/day)	=	12
Berth Occupancy Rate (BOR)	=	50

Required Berth Length (RBL):

$$= \frac{\text{No. of ship calls/day} \times \text{stay time} \times \text{ASD}}{\text{POH} \times \text{BOR}}$$

$$= \frac{50 \times 0.25 \times 10}{12 \times .50} = \frac{125 \text{ m}}{6} = 20.8 \text{ m} = 20 \text{ m}$$

Required Number of Berths (RNB):

$$= \frac{\text{RBL}}{\text{ASD}} = \frac{20}{10} = 2 \text{ berths}$$

VI. RECOMMENDATION FOR PORT DEVELOPMENT

Location of the Babak port is advantageous compared to other ports in the island owing to its calm waters and short travel time between the Samal Island and Davao City. This is manifested in the high level of passenger traffic compared to the other ports. There is at present still low level of cargo traffic in Babak port due to the narrow catwalk, making cargo handling dangerous and inconvenient. It is only suitable for one way flow of passengers and hand carried cargo. In addition, the walkway may pose a threat to the safety of passengers especially during high tide since the wooden walkway is totally submerged in water.

To ammend the said situation, it is recommended that the government port be rehabilitated and improved by lowering down the crown height of the existing pier. This is for the convenience of small sized vessels and to widen the width of the apron for smooth passenger and cargo handling on the pier. Extension of the pier is no longer needed.

I. PORT FACILITIES DESIGN AND COST ESTIMATION

A. Port Facilities Design

The following describe the various physical consideration in preparing design of structures and cost estimation to be developed at the port:

1. Existing Facilities

Existing facilities at the Babak Port consist of a 6 m wide x 154.15 m long rock causeway. At the end of causeway, attached is 7 m x 10 m timber deck (pier) on 0.40 x 0.40 m R.C. piles.

The existing facilities are not utilized at present because of the high elevation of the pier and/or causeway.

There are also no existing water and power facilities at the port.

2. Physical Design Condition

2.1 Seismic Force

Seismic force in the area is 0.15 m based on Structural Code of the Philippines.

2.2 Tides

The design tidal levels of port facilities of Babak Port have been determined based on the "Tide and Current Table, Philippines 1986" published by the Bureau of Coast and Geodetic Survey, Ministry of National Defense.

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The tidal levels referred to MLLW as elevation 0.00 are as follws:

a. Mean Tidal Level (MTL) +0.75 m
b. Mean Higher High Water (MHHW) +1.545 m
c. Mean Lower Low Water +0.00 m

Reference:

2.3 Winds

The prevailing wind direction for the period October to May is from southwest; while for the period of June to October is from the northwest.

The design wind velocity is 20 meters per seconds (MPS) or 72 kilometers per hour (KPH).

Reference: Average maximum wind distribution map of the Philippines.

2.4 Wave

The prevailing wave direction is from the southwest. The significant wave height (H1/3) is 1.20 meters. The corresponding significant period (T1/3) is 3.6 seconds. Fetch is 12 km. reckon from Digos, Davao del Sur wave height is obtain given the wind velociyt and fetch length making use of the S.M.B. Method.

3. Other Design Data for Structures

3.1 Pier

a. Design Water Depth -1.50 4.00 m

b. Design Vessel

Gross Weight	= 50 tons
Length	= 10.0 m
Width	= 5.0 m
Draft	= 1.0 m
Berthing Velocity	= 0.30 mas.

c. Design Loads

Live Loads = 1.0 t/m2

4. Description of Structures

4.1 Pier

4.1.1 Water Depth

The water depth is -3.50 m.

4.1.2 Length

The existing length of the timber pier is 9.5 m. Existing timber deck and existing R.C. piles will be chipped to reach an elevation of 2.6 m.

4.1.3 Width

The width of existing and proposed pier is 7.0 m which corresponds to two (2) lanes. Both sides of the pier will be utilized for berthing resting and other cargo loading activities.

4.1.4 Crown Height

The existing crown height of the pier 3.75 m from MLLW. The crown height of the proposed extension is determined by considering Tidal Range and significant wave height, and the computed crown height is +2.6 m from MLLW.

4.2 Causeway

4.2.1 Width

The width of causeway is 6.0 m or equivalent to 2 lanes.

4.2.2 Length

Length of causeway is 154.15 m.

4.2.3 Height

Elevation of causeway will be cut-off or graded to a level of +2.6 m from MLLW.

4.3 Reclamation

4.3.1 Area

Reclamation area is proposed with a dimension of 25 m x 40 m, equivalent to 1,000 sq. m.

4.3.2 Purpose

A place for depositing of in-coming and out-going cargo. Also a site for other port facilities such as multi-purpose shed, parking area etc.

4.4 Multi-purpose Shed

4.4.1 Area

The multi-purpose shed has a dimension of 16 m x 5 m or a floor area of 80 sq. m.. It has a height of 3 m from ground floor elevation to bottom of

4.4.2 Purpose

Ensure the safety of the cargo and passengers from the destructive elements of nature during inclement weather condition. Also a temporary shelter and depostion of incoming and outgoing cargoes.

3. Preliminary Cost Estimates

The preliminary cost estimate for the inital year for the Babak Port is ₱4.36 Million. Maintenance cost is placed at zero percent of total cost for the whole 20 year period. Summary of preliminary cost estimate is presented in Table 4.

Construction schedule is proposed for 205 days. Detailed construction activities are shown in figure 3.

TABLE 4
Preliminary Cost Estimate
Babak Feeder Port

Item No.	Description	Quanity	Unit Price	Total Cost
1.0	Pier			
1.10	Stripping of timber deck	66.50 pcs.	71.00	4,721.50
1.20	Pile Cutting	16.00 pcs.	754.00	12,064.00
1.30	Caps and Haunch Preparation	24.00 pcs	9,355.00	244,520.00
1.40	Casting and Driving of Piles	60 L.M.	1,655.00	99,300.00
2.0	RC Beam & Slab "Class AA"	68 cu. m.	30,341.00	2,063,188.00
3.0	Causeway			
3.10	Chipping/grading & base course Prep	155 LM	935.00	144,925.00
3.20	Widening end of Causeway	72 cu. m.	310	22,320.00
3.30	Concreting of Curb	310 L.M.	785.00	243,350.00
3.40	Concreting Pavement	216 cu. m.	1,475.00	318,600.00
4.0	Reclamation Area			
4.10	Revetment	925 cu. m.	335.00	309,875.00
4.20	Sand Fill	1095 cu. m.	207.00	226,665.00
4.30	Gravel base Coarse	150 cu. m.	286.00	42,900.00
4.40	Concreting Curb	90 L.M.	285.00	25,650.00
4.50	Concreting pavement	200 cu. m.	965.00	193,000.00
5.0	Passenger Shed	80 sq. m	2,000.00	160,000.00
6.0	Rubber Fender and Accessories	8	33,425.00	267,400.00
	TOTAL DIRECT COST			4,358,473.50
				₱ 4.36 M

Note:

The above cost estimate was based on the following:

a. The unit of construction materials taken from the MPWH Construction Materials Cost Report for the first quarter ending March, 1986.

b. Rental of Equipment - taken from accpeted rates published by the Assoicated Construction Equipment Lease Inc. (ACEL)

c. Labor - taken from Wage Order No. 5 dated June 11, 1984

Reference: Cost Analysis and Estimating Strategies

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VIII. DEVELOPMENT EFFECTS

A. Direct Benefits

1. Benefit due to reduction in cargo handling services.

The development of the port at Babak may minimize the need for stevedoring and arrastre services. The number of laborers required to handle loading and unloading of cargo will be reduced. This will benefit largely the cargo owners who require their services for tranport of goods from ship to land transport.

Sc = Total shipcall = 15,510
L_1 = average number of laborers (w/o Port) = 10
L_2 = average number of laborers (w/ Port) = 5
M_r = man-hour rate of labor = ₱4.50

Formula

$$B = SC\ (L_1 - L_2)\ M_r$$

$$B = 15{,}510\ (5)\ 4.50$$
$$B = 349 \text{ thousand pesos}$$

2. Benefit due to reduction on vessel turn around time

The result of the construction of the pier will reduce the no. of turn around time of vessel thus allowing other vessels to seek for additional income. The shipowners will obtain an extra of 2 vessels to try other sources of revenue.

Computation:

STI = staytime at Davao Port = 30 min
TI = Travel time from Davao to Babak and vice versa = 15 min.
WI = Staytime at Babak port (w/o Project) = 30 min
W2 = Staytime at Babak Port (w/ Project) = 15 min.
J_c = % probability of job opportunity = 0.30
SO = no. of sailing days/year = 330
BI = income per ship = ₱800
POH = port operating hrs = 12 hrs

Total turn around time/ship:

W/o Project (B1) = STI + TI + WI = 30 + 15 + 30 = 75 min
W/ Project (B2) = STI + TI + W2 = 30 + 15 + 15 = 60 min.

Total no. of turn around time (Tt) = $\frac{(POH \times 60\ min)}{B2} - \frac{(POH \times 60\ min)}{B1}$

$$= \frac{(12 \times 60)}{60} - \frac{(12 \times 60)}{75} = 2$$

Benefit = Tt x 30 x Bl x JC
= 2 x 330 x 800 x .30
= 158 thousand pesos

B. Indirect Benefits

The improved Babak port will ensure the safety and convenience for both cargo handling and passenger traffic. Flow of passengers and cargo will be easy and smooth. The continuous access to the port at any time of the year can therefore assure the reliability of access to the goods, services and facilities available at Davao City for the local inhabitants. Since the wooden walkway at the private port may not fully serve the increasing influence of cargo and passenger, other boat owners and potential vessels may call at the newly constructed port.

C. Cost Benefit Analysis

Economic indicators as derived from the port's Cash Flow statement for the whole 20 year period has revealed a net prevent value of 27.65 million at a discount rate of 10 percent and IRR of 13 percent and benefit cost ratio of1.31

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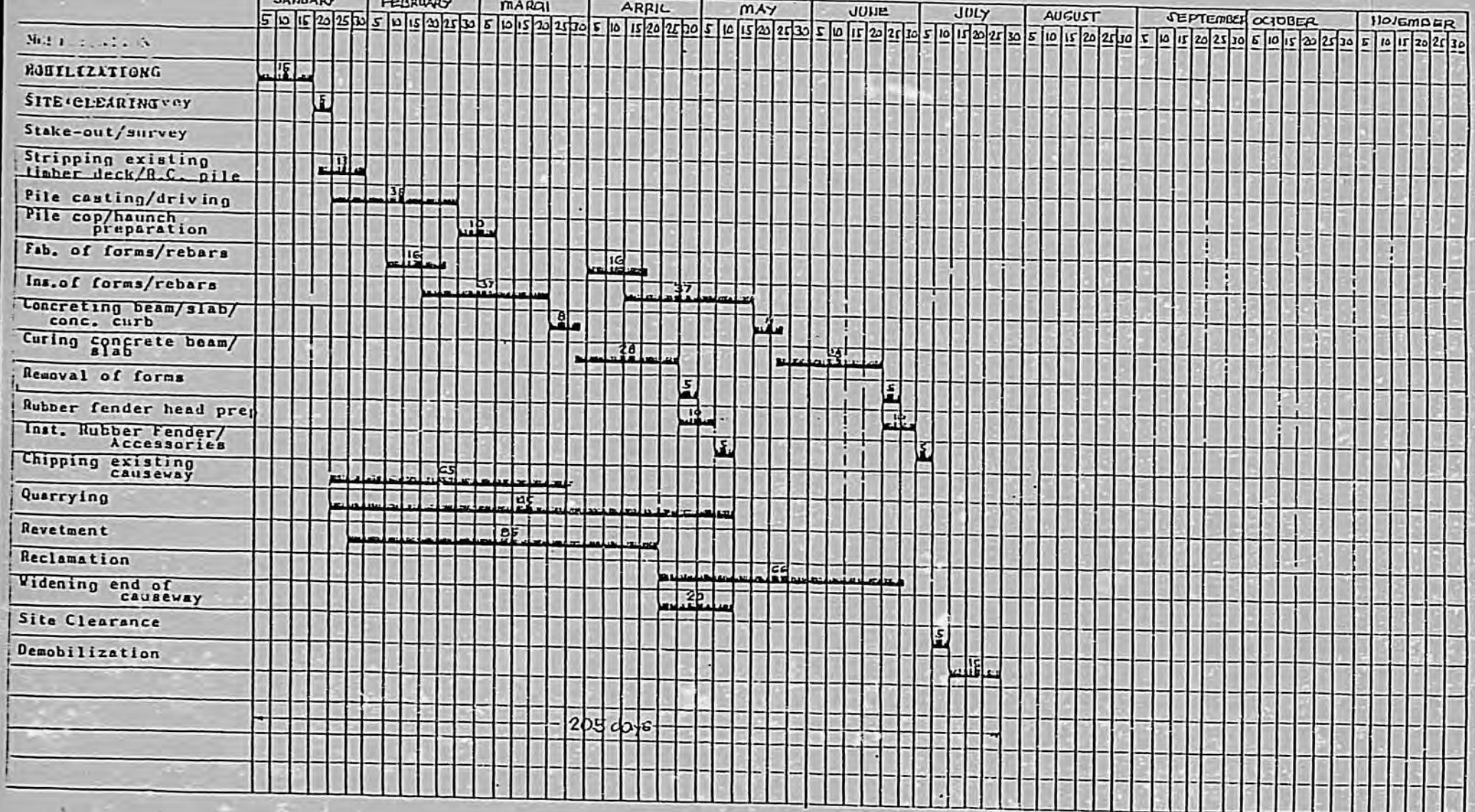
Fig 3

PRELIMINARY WORK SCHEDULE
BAR CHART

BABAK FEEDER PORT



E

Extracts from Financial, Organizational and Technical Assessment of the National Electrification Administration & Rural Electric Cooperatives

I. BACKGROUND

A. Historical Perspective

Electricity in the rural Philippines is distributed through a system of 117 Rural Electric Cooperatives (RECs) established and run under the auspices of the National Electrification Administration (NEA). NEA's mandate has been to plan, supervise and bankroll REC development since 1969. The cooperatives, which account for 12% of the electricity sold in the country, had by 1985 energized 45.6% of households in the coverage areas. In doing so the cooperatives have enabled the growth of small and medium scale industries and agro-industries by providing power for irrigation pumps, welding shops, ice plants and other enterprises.

The rural electric system has grown rapidly since its organization in 1969. AID has invested $85 million in the program since undertaking the first feasibility study in 1964. Other donors, including the World Bank, the ADB, Germany, France, and Japan, followed its lead with $362 million in additional assistance. The national policy objective of total electrification, first articulated in 1969, remains a cornerstone of the new GOP's rural development strategy. Following the electrification of one million households in its first decade, from 1969 to 1979, the NEA embarked on a program of unprecedented systems expansion and electrified its two millionth rural household in 1982. This rapid drive toward total area coverage severely tested NEA's managerial capacity but was not the only factor in its subsequent decline. The strain of rapid expansions of service areas without adequate institution building within the cooperatives and NEA, coupled with increasing world energy prices, gave rise to financial and operational problems in the rural electrification sector. By February 1986 inefficiencies and politicization of management had left NEA and the cooperatives in a state of disarray and insolvency.

If left to deteriorate, financial, managerial and technical problems threaten to destroy significant strides already made in rural electrification and the potential it has created for rural development. The Aquino government has responded by appointing an accountant/businessman from the private sector as NEA administrator and by committing itself to reform and rehabilitation as preconditions for future systems expansion.

B. Infrastructure Problems

Infrastructure problems confronting the Philippines' rural electrification system today are rooted primarily in institutional weaknesses. The originally sound power distribution systems built with U.S. and other donors' assistance have deteriorated as a result of mismanagement, poor financing and lack of maintenance. At present, only a small minority of RECs generate sufficient revenue to pay for power purchased from the National Power Corporation (NPC) and also meet amortization of debts to the NEA. Few can finance routine maintenance, let alone systems expansion. NEA, itself financially unviable, is of little help either financially or in terms of technical and managerial guidance. The result is undependable and expensive power in the rural areas.

If action is not taken to correct "soft" infrastructure (management) problems, the "hard" infrastructure (distribution networks) is likely to deteriorate at an increasing rate. The substantial investments made in the sytem will generate decreasing economic returns, broadly defined. On the other hand, relatively small investments in effective management systems and systems rehabilitation can maximize returns on REC investments and boost rural commercial activities and productivity. Specific problem areas in the institutional structure of the rural electrification system include:

1. RECs that are too small in scale to be economic. Political pressure to create patronage positions on REC Boards and staffs led to the subdivision of RECs into micro-units unable to achieve economies of scale. 117 cooperatives is far in excess of the number required to serve 2.7 million consumers in the covered area. Increased vulnerability to graft and politicization characterize the fragmented cooperatives.

2. Poor NEA management. The gradual inclusion on NEA's agenda of activities unrelated to electrification, such as housing and water systems, has left it an overextended institution unable to focus on the basic business of electrification. Staff are poorly trained, inefficiently deployed and lack expertise in such areas as rate-making and financial management necessary to support the cooperatives and run NEA itself. A management information systems to monitor the RECs and flag problems is not in place. There is no physical inventory assessment or systematic collection and analysis of financial and statistical data. REC financial development has been accorded much lower priority than systems expansion.

3. The financial condition of many RECs is indeterminate. Twenty out of twenty sample RECs in the recent Price Waterhouse study (including those chosen by NEA as the best in the country) were unable to reconcile their loan accounts with NEA. NEA balances are higher than those carried in REC books. As a result, asset and liability accounts are materially understated, provision for depreciation is inadequate due to the understated property in the service accounts, and accurate financial planning is impossible.

4. REC organizational structure, financial controls and management information systems are extremely weak. RECs are overstaffed with poorly trained, poorly deployed employees and, in most cases, ineffective managers. Financial controls and management information systems are deficient. As a result, graft and theft of power are easy to accomplish, difficult to detect and rarely controlled. Poor organization combined with the absence of management will has resulted in unacceptably high systems losses and unsupportably low collection rates. Mismanagement has made potentially viable RECs unable to exist without subsidies.

5. The rates at which RECs buy and sell power are not analytically based and in fact seriously impinge on the RECs' potential for showing positive operating margins. At the national level, the National Power Corporation (NPC) sells power to industrial customers at a descending rate to encourage expansion and it sells to utilities, including RECs, at an ascending rate to encourage conservation (which already conflicts with NEA's mandate for systems expansion). An important factor in a REC's viability is its ability to attract industrial consumers, and to do so its rates must be competitive with the NPC's, i.e., descending as consumption grows. Therefore, at some point the rate structures cross and the REC starts actually losing money on what should be a major income earner. At the cooperative level, consumer rates are based on a very loosely defined combination of historical average and future projections without any allowance for depreciation. This has proven inadequate to consistently cover REC expenses. Moreover, rates are subject to political manipulation.

6. Technical systems deterioration. Lack of funding has caused portions of the electric power distribution systems to fall into disrepair. Tools and equipment are in short supply at most cooperatives. NEA is unable to finance replacement of fully amortized and deteriorating equipment. Repair facilities are either unavailable or unaffordable.

II. PROPOSED ASSISTANCE

The proposed rural electrification subproject will address both institutional and physical infrastructure weaknesses in the electrification system. The first subproject element is a comprehensive technical assistance package designed to attack specific problems identified in NEA and the RECs during a recent detailed financial/management/technical study. The package consists of a number of mutually reinforcing components which, taken together, will enable NEA to attract, absorb, disburse and maximize the benefits of capital investments in the near term. The second subproject element is commodities procurement, which will begin once the technical assistance is under way and several conditions have been met. Disbursement for commodities need not be delayed until the entire management rationalization program has been implemented. However, the technical assistance components essential to effective funds management and commodities procurement will be implemented relatively early in the life of the project. In the interest of maximizing funds available for

system rehabilitation, both as an end in itself and as an incentive for NEA and the GOP to act decisively on politically sensitive issues in sector restructuring, funds allocated to technical assistance will be held to an absolute minimum. Further reduction of the institution-building component of the project would seriously jeopardize project results and the effectiveness of past and present capital investment.

The scope of assistance needed to address the two problem areas identified above is summarized as follows:

Duration:	Three years concentrated TA effort, with an additional two-years optional, and distribution rehabilitation commodities purchased for participating RECs.
Personpower:	65 person-years, 60% local. 5 long-term expatriate advisors, including the project director. (2 expatriate advisors during the optional extension)
Implementing Agency:	NEA, with oversight from NEDA

Specific project components are:

A. Technical Assistance

1. Consolidation of RECs into larger units. This will involve overlapping study and implementation phases. A detailed technical, financial and administrative/political analysis will be accomplished within 3 months to determine optimum consolidation patterns. Implementation will begin as soon as agreement with NEA, the RECs and other participating organizations is reached. In this way, consolidation need not be delayed in cooperatives which are less sensitive politically. Similarly, as consolidation is accomplished in each cluster, subsequent phases of reorganization, computerization and commodities transfer will begin.

Timing: Completed by end of year 1.

Person-power:	90 person-months 3 full-time expatriates joined by 3 Filipino consultants to participate in implementation, encompassing engineering, financial and management expertise.
Implementing Agency:	NEA and affected coops.

2. Restructuring of NEA. Includes::

a. Basic reorganization
b. Establishing financial controls
c. Installing management information systems
d. Creating systems for statistical collection and analysis of statistics
e. Training programs - training of trainers.

Timing: Macro reorganization within 3 months; remainder within first nine months.

Personpower: (a) and (b): 3-4 person-months expatriate financial/management expertise. Many of these problems have already been addressed in the Price Waterhouse study.
(c) and (d): 24-30 person-months, expatriate and local.
(e): 12 expatriate person-months. Note this is a self-sustaining program which will focus on training trainers and establishment of a continuing program.

3. Reconciliation of NEA-REC loan accounts. This is a narrowly-focused but absolutely essential and time-consuming item.
Timing: Completed by end of year 1.
Person-power: 96 local financial analyst person-months.

4. REC Restructuring: Similar to NEA restructuring. A model REC plan will be developed by the same team that handled item A.1 consolidation. The experience gained during that phase will be essential to the creation of a viable model. As coop clusters progress from consolidation to restructuring at different rates, the model will be automatically tested by the first cluster to reach the restructuring phase, and will be modified as necessary. The same teams that handle NEA training and computerization will be redeployed to accomplish those tasks at the RECs. Specific recommendations detailed in the Price Waterhouse study will be incorporated. For example, a mechanism for the proposed member aid referendum will be developed. Components include:
a. Macro reorganization, including financial controls,
b. Management information systems and coordination with NEA EDP, and
c. Training - two programs. First is in-country, and consists of a) national seminars sponsored by consultant trainers and NEA counterparts; and b) specialized training conducted by roving trainers at individual RECs. Second is training in the US at a sister utilities for all general managers remaining after consolidation. Training for staff will be very job-specific. That for managers will focus on modern management techniques, awareness, etc.

Timing: Macro reorganization and financial controls will be implemented during the second and third years of the project; training and computerization during the second year.

Person power: (a) 144 person-months, same team as A.1 of 3 expatriates and 3 Filipinos.
(b) 24-30 person-months, same team as NEA MIS.
(c) 12 person-months.

5. Rate Restructuring. For the rates at which RECs buy and sell power. It will be essential to procure the services of a top rate-making expert, both to devise an optimum rate structure and to help sell it to those political interests concerned. Once an optimum formula is devised for the coop selling rate, it can be applied extensively, with modifications. The rate study would also include policy analysis and recommendations on energy sector issues impacting on NEA and the RECs. The Project Director will be closely involved.

Timing: Primarily accomplished during year 2; into year 3 for some coops that are slow to consolidate.

Personpower : 24 person-months; could be some combination of expatriate master rate-maker and apprentices.

6. Design and implementation of a commodity procurement, management and technical improvement plan. Includes:

a. Operations and maintenance (O&M) and systems studies of each cooperative to estimate required quantities and set priorities for REC equipment needs.

b. Design and establishment of a revolving fund mechanism at NEA to administer and disburse commodity funds. This will be a separate, auditable loan system which can rapidly absorb large amounts and disburse them for future systems needs. The commodities component of this sub-project will be disbursed using this mechanism.

c. Design and implementation of a program to encourage private sector response to unsatisfied demand for specialized equipment repairs and maintenance.

Timing: a) Accomplished within the first 18 months. The systems study will follow the consolidation plan design.
b) Accomplished during months 6-12, following successful initiation of items (1) - (4). Disbursement will be triggered only on completion of a number of specific pre-conditions, such as reorganization of the coop concerned.
c) Accomplished during the first 18 months.

Personpower: a) 180 person-months, all local engineers
b) 24 person-months, local financial analysts.
c) No personpower allotment; will be accomplished by an ad hoc working group assembled from among the consultants and coordinated by the Technical Manager.

B. Commodity Procurement

Commodities. Depending on budget allocation, coop participation, and results of the above assessments, variable amounts of the following distribution rehabilitation equipment will be procured:

Voltage regulators
Capacitors
Sectionalizing devices
Lightning arrestors
KwH meters
Distribution transformers
Voltmeters - indicating and recording
Ampmeters - indicating and recording
Vehicles
Safety equipment
Tools and spares
Computer systems

Timing: Commodity procurement is expected to begin after 12 months.
Personpower: No additional human resources will be required as the NEA and coop capacity to survey, manage and utilize supplies and equipment will have been developed by the technical assistance. (Procurement services from the U.S. may, however, be secured by AID for direct AID purchases of such equipment.) If commodities procurement extends beyond the 3 base project years, the two-year monitoring option, may be required. This would involve the same 2 expatriate advisors described below as well as local technical staff.

C. Project Management

The rural electricification improvement subproject will be managed by 2 full-time, 3-year contract expatriates, both experienced in the managerial and engineering problems of rural electrification. One will be the Project Director, the other the Technical Manager. Both positions, particularly the latter, will involve substantial fieldwork. The subproject ha. been planned in such a way that activities requiring like skills flow together allowing staff retention. This will enhance project continuity, institutional memory and cut down on expensive shorter term experts. Other advisory assistance will be obtained as described elsewhere herein.

Project completion time is estimated to be 3 years. Success depends in large part on swift, decisive action. However, the activity does provide for an optional two-year extension period. The purpose is to keep advisors on site to guide the immediate post-implementation phase, and to assist in the final stages of rehabilitation in those areas where consolidation might have been delayed by political, security or other expected obstacles.

III. SUBPROJECT BUDGET

The optimal funding range for this three-year subproject is $25M to $40M. Based on estimates of coop needs, up to $50M could be applied for system rehabilitation. The minimum combination of TA and commodities for a successful project is estimated to be about $20M. The technical assistance budget detailed below is essentially fixed. In addition to the technical assistance, at least $14M in commodities is required to upgrade significant defects in the power distribution systems. The outputs of the technical assistance are necessary but not sufficient to achieve the stated project goals.

Table I

THREE YEAR BUDGET

A. Technical Assistance

Salaries

	Position	Daily Rate	No. of Days	Amount
U.S.	Project Director	$ 270	780	$ 210,600
	Technical Manager	270	780	210,600
	Team Manager	240	1,230	295,200
	Technical Analysts	175	3,500	612,500
		Total	6,290	$1,328,900
R.P.	Technical Manager	$ 64	260	16,640
	Technical Analysts/Engrs	52	5,630	292,760
	Engineers	40	4,160	166,400
			10,050	475,800

Overhead (Total) 2,707,050

Direct Costs

Airfares - Contractor Staff, 70 at $2,000	$ 140,000
- REC/NEA Staff to U.S., 40 at $2000	80,000
Housing/Education/Post Diff./Other Support	620,000
Per Diem - Contractor Staff, 2800 days at $80	224,000
- REC/NEA Staff in U.S. 1200 days at $100	120,000
Ground transport, Visas, Report Prep Computer Rental, Communications & all other	300,000
	1,484,000
Total	$5,995,750

B. Commodities

For items identified in the scope of assistance; to be specified following O&M and systems studies

Illustrative Range: $4,004,250 to $44,004,250

TOTAL $10,000,000 to $50,000,000

Table II

ADDITIONAL TWO-YEAR MONITORING AND COMMODITIES PROCUREMENT OPTION

A. Technical Assistance

Salaries

	Position	Daily Rate	No. of Days	Amount
U.S.	Project Director	$ 270	520	$ 140,400
	Technical Manager	270	520	140,400
	Technical Analysts	175	160	28,000
	Total		1,240	$ 308,800
R.P.	Technical Manager	$ 64	260	16,640
	Engineers	40	1,040	41,600
			1,300	$ 58,240
	Overhead (Total)			550,550

Direct Costs

Airfares - Contractor Staff 25 at $2,000	$ 50,000
Housing/Education/Post Diff/Other Support	180,000
Per Diem - Contractor Staff 200 at $80	16,000
Ground transport, Visas, Report Prep., Computer rental, communications & all other	75,000
	321,000
Technical Assistance Total	$ 1,239,600
B. Commodities	13,716,400
TOTAL	$15,000,000

INSTITUTIONAL SETTING FOR THE MAINTENANCE OF ELECTRIC POWER

5.1 ORGANIZATION OF THE POWER SECTOR

The major supply of electric power in the Philippines is (96%) from National Power Corporation. It has generation and transmission facilities on the islands of Luzon, the Visayas and Mindanao. The small remaining amount is about equally divided between the electric cooperatives with self generating capability and small private or municipal franchise holders. Of the 184 utilities distributing electric power, 118 are cooperatives organized by the National Electrification Administration. The rest are privately owned, municipal or other government agency operations ranging in size from Manila Electric Co. (MERALCO) with over million customers to Mercy de Vara with 1210. The cooperatives range from Central Negros with 51,720 households connected to Cagayan de Sulu with only 278.

The National Power Corporation is a government-owned entity. The National Electrification Administration is also an agency of the federal government. Its primary function is to implement the ultimate nationwide availability of electrical service through the formation of electric cooperatives. The cooperatives in areas as yet isolated from the NPC supply, generate their own power. Even when connected to the NPC system, they are also developing supplemental renewable energy sources, primarily hydro electric plants of 10 MW capacity or less and dendro-thermal plants.

The National Electrification Commission, whose members are the NEA Board of Administrators with the Minister of Human Settlements as Chairman (who is also Chairman of the NEA) is empowered to grant, alter or amend electric franchises. It also regulates the rates of the electric cooperatives. The rates of other franchises are controlled by the Board of Energy, which is under the supervision of the Office of the President.

The National Power Corporation, in effect, establishes its own rates although its rates are subject to review by the Cabinet and the President.

The National Power Corporation is under the jurisdiction of the Ministry of Energy; the National Electrification, under that of the Ministry of Human Settlements.

5.2 POWER GENERATION

Sources of Power

As of 1981, the latest date for which summaries on a nationwise basis were obtained, the installed generating capacity was:

NPC	4014.99 MW	or	86.1%
NEA	183.20 MW		3.9%
Others	468.00 MW		10.0%
Total	4666.19 MW		100.0%

In that year, the listed generating capacity generated a total of 19,824 gigawatt hours. Broken down by energy source, this was:

Oil fired thermal	8,893 GWh	or	44.9%
Coal fired thermal	247 GWh		1.2%
Diesel	4,165 GWh		21.0%
Hydro	3,748 GWh		18.9%
Geothermal	2,771 GWh		14.0%

1983 figures, neither for capacity nor for GWh generation were not available for NEA or "others" (small power utilities and self-generatin industries). However data was available for NPC, the major power supplies. They reported an increase in capacity to 5,001 MW with generation of 18,682 GWh.

Oil based (diesel and steam)	11,514 GWh	or	61.6%
Coal/oil fired	111 GWh		0.6%
Hydro	2,964 GWh		15.9%
Geothermal	4,093 GWh		21.9%

Their long term trend in reduction of the share of energy from oil

based sources from 74.6% in 1979 to 57.5% in 1982 suffered a slight reversal in 1983 due to the prolonged draught which reduced hydro generation from its 1982 share of 21.5%. Planned additions of hydro, geothermal, coal fired and nuclear capacity in the near future will further reduce the percentage of oil based power to 50% in 1984 if there is adequate rainfall.

Responsibility of NPC and Others

NPC is a stock corporation fully owned by the government and run by a Board of Directors who are all appointed by the President. The Chairman of the Board is the Minister of Energy. Prior to 1972, its role was limited to the construction and operation of hydro-electric plants, including multi-purpose projects in which power generation is the primary use. Since that time its responsibility has been extended to include all large scale power generation projects and the construction and operation of transmission lines and substations in Luzon, Mindanao and the Visayas. At the end of 1983, NPC operated 10,298 km of transmission lines in these three grids to which 10,842 MVA of substation capacity was connected.

NEA and its electric cooperatives generate power in those areas not served by the NPC grids. They are also engaged in the development of mini hydro projects and of dendro thermal (wood fired) power plants which, depending on their location, may or may not tie into the NPC grids. NEA reported in 1983 that it had added 9 MW of mini hydro capacity and has 12.7 MW of dendro-thermal under construction for 1984 operation.

Philippine National Oil Corporation (PNOC), another fully owned government corporation attached to the Ministry of Energy is also involved in power supply through its interest in geothermal energy. Geothermal field development is also being done by Union Oil and Caltex.

Sources of NPC Income and Areas of Expense

NPC's self generated income comes from the sale of its generated energy to privately owned utilities, such as MERALCO, large industrial customers, electric cooperatives and municipal systems.

For recent years, the following table is indicative of the money flow. The figures have been rounded out to millions (M) of pesos and extracted from NPC annual reports.

	1983	1982	1976
Operating Revenue	₱9,628.8M	₱6,665.3M	₱ 342.0
Operating Expense	8,142.8	6,058.8	192.4
Operating Income	1,486.1	606.4	149.6
Other Income	1,634.4	755.2	18.5
Interest and Other Charges	2,501.3	1,199.7	31.3
Net Income	619.2	161.9	136.8

The values for 1976 were included to illustrate the growth of the NPC system in recent years. Obviously, this growth has not been financed solely from net income, even though actual cash position is better than indicated by net income since operating expense includes depreciation, a non-cash item. Net internal cash generation in 1983 was actually ₱721 M. Extensive borrowing has been necessary to finance system expansion. As of the end of 1983, long term debt totalled ₱36,716.4. In 1976, this was ₱4,437.2. Of the ₱8,010 M in capital outlay in 1983, 59.3% were financed from foreign borrowing. A significant portion of the increase in the peso value of long term debt from ₱19,796.8 in 1982 to its current value was due to devaluation of the peso from ₱8.54/US $, the average rate in 1982, to 11.11 in 1983. The sources of loans have been worldwide. The latest list available of long term debts includes US$, French Francs, Japanese Yen, Italian Lira, Swiss Francs, Deutchmarks, Australian Dollars and other currencies. Of its loans for infrastructure development in the Philippines Asian Development Bank has granted a larger portion (31%) to the power sector than any other. Because of NPC's major expenditures for generating equipment, off shore

suppliers of that equipment arrange for a significant portion of NPC's necessary borrowings. The Philippine government has in the past provided sizeable government equity contributions for NPC's capital outlays (over one third in 1982) but the deteriorating financial situation in 1983 caused them to reduce their contribution materially. It amounted to only 14.3% of capital outlays in 1983.

Flow of Funds

While the NPC's total capital outlays for each year are available from the annual reports, those reports do not provide sufficient data to allocate the funds accurately between the three principal items, generating plants, transmission lines and substations. However, using a series of physical quantities and monetary values, the following tabulation shows what was achieved by the capital outlay.

		1983	1982	1981	1980	1979
Capital Outlay	(PM)	P8,005	P6,304	P6,623	P4,959	P5,859
Capacity Added	(MW)	677	421	87	300	1,328
Lines Added	(KM)	1,763	629	1,372	737	1,271
Substations Added	(MVA)	1,832	529	679	1,120	1,606

Since generating plants represent cumulative capital outlays over a period of years, but the capacity is only added to the system when the plan is operational, large capital outlays in one year may not be accompanied by a proportionate capacity increase. This is also true for transmission lines and substations, although the time period is shorter. A balance sheet entry for Construction Work in Progress gives a better picture of what is underway on the system, but, unfortunately, NPC only adopted the use of that line item in 1983. It was P35,110 M in 1983. This is more than four times the capital outlay in the same year, indicative of the lead-time required before investment in this sector yields a return.

Adequate funding to continue NPC's expansion plans as foreseen in the Ministry of Energy's 1982-1987 Philippine Energy Development Plan

will be extremely difficult to secure. The financial situation in 1983 caused foreign loan commitments of $91 M to be cancelled, the undrawn balances on three loans totalling $49 M to be cancelled and drawing against unutilized balances of nine other loans totalling $49 to be suspended. Additionally, government equity contributions were cut in half because of financial restraints that year.

However, NPC has improved its rate structure considerably by introducing a Foreign Exchange Rate Adjustment, a Steam Cost Adjustment and a Fuel Cost Adjustment besides increasing its base rate 10% om 1983 These moves enabled it to earn an 8.2% rate of return on its rate base in 1983, finally passing the 8% minimum received by its covenant with World Bank. This improved the net internal cash generated for capital outlay by P200 M. If sales had not been restrained by a drought, a further P420 M could have been generated.

Maintenance Management in the N.P.C.

N.P.C. has a formal maintenance schedule for their generating plants. It is prepared yearly with outages for plant overhaul arranged to permit the retention of the desired reserve capacity in addition to meeting forecast loads. This is standard utility practice. As with all utilities, the schedule can not be cast in concrete. Forced outages of other generating equipment may make it impossible to remove a unit from service without jeopardizing reserve margins or materials and parts for use during the overhaul would fail to arrive as scheduled. However, recent improvements in plant availability have permitted closer adherence to the schedule.

There is evidence to support the application of good maintenance practices in the NPC generating plants. Availability of the thermal generating stations increased from 84% in 1982 to 96% in 1984 (first nine months).

Although here the terms are often used interchangeably, the standard definition of "brownout" is the periodic and sequential disconnect-

cause line flashovers and, occasionally a pole fire. Chemical brush control on the rights of way has only been used in limited areas. This is due both to the cost of the herbicides and environmental constraints. Getting permission to trim or cut trees adjacent to the line which threaten service continuity is a continuing problem. NPC finds that people will only let them cut trees if they pay for them.

The funding difficulties of 1983 have prevented NPC from proceeding as rapidly as they planned with reinforcing their transmission system, both to provide alternative routings in case of loss of a line segment and to provide increased capacity. At present, the loss of one line frequently causes the loss of other lines from the subsequent overloading, a cascading effect resulting in a blackout. Recent transmission system additions, however, have improved the capability for North-South power flow with consequent increased flexibility of operation. Metro Manila represents 65% of the Luzon Grid load so all power flows in that direction.

They are now trying to develop a load shedding scheme based on transmission loading to supplement the existing one based on under frequency.

The interface with the cooperatives on substation maintenance is not well-defined. Some 69/133.8 kV substations are owned by the cooperatives, others still by NPC although NPC would like to have them transferred to the cooperatives. However, they do not wish to make the transfer until they have received payment. It is standard practice to meter at 69 kV with that eventuality in mind.

NPC does all substation relay testing and, upon request, will also do transformer testing in the cooperative-owned substations.

At present NPC has to operate the oil fired former MERALCO plants on base load. If the staff tries to operate them as peak load plants, their reliability and availability fall off severly. NPC is currently trying to arrange funding with the IBRD and ADB to allow it, to reha-

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bilitate these old plants and, in the process, make them suitable for peaking operation. This will provide increased flexibility of operation and reduce oil consumption.

The current economic situation has actually caused the NPC system to show a negative load growth of 10% from 1983 to 1984. They expect growth to resume next year and are confident that with present plant additions and the continued reduction of the derating on some existing plants through their ongoing maintenance and rehabilitation programs they will be able to supply the increased load reliably.

NPC does maintain complete outage records, but not in any centralized location. A complete and ongoing analysis of these records is not performed.

Performance of contractors on transmission line construction has generally been satisfactory since NPC makes a rigorous inspection before accepting the completed work. There have been problem, however, with subsequent failures of compression splices on the conductors. This, unfortunately, cannot be detected by visual inspection once the splicing sleeve has been compressed.

NPC has its own system wide communications system. They utilize microwave, power line carrier and VHF radio for voice communication, relaying, system control and data acquisition (SCADA), and telex. They try to utilize telex for all administrative communications to keep the voice channels from overloading.

5.3 POWER DISTRIBUTION

Role of NEA and the Individual Cooperatives

We have limited our review of the power distribution system to the electric cooperatives established under the aegis of the National Electrification Administration (NEA), a public corporation established by Presidential Decree No. 269. Although each cooperative is an independently chartered corporation and NEA fosters independence of the

of the cooperatives, as the source of funds for the cooperatives' construction programs NEA has de facto control over their activities. It periodically audits the job performance of cooperative staffs and Boards of Directors in addition to financial audits. Where necessary, it recommends and monitors corrective actions and, in extreme cases, is empowered to remove and replace Boards of Directors and/or staff members.

NEA organizes the initial formation of a cooperative, utilizing for that purpose teams of representative local residents who are given extensive training by NEA before setting about promoting and publicizing electrification for their area. This is followed by the organization of District Electrification Committees in each municipality within the service area of the proposed cooperative. The chairmen of these district committees serve as interim members of the cooperative board of directors pending formal incorporation of the new cooperative.

In addition to indoctrination and training of the personnel who will establish the new cooperative, NEA provides extensive training in all phases of management and operation for the cooperative staff. It also provides engineering and operating standards, centralized purchasing and specifications for and procurement of plant construction services in the initial phases of cooperative existence. As the cooperative matures, it will continue to provide managerial and technical support upon the request of the cooperative as special needs arise.

Once established, it becomes the responsibility of the cooperative itself, not that of NEA, to serve its members/customers. All operating functions from operating and maintaining the substation through which it receives its power from NPC (or its own generating plant if has one), constructing and maintaining the distribution system through to the meter on the customer pressure must be performed by its own staff. It must also perform all the commercial functions from meter reading through billing and collection. Its management must ensure that the

staff is adequately trained and numerically sufficient to perform those essential functions and provided with the required support services and equipment to do so. In addition the management, as in any corporation must follow sound fiscal policies so that it may pay for the power it receives, meet its payroll and its amortization payments on its loans from NEA. This must all be attended to while continuing to expand its system with the ultimate goal of making electric service available to all households in its franchise area.

Sources of NEA & Cooperative Funds; Areas of Expenditure

Funding for the NEA has been by the Philippine government and loans and grants from foreign agencies. The NEA when organized was capitalized by a Philippine government appropriation of ₱5,000 M (million). By the end of 1983, ₱2,283 M had been released. This amount included minor funds from other ministries for special projects. Foreign agency funds, including Japanese reparation payments, totalling $442 M had been committed to NEA by that time, of which letters of credit for $378 M had been opened.

Historically, USAID has been the major source of off shore funding to the NEA with a total (including pre-1971 loans of almost $3.5M) of about $89.5 M. Almost matching this is the recent ADB loan of $88 M. World Bank has provided $60 M and the Japanese, including reparations payments, $53 M. France, the United Kingdom, the Peoples Republic of China, West Germany and OPEC have been the other foreign lenders.

The cooperatives, in turn, have been dependent upon NEA loans for capital. For example, the six cooperatives visited had been funded by NEA as follows, through 1983.

	TOTAL AMOUNT OF LOAN	RELEASED	% OF POTENTIAL CONNECTIONS ACTUALLY SERVED
Pampanga II	₱ 46.5 M	₱ 29.6 M	91
Tarlac II	33.6	11.5	49
Iloilo I	36.7	35.2	40
Central Negros	156.0	117.0	54
Lanao del Norte	29.5	29.4	24
Maguindanao	35.5	32.7	10

The cooperatives can also, in theory, generate additional funds for capital investments from retained earnings. For many, extension of service to the remaining potential customers will require additional loans from NEA, as for example Iloilo I, Lanao del Norte and Maguindanao listed above.

For many cooperatives, it will become increasingly expensive to extend their lines to reach new customers. In a recent address, the Administrator of the NEA quoted the average cost of connection of a new customer as being ₱1,600. This is, in fact, an average cost, marginal costs are much higher. The more highly developed cooperatives have already extended service to the more populous part of their territories and extension of their lines to increasingly more thinly populated zones will be at a much higher unit cost for installation and, potentially higher costs for maintenance from increased travel time for crews. It would appear that achieving even a close approximation of the ultimate goal of making electric service available to 100% of the population can only be achieved with heavy government subsidization of the cooperatives.

The actual operating revenue picture for the six cooperatives visited is listed in Table 5-1. This data is from their final financial and statistical reports to NEA for 1983.

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Table 5-1
FINANCIAL AND PERFORMANCE DATA
(All Values in 000's of Pesos)

FINANCIAL HIGHLIGHTS	PAMPANGA II	TARLAC II	ILOILO I	CENTRAL NEGROS	LANAO DEL NORTE	MAGUINDANAO	
Operating Revenue	44,306	9,612	22,110	133,779	8,258	14,321	
Cost of Power	38,175	7,612	16,273	104,275	4,745	10,430	
Operating & Maint.	1,299	543	703	4,320	469	757	
Const. Account Exp.	2,054	469	1,347	2,711	750	659	
Admin. & Gen. Exp.	1,638	667	1,140	6,525	1,206	1,076	
Total Operating Exp.	43,166	9,192	19,463	117,830	7,165	12,722	
Operating Margin	1,140	420	2,648	15,948	1,093	1,399	
Depreciations & Interest	2,054	538	1,552	13,303	1,662	1,604	
Net Operating Margin	(915)	(118)	(1,095)	2,645	(570)	(205)	
Non-Operating Revenue	116	68	295	226	109	125	
Non-Operating Expense	26	2	133	125	10	537	
Net Margin	(825)	(53)	1,257	2,746	(471)	(618)	
Number of Customers	52,192	17,358	25,667	43,476	20,454 -	9,526	
% Paying Minimum Bill	8.5%	15.1%	30.2%	Not Avail.	43.1%	37.3%	
PERFORMANCE INDICATORS (%)							NEA STANDARDS
Power Cost Ratio	86.1	79.2	73.6	77.9	57.5	73.0	55-60%
Opn. & Maint. Exp. Ratio	2.9	5.6	3.2	2.5	5.7	5.3	5-8 %
Customer Exp. Ratio	4.6	3.8	6.1	2.0	9.1	4.6	3-5 %
Admin. & Gen. Exp. Ratio	3.7	6.9	5.2	4.9	14.6	7.5	10-15%
Operating Ratio	97.3	95.5	88.1	88.0	86.9	90.4	90-95%

NOTE: Financial Data may contain slight errors due to round out.

Although the NEA standard form used for the Financial and Statistical Report contains a column headed "Budget" only two of the six cooperatives posted this information. The information, where given, is only for the current month. Other information in the same section gives both current month and year to date figures.

A supporting schedule filed with the Financial and Statistical Report by one of the cooperatives is reproduced below as Table 5-2 to illustrate the type of expenses included under each heading in Table 5-1.

Flow of NEA Funds

In peso amounts, NEA funds as of the end of 1983 had been expended or committed as follows:

	Expended	Committed
Rural Electrification	₱3,491 M	₱ 764 M
Dendro-Thermal	462	356
Mini-Hydro	369	1,381
In-House Expenditures	275	
Special Projects	44	
Others	160	
T O T A L	₱4,801 M	₱2,510 M

Additional funds, not as yet expended or committed, in the amount of ₱3,886 M were still available to NEA from unreleased portions of the government equity and foreign loan commitments.

For the cooperative, Table 5-1 gives an overall picture of where the self-generated funds go for the sample of six organizations checked. Their basic supply of funds for construction, rather than operating and maintenance is from an NEA loan. A positive net margin means that internally generated funds can offset some of the demands upon NEA, as well as result in the repayment of NEA loans.

Table 5-2
TARLAC II ELECTRIC COOPERATIVE, INC.
Capas, Tarlac

SUPPORTING SCHEDULE
December 1983

I. Schedule of Operating Revenue (Sch. A)

Residential Sales	₱ 784,637.58
Commercial Sales	225,185.93
Industrial Sales	174,871.84
Public Street & Hiway Lighting	17,997.60
Sales to Public Bldg. & Other Pub. Authority	27,422.36
T O T A L	₱1,230,115.31

II. Schedule of Distribution Expense Operation (Sch. B)

Overhead Line Expense	₱ 22,493.64
Station Expense	160.90
Street Lighting & Signal System Exp.	2,577.80
Meter Expense	7,589.42
Miscellaneous Distribution Expense	476.40
T O T A L	₱ 33,298.16

III. Schedule of Distribution Maintenance (Sch. C)

Maintenance Supervision & Engineering	₱ 5,392.66
Maintenance of Station Equipment	6,375.27
Maintenance of Overhead Line	35,509.95
T O T A L	₱ 47,277.88

IV. Schedule of Consumer Accounts Expense (Sch. D)

Supervision	₱ 6,734.96
Meter Reading Expense	21,288.65
Consumer Records & Collection Expense	41,665.64
T O T A L	₱ 69,689.25

V. Schedule of Administrative & General Expense (Sch. E)

Administrative & General Salaries	₱ 49,446.11
Office Supplies & Expense	4,332.45
Outside Service Employed	1,000.00
Property Insurance	572.06
Injuries & Damages	10.00
Miscellaneous General Expense	31,212.62
Rent	3,050.00
Maintenance of General Plant	1,760.38
T O T A L	₱ 91,383.62

While the "net operating margin" shown in Table 5-1 may be a negative value, it is not necessarily a negative cash position since it is influenced by depreciation charges, a non-cash expense item. The item listed in the table as Depreciation and Interest also includes any amortization payments on their NEA loans. Thus, a negative net operating margin is an indication that no amortization, and perhaps no interest, will be paid that year on the NEA loan.

As indicated by Table 5-1, the increasing cost of power has put the power cost ratio for all cooperative outside the range considered appropriate for fiscal soundness by NEA as late as 1980.

The obvious result is that the other ratios will be reduced in compensation. It is certainly a good management practice to reduce the customer expense ratio, as long as it is not causing reduced collection efficiency. Central Negros has done this successfully with their computerized billing system.

There can also be reductions effected by alert management in the administration and general expense ratios. Again, however, care must be exercised to guard against those which may have a negative effect upon performance, such as elimination of employee training programs.

A drop in the operating and maintenance ratio can be a sign of increased efficiency. It can also, unfortunately, be a signal that the system is being allowed to deteriorate physically and/or that the quality of service to the consumers has worsened.

Maintenance Management in Cooperatives

Maintenance, in its broader sense in electric distribution system operations, means both the prevention of deterioration to the physical plant and the expeditious restoration of service to customers when interrupted. In the latter area, although system betterment expendi-

tures will often require additions to system capital investment, they may be considered improving maintenance by the reduction of customer exposure to service interruption, or by the reduction of the time required to restore service.

Successful maintenance management entails the conscientious and periodic performance of adequate inspections and tests and the prompt corrections of any defects or potential defects or irregular conditions encountered. It requires careful scheduling, adequate personnel training, and previous allocations of funds, manpower, equipment, tools, spare parts, and materials to ensure that the schedule can be kept and required action taken in a timely manner. Preventive rather than corrective maintenance should be the goal of the program. Senior management support is a must.

In the case of overhead systems, such as predominate in the electric cooperatives, periodic inspections of all elements of the systems on at least an annual basis must be made. For most system elements this entails only a rapid visual inspection which may be made while driving down the line.

During their daily travel through the system, construction crews and maintenance crews, properly trained and motivated, will be able to detect many conditions requiring correction. If lack of time or materials prevents immediate corrective action, a system of written reports must be utiliged. Verbal reports are too often forgotten. Further, prompt action must be taken upon those reports. Failure to do so results in an apathetic attitude towards maintenance by field forces.

However, there will be many sections of the system that will not be visited by line personnel over long periods. Although the meter readers will travel the entire system every month, experience has not

shown them to be a dependable inspection force for overhead lines. They should, however, be required to report any irregularities in meter and service installations. To ensure that a complete system wide inspection is made at least annually, and to ensure their intimate knowledge of their system, supervisors should personally conduct a visual inspection of the system every year.

The most common cause of distribution system problems, inadequate tree trimming, is readily spotted by visual inspections. So are such conditions as broken insulators, excessively sagged wires, dangerously rotten or warped cross arms, loose or missing hardware, leaning poles, slack guywires or dislodged anchors, overload lights on completely self-protected (GSP) transformers, oil leaks, broken lightning correctors or fuse mounts.

Certain system elements are not, however, adequately inspected by a "drive by". They require periodic examination by specially trained personnel. The inspection schedule may not be on an annual basis, but based on equipment manufacturors recommendations. This includes such items as reclosers and sectionalizing switches, street light timers, etc. Although residential meters need not be tested periodically, those of industrial and large commercial customers, as well as those on substations should be. Transformers, other than the CSP type should be given periodic load tests.

Pole inspection for ground line rot is a tedious, but necessary element of a complete maintenance program. Some serious cases will be detected by visual inspection, but many will go undetected, resulting in pole failure. Past experience will determine the minimum number of years after installation that a pole should be given thorough inspection at above and below the ground line with the proper tools. The period will vary with the type of wood and treatment. Of course, as a safety measure every lineman should be trained to inspect a pole visually and by sounding it with a hammer before climbing.

It is also essential to the proper maintenance of the overhead system that there be a co-existent maintenance program for all required support services. This will include vehicles, tools, and test equipment. Storerooms and yards should be adequately organized so that needed materials and parts are readily located and protected from deterioration or theft while in storage.

Specific Experience of Cooperatives

The field survey consisted of visits to six pre-selected cooperatives. These six provided a reasonably representative cross section. In terms of customer density, they ranged from 23 per kilometer of line to 300. In number of customers, from 9,500 to 113,500. One included a significant urban area, two were a mixture of small city, suburban and rural, and three were serving predominantly rural areas. Four systems incorporated varying amounts of old distribution systems taken over from former franchise holders, two had been entirely constructed by the cooperative. One had been incorporated in 1971, one in 1972, one in 1974, one in 1975, one in 1979, and one in 1981. In general, actual operation began from one to two years following.

A standard pattern was followed in each field visit.

Through NEA, the cooperative was notified of the date and intent of the visit. Upon arrival at the cooperative headquarters, the manager was shown our scope of work to further orient him in the purpose of the visit. He was then presented with a questionnaire and requested to have his staff provide the listed information. The questionnaire was designed to provide statistical data, information on policy and opinion concerning operations. It was anticipated that the rapidity with which the data could be assembled (and the lack of data in some areas) would be indicative of management effectiveness.

While data were being collected, an inspection was made of the headquarters offices, shops and stores facilities. Substations and some district offices where also visited. Overhead line facilities were inspected while in transit from one point to another and while travelling to and from the point of entry in the province to the coop headquarters. Only one cooperative had its own generation, Central Negros. Those diesel plants were inspected. At Iloilo, the NPC power barge and transmission substation were also visited.

During the course of the inspection tours, comments of the managers and of engineers and department heads were elicited. In several instances, there was opportunity for conversation with members of the board of directors. The comments provided information not covered by the questionnaire and also served as a check on the answers by others to items in the questionnaire. In every instance, the people encountered were generous of their time and eager to talk about their cooperative and their individual part in it.

Field observation of these six cooperatives confirmed the conclusions about operating and maintenance practices contained in the NRECA "Report on the Philippine Rural Electrification Impact Survey (1981)". The NRECA survey covered seven cooperatives, two of which were included in the current survey, Lanao del Norte and Iloilo I. Except for Central Negros, with its high proportion of urban load, the two surveys covered cooperatives with a similar range of characteristics.

Specific areas where improvement in current operating and maintenance practices should result in improved service reliability, more efficient operations and a sounder financial position are discussed below. In general, the comments apply to all six cooperatives. Any exceptions are noted.

No systematic and complete record of customer outages, giving duration, number of customers or KVA of load affected and cause, was maintained. In response to our request, partial data was supplied by some cooperatives but, from the time required for compilation, it was apparent that it was necessary to search for it. Generally, an interruption to service is noted on a piece of paper somewhere, a substation log book or a work order form for example, but the information is rarely, if ever, collected and analyzed. Such an analysis is useful to both engineering and management in the wise allocation of available funds for system betterment projects and for maintenance. Conversations with an expatriate consultant to NEA, indicate that this lack of records is widespread.

From the limited information available, it appears that at least half of the service interruption to cooperative customers are due to the interruption of the supply from NPC, both scheduled and unscheduled. A major cause of the remaining 50% of the outages is tree trouble. In part, this is due to Ministry of Natural Resources, Bureau of Forestry Development regulations limiting trimming to maintaining no more than one meter clearance. Many common species, such as ipil-ipil grow that much in less than a year. Uniform maintenance of outage records by all the cooperatives could possibly supply the Federation of Elec. Coop. of the Philippines (FECOPHIL) and NEA with sufficient data to persuade the Ministry to relax these regulations. This would both improve service and reduce the frequency of tree trimming, a significant maintenance expense.

Another area where well organized outage records are helpful is in justifying the expense of installing additional protective and sectionalizing devices on the primary circuits to limit the number of customer affected by line trouble. This method of limiting the impact of outages does not appear to have been exploited as fully as possible by the cooperatives. It is common practice to fuse all

laterals off the backbone feeder, but the use of a series of coordinated protective devices in the backbone itself is not common. At times, the installation of line sectionalizing devices can be economically justified by the reduction in lost revenue caused by scheduled outages for work on the feeders.

Scheduled outages can also be reduced by the provision of hot line tools and adequate instruction in their care and use. They are admittedly expensive but, again, an economic analysis of the lost revenue which could be prevented by a reduction in scheduled outages should at least be attempted. The minimum set of tools adequate for routine tasks such as insulator, crossarm or pole replacement should be considered. Most cooperatives do have records of past scheduled outages, since it is common practice to publish notices of them.

Abnormally high system loss factors constitute a financial hazard to almost all cooperatives. The 1983 loss factors for the six cooperatives in our study were:

Pampanga II	32%
Tarlac II	29%
Iloilo I	22%
Central Negros	13%
Lanao del Norte	19%
Maguidanao	13%

The latest available national summary figures (for 1980) gives system losses of electric cooperatives by regions as follows:

Region I	25%
Region II	22%
Region III	23%
Region IV	20%
Region V	18%
Region VI	17%
Region VII	24%
Region VIII	17%
Region IX	20%
Region X	8%
Region XI	18%
Region XII	22%

and for the Philippines as a whole, 20%. The low 8% shown for Region X is suspicious, to say the least. An examination of individual system data in 1983 showed one system reporting a 5% loss and another 1%!

ADB considers a 12% loss factor to be generally reasonable. Amounts above that can be considered to be partly due to metering errors, but any considerable deviation is undoubtedly due to theft. On at least one of the cooperatives visited, Iloilo I, the Chief Engineer had computed this theoretical system loss to be 10%. An aggressive campaign to detect and correct energy theft had resulted in a system loss reduction to 18% by September 1984 from the 1983 average of 23% and the recovery of some ₱250,000.

Central Negros also has an aggressive anti-theft campaign which can be credited for their 1983 average 13% loss factor. They have a specially trained group for this function, the Apprehension Inspection and Detection Department, popularly known by the acronum A.I.D. (Their consumers service group is known as C.I.A. for Complaints, Information, and Action.)

Many of the cooperatives, who are still operating the old and usually rundown systems of previous private franchise holders in their service area, blame their high loss factors on excessive losses in the older plant due to inadequate conductor sizes, etc. Recent ADB loans have been made to NEA for reconstruction of these old systems to modern standards. There is no doubt that a rebuild should improve service and public safety and reduce maintenance but the Central Negros experience would seem to indicate that a rebuild is not essential to loss factor reduction; the Central Negros system still incorporates much old reconstructed aerial plant.

Reported loss factors may in some cases, be less than the actual. In one cooperative, all meters were deliberately calibrated at 102%.

Their actual load factor may thus be 2% higher than reported. In another, one large industrial customer accounted for 76% of their 1983 sales. Thus the low loss factor (13%) recorded in 1983 may conceal a significant amount of theft by their other customers.

It is strongly recommended that all cooperatives have their engineering staff compute what the system losses should be for their actual configuration and loads so they can assess the amount of revenue they are losing due to energy theft and take aggressive action to recover it. Assuming the 20% average figure given for the cooperative systems as a whole for 1980, could have been reduced to the ADB target of 12%, the increase in revenue from the additional 121 gigawatt hours billed in that year would have been quite significant. Even more so at today's rates.

For a really accurate picture of the loan flows and losses throughout their systems, the cooperatives need to acquire additional metering equipment especially for use at primary voltage levels. Permanent metering of kilowatts and kilovars should be installed on each feeder at the substation. The meters should have demand elements. Portable metering should be available to check voltage, load and power factor at selected points on the feeder at both peak and light load times. This information would permit sound decisions to be made concerning proper conductor size, capacitor and voltage regulator location and rating, etc.

Most of the cooperative meter shops have only one rotating standard and one load box. Any systematic counter theft programs will require that the common present practice of testing most meters in the shop be supplemented by a program of field testing, (now only a practice with large users) for residential and small commercial customers. That will require at least one additional rotating standard and load box, plus, of course additional personnel at each cooperative.

All new meters are generally tested before being installed. In many cooperatives, this is being done one meter at a time. Even with the limited equipment available, gang testing is feasible and time saving. The possibility of only testing a sample of the new meters should also be examined if records indicate only a very small portion of the as received tests are requiring re-calibration to be within acceptable error limits. Such limits could probably be set at 1% plus or minus, or even 21% with little danger of the meter drifting outside the legal limits of plus or minus 3%. It will probably be found that such a program may be acceptable only with certain manufacturer's meters. The records of past test experience, if available, should be analyzed as an aid to making a decision in that area.

Harbin two wire residential meters were a universal source of complaint among the six cooperatives. They reported many customer complaints about noisy meters and customer apprehension about over billing because of the rapid speed of the small disc. The meter shops complained of wear problems with the plastic gears and that the meter would either stop or seriously under register if it were turned from its normal vertical position.

Other reports have already directed attention to the effect upon crew productivity of inadequate transport. It is hardly fair to use the term poor maintenance in this connection for what would belittle the efforts of the mechanics to keep many worn out vehicles operable. To quote from the NRECA 1981 survey: "The recent ADB loan to NEA will assist in modernizing this transportation deficiency at the cooperatives". There is still much to be done. Breakdown maintenance rather than preventive maintenance is imposed by the old vehicles.

Many of the cooperatives had sizeable stocks of defective transformers, oil reclosers, meters, etc. All of them were attempting,

at least to some extent, to repair meters by canibalizing parts, etc. Two claimed to have the capability to repair transformers. Only one, Central Negros, had a filter press and oil test capability. Both of these are essential to a transformer repair shop. This stock of defective transformers and oil circuit reclosers represents a salvageable investment. The establishment of repair facilities at a small cooperative may be impractical, but a common facility to serve three or four may be justifiable. In areas such as Region III or IV-B, commercial facilities can be perhaps be utilized.

In general, most storerooms had need of additional space and bins, racks and shelves. Materials are generally received in much larger quantities here than in the U.S. where there is ready access to distributors and it is possible to have them assume the burden of warehousing. Even outdoor storage, in some instances, was quite crowded. Aside from the lack of ease in locating and issuing materials under crowded conditions, there is also a greater possibility of damage to transformer bushings, insulators, etc.

Many reels of conductors were observed with rotten and broken chines where the cable had escaped from the reel and "bridcaged" to the extent that it would be a real task to rewind it on another reel. The general practice of storing reels flat on the ground, instead of an edge on checks or in racks contributes to this ultimate unnecessary use of manpower or, in severe cases, untimely relegation of material to the scrap pile.

Computerized stores records have been implemented at NEA, but among the cooperatives manual systems are the general practice and usually adequate. For a large system such as Central Negros a computerized system, which they have, is advantageous. The managers all reported that, when they needed emergency issues of stock items, they could get information through NEA as to the closest cooperative where the items were available. There did not appear to be any such

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information regarding spares such as transformer bushing, oil circuit recloser parts, etc. Perhaps because these items are not stocked.

A universal complaint on the six properties visited was the high incidence of early rot in the "Tanalize" treated poles. This was reported to have begun with poles received since 1980. The worst cases were with luan poles. Apitong poles were reported to be giving good service. Termit infestation in relatively new poles was also reported. One manager reported that he was replacing about one percent of these poles a year due to rot. This is far in excess of what should be expected for poles in service such a short time. It was even reported that poles were rotting in the store yard. An excellent report on pole selection and treatment entitled "Power Pole Survey" of 12 April 1972 should brought to the attention of NEA. A copy is available in the AID resource library. Evidently a strong quality control program is needed here.

A structural strength of these poles may also be inadequate. Photographs of typhoon damage on the Central Negros system showed several poles broken midway between the ground line and the crossarm. Usually, when the ground is as thoroughly soaked as it is during typhoon rains, the pole will fall over or lean due to footing failure rather than breaking at midpoint. Of course, impact loading such as might be due to a tree being blown into the line can cause such failures, but the photographs revealed no such cause.

A minor item frequently observed was a street light burning in daylight because of a photo cell control failure. These controls are sealed units and not subject to field repair. With present power costs, it is suggested that an economic study be made to determine the pay back period for a replacement control. It may be rather short. Except for shortened bulb life, the fact that street lights burn both day and night does not lessen their important contribution to security.

Bill collection is a continuing problem in all the cooperatives visited. The percentage of accounts one month overdue was high on all properties. This might be improved by making the penalty for late payment more severe. Presently applied penalties are relatively minor in the current atmosphere of high interest rates.

There seemed to be more lip service to safety programs than actual practice. Safety records, in terms of man-days lost due to accidents were not available. NEA has standard forms upon which cooperatives are to report accidents or property damage, but no analysis of the data appears to be made. In one cooperative, such a form was shown as an example. It was for a 15-day lost-time accident caused by a welder getting a splash of hot metal on his eyelid. In answer to an obvious question, the answer was that the welder had not been wearing safety goggles, since only one pair of goggles are available for three welders. Less than one hour later, in the shop area, one man was seen welding - with no goggles.

Another minor item observed which is indicative of a lax attitude towards safety was the sharpening of the gaffs on climbing irons. None of those actually examined at several cooperatives were sharpened to the correct profile. No gaff gaugers, an inexpensive item, were reported to be available.

The manager of one cooperative reported that a recent FECOPHIL meeting he had heard that it was possible that USAID might finance another series of training program in the U.S. for cooperative personnel by NRECA. Obviously, the idea of an all expense paid tour to the U.S. is very attractive. However, it must be noted that the three better managed of the six cooperatives visited had managers who had been sent to NRECA in the U.S. - perhaps it is time that NRECA was requested to conduct another round of training, here in the Philippines, however rather than in the U.S.

The area of substation maintenance needs to be examined. In

general, substations did not appear well maintained. Several transformers had defective oil temperature indicators, an important device since transformer capacity is limited by temperature. Also yards were frequently full of debris and high weeds, even though the substation was manned. Although they are universally metered at 69 kV by NPC, in some cases the 69/133.2 kV transformers are owned by NPC, while others belong to the cooperatives. NPC's policy is to eventually transfer ownership of all substations to the cooperatives, but they will not do so until the cooperative pay for the transformers. The local coops furnish the staff to tend the substations. In general, the coops do not have the test equipment required to maintain the transformers and must depend on NPC. This is also true for the protective relays. Where it is impractical or uneconomical for the local coops to acquire the capability to take over maintenance, a formal agreement for periodic maintenance should be executed between these coops and NPC.

CHAPTER 3

INSTITUTIONAL SETTING FOR THE MAINTENANCE OF TRANSPORTATION INFRASTRUCTURE

3.1 ORGANIZATION OF THE SECTOR

The fixed plant of the transportation sector in the Philippines comprises the following elements:

Highways[1]

National highways	24,140 kms, of which about 23% are concrete, 21% are asphalt, 53% are gravel or telford construction, and less than 3% are earth.
Provincial roads	29,725 kms, of which 3% are concrete, 9% are asphalt, 68% are gravel or telford construction and 20% are earth.
City streets	3,718 kms, of which 13% are concrete, 53% are asphalt, 30% are gravel and 4% are earth.
Municipal roads	12,240 kms, of which 13% are concrete, another 13% are asphalt, 48% are gravel and 26% are earth.
Barangay Roads	85,264 kms, of which roughly 11% are paved, 37% are gravel and the remainder earth.

[1] Source: Bureau of Maintenance, MPWH 1983 inventory, except for percentages under barangay roads, which came from a 1981 inventory. Because of the lack of data, the 1983 inventory assumed all barangay roads to be gravel.

(This inventory must be treated with a degree of caution. While national highways, as a group, consist of the more important and generally higher grade roadways, the criteria determining a national highway vs a provincial road are not always consistent; some political trade-offs are involved and some of the inventoried roads don't exist. Furthermore, the barangay roads shown are only those listed to be maintained through national funds. Other roads exist but they are considered to be of too low a standard to be eligible for such funding.)

Ports

National Ports	104 ports designated as National Ports grouped into 19 Port Management Units of the Philippines Ports Authority.
Municipal Ports	Some 500 ports, which range from modest, but locally important, facilities down to little more than half submerged stone jetties.
Private Ports	288 registered private ports, handling primarily bulk cargoes, which are supervised by the Philippine Ports Authority.

Airports

Civil Airports	Network of 83 airports operated by the Bureau of Air Transportation in the Ministry of Transportation and Communications.

Railways

Luzon Island	About 700 kms of narrow-gauge line extending north and south of Manila (not all of which is currently in use) that are operated by the Philippine National Railways.
Panay Island	Panay Railway, a specialized line, roughly 125 km long, serving primarily the sugar industry on the island.

The most recent information on the relative use of the different transport modes dates from 1980 and is found in the National Transport Planning Project reports. It is unlikely that relative shares have changed much since that time.

Table 3-1

APPROXIMATE NATIONAL MODAL SPLIT IN 1980
(Domestic traffic only)

	Freight		Passengers	
	Ton-kilometers (Billion)	Share (Per cent)	Passenger-kilometer (Billion)	Share (Per cent)
Road	22	(65)	53	(90)
Sea	12	(35)	4	(7)
Rail	0.04	(..)	0.4	(1)
Air	negligible	(..)	1.2	(2)
		(100)		(100)

From this table it can be seen that an overwhelming share of both freight and passengers is carried by road or sea transport. The volume of domestic passengers travelling by air from Manila to other islands is close to the volume carried by inter-island vessels but on other routes among the islands, sea transport clearly predominates.

Given the disproportionate share of traffic carried by road and sea traffic and the fact that air travel serves primarily those with higher incomes, or those on government business[2], the remainder of this section on the transportation will be devoted almost entirely to the institutional environment, for constructing and maintaining the country's roads and ports.

[2] According to National Transportation Planning Project data.

The transportation sector is clearly dominated by the Ministry of Public Works and Highways (MPWH) which was created in 1981 by the merger of the Ministry of Public Works and Ministry of Public Highways. This Ministry is responsible for the construction, rehabilitation and improvement not only of highway but also for many other elements of the Country's infrastructure. Specific elements include:

- National roads and bridges
- Rural roads and barangay roads covered by externally-assisted projects
- National and municipal ports - though these are funded and operated by others - plus harbors and coastal improvements
- Civil airports outside of Manila and major cities - though airports are funded and operated by others
- Artesian wells, springs and other water sources
- Flood control and drainage works
- Construction of school buildings and health facilities covered by special programs

MPWH is also involved in the construction (and later maintenance) of irrigation and water supply systems through autonomous agencies reporting to the Minister, as detailed in later sections of this chapter.

A major responsibility of the Ministry of Public Works and Highways is the maintenance of the network of national roads and, recently, under Executive Order 978, MPWH was once more charged with the task of supervising the maintenance of barangay roads. MPWH also maintains municipal ports throughout the country but the respective responsibilities of MPWH and the Philippine Ports Authority for such maintenance are not clearly defined.

Aside from the direct role played by the Ministry of Public Works and Highways, through its Bureaus and Services in Manila, its Regional Offices and its District Engineering Officers, MPWH also administers and monitors the funds for some local road construction and for local road maintenance, including provincial, city, municipal

and barangay roads.

Finally, on design standards, construction specifications, building techniques, maintenance norms, etc. the Ministry of Public Works and Highways is considered to be the repository of government expertise and is the accepted authority in such matters.

The second ministry to have a role in the transportation sector is the Ministry of Local Government (MLG). While the MPWH administers the national contributions to local road maintenance programs, and some local road construction programs, the MLG provides more direct support to provincial staff, including the provincial engineers, and is more closely involved in the development of the local road program. Also, it is the MLG that administers payments to provinces under various reimbursement programs, including the Rural Roads Programs, which reimburses provinces for up to 85% of construction costs for provincial, city, municipal and barangay roads.

The Ministry of Local Government may also have a role in determining the apportionment of the local government share of national revenues, which is distributed by the Bureau of Internal Revenue. This share of national revenues constitutes, particularly for the poorer provinces, a high proportion of their total revenues -- from which they must provide matching funds - equal to 50% of the national contribution -- for the maintenance of provincial, city and municipal roads.

The last ministry directly involved in the transportation sector is the Ministry of Transportation and Communications (MOTC). Perhaps most important from the standpoint of this report, is the fact that the Philippine Ports Authority (PPA) comes under the wing of MOTC and the Minister chairs the PPA Board. The Philippine Ports Authority is an autonomous body, which nominally funds port expansion and operations through user fees (berthing charges, wharfage

dues, arrastre income, etc.)[3]. It operates and maintains the 84 national ports, through 19 Port Management Units (PMU's), monitors the operation of 45 municipal ports and also monitors traffic and collects relevant fees at the country's private ports. The PPA undertakes feasibility studies for port improvements and seeks the necessary funds but actual design and construction is done by the appropriate bureaus of MPWH.

Through the Bureau of Air Transportation, the Ministry of Transportation and Communications operates and maintains the country's civil airports and navigation aids. As in the case of PPA, the Bureau also seeks funding for airport improvements but the design and construction are performed by MPWH.

Another autonomous agency under the Ministry of Transportation and Communications is the Philippine National Railways.

Except for those of the Ministry of Transportation and Communications Planning Service, which is involved in the allocation of capital funds and equity investments in the transportation sector, the remaining functions of the Ministry of Transportation and Communications, in the transportation sector, are primarily regulatory in nature. The Bureau of Land Transportation and Board of Transportation regulate road transport through registration of vehicles, licensing of drivers, franchising of carriers and enforcement of relevant statutes (including those on overloading). The Maritime Industry Authority, also within the MOTC, plays a similar role with respect to sea transport, albeit the Authority is also involved in the promotion of this mode. The regulation of air carriers is not under the MOTC, however. This is done by the Civil Aeronautics Board in the Ministry of Tourism.

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[3] Since 1977, the financial independence of the PPA has been sharply curtailed by Presidential Decree 1234. This is discussed in a later section of this chapter.

3.2 NATIONAL HIGHWAYS: LINE AGENCIES OF THE GOVERNMENT

Levels of Responsibility

The first line agency to discuss is the Ministry of Public Works and Highways and its primary responsibility for maintaining the national road network, and also municipal ports, and supervising the maintenance of barangay roads - as well as its construction responsibilities for all national roads and some local roads.

While the following discussion is devoted primarily to national roads (ports and barangay roads are covered in later sections), it should be borne in mind that the MPWH, as well as its regional and district engineering offices, is divided along functional, rather than sectoral, lines. (Figure 3-1) Thus, each of the three levels is also involved in the provision and maintenance of other elements of infrastructure, plus some local buildings.

Within the Ministry headquarters in Manila, staff functions come under the Deputy Minister for Planning, Administration and Finance. Six services cover:

Planning
Administration
Finance and Management
Legal Matters
Manpower Development
Comptrollership

Line functions of the MPWH are covered by bureaus. Under the Deputy Minister for Maintenance, Equipment and Design are the bureaus concerned with these disciplines. Under the Deputy Minister for Construction and Quality Control are the bureaus responsible for these disciplines. Thus, the six services listed above are parallelled by the following five bureaus:

Bureau of Design
Bureau of Construction
Bureau of Maintenance
Bureau of Equipment
Bureau of Quality Control

A similar functional structure extends down through the Regional Offices and the District/City Engineering Offices, except that staff and line functions are not separated and some are merged. Thus, each regional office has seven divisions covering:

Planning and Design
Construction
Maintenance
Finance and Management
Administration
Comptrollership
Materials and Quality Control

and an eighth division covering Pumping Stations and Floodgates. Attached to the office of each Regional Director is a separate staff for regional equipment services, which functions as an arm of the Bureau of Equipment.

There are fourteen regional offices in the country, covering Region I-XII (two offices in Region IV) plus the National Capital Region. These offices act as miniature counterparts of the MPWH in their respective parts of the country and the divisions listed above, provide reports to and receive guidance and technical approvals from their respective services or bureaus in Manila.

Within each region are from 5 to 10 Districts, plus up to 10 Independent Cities. District boundaries follow provincial lines except that some provinces are divided into two districts. Thus, there are a total of 91 District Engineering Offices and 58 City Engineering Offices.

Each district engineering office has essentially the same functional division as the regional offices. Each of the seven basic functional areas noted above is the responsibility of a section within the district engineering office. There is no section for pumping stations and floodgates, but there is an eighth section, which is responsible for building Code administration and enforcement within the district (Fig. 3-2). One feature to note is that district and city engineering offices normally do not have equipment; they must rent

it from the local representative of the regional equipment service - at approved rates, which are charged to the district or city maintenance budgets.

While the typical district engineering office has eight sections on the same level reporting to the District Engineer or his deputy, there appear to be several variations in the city engineering organizations. Some may still have their own equipment pools, for example, or they may have a separate electrical section (for street lighting).

The use of a functional division at all levels at MPWH rather than a sectoral division may have advantages in the use of personnel if skills in any given discipline are in short supply but it also has several disadvantages. For example, there is only casual contact, if any, between designers and those who must maintain a facility; or projects may be stalled between various stages, say between planning or design and actual realization. Repeated inquiries, however, as to whether any significant problems arose from this form of organization, brought forth replies to the effect that the difficulties encountered are generally not a result of the organizational split. At the same time, it is interesting to note that for major projects, a number of Project Management Offices have been established within MPWH, which guide these projects through the planning, design and construction phases at the national, regional and local levels. There were 29 of these project management offices in 1982. This having been said, outside of the lack of contact between designers and maintenance staffs, and the odd cleavage between maintenance organizations and equipment organizations, the functional form of organization does not materially affect maintenance. Within a separate road sector, a functional division would still be necessary.

Offhand, it would appear that there may be some duplication of tasks among the three levels of the organization and some redundant reviews by people who are well-removed from the actual site of the work to be done. In general, however, operating and capital programs

are developed initially and costed at the district level, then passed up through the regional offices to MPWH in Manila, where they are reviewed. Final programming of capital projects is done by the Planning Service. Maintenance programs are reviewed by the Bureau of Maintenance then sent directly to the Budget Division of the Financial and Management Service. Once programs are established and funded, in most cases the regional offices are charged with implementing the programs in their regions and delegated the authority to do so. In the area of design and construction the amount of responsibility borne by various levels of MPWH is essentially related to the size and complexity of the project, with district engineering offices undertaking smaller, simpler projects[4] and the central Ministry carrying out the largest and most complex. In the area of maintenance, the Bureau of Maintenance provides overall supervision of maintenance programs, establishes maintenance standards, collects reports on damage from typhoons, etc., and monitors national and local road maintenance activities. Figure 3-3 shows the organization of this bureau. As far as actual road maintenance is concerned, however, the districts have the primary responsibility for scheduling and caryying out their programs for each year. An exception to this is equipment -- where responsibility is centered in the regional offices.

The staff of districts visited in Regions III, VI and XII varied from 87 up to 185. Typically, it seems that a district may have roughly 0.55 employees per km of road though this may be an artificial measure since climate conditions and methods differ and districts have other responsibilities besides roads.

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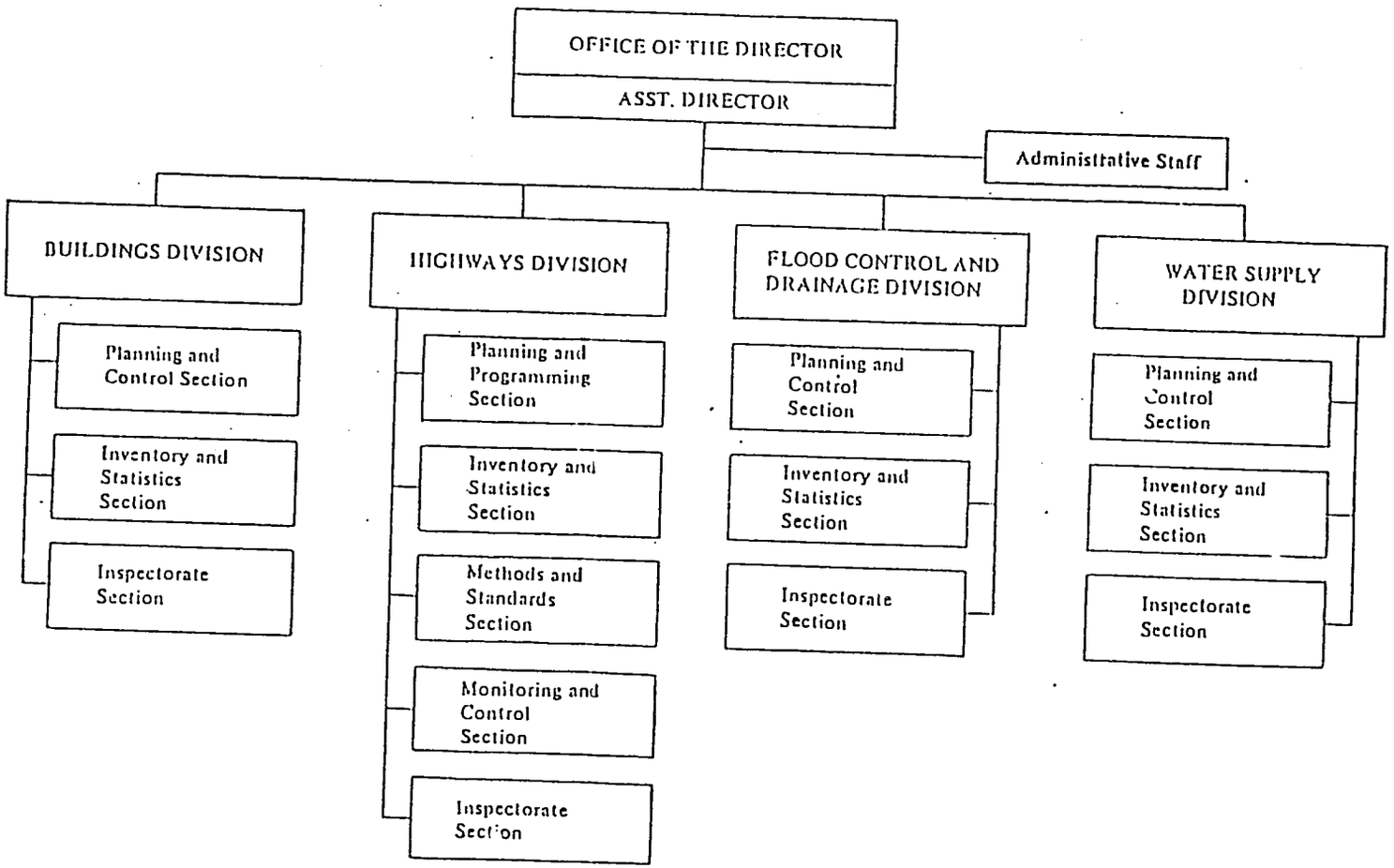
[4] Theoretically, District Engineers can enter into contracts of ₱500,000 or less; while Regional Directors have contracting authority up to ₱3,000,000. Both are subject to review at a higher level. In one of the regions visited, however, the complaint was voiced that, in practice, MPWH in Manila frequently contracts directly with Manila-based contractors for projects as low as ₱1,000,000, without the concurrence of the region involved. Typically, these contractors then broker the job, using the local contractors.

Inquiries in another region indicated that a similar problem did not exist there; the region and its districts were able to use their own lists of pre-qualified contractors. Nevertheless, an article in Bulletin Today on Nov. 13, 1984 indicated that the President was aware of a problem of big city contractors cornering government contracts and had informed mayors and governors that measures would be adopted to correct any inequities.

Figure 3-3
Ministry of Public Works and Highways
BUREAU OF MAINTENANCE
Organization Chart



Sources of Funds and Budget Allocations

The source of funds for both operating and capital expenditures by the Ministry of Public Works and Highways is the National Budget. The funds are appropriated through several acts:

General Appropriations Act (which covers current operating expenditures and small capital projects of less than one year duration).

Public Works Act (which defines total obligational authority for large multi-year projects. Only a portion of these funds are spend in a given year).

Funds may also be appropriated by Presidential Decree but this appears to be a practice of the past.

Within the General Appropriations Act there are typically some thirty-five or more chapters. Appropriations for capital expenditures for national road projects may be found in the chapters covering:

Ministry of Public Works

National Priorities Support Fund (includes contingency funds for contract price increases stemming from energy costs funds for various feasibility studies and peso counterpart funds for foreign-assisted projects. Starting 1985, this chapter also includes all ESF funds)

Calamity Fund (for reconstruction of facilities, including roads, in cases of natural disasters, etc.)

Appropriations for maintenance of national roads and bridges are found only in the chapter covering the Ministry of Public Works and Highways.

Table 3-2 shows appropriations in recent years for maintenance of national roads and bridges (in addition to those for local road maintenance and capital outlays). It can be seen that the largest share appropriated for maintenance of the national road network is that which is determined on the basis of an approved rate per "equivalent maintenance kilometer (EMK). This is a standard formula that incorporates the number of EMKs in

Table 3-2
NATIONAL AND LOCAL ROADS
ALLOCATIONS FOR MAINTENANCE AND INVESTMENT
(All figures are P1,000's)

ROAD MAINTENANCE	GENERAL APPROPRIATIONS ACT				
National Roads & Bridges	1981	1982	1983	1984	1985
Allocation based on EMK formula	441,136	447,136	436,080	434,599	541,620
(Contingency)	(241,555)	(278,000)	(250,000)	(136,346)	(90,703)
Operational Support	17,835	19,868	21,000	22,129	24,135
(Equipment Operation & Maintenance)	(198,719)	(175,952)	(93,069)	(116,298)	(196,239)
National Support for Local Roads & Bridges					
Provincial & City Roads	183,515	182,685	183,940	181,463	182,611
Munic. & Barangay Roads	414,659	423,551	427,367	428,136	431,163
Local Contributions*					
All local roads	299,087	303,118	305,654	304,800	306,887
MAINTENANCE TOTALS (Excluding contingency & Equip. maint.)**	1,356,232	1,376,358	1,374,041	1,371,127	1,486,416
CAPITAL INVESTMENT***	GENERAL APPROPRIATIONS ACT				
National Roads & Bridges	106,590	117,300	170,000	-	-
Prov'l & City Roads & Bridges	64,105)				
Munic. Roads & Bridges	35,345)	106,391	126,183	-	-
Barangay Roads & Bridges	409,290	180,894	238,117	188,128	100,000
(Construction Equipment)	(95,567)	(100,287)	(41,190)	(60,950)	(76,381)
Rural Roads Program****	32,559	179,773	240,000	240,000	199,762
Third Road Imp. Proj.	-	-	-	-	115,115
	PUBLIC WORKS ACTS				
Roads & Bri ges	1,062,904	4,897,683	3,944,389	2,679,782	2,089,692
INVESTMENT TOTALS (Excluding equip. acquisition)	2,710,793	5,482,041	4,718,689	3,107,910	2,504,569

* Based on matching fund equal to 50% of the national contribution for all local road categories. Actual amount may be higher - see text.

** Equipment maintenance excluded since use of equipment is charged against the EMK-based maintenance budgets at approved rental rates. Also, for maintaining other kinds of infrastructure is included in the equipment figure.

*** Taken from MPWH Programs for the respective years, since the Public Works Acts each cover a multi-year period, indicating total obligational authority for each project for the full construction period. The same source is used also for investments with funds from the General Appropriations Act for the sake of consistency.

**** Figures for 1983-1985 include small amounts for projects other than rural roads.

the road system and a flat amount for each EMK. The concept of EMK's was introduced in 1972, and the number of EMK's in a given road system has been derived by multiplying the actual length of road by factors that account for:

- surface type and width
- surface type and traffic volume

and adding the average length of bridge per kilometer times a factor for bridge type. The factors used through 1984 do not consider very lor or very high traffic volumes, predominant truck traffic, terrain or climatic conditions. The flat amount per E.M.K. (₱11,342) has not changed since 1976, so the basic allocation has varied only slightly since that time.

Recently, however, the MPWH Bureau of Maintenance has modified the EMK factors in order to discriminate among low volume roads and consider the higher traffic volumes on heavily travelled roads. Therefore, even though increases in the flat amount allowed per EMK have not been approved by the Commission on Audit, the 1985 budget allocation for maintenance of national roads and bridges is roughly 21% higher than in previous years.

In late 1983, a consultant to the MPWH Bureau of Maintenance, supported by the IBRD's Fourth Highway Loan, prepared a performance budget, based upon the physical feature inventory of national roads outside the Manila area that was then related to the cost of undertaking activities necessary for routine and periodic maintenance on the system[5]. This was compared to the amounts allocated for maintenance in the 1984 budget and it was found that only 61 percent of the routine maintenance budget varies directly with the surface type or bridge type. Other variables make up the difference. Thus, some distortion has resulted -- in relative terms, bituminous roads may get less than their proper share, whereas steel and temporary bridges may get more. It should be noted that regions receive an additional 7% in discretionary reserves, which they may use to correct imbalances among

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[5] Final Report, Highway Maintenance and Technical Assistance Project, RJA/TAMS, January 1984.

districts that may reflect the differences in the make-up of their road systems. At the same time, some regional imbalances may also result from use of the EMK formula. Furthermore, when both routine and periodic maintenance requirements were calculated under the performance budget the resulting amounts were 66.8% higher than the total amounts actually budgeted, so it is evident that, because of the ravages of inflation, maintenance on national roads is clearly underfunded under current budgetary restraints and practices.

Sources in the Ministry of Public Works and Highways indicate that when it starts the programming cycle (about 18 months before the year being budgeted), the MPWH normally receiving a ceiling for all appropriations from the Office of Budget and Management. It is nominally up to the Ministry to divide this between maintenance (and other operating) expenditures and capital investment. There is however, no formal mechanism for comparing the relative value of maintenance vs. investment. Early in the cycle, the maintenance budget is separated from the capital budget and several agencies, other than MPWH are involved, such as the Office of Budget and Management, and the National Economic and Development Authority (NEDA). Later, there may be item-by-item trades as the cycle proceeds, which are likely to reflect what one Asst. Minister stated is the current policy of MPWH: to grant maintenance the higher priority.

This is, in fact, quite evident from looking at Table 3-2. It is necessary to look at aggregates, however, since the amounts appropriated under the Public Works Acts and programmed for each year by MPWH are not broken down according to the categories of national, provincial, city, municipal and barangay roads.[6] Total capital investments in Table 3-2 also do not include roads built under the Municipal Development Fund portion of the Economic Support Fund of USAID. The MDF includes more than roads, but

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[6] In the 1984 Program, roads are categorized as Major Highways and Secondary/Feeder Roads, with P2.31 billion programmed for the former and P0.37 billion for the latter. The programs for other years list individual projects, but classify them only as foreign-assisted or locally-funded and the project descriptions alone are not sufficient to establish the category to which they belong.

in U.S. Fiscal Years 1981-1983, the fund provided an average of $18.3 million (about ₱164 million) annually. Leaving this amount aside and looking at the totals in Table 3-2, it can be seen that in constant pesos, while maintenance allocation declined by 37% between 1982 and 1984, programmed investments dropped by 74%. In 1982 the ratio of programmed investments to maintenance allocations was 3.85; in 1984 it was 1.60 and in 1985 it will be 1.47. This may not be a completely accurate picture, however. As discussed later, particularly at the provincial levels, there is some diversion of maintenance funds and resources to improvement projects, once funds are received at the operating levels.

One final note on the funding of highway work is that the amounts programmed for capital projects previously included a 12% allowance for inflation. (The allocations for maintenance have no such allowance and, therefore, are fully eroded by subsequent inflation). This 12% allowance proved to be insufficient in recent years, and the Capital Expenditures Adjustment Fund in the General Appropriations Act has been extremely difficult to tap. (Presidential approval is required.) Districts and regions have preferred instead, to scale a project down or reduce its standards if the original funds prove to be insufficient. The MPWH suggested that it be increased to 30% and the latest amendments to the Implementing Rules for P.D. 1594 have done just this.

Flow of Funds, Actual Expenditures

Once the budget comes into effect, on the first of the year, the initial documents received by individual agencies are Sub-Allotment Advices (SAA's) for the first quarter, issued by the Office of the Minister (of Public Works & Highways in this case). These state the activities and projects that have been authorized for expenditure in the quarter.

Actual releases of funds by the national government, however, are governed by documents called Cash Disbursement Ceilings (CDC's) issued by the Office of Budget & Management, which indicate that funds are actually available and fix the maximum amount that may be spent by an agency for a specific project or activity. These CDC's function as the obligating documents. While CDC's

apply to quarterly allotments of funds, MPWH and its regional and district engineering offices have six months from the beginning of the quarter to actual expend the funds.

Analysis of expenditures in 1982 and 1983 indicate that for maintenance about 95% of the amounts appropriated are actually spent. In the case of national highway maintenance funds, it would appear that virtually all of the money appropriated on the basis of the EMK formula, plus a small portion of the contingency allowance was actually spent. A somewhat lower proportion of the funds appropriated or programmed for capital investment were actually spent. About 70% of the money programmed from the General Appropriations Act and the Public Works Act in 1982 and 1983 was actually spent. This figure needs to be treated with caution, however, since expenditures may include funds from the last quarter of the preceding year and exclude some funds obligated in the last quarter of the year being looked at. Sources in the MPWH state that a much higher proportion of capital funds are now spent, since MPWH has been given the power to reallocate unspent funds from one project to another. A figure of 85% was cited for barangay roads.

Discussions with regional and district engineering staffs indicated that CDC's are generally received in timely fashion, so that maintenance work can proceed. The CDC's are issued, however, for four equal installments of the allocated funds and, therefore, allow limited flexibility in the scheduling of maintenance work. Some maintenance activities are only possible during the dry season and district engineers would prefer to schedule a higher proportion of the work during that period (generally from November through to May or June, albeit in parts of Mindanao and the Visayas the truly dry period may only extend from March through June). Except for the fact that funds obligated in one quarter may be spend any time within six months from the beginning of that quarter, district engineering offices have little opportunity to concentrate more maintenance work in the dry season.

The overriding concern however, expressed at both the regional and district levels, is that the funds available for maintenance work are totally inadequate. The various regions and district engineering offices have developed their own approaches for coping with the shortage of funds and establishing maintenance priorities. Some concentrate on specific maintenance activities; others give priority to more heavily travelled roads.

Maintenance Management -- Programming, Directing, Monitoring

Since 1981 a consultant has been working with the MPWH Bureau of Maintenance and four pilot regions on the Highway Maintenance Technical Assistance Project supported by the IBRD Fourth Highway Project for the purpose of developing a new maintenance management system[7], which would be more effective than the earlier system, a system that lacked consistency and did not include certain major activities. At the present time the MPWH is extending the new system from the pilot regions to the other regions of the country and this effort has been accompanied by an intensive training program to acquaint district engineering staffs with this system. During recent field visits, a regional maintenance chief and several district engineers were asked about the new system and the Highway Maintenance Management Manual completed in late 1983. They all produced copies and stated that it was used in programming 1984 activities and in current scheduling of work. In the Sultan Kudarat district engineering office the schedule for the current 15-day cycle, using the format developed by the consultant, was written on a blackboard for reference by all personnel.

The new system, called the Philippines Highway Maintenance Management System (PHMMS), is based upon the classification of maintenance work by field crews into specific activities, such as reshaping unpaved roadways, spot bituminous surface sealing, etc. The system, as developed, includes 70 activities, but this is expected to be reduced to 40 or 50 activities after revisions to the system are made on the basis

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[7] See Forrnote 5, above.

of subsequent experience in the field. Table 3-3 shows the activity groups and sub-groups currently in use.

Crews are now assigned, within a district or city area by activity according to the work to be performed, rather than being assigned to a fixed section of road as was done formerly. Crew assignments are made by the area engineers (districts may have from 2 to 5 areas), who must also schedule equipment needs.

Annual Work Programs are prepared by district/city engineers at the level of the entire district or city. Maintenance activities to be addressed are determined by the type of roads in the district/city inventory. Quantities of labor, equipment and materials are based upon functions of the physical inventory, a separate assessment of physical conditions and the desired level of service. There are also functions of work methods; the method for any given activity may be a composite of labor-intensive vs equipment-oriented methods. Nationwide planning values have been used for these quantities in preparing the Annual Work Program for 1984. Later, as experience is gained in the use of the PHMMS, these values are to be adjusted to reflect local conditions. A "performance budget" is prepared by applying unit costs to the work programs.

Annual scheduling follows and workdays are distributed to months according to the weather and other conditions (to the extent possible within the quarterly allocation pattern for obligating funds). In theory, the system encourages more periodic maintenance, since 20% of the performance budget for 1984 is devoted to periodic maintenance, and some 71% of the amount budgeted for routine maintenance is for work on road surfaces, shoulders, drainage facilities and bridges. Unnecessary vegetation control is hopefully reduced. The performance budget also provides for the routine replacement of handtools.

Detailed scheduling and crew assignment is done on a 15-day cycle. The schedule details work to be done and who is to do it. The area engineer is supposed to inspect all roads in his area twice a month and

Table 3-3

ACTIVITY GROUPS AND SUBGROUPS

Group 100 Roadway and Related Features

Subgroup 10 - Unpaved Surfaces
11 - Bituminous Surfaces
12 - Concrete Surfaces
13 - Unpaved Shoulders
14 - Drainage Features
15 - Bridges and Major Structures

Group 200 Roadside Maintenance

Group 300 Traffic Services

Subgroup 30 - Signs and Markers
31 - Safety and Protection Devices
32 - Painting
33 - Visibility Control

Group 400 Vacant

Group 500 Preventive Maintenance

Group 600 Emergency Maintenance and Major Repair

Subgroup 60 - Emergency
61 - Major Repair (Project)

Group 700 Maintenance Materials

Subgroup 70 - Material Production
71 - Hauling and Stockpiling
72 - Material Manufacturing

Group 800 Support and Overhead

Group 900 Periodic Maintenance

use his observations in scheduling the work. Work needs are documented and written assignments are placed on daily activity cards. These are given to the foremen and capataces, and the completed cards serve as daily reports. (Figure 3-4) Activity standards are used by foreman as a guide to the purpose, work method and quantities appropriate to an activity.

The PHMMS addresses only management reporting and is separate from cost accounting. ("Standard Costs" are used for the various resources and applied to the work program. These are unit costs that incorporate all accountable costs borne by the MPWH in order to bring the resources to the job site and also allow for fluctuations during the year.) Two monthly summaries are prepared, using the activity cards as the primary source of information. One summary shows all data of maintenance during the month-man-days, accomplishments and costs. The second summary uses selected data and compares actual with planned performance This last summary is a significant departure from the earlier system of reporting and control, which emphasized the control of expenditures along; not what is performed with the money.

Recent Project Experience

Not only in the four pilot regions but also in other regions visited during the present study, the Philippine Highway Maintenance Management System has received a generally positive reception. According to the IBRD-supported consultant's Fiscal Report, the system has yielded some early results:

- The MPWH Bureau of Maintenance is able to control the maintenance planning process and impose a uniform set of objectives. The process has been simplified, albeit district engineers still tend to believe that annual plans must specify exact locations.

- Crew sizes have decreased, indicating higher productivity.

- Motor grader productivity has improved.

Figure 3-4

MPWH
HIGHWAY MANTENANCE
ACTIVITY CARD

Form TAD 1.1

Activity Name	Act. No.

District/City	Date

—WORK ASSIGNMENT—

Road/Bridge Name	From Km.	To Km.	Road Sect.

Crew Size	Foreman/Crew Leader

Special Instructions

—RESOURCES USED—

Labor

Transfer Total Man-Days From Other Side ——> |

Equipment		Material		
Description	No.	Description	Quantity	Unit

REPORTED BY	ACCOMPLISHMENT	
	Amount	Unit

- The use of bituminous cold mix has been introduced.

Nevertheless certain major problems persist. Funding is inadequate and, since it follows a fixed formula, regional and district/city engineering offices may be discouraged from preparing the Annual Work Programs and performance budgets with the care that's needed. The Bureau of Maintenance forwards to the Budget Division of the MPWH Finance and Management Service only the budget request based upon the EMK formula; the Annual Work Programs and performance budgets remain as internal documents. The regional directors and district or city engineers don't fully appreciate the extent to which the performance budget can help them in a tight budget situation. Nevertheless, the Region III Chief of Maintenance stated that he now is in position to assign a higher priority to periodic maintenance items, even with a budget that falls far short of his needs. It was noted, however, that one periodic activity in the group he cited is bituminous surface treatment (road sealing) and he mentioned that, because of the price of asphalt, there is not enough money for a regular program of sealing roads, so spot sealing is used instead.

The IBRD-supported consultant has noted that engineering personnel still do not get out into the field enough and, also, that field crews are still not fully instructed on duties and techniques. This is evident from observation of the national roads in the various regions visited. There is little doubt that national roads are better maintained on the average than local roads (except for city streets) but certain activities, such as shoulder reshaping and ditch cutting are not what they should be. Typically, there was a considerable drop-off between the edge of the pavement and the unpaved shoulder and some edge crumbling was noticed. (In Region III some bituminous roads had been widened by a few inches on each side and this additional section was separating from the rest of the roadway). In Lanao del Norte, most of the length of the national highway linking the provincial capital of Tubod with the City of Iligan is a gravel, or telforded, road that has not been properly maintained. The provincial engineer stated

that the district had regraded the road during the two months before the team's visit and that subsequent rains had destroyed much of the work. While long sections of the road had a good crown, there were few places where ditches were in evidence and, particularly on uphill grades the section was flattened out and potholed. In some sections the road structure had already failed, so that rebuilding is needed. While rain is no doubt a major problem, it is most unlikely that the regrading (or any reshaping) was done properly in the first place or that there was any effective supervision. Related to this problem is one that stems from a lack of real models. Many engineers and equipment operators have not had an opportunity to see what a well-maintaine road, paved or unpaved, actually look like and what are its features in reality.

As noted earlier, road maintenance equipment is controlled and maintained by the Regional Equipment Services (under the Bureau of Equipment) and their offices at the district level. This system of centralized control was instituted a number of years ago, in response to a situation in which equipment was often diverted from its proper use and was not maintained. The operation of the system has engendered several problems. When road maintenance equipment is scheduled for use by the district/city engineers they must file a request with the equipment service and a rental fee (covering depreciation, the cost of maintaining the equipment, insurance and an administrative burden of 25%) is charged against the district's EMK-based maintenance allocation. It used to be that if a piece of equipment was used at all, the district had to pay rent for a minimum of 20 days. This has now been modified by the Bureau of Maintenance, so that during the dry season the minimum rental is for 11 days and during the rainy season only the actual days of use are paid for. Nevertheless, rental rates are considered high by the district and city engineers and even the modified minimum tends to discourage equipment use. What also happen is that district engineers work out "understandings" with the local offices of the Regional Equipment Services, whereby their maintenance budgets are charged for, say, only 10-15 days, while the equipment is actually used for perhaps 20 days or more. Since equipment is scheduled for mainte-

nance on the basis of recorded use, the result is that many pieces of equipment are under-maintained. The IBRD-supported consultant for the PHMMS has suggested that the fixed costs of equipment located within a district should be charged to the district's maintenance budget, whether it's used or not. The daily rental rates would then cover only the variable costs. This would encourage district/city engineers to make greater use of equipment.

Another problem that still remains is the diversion of maintenance funds and resources to project areas other than maintenance. This is less of a problem on the national road network that it is on provincial roads, since most road construction by MPWH is done by contract and the Bureau of Maintenance has tighter controls. There is still the problem, however, of diverting maintenance crews to emergency repairs. The General Appropriations Act includes a contingency fund for emergency repairs but its use requires Presidential approval and, also, the government's contracting procedures are too slow for emergency repairs by contract. It's easier for district engineers to divert their maintenance crews to do the needed repairs. While repairs are a valid part of maintenance, they aren't covered by regular allocations so diversion means that normal maintenance suffers. Since the MPWH districts once more have the responsibility for seeing that barangay roads are maintained, there will, no doubt, be pressure in the future to use crews and equipment intended for the national road system on barangay roads.

Vehicle Overloading and the Effect of Maintenance

Any discussion of road maintenance in the Philippines is not complete without some coverage of the problem of overweight vehicles. The problem stems primarily from a lack of enforcement capability and the type of vehicles used. It is aggravated, however, by inconsistencies in the regulations, which allow a Gross Vehicle Weight (GVW) that implies axle loadings higher than the legal maximum.

The most commonly used vehicle for highway transport is a 3-axle straight truck; it is the vehicle type that is also the most heavily overloaded. Because of this fact and the fact that registration fees for this common vehicle type are low, it is cross-subsidized by other types. Ironically, current regulations on Gross Vehicle Weight discourage the use of truck-trailer combina-

tions, which though they have a higher total vehicle weight will normally have lower individual axle loads. The legal maximum load on the most heavily loaded axle group (two axles 1.2 m or so apart) is 14,000 kg. but current GVW regulations imply a maximum load on the rear axle group of a 3 axle, 10-wheel truck of 18,000 kg. and loads of 23,000 kg or more were found to be not at all uncommon during surveys for the National Transportation Planning Project.

The problem of overloading is most severe on the island of Luzon, largely because the roads are better. In the Visayas and Mindanao the poorer condition of the roads restrains overloading since owners are conscious of greater damage to their vehicles. Thus, the government may find itself in a position in which better-maintained roads will result in more overloading, which in turn will impose higher maintenance costs -- unless it finds a way to enforce overload regulations.

The National Transportation Planning Project maintained that the personnel and equipment existed in 1982 for an effective enforcement program. What has been lacking is the will and the administrative structures needed to mobilize an effective program.

* * *

In summary, a workable system for programming, directing and controlling maintenance work on national roads has been developed and is generally accepted by the MPWH, its regional offices and district/city engineering offices. Furthermore, the IBRD's 5th Highway Project, approved on Sept. 27, 1984 includes funds for continued support of the new maintenance management system. Nevertheless, some significant problems do remain, which are related to a funding formula that is somewhat anachonistic, (though the Government is now committed to change this), a current insufficiency of funds, the need for more training and greater awareness of the importance of field supervision, the lack of appropriate models, the system of equipment management, pressures to divert funds and resources from maintenance work and last, but decidedly not least, the chronic problem of overloaded vehicles on the road network.

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[8] National Transportation Planning Project, Final Report - Appendices, NEDA, MOTC, MPWH, PNR, PPA, MARINA - August 1982.