No.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
(DPWH)

PREPARATORY SURVEY

FOR

ROAD ENHANCEMENT AND ASSET PRESERVATION MANAGEMENT PROGRAM (REAPMP)

IN THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

OCTOBER 2009

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

EID
CR(2)
09-119

COMPOSITION OF FINAL REPORT

Main Report

CURRENCY EXCHANGE RATE

Following currency exchange rates were adopted in this report unless otherwise stipulated.

(1) Philippine Peso vs. US Dollar
Selling rate of Bangko Sentral ng Pilipinas on June 30, 2009
USD 1= Php 48.31

(2) Philippine Peso vs. Japanese Yen
Selling rate of Bangko Sentral ng Pilipinas on June 30, 2009
JPY 1 = Php 0.5033

PREFACE

The Government of Japan decided to conduct "The Preparatory Survey on the Project for Road Enhancement and Asset Preservation Management Program (REAPMP) in the Republic of the Philippines" and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team from March to August, 2009.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made. As this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Philippines for their close cooperation extended to the survey.

October, 2009

TOSHIYUKI KUROYANAGI
Director General
Japan International Cooperation Agency

Letter of Submittal

Dear Sir,

We are pleased to submit to you the report on "The Preparatory Survey on the Project for Road Enhancement and Asset Preservation Management Program (REAPMP) in the Republic of the Philippines". The report compiled all findings and recommendations obtained through the survey from March 2009 to September 2009 conducted by Nippon Koei Co. Ltd. in accordance with the contract with Japan International Cooperation Agency (JICA).

The objectives of the survey are to study the road operation and maintenance systems and select sub-programs for REAPMP to be requested by GOP for Japanese ODA. REAPMP is comprised of four components; road improvement (UI) project, long-term performance based maintenance (LTPBM) project, preventive maintenance programs and institutional capacity development of Department of Public Works and Highways (DPWH).

The Survey team concluded that REAPMP will be technically and economically feasible and acceptable from the environmental aspects. Its implementation will contribute to the enhancement of economic development of the Republic of the Philippines. Therefore, the Survey team recommends earlier implementation of the program.

We wish to express our sincere gratitude to your agency, including the JICA experts concerned, and also wish to express our deep appreciation to the government of the Philippines, especially the counterpart agencies of the Department of Works and Highways (DPWH) for their close cooperation and assistance extended to us during the survey.

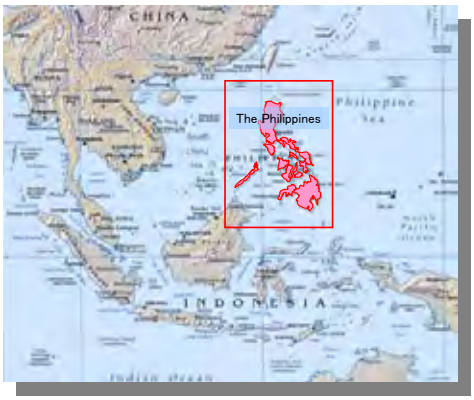
We hope this report will contribute to the development of the Republic of the Philippines.

Very truly yours,

October, 2009

Yuichi TSUJIMOTO

Leader of the Survey Team



UI and LTPBM

Preventive Maintenance (PM)

Pre-fixed Road Links (L=93.01 Km)

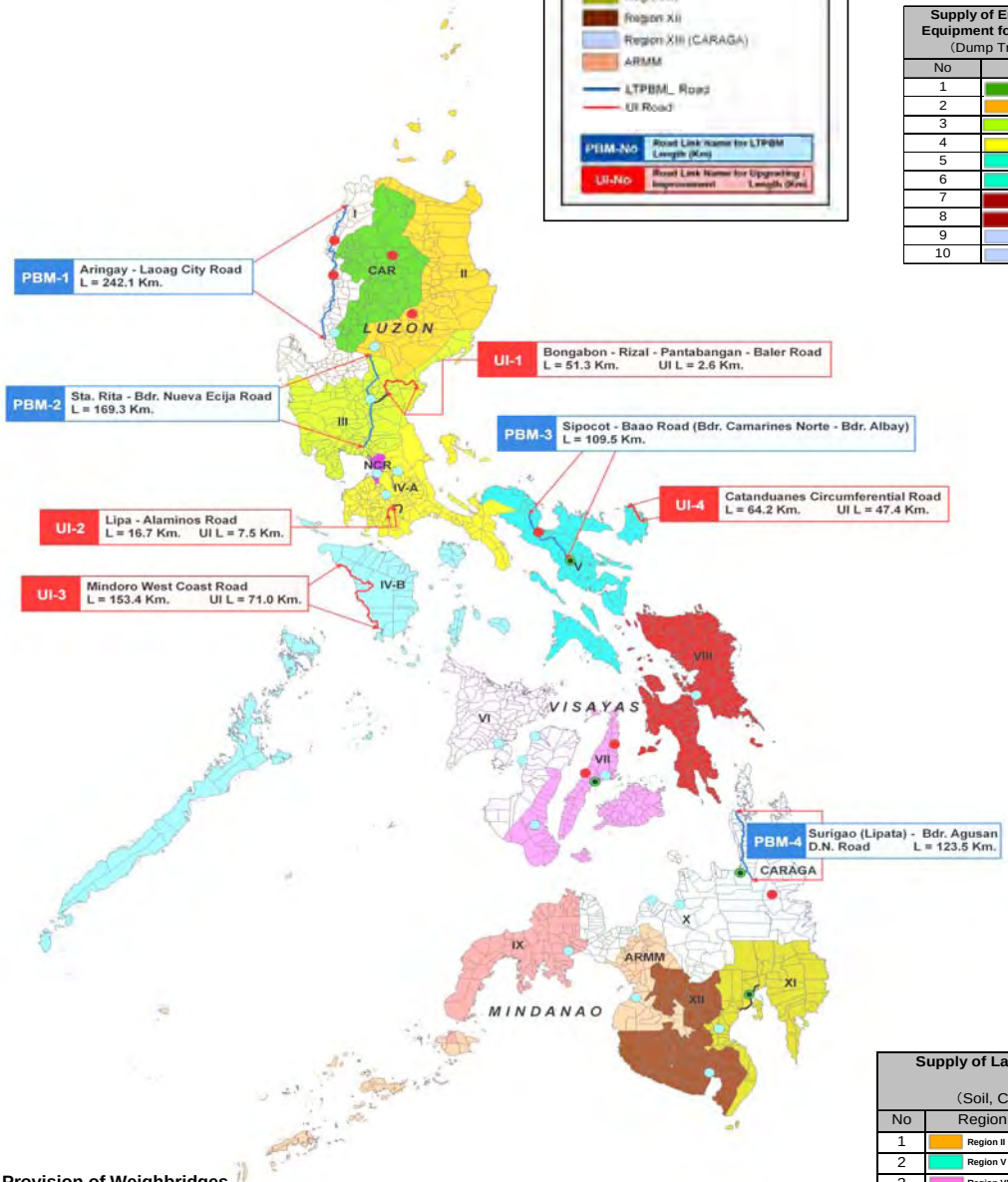
- Region III
- Region IV-A CALABARZON
- Region XI

HDM-4 Selected Road Links (L=500 Km)

- CAR
- Region I
- Region II
- Region III
- NCR
- Region IV-A CALABARZON
- Region IV-B MIMAROPA
- Region V
- Region VI
- Region VII
- Region VIII
- Region IX
- Region X
- Region XI
- Region XII

Supply of Emergency Disaster Recovery Equipment for Typhoon and Slope Failures
(Dump Truck x 2, Wheel Loader x 1)

No	Region	Location (DEO)
1	CAR	Benguet
2	Region II	Nueva Vizcaya
3	Region III	Aurora
4	Region IV-A	Quezon
5	Region V	Albay
6	Region V	Catanduanes
7	Region VIII	Eastern Samar
8	Region VIII	Southern Leyte
9	Region XIII	Surigao del Sur
10	Region XIII	Agusan del Sur



Provision of Weighbridges

Existing Weigh Bridges	22 nos.
Refurbish of Existing Weigh Bridges	4 nos.
New Weigh Bridges	8 nos.

Supply of Laboratory Equipment and Apparatus
(Soil, Concrete, Aggregate)

No	Region	Sub-Region
1	Region II	Cabarroguis, Quirino
2	Region V	Naga City
3	Region VII	Dumaguete City
4	Region VIII	Catbalogan, Samar
5	Region IX	Pagadian City
6	Region X	Oroquieta City
7	Region XII	General Santos City
8	Region XIII	Surigao City

LOCATION MAP OF REAPMP

FINAL REPORT

TABLE OF CONTENTS

List of Figure

List of Table

LIST OF ABBREVIATIONS

A

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Office
AC	Asphalt Concrete
ADB	Asian Development Bank
ASEC	Assistant Secretary
AusAID	Australian Agency for International Development
AWP	Annual Working Program

B

Bill. or Bil.	Billion
B/C	Benefit/Cost Ratio
BM	Backlog Maintenance
BMS	Bridge Management System
BOD	Bureau of Design, DPWH
BOE	Bureau of Equipment, DPWH
BOM	Bureau of Maintenance, DPWH
BRS	Bureau of Research and Standards, DPWH

C

CAR	Cordillera Administrative Region
CBR	California Bearing Ratio
CNC	Certificate of Non-Coverage

D

DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resource
DEO or DO	District Engineering Office
D.O. or DO	Department Order (of DPWH)
DOF	Department of Finance
DOTC	Department of Transportation and Communication
DPWH	Department of Public Works and Highways

E

ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMB	Environmental Management Bureau, DENR
EMK	Equivalent Maintenance Kilometer
ESSO	Environmental and Social Safeguards Office

F

FC	Foreign Component or Foreign Currency
FWD	Falling Weight Deflectometer

G

GAA	General Appropriations Act
GDP	Gross Domestic Product
GOJ	Government of Japan
GOP	Government of the Philippines
GRDP	Gross Regional Domestic Product
GVW	Gross Vehicle Weight

H

Ha	Hectare

HDM-4	Highway Development and Management Version 4 Program

I

ICB	International Competitive Bidding
ICC	Investment Coordination Committee, NEDA
ICD	Institutional Capacity Development
IEE	Initial Environment Examination
IRI	International Roughness Index
IRR	Internal Rate of Return
IT	Information Technology

J

JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency

K

km	kilometer

L

LA	Loan Agreement
LC	Local Component or Local Currency
LCB	Local Competitive Bidding
LTO	Land Transportation Office
LTPBM	Long-Term Performance Based Maintenance
LTPBMC	Long Term Performance Based Maintenance Contract

M

Mill. or Mil.	Million
MBA	Maintenance by Administration (force account)
MBC	Maintenance by Contract
MCA	Multi-Criteria Analysis
MIS	Monitoring and Information Service, DPWH
MTPDP	Medium-Term Philippine Development Plan
MTPIP	Medium Term Public Investment Program
MVUC	Motor Vehicle User Charge

N

NEDA	National Economic Development Authority
NGO	Non-Governmental Organization
NPV	Net Present Value
NPV/CAP	Net Present Value/Capital Cost
NRIMP	National Roads Improvement and Management Program

O

ODA	Official Development Assistance
OJT	On-the-Job Training
OPRC	Output and Performance-based Road contract

P

PAP	Project Affected Persons
PBM	Performance Based Maintenance
PCC	Portland Cement Concrete
PCU	Passenger Car Unit
PD	Presidential Decree
PEGR	Philippines – Australian Partnership for Economic Governance Reforms
Php	Philippine PESO
PJHL	Philippine-Japan Highway Loan (PMO)
PM	Preventive Maintenance

PMO	Project Management Office
PMO-FS	Project Management Office-Fusibility Staudies
PMS	Pavement Management System
PNP	Philippine National Police
PPP	Public Private Partnership
Pre-FS	Pre-feasibility Study
PS	Planning Service, DPWH

Q

QA	Quality Assurance
QAU	Quality Assurance Unit
QC	Quality Control

R

R.A	Republic of Act
R.A.9184	Republic Act No.9184, other wise known as the Government Procurement Reform Act of 2003
RAP	Resettlement Action Plan
RBIA	Road and Bridge Information Application
REAPMP	Road Enhancement and Asset Preservation Management Program
RIMSS	Road Information Management Support System
RH	Rehabilitation
RM	Routine Maintenance
RMMS	Routine Maintenance Management System
RO	Regional Office, DPWH
ROW	Right of Way
RP	Resettlement Plan
RS	Road Safety

S

SONA	State of the Nation Address of the President
SRNH	Strong Republic Nautical Highway
SRSF	Special Road Safety Fund

T

TA	Technical Assistance
TARAS	Traffic Accident Recording and Analysis System
TCP	Technical Cooperation Project
TOR	Terms of Reference
TWG	Technical Working Group

U

UI	Upgrading or Improvement
USEC	Under Secretary
US$	United States Dollar

V

VAT	Value Added Tax
VCI	Visual Condition Index
VOC	Vehicle Operation Cost

W

WB	World Bank

SYNOPSIS

1. Country	Republic of the Philippines
2. Name of Study	Preparatory Survey for Road Enhancement and Asset Preservation Management Program (REAPMP)
3. Counterpart Agency	Department of Public Works and Highways
4. Objectives of Study	1. Enhancement of the Road O&M System 2. Selection of national road links for a Japanese ODA Loan for implementation of REAPMP and confirmation of the scope of the program
5. Study Area	All over the country

6. Scope of Study

1) To collect the basic data on roads and bridges, including the current condition, relevant institutions, and the extent of assistance by major donors,
2) To collect and analyze the present O&M system for roads and bridges, and recommend improvement measures,
3) To confirm and propose the projects/programs to be funded by a Japanese ODA Loan for asset management, and
4) To confirm the conditions concerning the social and environmental considerations for the Japanese ODA Loan projects.

7. Major Findings

1) Key issues in the road sector of the Philippines include low quality of roads due to the insufficient level of budget allocation to DPWH and its utilization, etc., inadequacy in road planning and management system, overloading adversely affecting the pavement and bridges, weakness and insufficient capacity in the design, construction and maintenance stages, and construction cost increase mainly due to the significant hike of material prices.

2) Key issues in the national road maintenance include Routine Maintenance Management System (RMMS) to become operational to replace the conventional EMK (allocation of budget per km), big funding gap between the allocated budget and actual needs, and large maintenance backlog to be solved within a short- to medium-term period.

3) DPWH's rationalization plan is still in progress with some policy change in the proposed DPWH structure such as the targeted MBC and MBA ratio of 90:10, the privatization of BOE, downsized manpower, etc.

4) Through the review and rearrangement of the scope and components of REAPMP, the sum of roads covered by the proposed REAPMP becomes 1,523 km, compared to 1,655 km once approved by NEDA-ICC. Among them, upgrading/improvement (UI) covers four road links in length of 286 km (128 km of new concrete pavement length) and 22 bridges construction in total length of 809 m. Long Term Performance Based Maintenance (LTPBM) covers four road links with 644 km total length, including 2 bridges construction (129 m). Preventive Maintenance (PM) includes 593 km in total. Institutional Capacity Development (ICD) has subcomponents such as equipment supply, capacity development in program/project implementation and management, etc.

5) The total base cost (2009 Price) is estimated at Php 20.8 billion, comprising Php 5.2 billion (24.9%) for UI, Php 14.2 billion (68.5%) for LTPBM and PM, and Php 1.4 billion (6.6%) for ICD. Out of the total amount, civil works cost is Php 17.7 billion (85.2%), consultancy services is Php 1.5 billion (7.3%), and others at Php 1.6 Billion (7.5%).

6) Economic analysis undertaken resulted in a favorable economic feasibility (EIRR>15%) for all UI, LTPBM, and PM cases.

7) Adding the physical and price contingencies, VAT, and administration cost to the base cost, the total program cost is estimated at Php 29.1 billion, as compared to Php 28.2 billion previously approved in the NEDA-ICC.

8) Based on the Philippines EIA system, it is ascertained that the environmental and social considerations for the Project conform well to the JICA (and JBIC) guidelines. Among the projects under REAPMP, four UI projects require acquisition of ECC. These ECCs were already obtained and are judged to be still valid.

8. Conclusions and Recommendations

1) Directions addressing the key issues include development of a long-/medium-term national road and bridge improvement and maintenance plan and strategy, promotion of LTPBM aiming for the reduction of the life-cycle costs and increase of maintenance efficiency towards the future, and enhancement of cooperation and coordination among donors assisting GOP for national road network development and maintenance.

2) The proposed financing for the total program cost of Php 29.1 billion is Php 9.0 billion (30.8%) from GAA of GOP, Php 2.8 billion (9.7%) from MVUC of GOP, and Php 17.3 billion (59.5%) from the Japanese ODA Loan. The Japanese loan amount is estimated at 34.4 billion yen.

3) A new unified REAPMP Program Management Office (REAPMP-PMO) shall be established for the administration and management of REAPMP.

4) After the Loan Agreement scheduled in March 2010, the entire Program implementation period will be 8 years from 2010 to 2017, comprising almost a half year for consultancy procurement, another 1.3 years (15 months) for Detailed Design for UI and LTPBM projects and tendering for contractors, 5 years for LTPBM implementation in parallel with UI, PM, and ICD, and the last 1 year for monitoring and evaluation of LTPBM.

5) Approval of REAPMP by the NEDA-ICC has expired as of the end of August 2009. DPWH should prepare a new (or revised) NEDA-ICC proposal based on this Final Report and resubmit to NEDA for approval just after the project appraisal of JICA scheduled in November 2009. This would enable the signing of the Loan Agreement by the end of March 2010.

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

Total length of the roads in the Philippines is about 200,000 km, which consist of national, provincial, municipal, and barangay roads. As of 2008, the total length of the national roads is about 30,000 km. The roads bear 90% and 50% of the total domestic passenger and freight transport, respectively. The Department of Public Works and Highways (DPWH) is responsible for the development and management of the national roads which support the fundamental transport and economic activities in the Philippines. In order to assist accomplishing the development visions and goals stated under the Medium-Term Philippine Development Plan (2004-2010), the State of the Nation Address (SONA) and 10-point legacy of the Arroyo administration, DPWH formulated the Medium-Term Public Investment Program (2005-2010), which tackles the following three major challenges of the road sector.

	Major Challenge	Basic Policy and Targets
1	Low level of national road development Only 21,000 km out of total 30,000 km of national roads are paved. Surface conditions for 41% are poor or bad.	- Ratio of paved national roads up to more than 95% - Surface conditions with 'good' and 'fair' up to more than 90% - Adoption of road asset preservation approach and priority Operation & Maintenance (O&M)
2	Low level of investment to road development and O&M, insufficient budgets, and inefficient budget execution	- Increase of GAA to road expenditure - Further development of Road Fund for O&M and Road Board - Improvement of budget allocation and distribution - Assistance from foreign donors (NRIMP from WB, RSIP from ADB, REAPMP from JICA)
3	DPWH's insufficient capacity for planning, implementation and management	- Rationalization of 26,000 DPWH employees - Improvement of business processes for planning, project management, quality assurance, etc. - Control of overloading - Institutional Capacity Development (ICD)

Japan has been the large amount of external assistance to the road sector of the Philippines. It provided a large share of the total amount of assistance, and exercises initiative at the policy level to support infrastructure development. It functions in a way similar to that of the co-chairpersons of the infra development group of the Philippine Development Forum. Hence, it recognized the needs for further expansion of the road network, strengthening of O&M and improvement of existing roads, and capacity development of administration for management and development of roads are recognized.

Under these circumstances, DPWH proposed the Road Enhancement and Asset Preservation Management Program (REAPMP) and requested the Government of Japan (GOJ) to provide a technical assistance for improvement, rehabilitation, preventive maintenance, road safety, O&M enhancement, and Public-Private Partnership (PPP) application for the existing national roads. On the other hand, World Bank (WB) is implementing the National Road Improvement and Management Program Phase 2 (NRIMP-2) as a similar road sector assistance aiming for the enhancement of road O&M and ICB.

1.2 SURVEY OBJECTIVES

The objectives of this Survey are as follows:

1) To enhance the road O&M system which includes:

   - Review of the present O&M system for roads and bridges in DPWH and identify key

issues

- Recommendation of the overall improvement of O&M system of DPWH

2) To propose roads to be included in the Japanese ODA Loan for the implementation of REAPMP. Said roads shall be selected from the projects requested by the Government of the Philippines (GOP) for Japanese ODA. This shall include:

   - Confirmation of the prioritized REAPMP projects among those requested, preparation of the project plans, and clarification of the relevance and effects.

The final report based on this survey will be utilized by JICA for the appraisal of the requested Japanese ODA Loan.

1.3 SCOPE OF SURVEYS AND SURVEY AREA

The basic reference for the survey carried out is the "Road Operational and Maintenance Sector Study Final Report, 31 July 2007" (Pre FS) prepared by JBIC and DPWH. The scope of works for the survey is as follows:

(1) Collect the basic data on roads and bridges, including the current condition, relevant institutions, and the extent of assistance provided by major donors,

(2) Collect and analyze the present O&M system for the roads and bridges, and to recommend corresponding improvement measures,

(3) Confirm and propose the projects to be funded by a Japanese ODA loan for asset management, and

(4) Confirm the conditions concerning the social and environmental considerations for the Japanese ODA loan projects.

The survey areas (national road links) based on abovementioned objectives are as follows:

(1) Enhancement of the highway O&M system: All national highways managed by DPWH

(2) Confirmation of the proposed highways for improvement (UI) and long-term performance based maintenance (LTPBM) to be included in the Japanese ODA loan, are as follows and as shown in Figure 1.3.1.

   1) JLM3, Aringay – Laoag L=242 km
   2) JLM6, Talavera – Rita – Bongabon – Pantabangan – Baler L=119 km
   3) JLM1, Sta. Rita – Nueva Ecija L=160 km
   4) JLM10, Lipa – Alaminos – San Pablo – Tiaong L=43 km
   5) JLM2, Sipocot – Baao L=100 km
   6) JLM11, Catanduaness Circumferential Road L=58 km
   7) JLM8, Mindoro West Coast Road L=119 km
   8) JLM4, Lipata – Davao L=161 km

(3) Update of approximately 500 km of the road links financed for preventive maintenance program.

(4) Review the Institutional Capacity Development (ICD) programs proposed in the Pre-FS and select the programs to be included in the Japanese ODA loan.

ICD Sub-Component in Pre-FS Report
Institutional Capacity Building（ICB)
1 Routine Maintenance Enhancement
(1) Operation of Routine Maintenance Management System (RMMS)
(2) Capacity Building for DPWH RO and DEO Staff
2 Road Safety Enhancement
(1) Enhancement of TARAS
(2) Improvement of Road Safety Audit (RSA) System
3 Overloaded Vehicle Control
4 Quality Control System（Construction, Rehabilitation and Preventive
5 Enhancement of Contractors and Consultants on Road Maintenance
6 Road Disaster Countermeasure Design and Construction
7 Supply of Emergency Disaster Recovery Equipment
Technical Assistance (TA)
(1) Formulation of PPP
(2) Formulation of Future REAPMP-Phase II, including engineering design

Source: Pre-FS Report, July 2007

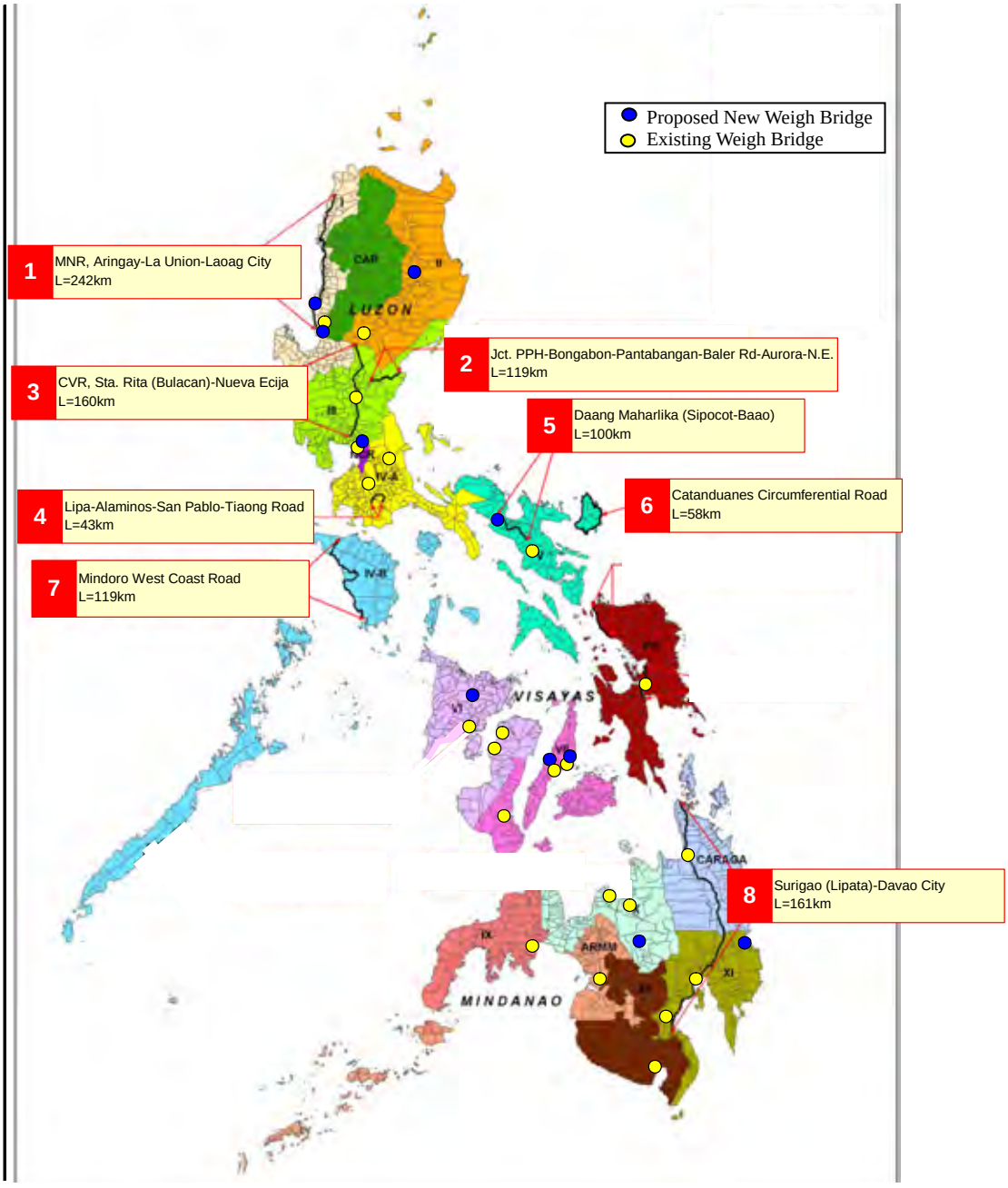


Figure 1.3.1 Road Links UI/LTPBME Requested for Japanese ODA

1.4 SURVEY PROGRESS

The survey work commenced on March 16, 2009, on which the first Steering Committee meeting was held in DPWH for a briefing of the Inception Report. Subsequently, the Survey Team initiated obtaining basic data on national roads and bridges, site reconnaissance survey, analysis of the present O&M systems, and confirmation of REAPMP projects to be covered by Japanese ODA Loan, as well as the relevant environmental and social considerations. The results initially obtained and the overall direction of the activities thereafter were discussed and approved during the second Steering Committee meeting held on June 16, 2009. The collected information and analysis was compiled in the Progress Report submitted to JICA and DPWH on July 10, 2009.

The following activities were then carried out:

- Confirmation and proposal related to the ODA loan project for JICA-assisted road asset management programs
- Supplemental analysis of O&M of national roads and DPWH's institutional capacity development.

The works on the following items was completed, compiled in the Draft Final Report and submitted on September 4th, 2009. The progress schedule of said works is presented in Figure 1.4.1:

- Summarization of current status and major issues in the road sector
- Summarization of current status and major issues in the national road maintenance, MVUC, and road safety
- Summarization of plans and programs addressing to the major issues
- Description of the JICA-assisted road asset management program including UI, LTPBM, PM, and ICD
- Review of EIA and current ECC status
- Cost estimate
- Implementation plan
- Recommendations and agreed action plans for the Project and DPWH reform
- Conclusion and recommendations

The outline and survey results were discussed and approved during the third Steering Committee meeting on Draft Final Report held on August 27, 2009. The Survey Team incorporated agreements made during the Steering Committees in the Draft Final Report.

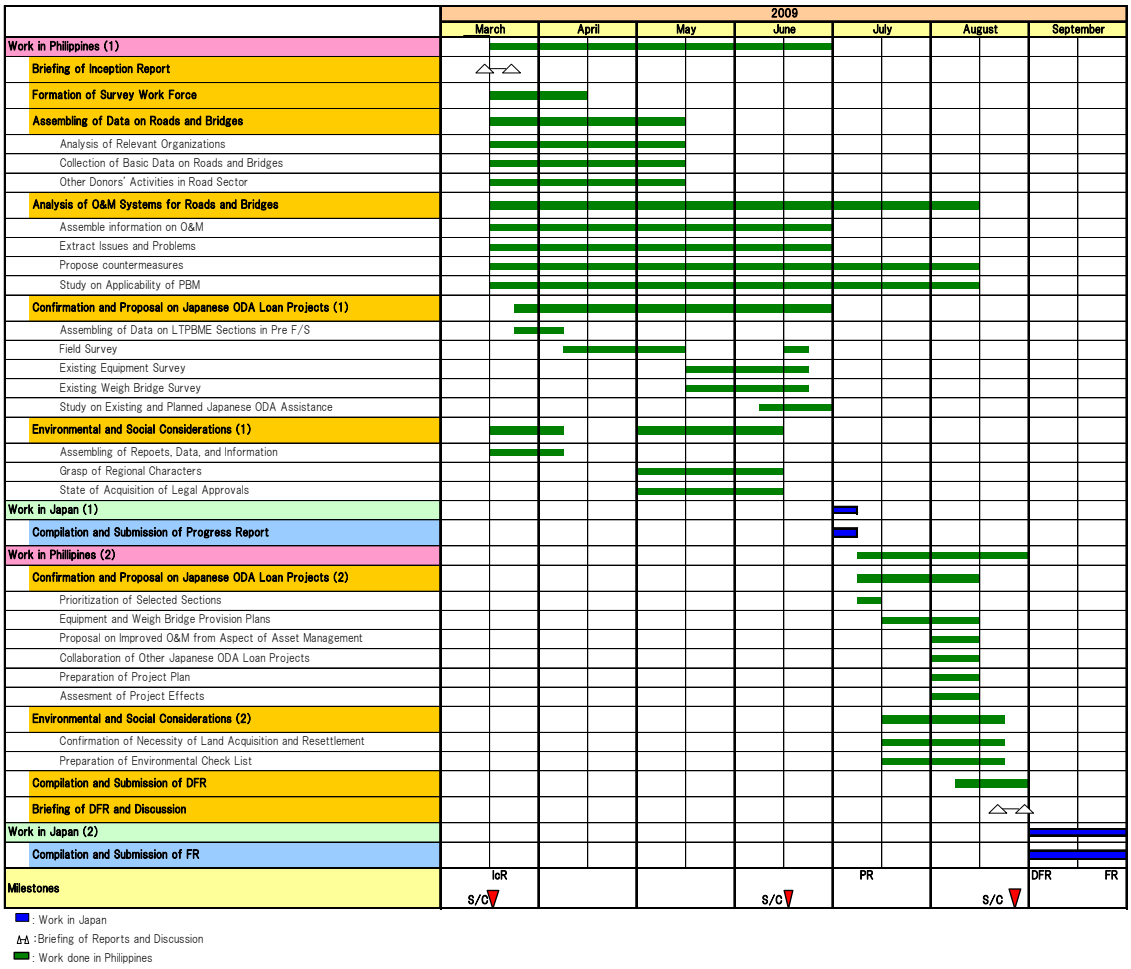
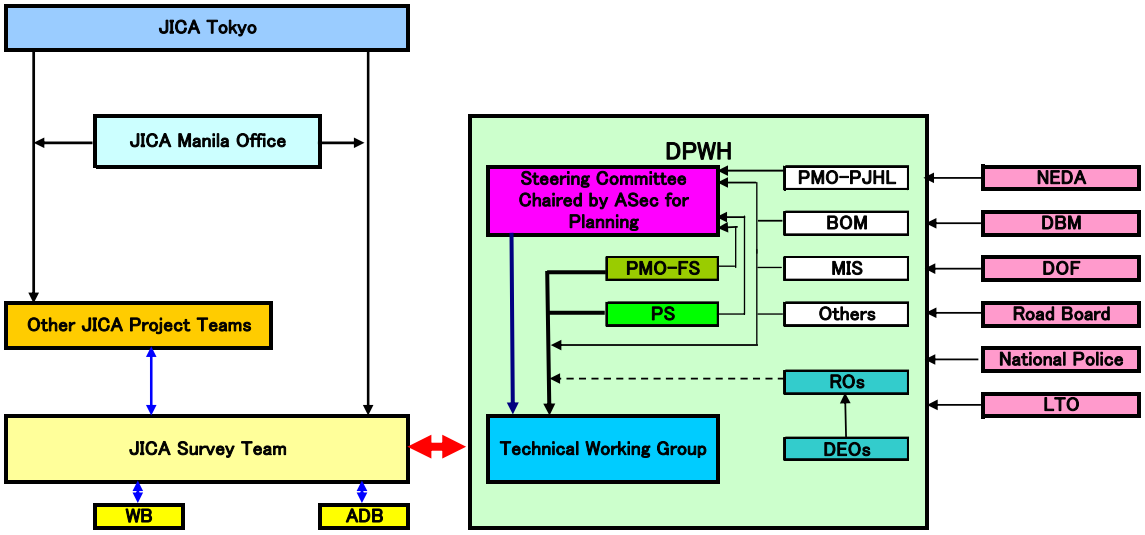


Figure 1.4.1 Progress of Work

1.5 ORGANIZATION FOR THE SURVEY

The survey was carried out through close coordination between the Survey Team and the DPWH counterparts. The latter constitutes the Steering Committee, chaired by the Assistant Secretary for Planning, and the Technical Working Group consisting of designated representatives from PS, PMO-FS, BOM, MIS and ESSO. The organizational set-up is shown in Figure 1.5.1.



STEERING COMMITTEE (SC)

Senior Undersecretary –Advisor
Assistant Secretary for Planning – Chairperson
Director of PMO-Feasibility Studies – Vice Chairperson
Director of Planning Service (PS)
Director of Bureau of Maintenance (BOM)
Director of Management and Information Service (MIS)
Director of Bureau of Design (BOD)
Director of Road Information Management Support System (RIMSS)
Director of PMO for JBIC-assisted Highway Projects
Head of Procurement Office for Civil Work (POCW)
Environmental and Social Services Office - Member

TECHNICAL WORKING GROUP (TWG)

Mr. Carmelino Tizon	PMO-FS – Coordinator
Engr. Rebecca Garsuta	PS (Development Planning Division) – Co-Coordinator
Engr. Nenita Jimenez	PS (Highway Development and Management or HDM 4)
Engr. Napoleon Famadico	PS (Road & Bridge Information Application)
Engr. Solita Genota	PS (Road Safety)
Engr. Maria Visna Manio	BOM (Long Term Performance Based Maintenance)
Engr. Cindy M. Argote	BOM (Preventive Maintenance)
Ms. Ma. Nieva S. Dela Paz	MIS
Ms. Belinda I. Fajardo	ESSO

Figure 1.5.1 Inter-Organizational Linkage for Survey

CHAPTER 2 CURRENT SITUATION OF THE ROAD SECTOR

2.1 NATIONAL POLICY AND DEVELOPMENT PLANS

2.1.1 MEDIUM-TERM PHILIPPINE DEVELOPMENT PLAN (MTPDP), 2004-2010

The basic task of the MTPDP 2004-2010, formulated by GOP through NEDA, is to fight poverty by building prosperity for the greatest number of the Filipino people. The country must open up economic opportunities, maintain sociopolitical stability, and promote good stewardship - all to ensure a better quality of life for its citizens. The country will focus on strategic measures and activities, which will spur economic growth and create jobs. This can only be done by a common purpose to put the economic house back in working order.

The 10-point legacy of the Arroyo administration by 2010 has been set as follows;

1. Ten million jobs shall have been created, by supporting three million entrepreneurs and developing two million hectares of agribusiness land.
2. Everyone of school age will be in school, in an uncrowded classroom, in surroundings conducive to learning. Three thousand school buildings a year shall have been built and a computer put in every high school.
3. The budget shall have been balanced with the right revenues collected and spending on the right things ensured.
4. The network of transport and digital infrastructure on which the Arroyo government embarked in 2002 shall have linked the entire country.
5. Power and water shall have been regularly provided to the entire country.
6. Metro Manila will have been decongested with economic activity growing and spreading to new centers of government, business and community in Luzon, in the Visayas, and in Mindanao
7. The Subic-Clark corridor will have become the most competitive international service and logistics center in the Southeast Asian region.
8. Elections will no longer raise doubt about their integrity. The electoral process will have been completely computerized.
9. Peace will have come to Mindanao and all insurgency areas.
10. The divisive issues generated by EDSA 1, 2 and 3 will have had a just closure.

Among a number of sectors covered by the growth strategy in the MTPDP, the transport sector is referred to as follows:

The government of the Philippines (GOP) is aiming to achieve its growth targets by strong investment spending and export. To achieve these targets, the government shall pursue policies that address the root causes of declining competitiveness. These include keeping the cost of food items and other wage goods at competitive rates through greater productivity; reducing transport and distribution costs through better transport and digital infrastructure and logistics, especially with the completion of the nautical highway system; providing more competitive power rates through elimination of cross-subsidy between industrial and residential users and upgrading knowledge to increase productivity; and addressing corruption and simplifying business procedures.

Major infrastructure investment such as the nautical highway and roads in tourist destinations shall be financed mostly from BOT-type modes and non-recourse project financing where the

cash flows of a financially viable project will not require the proponent to seek government guarantee. Other innovative financing and revenue-generating strategies include capturing the increase in property values arising from the development of major roads and highways such as the Subic-Clark-Tarlac Expressway (SCTEX).

2.1.2 MEDIUM-TERM INFRASTRUCTURE PROGRAM OF DPWH (2005-2010)

The DPWH, in compliance with the directive of the President and in coordination with NEDA, has revised and updated the medium-term infrastructure program covering the period 2005-2010, as shown in Table 2.1.1 below.

Table 2.1.1 DPWH Term Infrastructure Program

List of Projects	Total Cost	Prior Years	PROPOSED ALLOCATION (In Thousand Pesos)						
			2005	2006	2007	2008	2009	2010	Later Years
I. HIGHWAYS	**366,182,452**	**74,369,749**	**30,943,707**	**32,786,541**	**37,011,150**	**38,151,705**	**40,095,987**	**43,604,325**	**69,219,288**
A. FOREIGN-ASSTD PROJ	231,490,526	60,969,855	17,269,209	22,375,969	24,341,893	23,229,749	17,789,140	20,694,445	44,820,266
a. On-going	121,864,773	59,774,270	16,892,908	18,839,159	16,551,097	8,742,088	1,065,251	-	-
b. New/Proposed	109,625,753	1,195,585	376,301	3,536,810	7,970,796	14,487,661	16,723,889	20,694,445	44,820,266
B. LOCALLY FUNDED PROJ	134,691,926	13,399,894	13,674,498	10,410,572	12,669,257	14,921,956	22,306,847	22,909,880	24,399,022
II FLOOD CONTROL	**77,466,515**	**19,028,632**	**6,724,544**	**7,398,556**	**5,855,147**	**7,568,592**	**9,065,31**	**8,968,972**	**12,856,762**
A. FOREIGN-ASSTD PROJ	66,880,493	17,082,610	5,534,544	6,208,556	4,665,147	6,378,592	7,875,310	7,778,972	11,356,762
a. On-going	34,645,529	17,071,910	5,449,544	5,896,756	2,802,798	1,557,452	1,339,630	50,000	477,439
b. New/Proposed	32,234,964	10,700	85,000	311,800	1,862,349	4,821,140	6,535,680	7,728,972	10,879,323
B. LOCALLY FUNDED PROJ	10,586,022	1,946,022	1,190,000	1,190,000	1,190,000	1,190,000	1,190,000	1,190,000	1,500,000
III OTHER DPWH PROJECTS 1/*	**26,568,073**	**18,757,855**	**1,051,703**	**1,051,703**	**1,051,703**	**1,051,703**	**1,051,703**	**1,051,703**	**1,500,000**
GRAND TOTAL	**470,217,040**	**112,156,236**	**38,719,954**	**41,236,800**	**43,918,000**	**46,772,000**	**50,213,000**	**53,625,000**	**83,576,050**

Under the program, DPWH is seeking to accomplish the following:

1. Pave all national roads to increase the ratio of paved length to total length from 70% in 2004 to 95% in 2010, with IRI of less than 4.
2. Replace/construct national bridges with permanent structures throughout the country to increase the ratio of permanent bridges from 93% in 2004 to 100% in 2010.
3. Prioritize roads to support the 10-point agenda of the GOP with the following pertinent thrusts related to road infrastructure:
   - Completion of the nautical highways. DPWH is seeking to complete the paving and improvement of the remaining unimproved road sections of the Nautical Highway as well as rehabilitation or replacement of weak bridges along the routes.
   - Decongest Metro Manila through the completion of expressway projects and undertake projects to speed up traffic in and out of Metro Manila.
   - Address critical transport bottlenecks by widening narrow roads, initiating traffic management and improving intersection in urban areas, while paving and improving arterial road links between regional centers and production areas in rural areas.
   - Improve access to major tourist destinations by paving and improving roads leading to tourist complexes.
4. Allocate infrastructure funds according to the priority order of:
   - Preservation and maintenance - an increase in the allocation for maintenance of national roads from P 4.8 billion to P 13.5 billion by 2010 to fully meet the computed needs, with IRI of less than 4.
   - Rehabilitation - provision of adequate funds to meet the rehabilitation needs based on PMS/BMS.

2.1.3 NAUTICAL HIGHWAY SYSTEM

If an efficient transport network is developed, the Philippines will progress from the fragmented and island economies separated by mountains and seas, into a unified and well-integrated economy where people and goods can move and trade swiftly and efficiently, locally and internationally. With Central Luzon, Metro Manila and Calabarzon, accounting for 30% of the total population and 55% of GDP, food will have to be sourced from regions like Cagayan Valley and Mindanao. The transport and logistics system should thus be adequate and efficient to bring down the cost of food, especially in the country's industrial heartland. This will make food plentiful at reasonable prices and the country's wages internationally competitive.

Inter-island routes provide regular roll-on roll-off (ro-ro) vessel operation, connecting the main islands of Luzon, Visayas and Mindanao. In 2003, the nautical highway system, known as the Strong Republic Nautical Highway (SRNH), was initiated to maximize the use of the ro-ro system to transport products from Mindanao through Visayas to Luzon. It will reduce travel time by 10 hours and costs by 40% for passenger and 30% for cargo. The recent implementation of the Western Nautical Highway connected the islands of Luzon to Mindoro, Panay, Guimaras, Negros and Mindanao. Besides this route, the nautical highway system shall be comprised of two other high priority routes, the Central Nautical Highway, connecting Luzon to Masbate, Cebu, Bohol and Mindanao, and the Eastern Nautical Highway, connecting Mindanao to Leyte and Masbate, as shown in Figure 2.1.1.

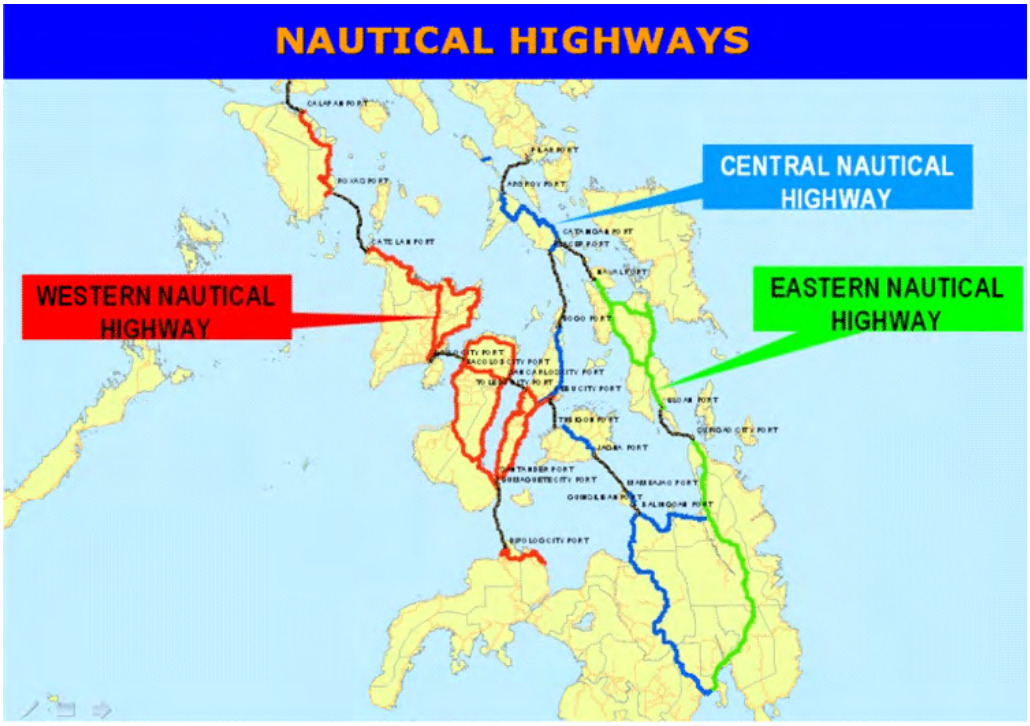


Figure 2.1.1 Nautical Highway System

2.1.4 STATE OF THE NATION ADDRESS (SONA)

The gist 2009 SONA on July 27, 2009 is as follows;

Financial meltdown in the west spread throughout the world in past twelve months. But the story of the Philippines in 2008 is that the country weathered a succession of global crises in fuel, in food, then in finance and finally the economy in a global recession, never losing focus and with economic fundamentals intact.

For the country to be ready for the first world in 20 years, key reforms were made, including the economic plan putting people first such as new tax revenues properly put in place for better healthcare, more roads, and a strong education system; housing policies; and agricultural investments. Today the business process outsourcing and tourism create wealth.

Reforms gave the resources to extend welfare support and enhance spending power, e.g. cash handouts to the poorest, the Comprehensive Agrarian Reform program, the lowest inflation rate of 1.5% since 1966, enabled investment in food production, the hunger mitigation program, cheaper medicine, health insurance covering 86% of the population, low power prices from the Electric Power Industry Reform Act and electrification reaching almost all villages, lower public debt to GDP of 55% in 2008 and foreign debt of 32% in 2008, improvement of the banking system, and education and skill training.

In summary:

1. The country has a strong economy in a good fiscal position to withstand global shocks.
2. The country built new modern infrastructure and completed unfinished ones.
3. The economy is more fair to the people than ever before.
4. The country is building a sound base for the next generation.

5. International authorities have taken notice that the Philippines is safer from environmental degradation and man-made disasters.

Tracking the GOP's accomplishments, sectoral and more detailed in nature, and, along the five strategies outlined in the MTPDP 2004-2010, covering the areas of: 1) Economic Growth and Job Creation; 2) Energy; 3) Social Justice and Basic Needs; 4) Education and Youth Opportunity; and 5) Anti-Corruption and Good Governance, infrastructure development is referred to as interventions in the area of economic growth and job creation. The SONA strategic infrastructure road projects are among the major focuses for development of the country to support the GOP's second phase of economic reforms. More specifically, the accomplishment in the restructuring of the Philippine economy is envisaged in the following five super regions, introduced in 2006 as a development concept to boost economic growth and job creation:

- North Luzon Agribusiness Quadrangle,
- Luzon Urban Beltway,
- Central Philippines,
- Agribusiness Mindanao, and
- Cyber Corridor.

2.1.5 DIRECTION OF THE ROAD SECTOR DEVELOPMENT POLICY IN THE NEXT MTPDP (2011-2015)

Following the current Medium-term Infrastructure Program of DPWH (2005-2010), DPWH intends to develop a subsequent program for 2010-2015. However, under the present condition the actual work on preparation for the next program has not started, although the continuation of the successive programs is ascertained by DPWH.

Considering the contents of the current program, it is anticipated that the general direction of the road sector policy tends to strengthen further the aspects of preservation and management of existing road assets, as well as their rehabilitation, rather than the development of new roads. In 2010 the next program leading to this direction will be developed by DPWH.

2.2 CURRENT SITUATION OF THE ROAD SECTOR

2.2.1 ROAD CLASSIFICATION

(1) Administrative Classification

The total road length in the Philippines is approximately 203,600 km as of 2007. This comprised of 29,370 km (14.3%) national roads, 31,285 km (15.2%) provincial roads, 7,052 km (3.4%) city roads, 15,804 km (7.7%) municipality roads and 121,989 km (59.4%) barangay roads.

The administrative classification of roads in the Philippines is as follows:

Table 2.2.1 Road Classification by Administration and Function

Classification	Administration	Function
National Roads	National Government (DPWH)	- Roads continuous in extent that form part of the main trunk line system - Road leading to national ports, national seaports or coast-to-coast roads
Provincial Roads	Provincial Government	- Roads connecting one municipality with another - Roads extending from a municipality or from provincial or national road to public wharf or railway station - Other roads to be designated as such by the Sangguniang Panlalawigan
City Roads	City Government	Roads/streets within the urban area of the city to be designated as such by Sangguniang Panlunsod
Municipality Roads	Municipal Government	Roads/streets within the poblacion area of a municipality to be designated as such by Sangguniang Bayan
Barangay (farm - to - market) Roads	City/Municipal Government	- Rural roads located either outside the urban area of the city or outside industrial, commercial or residential subdivisions - Roads located outside the Pobacion area of the municipality - Roads located outside of the urban area and to be designated as such by the concerned Barangay Council
Expressway	Philippine National Construction Corporation (PNCC)+PC	- NLEX (83 km, completed in 2005) - SLEX (27 km) - SCTEX (95 km) - STAR (42 km) - Others (Skyway, R-1, C-5)

The planning, construction and maintenance of national roads is the responsibility of the DPWH. The local government units or LGUs (provincial, city and municipal) are responsible for the provincial, city, municipal and barangay roads through the Provincial, City and Municipal Engineers Offices, respectively.

(2) National Road Classification by Function

The national road network is classified by function as follows:

North-South Backbone (5,246 km)	:	Main trunk lines from northernmost Luzon to southern Mindanao interconnecting major islands
East-West Laterals (2,965 km)	:	Roads traversing backbone and across the islands (about 100 km apart)
Other Roads of Strategic Importance (7,452 km)	:	Direct access to important centers and areas vital to regional development and emergency
Secondary Roads (13,987 km)	:	Other roads which complement national arterial roads to provide access to other main population and production centers
Expressways (Approx. 270 km)	: : :	A road corridor connecting several highly urbanized centers with ribbon-type of development; A road corridor with high traffic demand; A corridor designated as “Growth Corridor”.

2.2.2 NATIONAL ROAD NETWORK

Of the total length of 29,650 km (2008), 15,663 km (53%) are arterial roads (North-South Backbone, Eastern Lateral, and Other Roads of Strategic Importance). The remaining 13,987 km are secondary national roads.

Figure 2.2.1 shows the national road network map by functional classification.

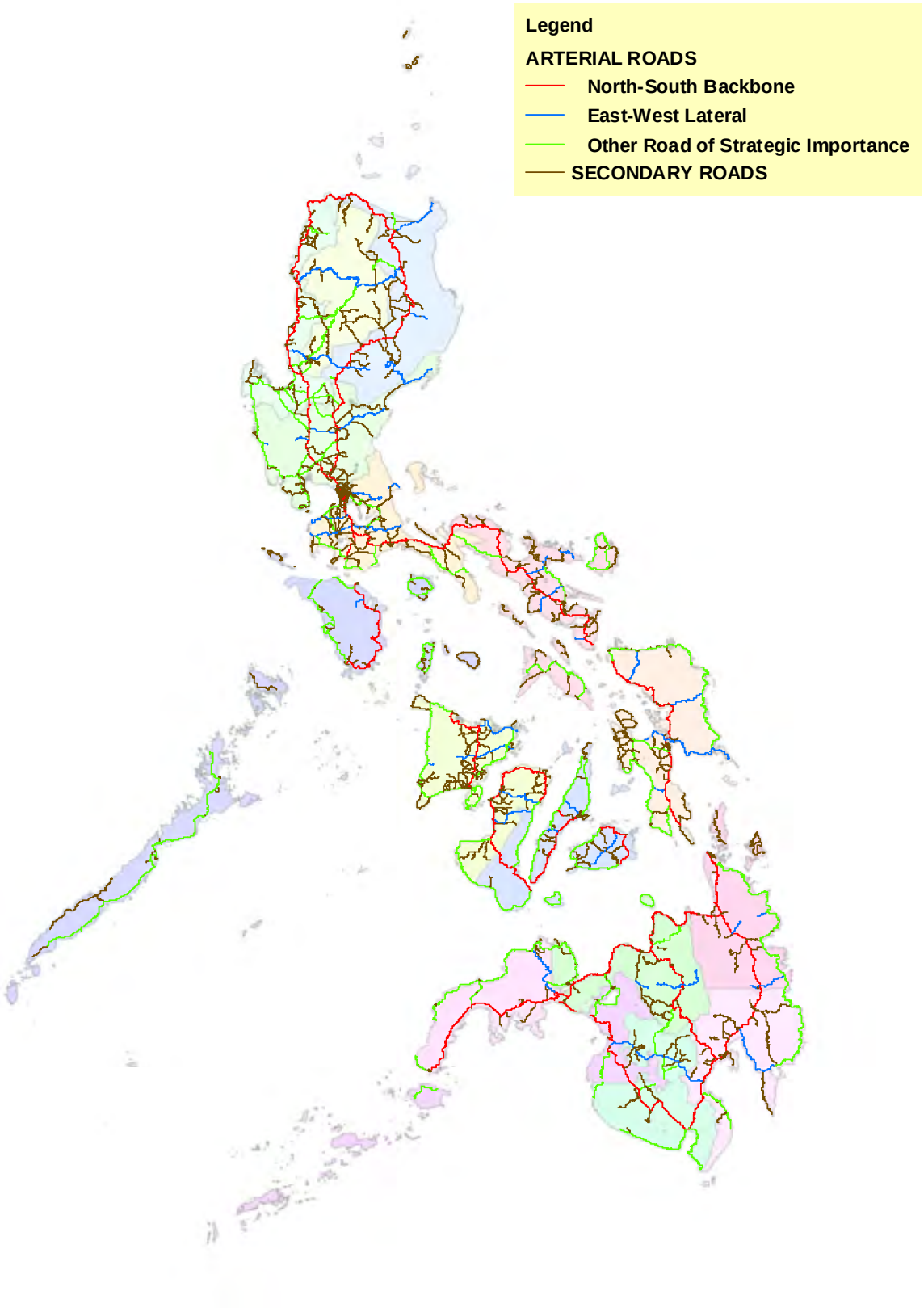


Figure 2.2.1 Existing National Road Network Map (2007) by Functional Classification

2.2.3 ROAD CONDITION

(1) Surface Type

Of the total length of 29,650 km national roads, 21,677 km (73%) are paved and 7,074 km (27%) unpaved, as of 2008. Paved roads have increased from 13,426 km in 1991 to 21,677 km in 2008.

Table 2.2.2 National Road Length by Classification, Surface Type and Condition (2008)

Unit: Km

Surface Type		Road Condition	Road Classification by Function				Total	%
			Arterial Roads			Secondary Roads		
			North-South Backbone	East-West Lateral	Other Roads of Strategic Importance			
PAVED	Asphalt	Good	1,008	186	960	999	3,153	10.6%
		Fair	757	117	525	422	1,821	6.1%
		Poor	413	55	304	281	1,054	3.6%
		Bad	660	119	641	532	1,952	6.6%
		No Assessment	12	0	17	83	112	0.4%
		TOTAL	**2,850**	**478**	**2,447**	**2,317**	**8,092**	**27.3%**
	Concrete	Good	302	345	760	1,004	2,412	8.1%
		Fair	651	457	1,274	1,855	4,237	14.3%
		Poor	423	239	551	1,381	2,596	8.8%
		Bad	822	529	852	1,797	4,000	13.5%
		No Assessment	81	41	45	173	341	1.1%
		TOTAL	**2,279**	**1,612**	**3,483**	**6,211**	**13,584**	**45.8%**
	TOTAL LENGTH	Good	1,310	531	1,720	2,004	5,565	18.8%
		Fair	1,408	575	1,799	2,277	6,058	20.4%
		Poor	837	295	856	1,662	3,650	12.3%
		Bad	1,482	648	1,493	2,329	5,951	20.1%
		No Assessment	93	42	62	256	453	1.5%
		TOTAL	**5,129**	**2,090**	**5,930**	**8,527**	**21,677**	**73.1%**
UNPAVED	Gravel	Good	33	137	267	742	1,179	4.0%
		Fair	76	382	616	2,541	3,614	12.2%
		Poor	7	276	397	1,581	2,260	7.6%
		Bad	1	37	165	425	627	2.1%
		No Assessment	0	41	76	96	213	0.7%
		TOTAL	**116**	**873**	**1,520**	**5,384**	**7,894**	**26.6%**
	Earth	Good	0	0	0	66	67	0.2%
		Fair	0	0	0	0	0	0.0%
		Poor	0	0	0	0	0	0.0%
		Bad	0	0	0	0	0	0.0%
		No Assessment	0	3	1	9	13	0.0%
		TOTAL	**0**	**3**	**2**	**75**	**80**	**0.3%**
	TOTAL LENGTH	Good	33	137	268	808	1,246	4.2%
		Fair	76	382	616	2,541	3,614	12.2%
		Poor	7	276	397	1,581	2,260	7.6%
		Bad	1	37	165	425	627	2.1%
		No Assessment	0	44	77	105	226	0.8%
		TOTAL	**117**	**876**	**1,522**	**5,460**	**7,974**	**26.9%**
SUMMARY		Good	1,344	667	1,988	2,812	6,811	23.0%
		Fair	1,484	956	2,415	4,818	9,672	32.6%
		Poor	843	571	1,253	3,243	5,910	19.9%
		Bad	1,482	685	1,658	2,753	6,578	22.2%
		No Assessment	93	86	139	361	679	2.3%
		GRAND TOTAL	**5,246**	**2,965**	**7,452**	**13,987**	**29,650**	**100.0%**

Notes: No Assessment : Road section either under construction or for implementation, bridge and/or segment length less
Surface Type : Based from the actual surface type during the conduct of Visual Road Condition Survey (Feb-Oct
Source: RBIA/DPWH

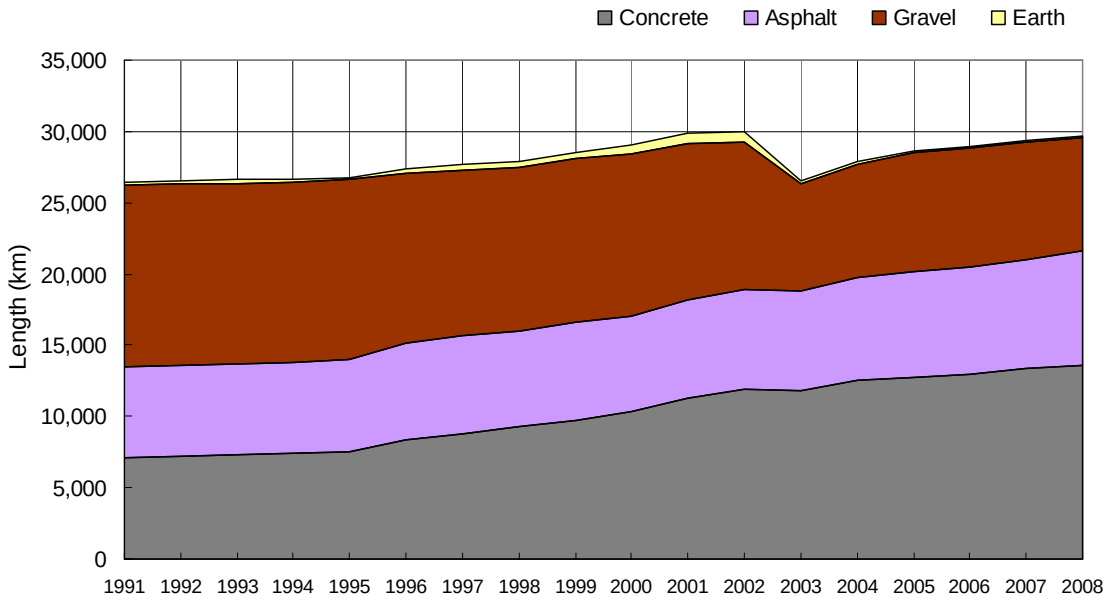


Figure 2.2.2 Increase in National Road Length by Surface Type (1991-2008)

Surface Type	North-South Backbone	East-West Lateral	Other Roads of Strategic Importance	Secondary Roads	Total (km)	(%)
ACP	2,850	478	2,447	2,317	8,092	27.3%
PCC	2,279	1,612	3,483	6,211	13,584	45.8%
Gravel/Earth	117	876	1,522	5,460	7,974	26.9%
Total	5,246	2,965	7,452	13,987	29,650	100.0%
(%)	17.7%	10.0%	25.1%	47.2%	100.0%	

Source: JICA Survey Team based on RBIA/DPWH

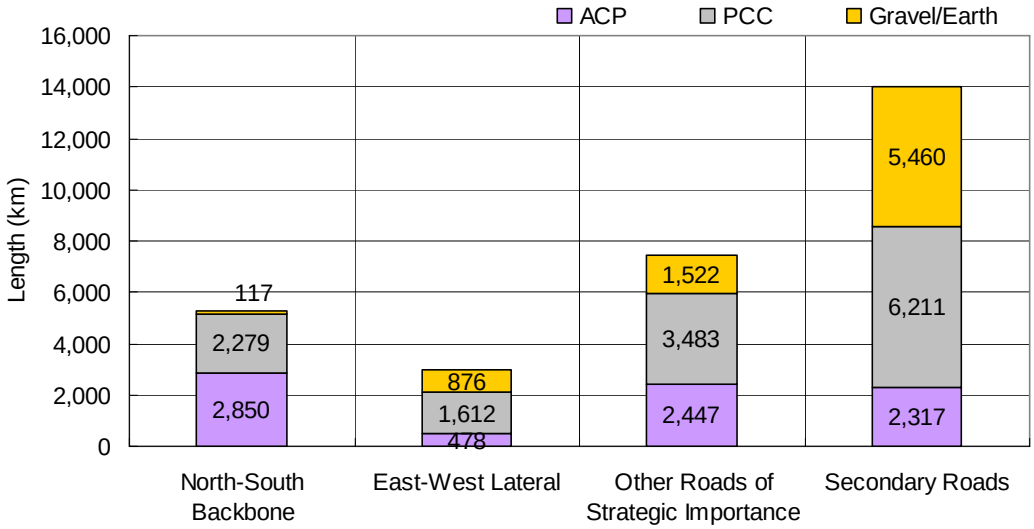


Figure 2.2.3 National Road Surface Type by Functional Classification (2008)

(2) Road Condition

With regards to the physical condition of the national roads, 6,811 km (23.0%) are in good condition, 9,672 km (32.6%) in fair condition, 5,910 km (19.9%) in poor condition and 6,578 km (22.2%) in bad condition.

Surface Type	North-South Backbone	East-West Lateral	Other Roads of Strategic Importance	Secondary Roads	Total (km)	%
Good	1,344	667	1,988	2,812	6,811	23.0%
Fair	1,484	956	2,415	4,818	9,672	32.6%
Poor	843	571	1,253	3,243	5,910	19.9%
Bad	1,482	685	1,658	2,753	6,578	22.2%
No Assessment	93	86	139	361	679	2.3%
Total	5,246	2,965	7,452	13,987	29,650	100.0%

Source: JICA Survey Team based on RBIA/DPWH (2008)

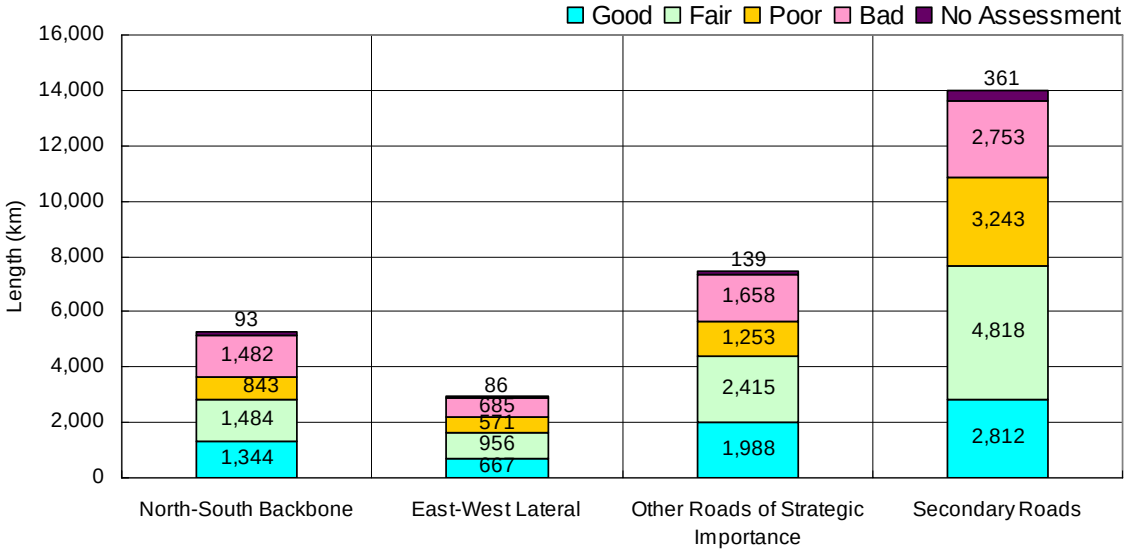


Figure 2.2.4 National Roads by Condition and Functional Classification (2008)

2.2.4 BRIDGE CONDITION

(1) National Bridges

Based on the bridge inventory survey conducted by DPWH in 2007, there are 7,744 bridges on national roads as summarized in Table 2.2.3.

Table 2.2.3 Number and Length of Bridges on National Roads

As of December 31, 2007

Region Name	PERMANENT						TEMPORARY						TOTAL	
	Concrete		Steel		Sub Total		Bailey		Timber		Sub Total			
	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM	No. of Bridges	Total Length in LM
CAR	187	5,881.55	33	3,014.88	220	8,896.43	83	1,756.34	2	16.50	85	1,772.84	305	10,669.27
NCR	264	18,746.13	5	567.00	269	19,313.13	-	-	-	-	-	-	269	19,313.13
Region I	441	24,139.20	58	5,611.12	499	29,750.32	19	326.75	-	-	19	326.75	518	30,077.07
Region II	382	18,488.16	23	4,327.55	405	22,815.71	20	303.02	5	55.42	25	358.44	430	23,174.15
Region III	569	25,228.69	37	3,518.66	606	28,747.35	1	21.30	7	102.00	8	123.30	614	28,870.65
Region IV-A	562	15,206.00	27	958.21	589	16,164.21	34	529.12	2	14.00	36	543.12	625	16,707.33
Region IV-B	408	15,026.55	45	1,577.80	453	16,604.35	128	3,357.90	46	581.25	174	3,939.15	627	20,543.50
Region V	519	20,032.64	34	1,388.67	553	21,421.31	50	730.26			50	730.26	603	22,151.57
Region VI	573	22,921.61	68	3,886.32	641	26,807.93	69	1,880.64	3	88.00	72	1,968.64	713	28,776.57
Region VII	460	15,375.09	25	2,051.44	485	17,426.53	36	551.96	3	66.80	39	618.76	524	18,045.29
Region VIII	717	25,646.03	58	5,474.05	775	31,120.08	72	1,150.53	63	758.97	135	1,909.50	910	33,029.58
Region IX	224	9,279.17	26	1,337.82	250	10,616.99	4	51.40	1	20.00	5	71.40	255	10,688.39
Region X	303	11,798.04	49	2,569.99	352	14,368.03	13	298.53	1	6.10	14	304.63	366	14,672.66
Region XI	224	10,836.76	14	966.47	238	11,803.23	14	402.08	-	-	14	402.08	252	12,205.31
Region XII	239	9,401.93	19	828.53	258	10,230.46	24	454.15	-	-	24	454.15	282	10,684.61
Region XIII	253	10,310.51	39	2,491.40	292	12,801.91	100	1,803.78	59	719.68	159	2,523.46	451	15,325.37
TOTAL	6,325	258,318.06	560	40,569.91	6,885	298,887.97	667	13,617.76	192	2,428.72	859	16,046.48	7,744	314,934.45

Source: DPWH

The data obtained from the DPWH is maintained by the Development Planning Division, Planning Services and updated through the annual bridge inspection report. Temporary bridges on primary roads are installed to replace damaged or collapsed bridges, which should be restored as a high priority. Most temporary bridges are of timber construction or Bailey bridge and are located mainly along secondary roads. No structures such as submerged bridges (spillway or overflow) are included in the table. However, approximately 60 locations require the construction of permanent bridge crossings throughout the year.

(2) Bridges on UI/LTPBM Road Links of REAPMP

With regard conditions of permanent bridges, these were determined using the data collected for all 300 bridges in the four road sections of LTPBM and four sections of UI outside of LTPBM, based on the bridge condition survey. Consideration was given for classifying defects of bridge elements based on the bridge inspection manual of BMS. This includes condition ratings, for example, with the defects classified as good, fair, poor or bad for each bridge element to judge the current performance level. In case a defect is rated as poor for a bridge element, corresponding repairs should be executed under preventive maintenance and its condition should consequently be upgraded in REAPMP. Overall bridge conditions in LTPBM and UI road sections are evaluated in Table 2.2.4 and Table 2.2.5.

Table 2.2.4 Overall Condition of Bridges Evaluated in LTPBM Road Section

Road Section	Selected Road Length (Km)	Number of Bridge	Bridge Length (m)	Bridge Condition		
				Good/Fair	Poor	Bad
Aringay–Laoag	242	95	4837.20	38	57	0
Sta. Rita– Nueva Ecija	160	60	2753.40	8	51	1
Daan Maharika (Sipocot–Baao)	100	47	1285.30	11	36	0
Surigao(Lipata) – Davao City	161	49	1952.90	4	44	1
Total	663	251	10828.80	61	188	2

Table 2.2.5 Overall Condition of Bridges Evaluated in UI Road Section

Road Section	Selected Road Length (Km)	Number of Bridge	Bridge Length (m)	Bridge Condition		
				Good/Fair	Poor	Bad
Bongabon-Baler	51	10	835	3	0	7
Lipa-Alaminos-San Pablo	17	4	256	1	3	0
Mindro West Coast Road	153	30	2,739	4	13	13
Catanduanes Circumferential Road	64	10	669	3	4	3
Total	285	54	4,499	11	20	23

Regarding bridge elements with poor conditions, concrete deck slabs on more than 50% of the bridges have deteriorated due to cracks, spalling or delamination. These are caused by corrosion of the rebars due to the penetration of water through the cracks. For steel bridges, steel plates mainly deteriorate due to corrosion caused by maintenance neglect. In the Philippines, many steel bridges were constructed along or near the shoreline, which accelerated the deterioration and resulted in the shortened bridge life. Expansion joints, as part of bridge accessories, were also damaged since the standard design adopted is not suitable for the existing traffic conditions. The defects in the expansion joints are caused by the deterioration of bearings and steel girders.

It is observed that there are illegal settlers below some of the bridges, utilizing the area as their shelter, storage and working spaces. These illegal structures/activities may cause negative effects on bridges as required spaces become inadequate for performing appropriate inspection/cleaning works. Overloaded vehicles are also one of the causes of bridge deterioration. Load limit signs are not followed and weigh stations are not fully operational due to equipment malfunction.

Meanwhile, quarrying activities for aggregates (gravel and sand) at the upstream and downstream sides are observed at some bridge sites. These activities result in the progressive scouring of bridge foundations.

2.2.5 ROAD AND BRIDGE ASSET MANAGEMENT SYSTEMS

(1) Road Management System

1) Road Information and Management Support System (RIMSS)

The DPWH, requiring details for the management of 29,000 km National Roads, initiated the Road Information and Management Support System (RIMSS) using the internet technology with the following considerations:

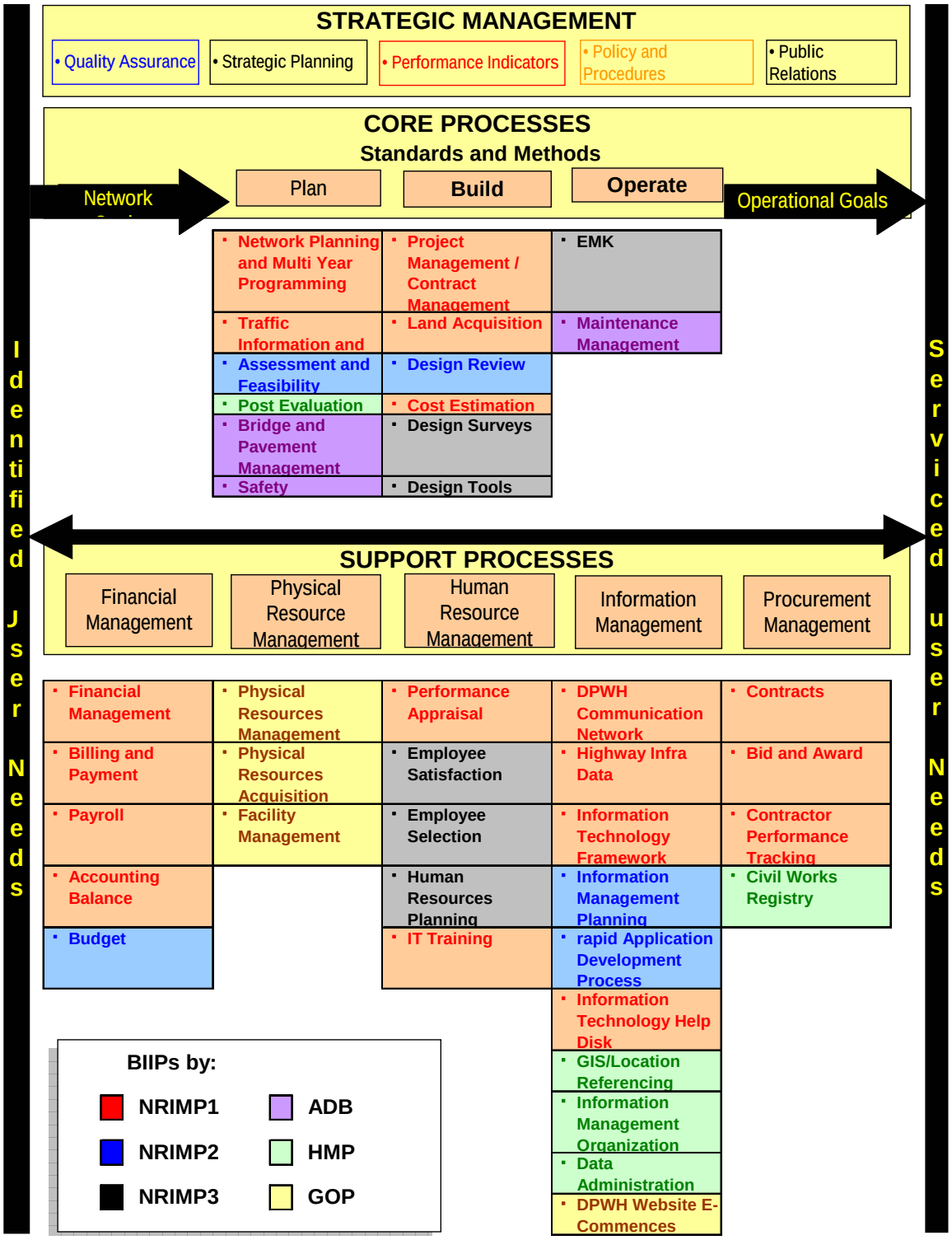
- Emphasis on customer needs (both internal and external).
- Focus on reengineering all significant processes.
- Identification and prioritization of opportunities for improvement in cost, efficiency, effectiveness, and controls.
- Use of latest technology to “enable” the steps to be taken.

The objective of the RIMSS is to improve the quality and delivery of DPWH services in the provision and management of the road system. It supports decision-making through the provision of various modern analytical tools and enhances better public relations and anti-corruption initiatives through transparency and accountability.

The business process improvements through the RIMSS include three core processes for highways and five support processes for all public works operations (Figure 2.2.5):

- Core Processes for Highways: 1) Plan, 2) Build (Design and Construction) and 3) Operate. These processes are associated with DPWH's highway assets.
- Support processes for public works: 1) financial management, 2) physical resource management, 3) human resource management, 4) information management and 5) procurement management. These processes are associated with the overall operation of DPWH in highways and other infrastructure sectors.

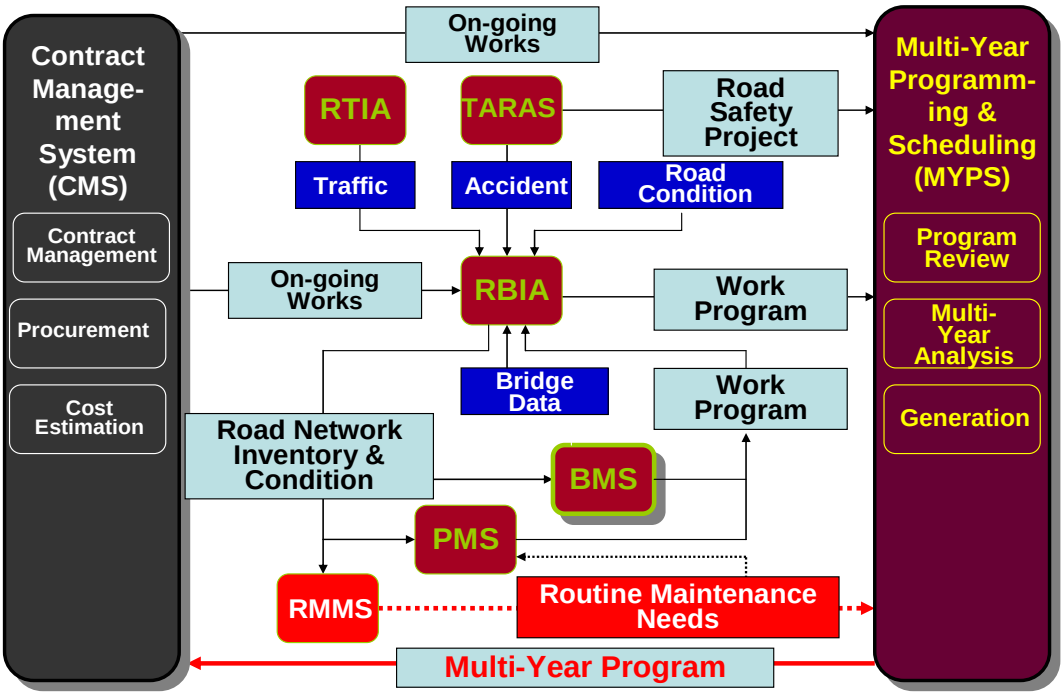
The priority RIMSS tools are called Business Process Improvement Implementation Projects (BIIPs). Implementation of the BIIPs is a key-component of the Institutional Capacity Building of the National Roads Improvement and Management Program (NRIMP) 1, 2 & 3 under World Bank (WB), and the 6th and 7th Road Projects under the Asian Development Bank (ADB).



Source: DPWH

Figure 2.2.5 Road Information and Management Support System (RIMSS) of DPWH

The DPWH has developed the core processing tools for road planning, building (design and construction) and operation as illustrated in Figure 2.2.6 with the assistance of WB's NRIMP-1 and the ADB's 6th Road Project.



Source: PS/DPWH

System	System Name	Cooperated by	Remarks
RTIA	Road Traffic Information Application	NRIMP-1 (WB)	
TARAS	Traffic Accident Recording and Analysis System	ADB (6th)	Continued in RSIP (ADB 7th)
RBIA	Road and Bridge Information Application	NRIMP-1 (WB)	
PMS	Pavement Management System	ADB (6th)	HDM-4 basic program
MYPS	Multi-Year Programming and Scheduling	NRIMP-1 (WB)	Continued in NRIMP-2 (WB)
RMMS	Routine Maintenance Management System	ADB (6th)	Required review and improvement for approval of DPWH
BMS	Bridge Management System	ADB (6th)	

Figure 2.2.6 Road Planning and Management Systems (Tools)

2) RBIA

The purpose of the RBIA is to keep comprehensive, accurate and up-to-date road and bridge information of the national road network as the database for various management systems. The DPWH conducts road condition survey for all road links annually through the ROs and DEOs. The road and bridge condition collected by the DEO is stored in the RO computer system (ROCOND) and transmitted to the PS. The PS stores these in the RBIA (network level road and bridge database). The PS processes the data and sends back to the RO for validation. These data are then transmitted to PMS/HDM-4 and MYPS for network level programming and scheduling.

3) PMS/HDM-4

The PMS is an analytical tool to assist in the economic evaluation and justification of policies and targets, to generate information required for the medium to long-term network planning and to prepare multi-year works programs. The PMS is based on the RBIA developed by DPWH and the HDM-4 (Highway Development and Management Tool Version 4) software developed by the WB, ADB and DFID (UK). HDM-4 is used for the technical and economic analysis of alternative pavement maintenance and improvement policies.

HDM-4 program analysis is carried out annually to update the multi-year works program based on the latest update of traffic and road condition information. It takes into account the maintenance and improvement activities that have actually been carried out in the previous year.

The sections included in the first year of the HDM-4 are considered for the annual program. MYPS is used to carry out multi criteria analysis to finalize the annual program, which are later divided into the Annual Infrastructure Program (AIP) and the Annual Works Program (AWP). These programs are split between the General Appropriations Act (GAA) and the Special Road Support Fund (SRSF) funding sources. The SRSF finances both routine (carriageway and roadside maintenance) and preventive maintenance.

The activities carried out under these programs are detailed in Table 2.2.6. However, there is a considerable overlap of work items within these programs. A project may be funded from different sources (GAA or MVUC / Foreign or Local Fund) depending on the availability of funds.

Table 2.2.6 Funding Sources and Preservation Activities

Preservation Activities	Program	HDM-4 Budget Heading
Route Realignment and Bypasses	AIP	Capital
Major widening (additional lanes)	AIP	Capital
Minor widening (improvement to meet minimum design standards)	AWP, AIP	Capital
Rehabilitation	AWP, AIP	Capital
Improvement (e.g. Unsealed to Asphalt or Concrete)	AWP, AIP	Capital
Structural Overlay	AWP, AIP	Capital
Resurfacing	AWP, AIP	Capital
Resealing	AWP, EMK	Capital
Re-gravelling	AWP, EMK	Capital
Pothole Patching	AWP, EMK	Recurrent
Drainage improvement and maintenance	AWP, EMK	Recurrent
Off carriageway maintenance activities	AWP, EMK	Recurrent

Source: PMS Manual/DPWH

HDM-4 analyses for planning purposes are mainly concerned with capital funding. When the optimized work program is generated for different budget scenarios only capital funding is constrained. HDM-4 can also give the total recurrent cost as reference. The actual programming of the routine maintenance activities is handled by RMMS.

4) MYPS

The MYPS is a tool to support the annual process of proposing and approving the multi-year program, also known as the Medium Term Highway Program. The basis of the MYPS is PMS-HDM-4, RBIA and the Contract Management System (CMS). The MYPS applies Multi

Criteria Analysis (MCA) approach, which is a combination of quantitative and qualitative criteria in a scoring system to assess and compare options. It incorporates social and other issues in addition to the economic indicators.

MCA is used in prioritizing candidate projects in terms of project preparedness, importance of the overall network and response to GOP's economic and social development policies.

The three main areas of MCA in the MYPS context are:

- Project preparedness, including economic evaluation (NPV/C>zero at 15% discount rate), environmental assessment and social impact
- Road network importance, including road category and strategic road network aspects
- Economic and social development policy reflecting the annual State of the Nation Address (SONA).

Table 2.2.7 shows an example of the procedure for MCA.

Table 2.2.7 Example of MCA in MYPS

June 4, 2003

Indicators for NewProjects	Score Points	Max. Points
1. Project Preparedness		75
1.1 Current Project Status		5
1.1.1 Submitted by DPWH to NEDA regarding ongoing programs with viability established	5	
1.1.2. Left over project of lending institution (from list submitted by NEDA)	4	
1.1.3 Left over project of NEDA (from list of projects submitted by DPWH)	2	
1.1.4 New proposal submitted by DPWH to NEDA	0	
1.2 Feasibility Study and/or Detailed Design carried out	5	5
1.3 Economic Viability		55
1.3.1 NPV/C ≥ 2.0	55	
1.3.2 NPV/C < 2.0 but ≥ 1.0	50	
1.3.3 NPV/C < 1.0 but ≥ 0.5	45	
1.3.4 NPV/C < 0.5 but ≥ 0.3	35	
1.3.5 NPV/C < 0.3 but > 0	25	
1.4 Environmental Assessment		5
1.4.1 Minor or negligible negative impact and any mitigation accounted for in project costs	5	
1.4.2. Moderate negative impact but mitigation accounted for in project costs	3	
1.4.3 Considerable negative impact but mitigation accounted for in project costs	2	
1.5 Social Impact		5
1.5.1 No resettlement	5	
1.5.2 Minor resettlement but mitigation cost included in project cost	3	
1.5.3 Major resettlement but mitigation cost included in project cost	2	
2. Road Network Importance		10
2.1 Road Category		
2.1.1 North-South Backbone, Arterial National Roads	8	
2.1.2 East-West Laterals, Arterial National Roads	6	
2.1.3 Other Arterial Roads of Strategic Importance	4	
2.1.4 Secondary National Roads	2	
2.2 Road Strategic Network		
2.2.1 Identified under major DPWH studies	2	
2.2.2 Not identified under 2.2.1	0	
3. Economic and Social Development Policy		15
a) Provide access to basic services which currently are not available (basic human needs)		
b) Develop economically and socially underdeveloped/depressed areas[a], provided a resource base is available		
c) Improve law and order		
d) Support agricultural modernization		
e) Support traffic decongestion		
f) Support industrial and tourism development		
3.1.1 All points met	15	
3.1.2 Point 3b) and another four out of the six points met	12	
3.1.3 Point 3b) and another two out of the six points met	8	
3.1.4 Only point 3b) met	4	
3.1.5 None of the points met	0	
Total Maximum Score[b]		**100**

[a] Within one of the declared economically and socially underdeveloped/depressed areas (currently 20 provinces).
[b] In case of equal maximum score, Point 1.3 (Economic Viability) will be the determining factor.

Source: PMS Manual 2006, DPWH

The MYPS collects work items form the RBIA, build up feasible projects, combines projects into multi-year program and finally exports the program to the CMS.

5) TARAS

The DPWH has implemented the road safety program to develop technical standards, policies and procedures for the safety of road infrastructures, improve traffic accident prevention and reduce accidents related to road infrastructure safety.

The DPWH has developed a computerized accident data system called Traffic Accident Recording and Analysis System (TARAS). It incorporates the collection, storage, retrieval and

analysis of traffic accident data. TARAS consists of a text and graphic data entry, and statistical query system that provides access to accumulated traffic accident information on national roads throughout the country. TARAS reporting and analysis module are used to query and report on traffic accident information stored in its database.

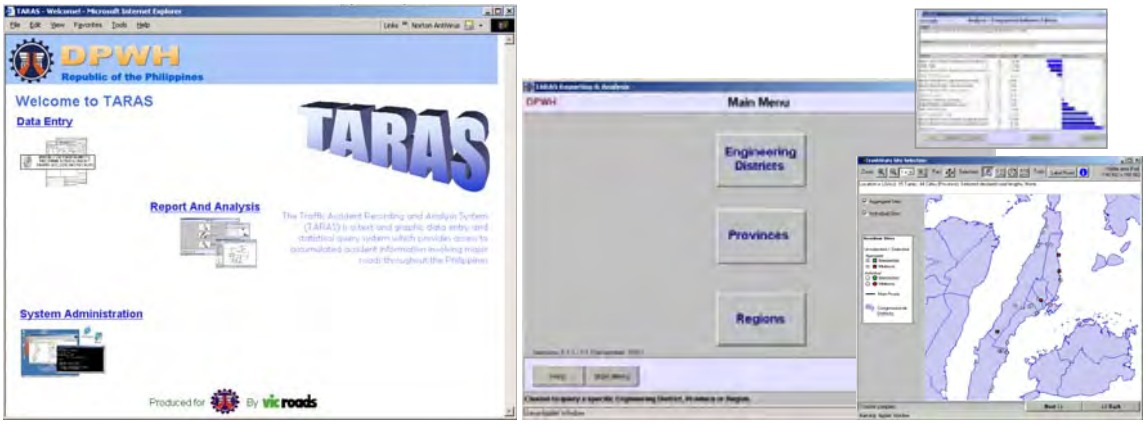


Figure 2.2.7 Traffic Accident Recording and Analysis System (TARAS)

6) RMMS

RMMS developed under the ADB 6th Road Sector Project is an integrated tool for planning, scheduling and monitoring the annual basic maintenance activities in order to sustain a level of service for the national roads. The DPWH has prepared the "Road & Bridge Routine Maintenance Procedures and Planning Manual (Volume I, II and III)" as guide and reference for personnel of the DPWH CO, RO and DEO, who are responsible for the routine maintenance of the national road network. This manual is consistent with the capabilities of the software used to support maintenance management.

(2) Bridge Management System (BMS)

The BMS requires initial inventory of bridge inspections to collect information for each bridge. It also requires annual condition inspections to collect updated data on the status of each bridge. The data in the inspection surveys needs to be accurate and consistent to ensure efficient and reliable operation of the BMS.

DPWH has therefore undertaken regular inspections to detect any deterioration or defects that may require repair or maintenance. The main focus of the bridge inspection manual includes:

- Bridge condition inspections (Type 2)
- Bridge engineering inspections (Type 3)
- Bridge inventory inspections (Type 5)

The purpose of the condition inspection is to monitor and rate the condition of a bridge structure as a basis for identifying current maintenance needs, forecasting future bridge intervention requirements and estimating future funding requirements. The bridge inspector is tasked to prepare the estimated costs for routine and major maintenance for the next fiscal year based on the damaged bridge components and actual conditions.

Bridge engineering inspections are undertaken as required to follow-up technical bridge inspections when defects with a "bad" condition are recorded, to determine whether the bridge should be subject to reconstruction, retrofit or upgrade. Bridge inventory inspection is intended to obtain basic data on bridges in the RBIA.

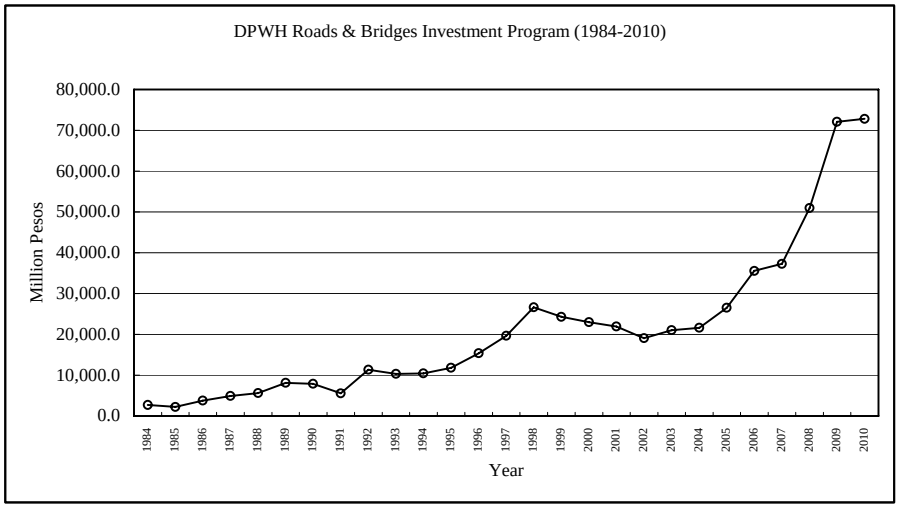
A simple database can also be used to store inventory and inspection data. More reliable system that delivers effective bridge management should be adopted, including the following:

- Asset management processes through the whole bridge life to identify the cycle of maintenance.
- Provide a standard method for repairs and rehabilitation to maintain the service level of all bridges.
- Provide a standard cost estimate for budgetary cost.
- Allow risk-based maintenance and detailed inspection methods to be developed.

2.2.6 BUDGET ALLOCATION AND EXPENDITURES FOR THE ROAD SECTOR

(1) Past Trend of Budget Allocations to Roads/Bridges Sub-Sector

The past trend of budget allocations for roads and bridges is shown in Figure 2.2.8 (including planned years up to 2010). An average rate of increase is 13.5% per annum from 1984-2010. Although the allocations have decreased from 1998 to 2002, these were increased significantly in the MTPDP (2005-2010). This is partly due to the recovery in the GOP's fiscal condition through the steady reduction in the budget deficit (Figure 2.2.9).



Source: DPWH

Figure 2.2.8 Trend of Roads/Bridge Budget Allocation (1986-2010)

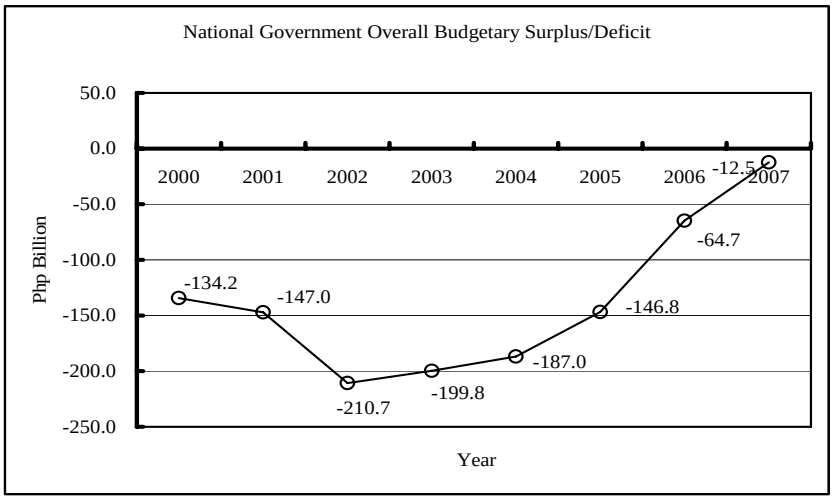


Figure 2.2.9 National Government Overall Budgetary Deficit

(2) Budget Structure of DPWH (FY2008 and FY2009)

The itemized budget proposed by DPWH for FY 2008 and FY 2009 is shown in Table 2.2.8. The budget for routine (RM) and preventive maintenance (PM) of national roads and bridges are included in the category of "Programs"

Table 2.2.8 Structure of DPWH Budget (FY 2008 & FY 2009, in 1000 Php)

Description	Personal Services & Maintenance	Capital Outlay (Investment/ Construction)	FY 2008	FY 2009
A. PROGRAMS	○		**11,447,966**	**12,641,557**
1. General Administration and Support	○		999,179	1,055,787
2. Support to Operations	○		651,300	734,592
3. Operations	○		9,797,487	10,851,178
3-1 Construction, Maintenance, Repair and Rehabilitation of Infrastructure Facilities	○		6,137,619	6,727,814
3-1-1 Routine Maintenance of National Roads & Bridges	○		2,001,850	2,500,000
3-1-2 Preventive Maintenance of National Roads & Bridges	○		4,000,000	4,000,000
3-1-3 Others of (3-1)	○		135,769	227,814
3-2 Maintenance, Repair and Rehabilitation of Infrastructure Facilities	○		1,381,401	1,498,753
3-3 Operational Support in the Maintenance and Repair of Infrastructure Facilities and Other Related Activities of District/City Engineering Office	○		1,651,160	1,920,373
3-4 Operational Support in the Maintenance and Repair of Infrastructure and Other Equipment Including Replacement of Parts, Regional Depot/Base Shops and Area Shops	○		627,307	704,238
B. PROJECTS		○	**75,306,957**	**99,723,117**
1. Locally-Funded Projects		○	52,648,923	74,624,158
1-1 National Arterial, Secondary & Local Roads and Bridges		○	38,043,349	61,312,377
1-1-1 Urgent National Arterial, Secondary & Local Roads and Bridges		○	20,353,900	35,942,030
1-1-1-a Rehabilitation/ Replacement of Damaged Bridges along National Roads		○	100,000	100,000
1-1-1-b Others of (1-1-1)		○	20,253,900	35,842,030
1-1-2 Rehabilitation/ Reconstruction of Damaged Paved National Roads Generated from PMS/HDM-4		○	10,449,449	15,965,347
1-1-3 Road Upgrading (gravel to concrete) based on Gravel Road Strategies, Traffic Benchmark for Upgrading to Paved Road Standard (HDM-4)		○	7,240,000	9,318,000
1-2 Flood Control and Drainage Projects		○	1,545,000	2,000,000
1-3 Preliminary and Detailed Engineering		○	934,000	988,281
1-3-1 Roads		○	637,500	469,931
1-3-2 Others of (1-3)		○	296,500	518,350
1-4 National Buildings		○	650,000	613,500
1-5 Payments of ROW, Contractual Obligations and VAT		○	4,676,574	3,120,000
1-5-1 Roads & Highways		○	3,729,705	2,403,530
1-5-2 Others of (1-5)		○	946,869	716,470
1-6 Water Supply		○	500,000	0
1-7 Various Infrastructure including Local Projects		○	6,300,000	6,590,000
2 Foreign-Assisted Projects		○	22,658,034	25,098,959
2-1 Highways (Roads and Bridges Projects)		○	18,571,276	20,168,058
2-2 Flood Control Projects		○	4,086,758	4,930,901
A+B Total Appropriations			**86,754,923**	**112,364,674**

Expansion	43,192,381	58,883,549
RM, PM, U/I	23,791,299	31,883,347
Total of Road:	66,983,680	90,766,896

Foreign Assistant Road Investment Projects	30.5%	34.3%

Source: Department of Budget and Management (DBM), Philippines

The rehabilitation (RH) and reconstruction/upgrading (U/I) works are included in the category of "Projects (Investment)". The total budget for RM, PM, and U/I works amounted to Php 23,791 million in 2008 and Php 31,883 million in 2009 (35% of road project costs). Regarding "Projects", 30% - 34% of the road budget comes from foreign assistance sources.

(3) Budget for Maintenance

At present, the maintenance program for national roads by DPWH consists of RM and PM.

Funds are from two sources – General Appropriations Act (GAA) and the Special Road Support Fund (SRSF) from the Motor Vehicle User Charge (MVUC) as shown in Figure 2.2.10.

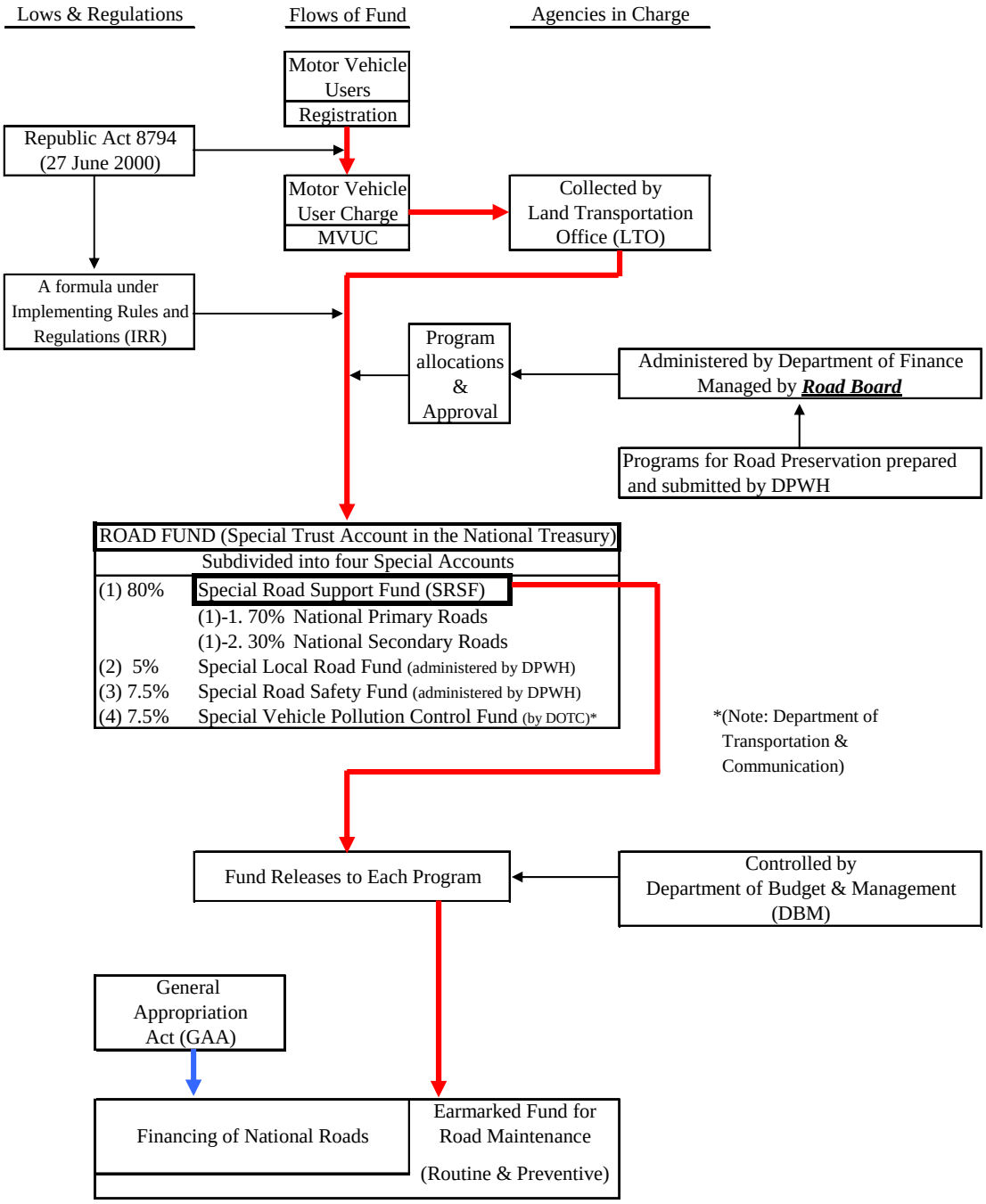


Figure 2.2.10 Structure and Funds Flow of MVUC Collections

Republic Act No. 8794 (27 June 2000) mandates the imposition and collection of the MVUC for national primary and secondary road maintenance, local roads, road safety, and air pollution control. MVUC is collected by the Land Transportation Office (LTO) as part of the annual vehicle registration fee. The MVUC is divided into four special funds: 1) 80% to the SRSF, 2) 5% to the Special Local Road Fund, 3) 7.5% to the Special Road Safety Fund, and 4) 7.5% to the Special Vehicle Pollution Control Fund. Funds 1) to 3) are administered by DPWH and fund 4) goes to the Department of Transportation and Communications (DOTC). Collected amounts of the MVUC and their distribution to DPWH and DOTC are shown in Table 2.2.9.

Table 2.2.9 Collected Amounts of MVUC (2003-2008, in Billion Pesos)

FY	DPWH	DOTC	Total	% Share	
				DPWH	DOTC
2003	5.3	0.4	5.7	93.0%	7.0%
2004	6.6	0.5	7.1	93.0%	7.0%
2005	6.7	0.5	7.2	93.1%	6.9%
2006	7.0	0.6	7.6	92.1%	7.9%
2007	7.2	0.6	7.8	92.3%	7.7%
2008	7.4	0.6	8.0	92.5%	7.5%
Accum.03-08	40.2	3.2	43.4	92.6%	7.4%
	92.6%	7.4%	100.0%		

Source: Facts in Figures, Congressional Planning & Budget Department, House of Representatives, January 2008 (No.1)

(4) Combination of Budget Allocation from GAA and MVUC

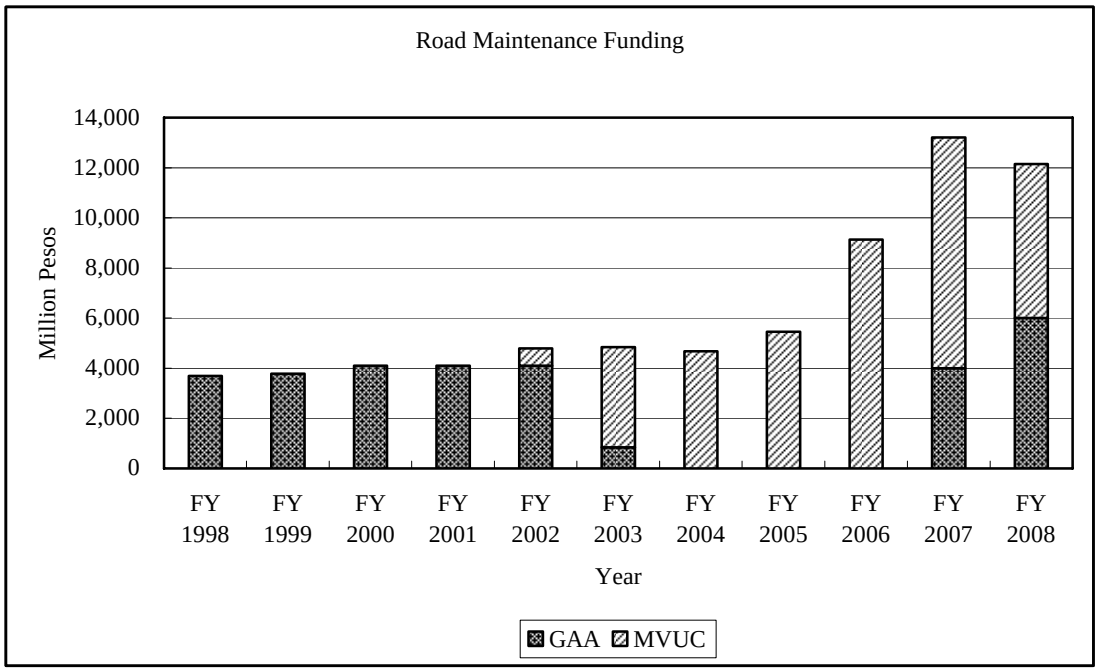
Although MVUC was established in 2000, its releases have been controlled by the Department of Budget and Management (DBM). There were no releases until 2003, although LTO started collections as early as 2000. The budget for road maintenance was provided from the GAA mainly for RM purposes until the SRSF became fully operational in 2003. However, the budget allocation from the GAA was reduced from Php 4,094 million in 2002 to Php 847 million in 2003. Furthermore, there were no allocations for the period 2004 – 2006. The GOP restarted the budget allocations from the GAA for PM in 2007 (Php 4,000 million) and for both PM and RM in 2008 (Php 4,000 million and Php 2,000 million, respectively), as shown in Table 2.2.10, Figure 2.2.11 and Figure 2.2.12). As the maintenance budgets from the MVUC are not enough at present, it is necessary to supplement the amount by combining its funds with that of GAA.

Table 2.2.10 Budget Allocation from GAA and MVUC

(Million Pesos)

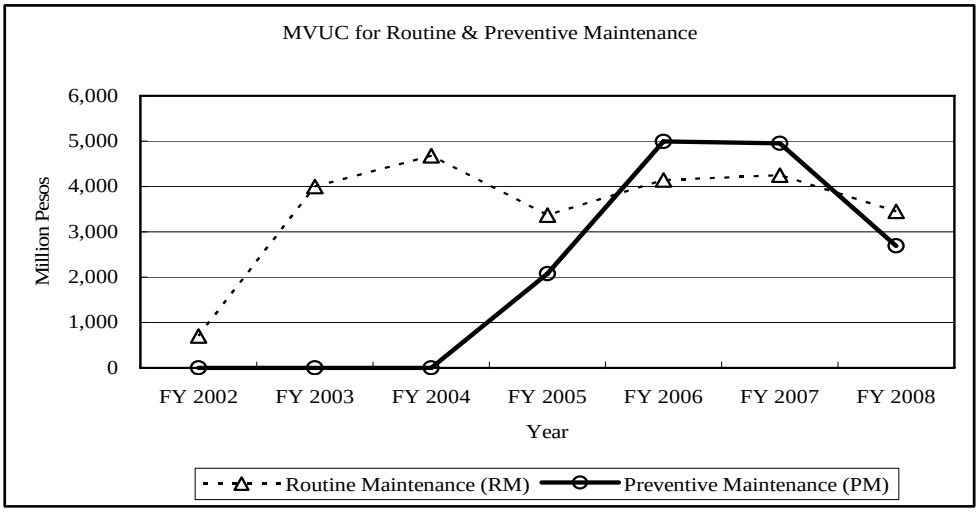
	Maintenance Works	Fund Source	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
1.	Routine Maintenance (RM)	GAA	4,094	847	0	0	0	0	2,000
		MVUC	700	4,000	4,680	3,369	4,145	4,250	3,454
		Sub-Total	4,794	4,847	4,680	3,369	4,145	4,250	5,454
2.	Preventive Maintenance (PM)	GAA	0	0	0	0	0	4,000	4,000
		MVUC	0	0	0	2,079	4,993	4,952	2,690
		Sub-Total	0	0	0	2,079	4,993	8,952	6,690
3.	Total Maintenance Budget	GAA	4,094	847	0	0	0	4,000	6,000
		MVUC	700	4,000	4,680	5,448	9,138	9,202	6,144
		Total	4,794	4,847	4,680	5,448	9,138	13,202	12,144

Source: DPWH (Bureau of Maintenance, Planning Service), World Bank



Source: DPWH and from Table 2.2.10 above)

Figure 2.2.11 Road Maintenance Funding (GAA and MVUC)

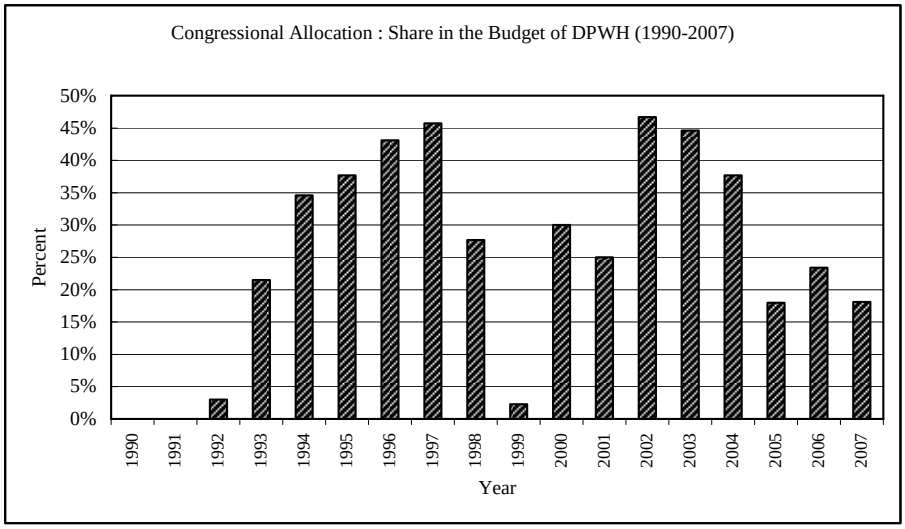


Source: From Table 2.2.10

Figure 2.2.12 Road Maintenance Funding (RM and PM)

(5) Congressional Allocations

The congressional allocation for legislators is another funding source for roads and bridges, which is included in the GAA, but not in the MVUC. These are mainly used for earmarked local projects, identified by members of Congress and are the second highest expenditure item in the DPWH budget. Their peaks were observed in 1997 (45.7%) and in 2002 (46.7%) as shown in Figure 2.2.13.



Source: "Philippines Transport Growth" Feb 24, 2009, World Bank

Figure 2.2.13 Congressional Allocation: % in DPWH Budget (1990-2007)

Congressional allocations are typically spent on public infrastructures such as barangay roads and multipurpose buildings implemented through the DPWH budget or LGUs in their district. (Table 2.2.11).

As congressional allocation projects involve mostly small local works, it is recommended that these should be handed over to, the LGUs which are expected to develop and directly handle the undertakings from the aspect of efficiency and optimal fund allocation (*"Road Operation and Maintenance Sector Study" Final Report, 31 July 2007, JBIC-DPWH*).

Table 2.2.11 Congressional Allocations by Sector (2003 and 2005: in Million Pesos)

	2003	2005
Total	**24,172**	**12,228**
1. Education	608	661
2. Health	442	315
3. Social Welfare	393	825
4. Infrastructure	**446**	**344**
4-1. Roads & Bridges	281	185
4-2. Farm to Market Roads	75	50
4-3. Other Roads	0	3
4-4. Multi-Purpose Pavement	1	1
4-5. Flood Control	80	97
4-6. Drainage/ Canal	9	8
4-7. Heavy Equipment	0	0
4-8. Various/ Urgent Infrastructure including Local Projects (under DPWH)	18,004	6,965
5. Water Supply	54	56
6. Irrigation	1	6
7. Housing	0	0
8. Economic Enterprises	1	20
9. Other Structures	44	109
10. Others	4,180	2987

Source: "Philippines Transport for Growth", Feb. 2009, World Bank

2.3 KEY ISSUES IN THE ROAD SECTOR

The key issues in the road sector include unsatisfactory preservation of road assets (maintenance), inadequate investments, slow pace of institutional reforms in the DPWH, and technical weakness of both the DPWH and the private sector. The DPWH has addressed some of the challenges in solving the key issues since the Better Roads Philippines Study of 1999. Although some key issues have been well addressed with considerable progress, there are still new and remaining issues that exist as of date.

2.3.1 INSUFFICIENT BUDGET ALLOCATION AND LOW LEVEL EXPENDITURES

(1) Important Roles of the Road Network vs. Inadequate Quality of Service Levels

The road network has important roles in the Philippines, contributing to transport 53% of freight ton-kilometer and 89% of passenger-kilometer as of June 2008. About 200,000 km of the road network of the country is comprised of about 29,000 km national roads (14.4%), 27,000 km provincial roads (13.5%), 7,000 km city roads (3.5%), 15,800 km municipal roads (7.9%), and 122,000 km barangay roads (60.7%). Although the Philippines has a higher density of roads (0.67 km/km2) compared to other Asian developing countries and a high road length per dollar of per capita GDP, the proportion of paved roads is very low at only about 20%. The country has low percentage of roads in good and good/fair condition compared to other Asian countries (Table 2.3.1).

Considering the important roles of the road network in logistics and economic activities, the quality of the roads in the Philippines is considerably low.

Table 2.3.1 Comparison of Road Kilometers and Conditions in Asian Countries

Country	Road km /1000 km^2	Road km per $ GDP per capita	% of Paved Roads	% of Roads in Good Condition	% of Roads in Good or Fair Condition
Philippines	671	2.37	20	18	50
China	201	0.97	81	n.a.	n.a.
India	1,138	4.90	47	n.a.	n.a.
Indonesia	203	1.43	58	n.a.	54
Japan	3,230	0.25	78	n.a.	n.a.
Korea	1,016	0.15	87	87	100
Malaysia	300	0.83	81	78	98
Pakistan	335	2.69	65	88	100
Thailand	112	0.36	98	98	100
Vietnam	287	4.91	19	n.a.	n.a.

Source: "Philippines Transport for Growth", February 2009, World Bank
Original Source: World Bank Road Network Data Bank (Policy Research Paper 3643), June 2005.

Arterial transport network to connect the widely dispersed regions of the Philippine archipelago is particularly important to support the sustainable development of the country. However, the existing inadequate condition of infrastructure, especially the lack of reliable, safe and efficient road network constitutes a major constraint in promoting regional growth.

(2) Low Level Budget Allocation to DPWH

The budget allocation for national roads through the DPWH (including some portions for local roads and bridges) were significantly increased for the current Medium Term Public Investment Program (MTPIP), the amount of the budget as % of GDP were only 0.49% in 2005, 0.59% in 2006, and 0.56% in 2007.

(3) Insufficient Budget Allocations to Cover the Needs of the National Roads

DPWH roughly estimated the investment/maintenance requirements for the national road network as of 31 December 2006 as shown below (*"Road Operation and Maintenance Sector Study," Final Report, July 2007, JBIC*). In order to maintain and improve road conditions, including road safety measures, Php 62.8 billion is required and another Php 463.2 billion is necessary for rehabilitation, reconstruction, new construction, and expansion of the national roads (total estimated cost is Php 526 billion in 2006 prices). On the other hand, the budget allocation for national roads for the remaining MTPDP period (2007-2010) is only Php 239.8 billion excluding the allocation from SRSF of the MVUC.

It is evidently difficult for DPWH to cover the expenditure requirements for maintaining and expanding the national roads within the medium-term plan period with only 46% of the budget available.

Table 2.3.2 Expenditure Requirements for National Roads (as of end of 2006), at 2006 prices

	Infrastructure Needs			**Cost (Php. B) at 2006 prices**
	Present condition	**Length/Number**	**Intervention Needed**	
a.	Paved roads in poor/ fair condition	Poor: 5,475 km Fair: 4,675 km	**Preventive maintenance** (asphalt overlays)	54.7
b.	Paved roads in good condition and unpaved roads in good condition	-Paved & good: 4,163 km -Unpaved & good : 2,033 km	**Routine maintenance** to prevent early deterioration	1.0/year (4 years x 1.0 =4.0)
c.	2,000 accident black-spots along National Roads	2,000 no.	**30 weigh-bridges** must be installed to check for overloaded vehicles which destroy the roads	4.1
Sub Total of Maintenance and Installation of Weigh-Bridges				**62.8**
d.	Paved roads in bad condition	Bad: 6,192 km	**Rehabilitation/ reconstruction** to the original design condition	130.0
e.	Unpaved with gravel surface	Gravel: 29,013 km	These roads **must eventually be paved**	204.2
f.	-Temporary bridges -Existing old Bridges -Missing links and narrow roads -No bridge crossings	-Temporary Bridges: 16 km -Old Bridges: 57 km -Missing Links, narrow roads: 2000 km	-Permanent bridges -Strengthen old bridges -Construction of new roads including widening and bypasses -Construction of 15 km of new bridges -Construction of 15 interchanges to improve traffic flow.	129.0
Sub Total for Rehabilitation/Reconstruction/ Widening/ New construction				**463.2**
GRAND TOTAL				**526.0**

Source: "Road Operation and Maintenance Sector Study", Final Report, July 2007, JBIC/DPWH

In addition, planned budget allocation from MVUC from 2007-2010 is about Php 30 billion. It is therefore impossible to cover the total needs above (Php 526 billion) even if Php 30 billion of MVUC is provided.

(4) Budget Utilization

The budget utilization (disbursement) by the DPWH is mostly within the range of 65% - 80%. It was 70% in 2005, 85% in 2006, 70% in 2007 and 65-70% in 2008. There are a few reasons behind this low utilization, including the delayed approval of the budget by Congress, late release of the budget by DBM (mostly at the end of 1st quarter or early 2nd quarter) and the civil works enforced implementation during the rainy season (due to the late budget release). The implementation of projects during the rainy season also affects the quality of road works. The DPWH is discussing the frontloading system of budget release in order that it can implement the projects/programs from the beginning of the year and during the dry season. The DPWH is also implementing an advance procurement system, with procurement starting in the previous year, while award made as soon as the budget is approved and released.

Another issue is the absorptive capacity of DPWH. It has recently been allocated with significantly increased budget for its infrastructure projects. However, its capacity to manage such projects and utilize the funds is insufficient.

(5) Political Influence

The funding for the national road investment is through the DPWH's capital outlay budget (GAA) while the maintenance program is from both GAA and the SRSF. The road links for PM are prioritized by the PMS/HDM-4 and are validated by BOM/DPWH for submission to the Road Board. However, the SRSF has not been used based on the priorities established by PMS (HDM-4). The administration of the SRSF has been influenced by external pressures (political), causing delay and diversion of the release of the funds.

The DPWH receives budgetary allocation from the Congressional Initiative Fund (CIF) for expenditure on local roads, which is between 15% and 40% of the DPWH budget. The CIF should be used and aligned more closely with local development policies and priority plans to contribute to regional economic development and regional welfare.

2.3.2 ROAD PLANNING AND MANAGEMENT SYSTEMS

(1) Lack of Long-Term Road Development and Maintenance Plan

The DPWH should establish clear medium- and long-term road asset management plan (both development and maintenance) with clear policies, strategies, targets and investment costs and resources required to attain such targets.

The JICA has conducted two national road master plan studies as follows:

- Master Plan Study on Luzon Island Strategic Road Network Development Project (1992.2 – 1993.5)
- Master Plan Study on Visayas and Mindanao Islands Strategic Road Network Development Project (1996.12 – 1999.3)

More than ten years have passed since the completion of these studies. Hence, a new nationwide master plan study should be conducted to establish a long-term highway development and asset management plan. It is noted that the on-going high-standard highway master plan study only covers three metropolitan areas (Manila, Cebu and Davao).

The DPWH has many secondary national roads with unclear national functions and roles. The DPWH should reclassify these roads in accordance with existing spatial plans and convert these to local roads, if required.

The highway network and their development concepts do not coordinate well with the other transport modes, such as ports, airports, rails and ferries. Even these are not well coordinated with regional development strategies and plans. The DPWH has been implementing the MPTDP 2004-2010 and have commenced preparation for the next MTPDP 2010-2015. However, as the DPWH does not have a long-term development plan itself, it should establish a highway (road) master plan.

(2) System Development Application

The DPWH has developed comprehensive road planning and management systems with the assistance of the WB and ADB. These systems were developed independently and integrated as much as possible. As a result, these systems currently have the following problems:

- The systems have become complicated and only specially trained staff are capable of using these.
- Some systems, like the RMMS, do not work well at the operation stage and require review and modification.
- There are two systems for HDM-4 based road management programs (PMS and RMMS). These should be combined as in some other countries given that HDM-4 has such capability.
- One of the key data for HDM-4 is International Roughness Index (IRI), which is converted from the ROCOND visual inspection data. Correlation between both systems is not satisfactory for some road links.
- The communications system for some DEOs are poor and have difficulty in accessing the DPWH intranet. Some DEOs' computers are obsolete and require replacement to facilitate access to the systems developed by the DPWH CO. Said computer systems are also vulnerable to computer viruses.

(3) PMS

The potential projects considered for inclusion in the AIP need to be implemented within the time constraints of the AWP. The process of approval of the annual program and budgeting exercise is summarized in the next paragraph.

At present, program preparation begins on April of each year. After which, the process of budget hearings commence. Approval is obtained from the various bodies involved, such as the DPWH Budget Division, DBM, Congress and the Senate. Forecasts of availability of funds are provided by the Development Budget Coordination Committee (DBCC). Hence, the earliest that condition ratings for any particular year that will be used for identifying projects is two years thereafter. This is the minimum period required to be able to incorporate particular projects into the program. The time gap causes budget insufficiency or technical inadequacy, especially for PM, as the road deteriorates annually.

(4) Capacity of RO and DEO

The ROs and DEOs have important roles in the conduct of field surveys and revising road and bridge condition data annually to update the RBIA database. However, skills and capacities among DEOs are inconsistent, resulting in the inclusion of inappropriate or erroneous data.

Many RO and DEO staff lack skills in using the IT and computer systems. Their computer operators meanwhile do not have adequate knowledge on road engineering. As a result, verification of field, input and output data have many inconsistencies or errors.

2.3.3 OVERLOADED VEHICLES

(1) Adverse Effects on Roads

Under Republic Act (RA) No. 8794 of 2000, the maximum allowable Gross Vehicle Weight (GVW) limits are defined as shown in Figure 2.3.1. RA 8794 or "An Act Imposing A Motor Vehicle User's Charge On Owners of All Types of Motor Vehicles and For Other Purposes", increased the GVW limits for 2-axle and 3-axle trucks while those for trailer trucks were limited to 40 tons to avoid adverse affects on existing bridges. The DPWH, DOTC and DILG issued a Joint Circular in accordance with the Implementing Rules and Regulations (IRR) of RA 8794 in 2001, which defined an axle load limit of 13.5 tons, one of the highest in the world.

These have caused considerable negative effects on pavements. Although the GVW increase was 13%-30% compared to previous legislation, it doubled pavement damage factors from 5.4 ESAL to 9.9 ESAL for 2-axle trucks and triple from 2.9 ESAL to 8.8 ESAL for 3-axle trucks as shown in the figure below.

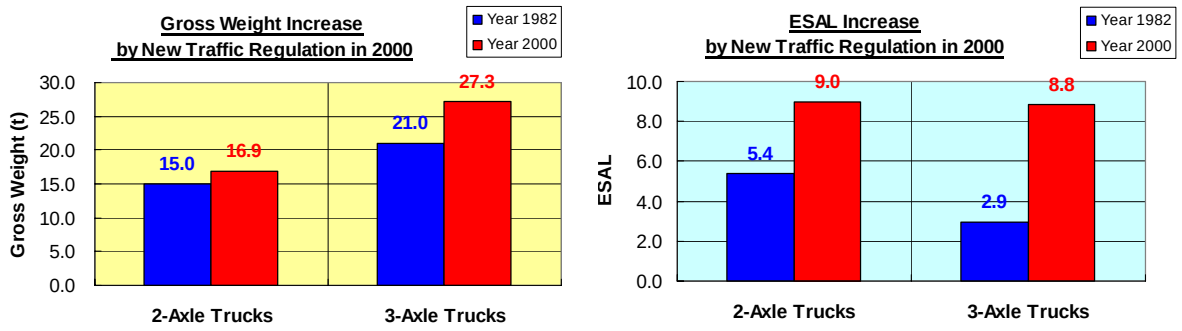


Figure 2.3.1 Estimated ESAL (Equivalent Standard Axle Load) under RA 8794

There is also an argument over which has preference in terms of defining overloading, GVW or axle load. If overloading is defined by GVW, most of the trailer trucks on the road will be classified as overloaded vehicles. If overloading is defined by axle load, only about 10% of trucks will be classified as overloaded.

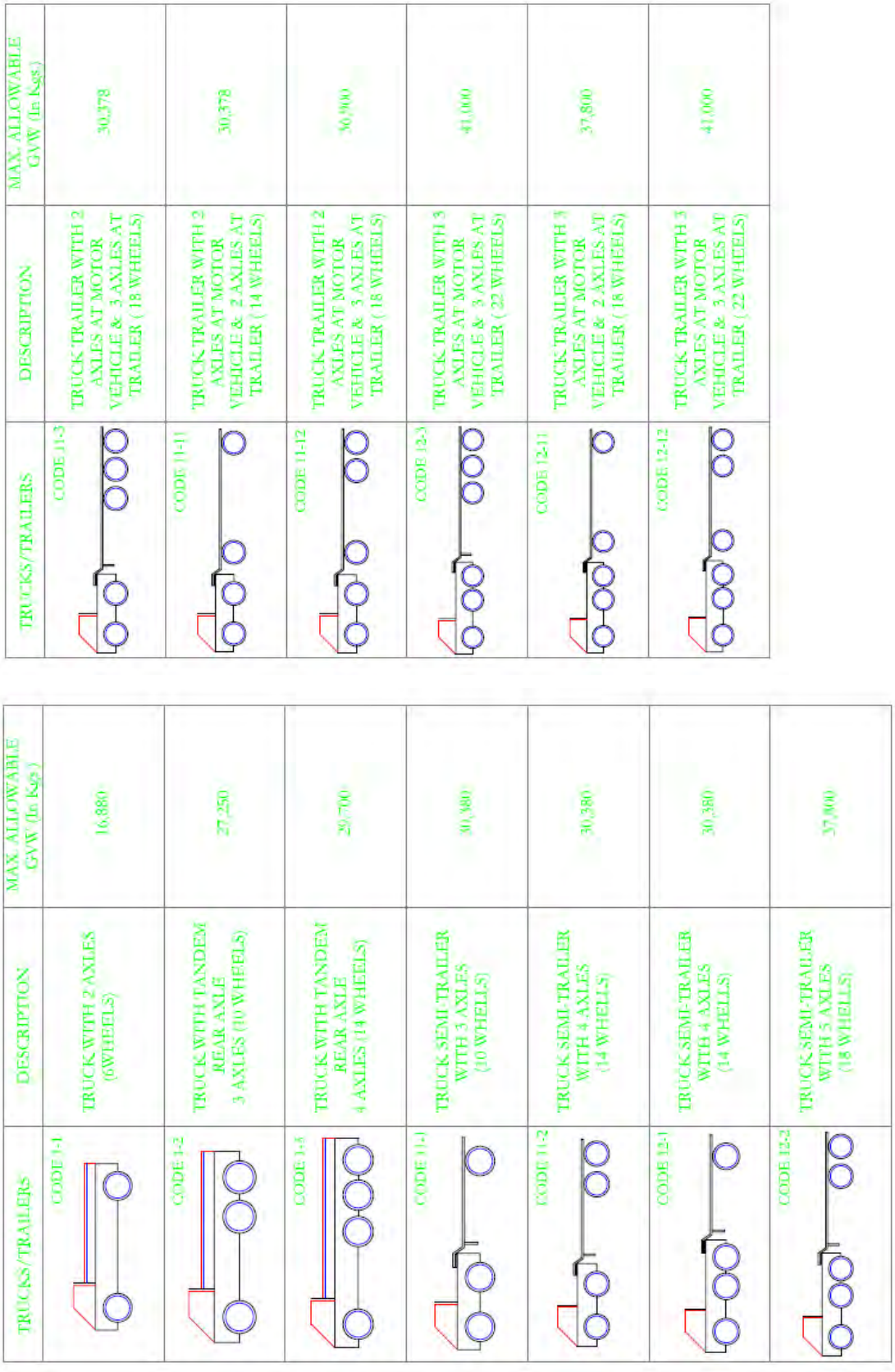


Figure 2.3.2 Gross Vehicle Weight (GVW) Limits in RA No.8794

(2) Adverse Effects on Bridges

Abnormal vibration occurs on a bridge due to the passing of overloaded vehicles. Cracks on the concrete deck slabs and girders, failure of bearings and defective expansion joints occur due to the abnormal vibration. These could lead to further structural problems, which may be catastrophic. However, cracks caused by excessive vibration due to overloading may not be structurally damaging, unless the vibration is caused by resonance. Water penetration, which is normally due to rain or dampness of the concrete deck slabs and girders, leads to the corrosion of rebars. It is recommended that waterproofing be provided for the concrete of deck slabs, especially for under-designed bridges, to prevent progression of the existing deterioration on stability due to the prevailing traffic conditions.

Expansion joints and bearings, which were designed using current DPWH standards, are under-designed and damaged due to the impact of overloaded vehicles. It is necessary that the standard design of the expansion joints should be revised to the more solid type or joint-less structure considering the actual axle load of the traffic.

(3) Overloaded Vehicle Control Plan Proposed by AusAID Study

As an effort under the Partnership for Economic Governance Reforms (PEGR), AusAID contracted Halcrow Asia in March 2008 to undertake an eight month technical assistance study to assist the DPWH, together with other GOP agencies, to enforce regulation on overloaded trucks along the national road network in the Philippines.

The findings of the study are summarized in the Final Study Report, dated December 2008. The detailed information on each aspect of the study is set-out in a series of accompanying reports as follows:

Daughter Report No. 1	Existing Weighbridge Stations, Site Survey Report
Daughter Report No. 2	Institutional Solutions Report
Daughter Report No. 3	Legal Recommendations Report
Daughter Report No. 4	Economic Analysis, Penalty Regime and Incentives Report
Daughter Report No. 5	Weighbridge Station Network Expansion Report
Daughter Report No. 6	Consultation Report
Daughter Report No. 7	Communications Plan
Daughter Report No. 8	Outline Sample Bidding Documents

(Submitted separately to DPWH and PEGR)

1) The Context for Providing New Infrastructure

Success in enforcing anti-overloading restrictions throughout the Philippines requires:

- Firstly, those changes are made to the current institutional environment, so as to overcome a series of issues that prevent the effective deployment of enforcement personnel;
- Secondly, it requires that the current confusion regarding overloading regulations is resolved, an acceptable definition of overloading is adopted and a suitably punitive penalty regime is put in place; and
- Thirdly, it requires that a climate be created within which enforcement action is seen as acceptable, through allowing the trucking industry to operate profitably within the

confines of the law, while at the same time minimizing the impact that overloading enforcement has in increasing transport costs.

All of these issues have been discussed in three previous study reports: the Institutional Solutions Working Paper, the Regulatory Solutions Working Paper and the Final Economics Report.

If all of the recommended changes set out in these reports are implemented, there will be a need to ensure that an adequate infrastructure network with enforcement initiatives can be carried out. The provision of such infrastructure, if suitably located, will form the final key element of the enforcement regime.

2) The Required Infrastructure

Two reports prepared by the study, the 'Existing Weighbridge Stations Site Survey Report' and the 'Weighbridge Station Network Expansion Report', analyzed the flows of heavy goods vehicles and assessed whether the location of the existing network of weighbridge stations is appropriate to accommodate the bulk of existing and future overloaded traffic.

The reports also set out the results of a physical inspection of all the existing weighbridge stations in the country to determine the suitability of their location, site's current conditions and needs for improvements.

The reports concluded firstly that the majority of the existing weighbridge stations are in poor condition. These stations have inoperative equipment, and are mostly located at sites, which has insufficient signage, inadequate lighting and damaged carriageways. Out of the current total network of some 23 DPWH weighbridges, it was found that:

- Virtually none of the sites are currently operating satisfactorily due to various technical issues;
- Most of the sites require remedial works to improve their condition to a consistent, professional operational standard;
- The current maintenance regime is poor, with many sites being non-operational due to defective parts (mainly load cells); and
- Several of the sites are poorly located in places, either there are few trucks to weigh or the site itself is situated in a dangerous location.

Based on these findings, it was concluded that 15 of the existing weighbridge stations need to be refurbished and retained. Seven of the remaining eight sites should be decommissioned, as they are either unsafe or ineffective. The remaining site meanwhile, which is currently being refurbished by DPWH, should be retained only for a short to medium term, until such time as the site can be replaced by new sites in more appropriate locations.

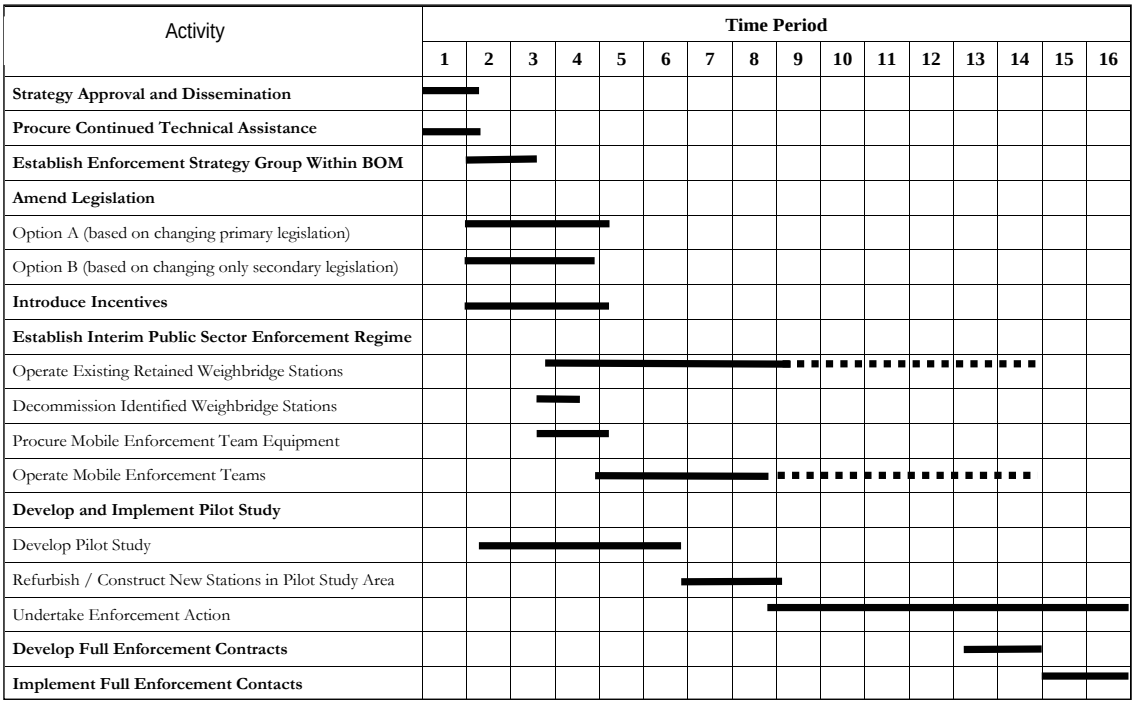
In addition, it was also concluded that the 16 retained sites, although all are generally well located from an enforcement viewpoint, form an inadequate national network from which to achieve effective enforcement. To address this issue, it was recommended that 20 new sites be added to the weighbridge network and that a number of mobile enforcement squads, utilizing portable axle weighing machines, also be established.

Figure 2.3.3 Proposed Weigh-Bridge Stations with Priorities Indicated

3) Overall Implementation Timetable

A four year implementation timetable has been proposed in the Final Study Report. This implementation plan encompasses:

- setting up of a new strategic overloading group within BOM;
- undertaking of all of the communications activities set out in the communications plan to secure the required changes to legislation, facilitate the use of private sector contractors, put in place incentives and inform the wider community of the proposals and their impacts;
- setting up, tendering and monitoring of a pilot study; and
- tendering of further contracts covering the whole Philippines.



2.3.4 WEAKNESS AND INSUFFICIENT CAPACITY IN PLANNING, IMPLEMENTATION AND OPERATION & MAINTENANCE

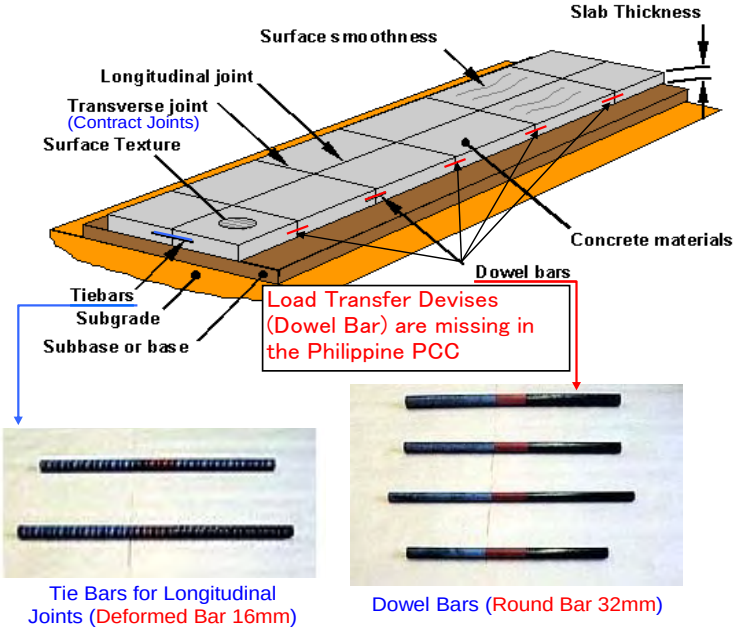
(1) Roads

Most of the pavements in the Philippines, either newly constructed or rehabilitated, are not expected to last for its planning or design period. Several causes for this include:

- Design Stage: Design weakness
- Construction Stage: Poor quality of materials, workmanship and supervision
- Maintenance Stage: Inadequate maintenance and weakness in maintenance technology
- Weakness in Implementation Capacity.

1) Design Weakness

Portland cement concrete (PCC) pavement is dominant in the Philippines compared to asphalt concrete (AC) pavement. However, the standard design drawings of DPWH do not indicate provision of load transfer devises (dowel bars) at 4.5m transverse cut joints, although required by all international standards (USA, UK, Japan, etc.).



Tie Bars for Longitudinal Joints (Deformed Bar 16mm)

Dowel Bars (Round Bar 32mm)

It should be realized that HDM-4 is a planning but not a design tool. AC overlay is a standard method for increasing the structural strength of the existing PCC pavement both in rehabilitation projects and PM programs in the Philippines. However, no overlay design is conducted for such implementation.

2) Quality Control

Currently, the term 'quality control (QC)', as applied to the various stages of project implementation, is viewed and considered as the contractor's responsibility while the term 'quality assurance (QA)' is supposed to be the responsibility/obligation of the DPWH for ensuring strict compliance to stated standards/specifications and other pertinent DPWH issuances prior to project implementation. This is however a conventional approach. QA is defined as "planned systematic actions to ensure that the quality of a product satisfactorily meets the requirements of the governing specifications." Hence, QA is a total system attained as a result of the combined efforts and resources of the entities involved in the construction of the project/s (DPWH, contractors and Consultants).

The contractor has the prime responsibility to produce/process the products (i.e., construction materials) to satisfy the quality requirements in accordance with the specifications prior to incorporating them into the project. The DPWH Project Engineer (PE), on the other hand, has the responsibility to verify/ensure/ascertain that the contractor meets the requirements in accordance with the contract and specifications. However, majority of the medium and small contractors do not have quality testing equipment and capability. The DPWH laboratories at the RO and DEO are also not fully utilized.

Most DPWH projects have not been using statistical QC methods for infrastructure projects. Statistically based methods are effective means of ensuring a quality product, and would be a fundamental component in construction quality management. It is a challenge to introduce the practice for DPWH projects, especially for PCC and AC production and pavement construction.

3) Inadequate Maintenance and Weakness in Maintenance Technology

Road maintenance consists of RM, PM (periodic) and emergency works. RM is an activity that should be undertaken every year. It is mostly labor intensive work compared with the PM that is

equipment based.

The contractor, under the DPWH standard contract, has obligations for the RM of completed works until its final turn-over. Maintenance shall be carried out with adequate equipment, methods and supervision in order that the roadway, or structures, is kept in satisfactory condition at all times. However, both the DPWH and the contractor have not paid much attention to maintenance. RM becomes the responsibility of the DPWH after it has taken over the completed project.

The design period for new or upgrading projects is ten years for AC pavement and 20 years for PCC pavement. The first PM will be due within 10 years after the opening to traffic. In principle, since the design life under PM is 5-10 years, it should be initiated every 4-9 years depending on the level of traffic and road condition.

Table 2.3.3 Required Maintenance Activities for Road Facilities

Category	Classification	Routine Maintenance	Preventive (periodic) Maintenance	Emergency Maintenance
Roadway	Road surface (AC pavement)	Crack sealing Patching	Overlay, partial reconstruction	Damage or road cut-off by slope failures, scouring, etc.
	Road surface (PCCP)	Crack sealing	Overlay, partial reconstruction	Damage or road cut-off by slope failures, scouring, etc.
	Shoulders and approaches	Vegetation control		
		Spot failure repair	Material addition and/or sealing	
Drainage	Culverts	Cleaning	Capacity increase	Cleaning debris
	Roadside Drains	Cleaning	Repair, addition	Cleaning debris
Roadside	Embankments	Vegetation control	Slope stabilization	Slope failure, settlement
	Cut slopes	Removal of fallen rock/boulders	Slope stabilization	Slope failure repair (grouted riprap, rock net)
Bridges	Superstructure	Drainage	Repainting (steel)	Joint repair
	Foundation		Scouring protection work	Scouring protection / repair
	Others	Approach road settlement	Approach slab construction	
Traffic control device	Information and regulation signs, markings, etc.	Repair	Repainting of markings, addition	Replacement of crushed signs, etc.
Safety devise	Guard rails, barriers, etc.	Repair	Repair and addition	Replacement of crushed guard rails, signs, barriers, etc.

The most important item for pavement is the pothole repair to minimize penetration of water into the foundation. The DPWH still use outdated conventional pothole repair methods, applying heated MC layers at delayed timing.

The popular method for pothole repair in developed countries is by using pre-mixed materials or cold mix. The development of AC cold mix production will be a new challenge necessary for the DPWH and construction material industry.

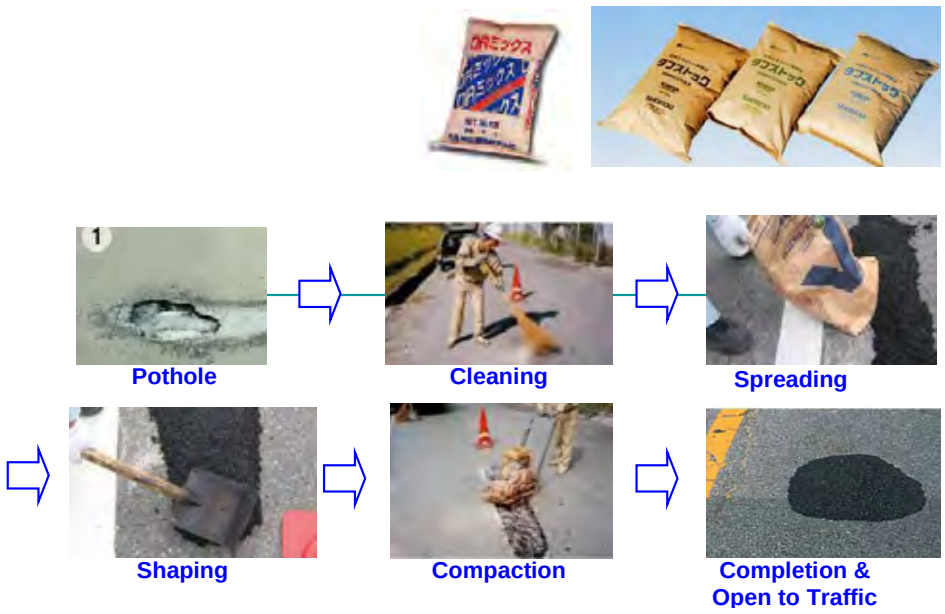


Figure 2.3.4 Pothole Repair Method in Developed Countries

4) Weakness in Implementation Capacity

Both development and PM projects are implemented by contract. The ROs and DEOs are the implementing agency for most of the development and maintenance contracts. They are responsible for design, procurement, construction supervision and project management if the contract amount is less than Php 50 million. However, the capacity of the RO and DEO is weak in terms of design, quality and project management.

5) Quality Assurance Unit (QAU)

The QAUs perform a different function, auditing the performance of the DPWH implementing units – PMOs and ROs and DEOs. The scope of the assessment varies, including review of the technical and disbursements aspects of projects. The assessment is intended to audit the QA activities of the implementing units to identify any major defects and deficiencies. Where defects or deficiencies are identified, the implementing units are required to explain, carry out corrective works, deduct non-complying works from billings, and refund any overpayment. The project assessments are carried out on a quarterly basis.

Several measures to strengthen the QAUs, are as follows:

- DPWH laboratories should be commercialized for efficient utilization. Its staff with better skills, knowledge, motivation and services should be retained.
- Insufficient staff and knowledge of QAU: QA activities should not be outsourced to qualified consultants and materials engineers.
- Change scheduled quarterly inspections of QAU to unannounced inspections.

(2) Bridges

To obtain consistent bridge data to ensure required stability and safety, the establishment of minimum guidelines for QC/QA and repair procedures for bridge construction and maintenance is needed. However, such procedures followed by each district office, is mainly authored by the local contractor. Obtaining uniformity and consistency of QC/QA and repair manuals used by various inspectors throughout the country is important to bridge asset management. New or more

assertive types of QC/QA and repair manuals to improve reliability and consistency of inspection data should be identified by DPWH, including performance testing of inspectors, use of control/reference bridges, and inspector certification.

2.3.5 CONSTRUCTION COST INCREASES

Construction costs had increased from 2003 to 2008 in line with the growth in the world economy. Prices of fuel, asphalt and steel have recorded significant increases. Although these markets prices decreased in line with the worldwide economic upheaval in late 2008, prices are at still higher levels compared to 2003-2005 prices.

Year	Gasoline (¥/lt)	Diesel (¥/lt)	Asphalt (¥1000/ton)	Steel Bar (¥/kg)	Cement (¥100/ton)
2000	98	76	22	26	89
2001	98	75	25	27	87
2002	97	74	26	30	82
2003	103	76	27	37	83
2004	113	80	28	54	84
2005	122	92	38	58	85
2006	124	101	52	57	85
2007	127	105	57	67	85
2008	145	122	66	70	85
2009	99	90	62	70	96

Note: Average price through year except 2009, which is March prices.

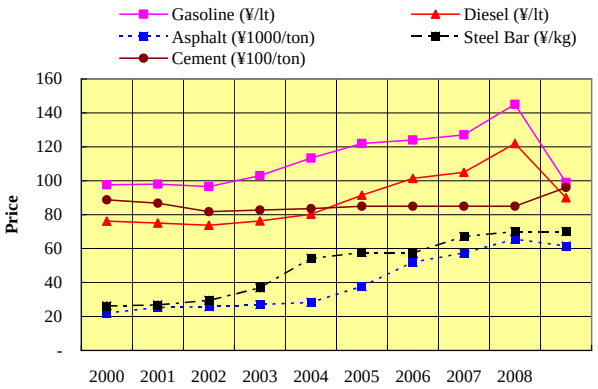


Figure 2.3.5 Major Material Price Changes in the World Market

Construction materials and construction costs in the Philippines had increased, influenced by material prices in the world markets. World market price increases for oil and asphalt pushed up construction cost drastically in 2006 by approximately 33%-60% over 2005 prices as shown in the following table. Although material prices were lower since the late 2008, it is still high compared to 2005 prices.

Table 2.3.4 Unit Road Construction Increase influenced by Material Price Rises

Pavement Type	Construction Type	Geometry	2005-2006 Cost Increase in %	2006 Costs (Mill.PhP/km)	2009 Costs* (Mill. Ph/km)
ACP	New	6.1m sh2x1.0m 50mm	60	23.0	26.5
	New	6.1m sh2x1.0m 80mm	66	27.3	31.4
	New	6.1m sh2x1.0m 100mm	70	30.6	35.2
	New	6.7m sh2x2.5m 50mm	27	28.6	32.9
	New	6.7m sh2x2.5m 80mm	31	33.7	38.8
	New	6.7m sh2x2.5m 100mm	33	37.8	43.5
PCCP	Slab replace	230mm (per m2)	9	6.6	7.3
	New	6.1m sh2x1.0m 200mm	19	23.0	25.3
	New	6.1m sh2x1.0m 230mm	19	24.1	26.5
	New	6.7m sh2x2.5m 200mm	18	27.9	30.7
	New	6.7m sh2x2.5m 230mm	18	30.6	33.7

Source: PMS/DPWH

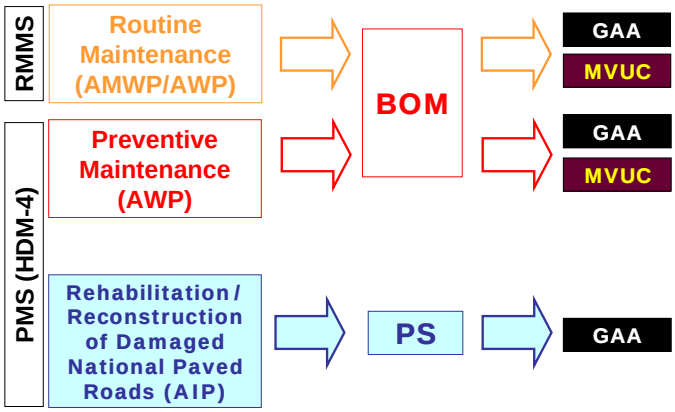
* Assumption by the JICA Survey Team
(15% and 10% increase to the 2006 cost for ACP and PCCP, respectively)

2.4 CURRENT SITUATION AND KEY ISSUES IN THE ROAD MAINTENANCE SECTOR

2.4.1 CURRENT ROAD MAINTENANCE PLANNING AND IMPLEMENTATION SYSTEM

(1) Maintenance Planning

The maintenance plan is established based on the annual road condition survey conducted by the DEOs. PM is programmed by PMS (HDM-4) which are validated by the BOM. RM is currently scheduled using Microsoft Excel based computer program (Equivalent Maintenance Kilometer or EMK). Both maintenance programs are financed by GAA and MVUC.



The budget for RM is allocated to each DEO based on EMK method which accounts for road length, width, pavement type, pavement structures (thickness), pavement width, traffic (AADT) and bridges. However, it does not consider road condition (good, fair, poor and bad), drainage and slope maintenance requirements.

CALCULATION OF MAINTENANCE SHARE
EQUIVALENT MAINTENANCE KILOMETERS (EMK) METHOD

{LENGTH OF ROADS IN KMS. x (EMK FACTOR FOR WIDTH) x (EMK FACTOR FOR SURFACE TYPE)} +
+ {(LENGTH OF BRIDGE IN L.M.) (EMK FACTOR FOR BRIDGES)} = TOTAL

FROM ROAD INVENTORY — FROM BRIDGES INVENTORY — BRIDGE FACTOR

TYPE	EMK FACTOR
CONCRETE	0.010
STEEL	0.035
TEMPORARY BAILEY & TIMBER	0.100

CORRECTION FACTORS

TYPE	WIDTH	EMK FACTOR
Unpaved	< 5 m	0.80
	5 - 7.5 m	1.00
	7.5 - 10 m	1.20
	10.0 - 12.5 m	1.40
	12.5 - 15 m	1.60
	> 15 m	1.80
Paved (Asphalt or Concrete)		
	< 7.5 m	1.00
	7.5 - 10 m	1.15
	10 - 12.5 m	1.30
	12.5 - 15 m	1.45
	15 - 17.5 m	1.60
	17.5 - 20 m	1.75
	20 - 22.5 m	1.90
	22.5 - 25.5 m	2.05
	25.5 - 27.5 m	2.20
	27.5 - 30 m	2.35
	30 - 32.5 m	2.50
	32.5 - 35 m	2.65
	35 - 37.5 m	2.80
	37.5 - 40 m	2.95
	40 - 42.5 m	3.10
	42.5 - 45 m	3.25
	45 - 47.5 m	3.40
	47.5 - 50 m	3.55
	> 50 m	3.70

AADT AND SURFACE FACTORS

TYPE/THICKNESS	1	25	50	75	100	150	200	300	400	600	1000			
UNPAVED														
LOW														
< 100 mm	0.35	0.40	0.50											
MEDIUM														
100 mm - 200 mm	0.40	0.60	0.90	1.40	1.90	2.20	2.40	2.50	2.60	2.80	3.10			
HIGH														
200 mm			0.85	1.00	1.45	1.90	2.10	2.30	2.50	2.90	3.50			

BITUMINOUS	200	400	600	1000	1500	2000	3000	5000	10,000	15,000	20,000	30,000	50,000	70,000
LOW														
10 - 30 mm	1.10	1.55	2.10	2.50	2.60	2.75								
MEDIUM														
31 - 60 mm	1.00	1.25	1.55	2.00	2.20	2.30	2.40	2.50	2.60					
HIGH														
61 - 100 mm	0.70	0.85	0.95	1.20	1.65	1.85	1.95	2.10	2.20	2.30	2.45	2.75	3.15	3.65
EXTRA STRENGTH														
< 100 MM	0.5	0.6	0.7	0.8	0.9	1	1.1	1.15	1.2	1.25	1.33	1.48	1.68	1.93
CONCRETE														
20 CM	0.5	0.6	0.8	0.85	0.9	0.95	1	1.05	1.1	1.15	1.23	1.38	1.58	1.83

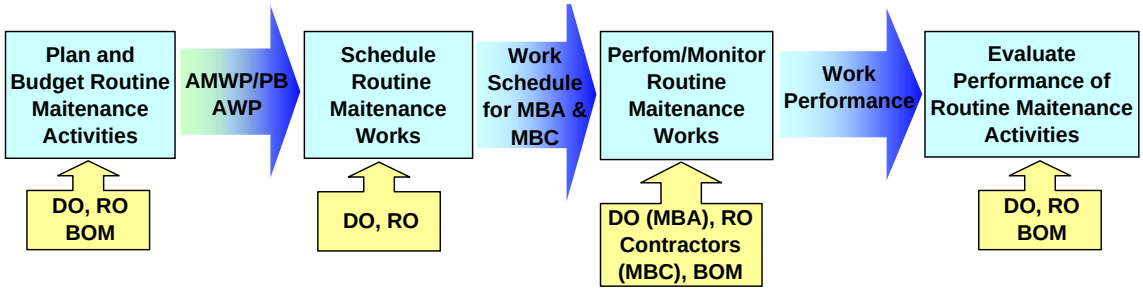
Source: DPWH

(2) Road Maintenance Management System (RMMS)

DPWH has developed RMMS to replace the conventional EMK method. The main objective of the RMMS is establishment of a system for making informed decisions on road maintenance.

The specific objectives are to provide the following:

- Adequate levels of maintenance service throughout the country
- Means to use labor, equipment and material of administration and contractors
- Objective basis for planning and maintenance works programming
- Comparison of planned work and actual performance (monitoring and evaluation).



Source: Road & Bridge Routine Maintenance Procedures and Planning Manual, DPWH

Figure 2.4.1 Flow of RMMS

The RMMS can solve the current EMK budget allocation problem by considering the road condition (good, fair, poor and bad). However, RMMS is not yet operational and approved by the DPWH and is still under review/evaluation.

2.4.2 INSUFFICIENT BUDGET ALLOCATION AND LOW EXPENDITURES IN ROAD MAINTENANCE SECTOR

(1) Budget Allocations for Maintenance of National Roads under the MTPIP

Table 2.4.1 DPWH Budget Allocations for Road Maintenance (in Million Pesos)

Plan/ Actual	Fund Source	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Total (2005-'10)	Total (2007-'10)
MTPIP	GAA	0	0	0	4,000	6,000	6,500	8,077	24,577	24,577
	MVUC	4,680	5,618	8,679	8,943	6,144	6,420	8,210	44,014	29,717
	Total	4,680	5,618	8,679	12,943	12,144	12,920	16,287	**68,591**	**54,294**
								Per annum	**11,432**	**13,574**
							Total (2004-'08)			
Actual	GAA	0	0	0	4,000	6,000	10,000			
	MVUC	4,680	5,448	9,138	9,202	6,144	34,612			
	Total	4,680	5,448	9,138	13,202	12,144	44,612			
						Per annum	**8,922**			
Actual/Plan		1.00	0.97	1.05	1.02	1.00	1.01			

Source: DPWH

The total actual budget allocation for road maintenance from GAA and MVUC during the period 2004–2008 was Php 44.6 billion which is equivalent to Php 8.9 billion per annum. This average amount per year will be increased up to Php 11.4 billion for the MTPIP 2005-2010 period and Php 13.6 billion for the MTPIP 2007-2010 period. However, these are still not enough to cover the needs for adequate road maintenance.

(2) Funding Gap between Allocated Budget and Needs for Road Maintenance

1) Needs for National Road Maintenance

The *Better Roads Philippines 1999* Study by WB/DPWH estimated required annual cost for national road maintenance at Php 13.4 billion in 1999 prices which is broken down as follows:

a. Normal maintenance cost (PM, RM)	Php 10 billion per year
b. Backlog maintenance or rehabilitation/reconstruction (BM, RH, RC)	Php 2.6 billion per year
c. Upgrading (Gravel to paved roads) UI	Php 0.8 billion
Total	**Php 13.4 billion (1999 prices)**

This amount, if converted to 2008 prices, is **about Php 20 billion** (applying a 5% escalation rate per year).

Note: Backlog Maintenance (rehabilitation and reconstruction) is classified into infrastructure investment (capital development) cost according to the current DPWH accounting system.

Based on this result and actual/planned allocations of budgets explained above, the total of four years budget for the remaining MTPIP (2007-2010) is not enough, covering only 68% of the required maintenance cost (=54.3/ 80), and only 69% (=41.3/60) for the rest of the three years (2008-2010).

A more precise assessment was made in "*Road Operation and Maintenance Sector Study", Feb. 2007, JBIC/DPWH*, based on HDM-4 under unconstrained budget simulation. The estimated needs for maintenance costs per year are summarized below:

a. Preventive Maintenance (PM)	Php 15.0 billion a year
b. Rehabilitation (RH)	Php 43.2 billion a year
c. Routine Maintenance (RM)	Php 3.2 billion a year
Total (with RH)	**Php 61.4 billion a year**
Total (without RH)	**Php 18.2 billion a year**

These values are in 2006/07 prices at the time of the study and higher than that of "Better Roads Philippines 1999" by about 3 times (=61.4/20). Therefore, it is apparent that the present budget allocation for national road maintenance has a big funding gap compared to the actual requirements.

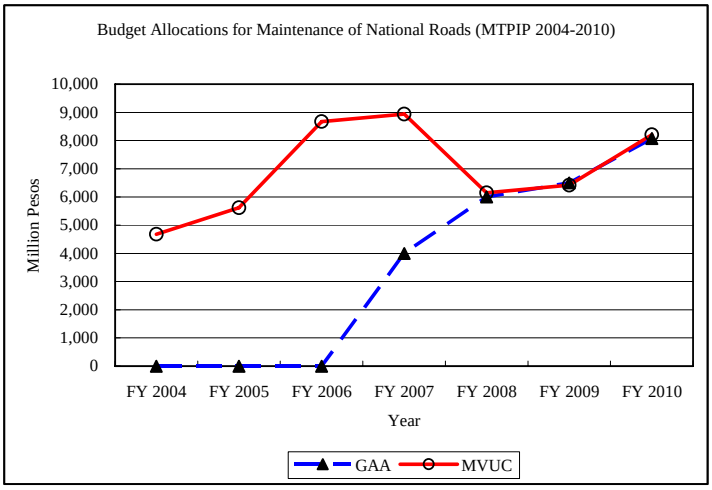
(3) Options for Increasing Road Maintenance Funds – Recommendations

In order to meet the long-term needs for road maintenance and to keep sustainable funding, four additional funding measures may be recommended (also refer to the WB document: "*Philippines Transport for Growth, Feb. 2009*").

1) Increase Budget Allocation from GAA, but should not substitute for the SRSF through MVUC.

This will be a short-term measure because, in the long-term, road maintenance costs could be funded properly by road users based on the "Beneficiaries Pay Principle".

The road maintenance costs from GAA are planned to be increased to the same level of the MVUC from 2008 to 2010 as shown in Figure 2.4.2. This trend should then be continued.



Source: DPWH and from Table 2.4.2-1

Figure 2.4.2 Planned Allocations from GAA and MVUC (2004-2010)

2) To increase the contribution of road users to supplement the SRSF from the current MVUC.

2)-1. A possible measure is to introduce **a surcharge on fuel** although it would be politically sensitive to impose, considering the effects on other commodity prices such as food. However, a surcharge on fuel is a common worldwide measure adopted in many countries to raise funds from road users.

2)-2. At the same time, the increase in the current rates of MVUC which have been fixed since 2004 is another alternative, particularly for trucks currently fixed at a very low level compared to the cost of road damage caused. (However, this adjustment in the charging rate of trucks may require understanding of the trucking and logistic industries.)

3) Introduction of the Toll Road System (not necessarily on a Tollway) to collect charges from vehicles passing through existing national roads at a rate to cover some portions of road maintenance costs including both RM and PM works.

Although measure 2) will require new regulation/ or changes in the current legislation, it is worthwhile to discuss creation of future sound fund sources for national road maintenance.

2.4.3 DELAY OF MAINTENANCE (MAINTENANCE BACKLOG)

Two definitions are used for the “maintenance backlog” terminology in the WB, DPWH and this report:

- Maintenance Backlog: Difference between how much of the road network is currently in poor and bad condition as a result of past insufficient maintenance and required rehabilitation, reconstruction or overlay after repair to reinstate to the normal road condition. This is the terminology used in the Better Roads Philippines 1999 (WB Report).
- Backlog Maintenance (BM): Restoration of shoulders, reconditioned or new drainage and minor improvement such as localized slope protections. These are works left when new pavements or overlay are made on the carriageways but associated shoulder and drainage works are left undone mostly due to budget constraints. This is terminology

used in the scope of works for REAPMP.

National paved roads of 5,950 km were in bad condition in 2008. These roads are classified under the maintenance backlog requirements which should be rehabilitated or reconstructed in the short term (2009-2012). The 3,650 km paved roads of fair-condition roads in 2008 will deteriorate further in the short-term. Approximately 30% (1,095 km) would turn to bad condition in the mid-term (2013-2015) as sufficient PM (fair) budget is not available in the short-term and subject to maintenance backlog.

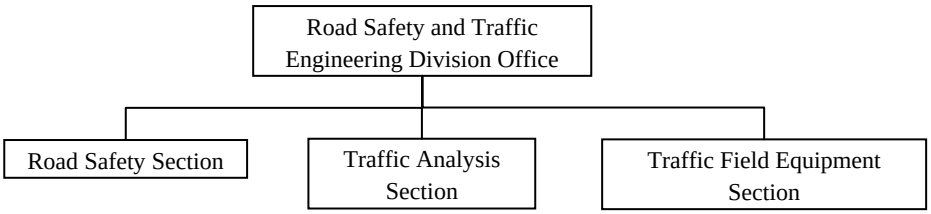
The estimated maintenance backlog will cost Php 51 billion for the short-term period (2009-2012) and Php 118 billion for the mid-term period (2013-2015). Maintenance backlog should be solved in the short to medium term to avoid further investment requirements.

2.5 ROAD SAFETY

2.5.1 POLICY OF GOP

GOP has committed to improving the road safety for all road users and has been promoting leadership in coordinating the measures for reducing the impact and cost to address road problems in the Philippines.

Based on the above, the Road Safety Section was established as a center of expertise for road safety in the Project Evaluation Section, Panning Service, DPWH.



Source: Figure 1 - Road Safety Section Revised Proposed Functional Chart (Road Safety Section Operation Manual)

Figure 2.5.1 DPWH Organization for Traffic Safety Works

2.5.2 TRAFFIC ACCIDENTS RECORDING AND ANALYSIS SYSTEM (TARAS)

A road accident data system called TARAS was established in the Project Evaluation Section, Planning Service of the DPWH with the assistance of ADB. Moreover, various manuals or reports are prepared as auxiliary to the Road Safety Section Operation Manual as follows:

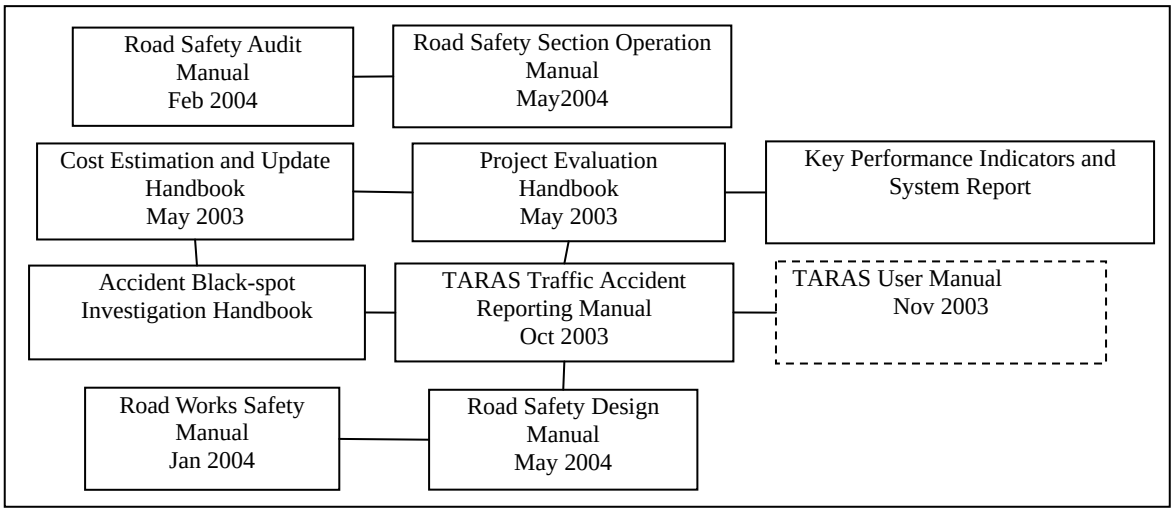


Figure 2.5.2 Sequence of Manuals

Any accident is recorded in the Reporting Form by Philippine National Police (PNP), and will be sent to the DPWH Regional Office based on the Memorandum between the PNP and DPWH. The data will be inputted at the RO and sent to the Central Office through the intranet.

However, the following issues have to be considered and improved/resolved.

(1) Police description in the Reporting Forms appears extensive.

(2) There is no method to confirm the difference between the actual accident figures in the Reporting Form prepared by PNP, and the data sent to DPWH.

(3) The server system in DPWH seems obsolete and inefficient for inputting and analyzing data.

(4) Server system shall be modified to meet with the current large volume of data files.

(5) All of the output data especially the numeric data are supposed to be compatible with excel formats (Currently only Summary Graph sheet can be accessed using MS Excel)

2.5.3 TRAFFIC ACCIDENT RECORDS

The summaries of data collected are as follows

year	Accident Number	Severity of accidents				Number of Casualties			Main Cause			Alcohol/ Drug Suspected
		Fatal	Serious	Minor	Property damage	killed	Serious	Minor	Human error	Vehicle defect	Road defect	
2004	7275	839	1012	2173	3251	1058	1765	4884	6352	565	193	710
2005	7883	1090	1347	2517	2929	1414	2545	5891	6859	666	207	876
2006	8471	1097	1377	2619	3378	1385	2398	5643	7442	690	148	801
2007	7910	858	1186	2364	3502	1086	2018	5016	7053	617	106	633
2008	6906	687	1086	2098	3035	892	1846	4467	6144	519	111	521

Source; Road in the Philippine (Feb 2009) and Data from TARAS

PNP shows in their website that a total of 15,064 traffic accidents occurred in 2006. However, said data are around two times greater than above DPWH data.

2.5.4 EFFECTIVE UTILIZATION POLICY OF TARAS

(1) Project Selection Criteria for Road Safety Audit

In case of new road projects, the effective countermeasures for road safety could be ensured through the system called "Road Safety Audit" during the design and construction stages.

The criteria for road projects to be audited at various stages are detailed in the table below:

ROAD SAFETY AUDIT STAGE	Audit Criteria - Cost of Road Project		
	Major Projects	Medium Projects	Minor Projects
total cost	exceeding PHP 50 million	between PHP 10 ~50 million	under PHP 10 million
Stage 1: Feasibility	All projects	Not Required	Not Required
Stage 2: Draft Design	All projects	All projects (1)	At the discretion of the District Engineer (2)
Stage 3: Detailed Design	All projects		
Stage 4: Pre-opening	All projects	All projects	
Stage 5: Roadwork Traffic Schemes	Any road work traffic scheme that is to remain in place for more than two months		
Stage 6: Existing Roads	National Highway sections are to be audited each year at the direction of the District Engineer, and as resources permit.		
Note (1) These projects may be audited at either of the stages shown.			
Note (2) These projects may be audited at any of the stages shown.			

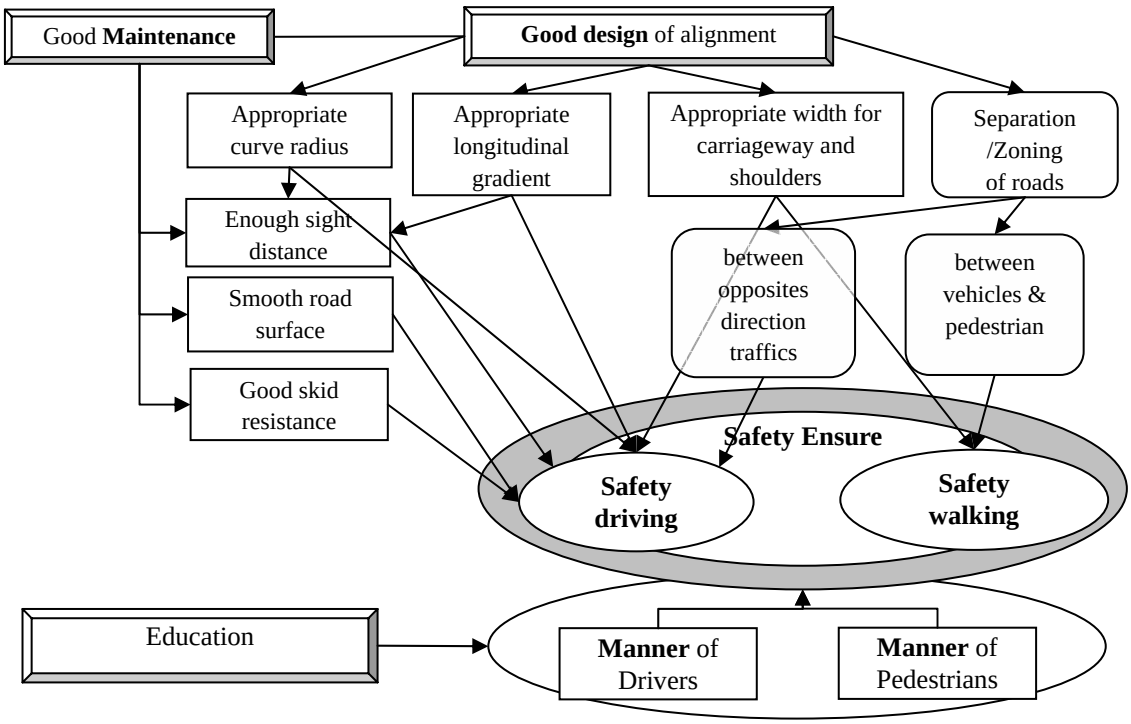
Source: Table 1: Project Audit Criteria for Road Safety Audit P14

The checking is required at each stage according to the respective cost of the road project in order to apply resources and gain maximum benefits.

2.5.5 TECHNICAL COUNTERMEASURE FOR ENSURING ROAD SAFETY

Good road and traffic engineering can also ensure that the road user is provided with a road system that is practically predictable and minimizes the need for complex decisions by guiding, warning and reducing the number of potential conflicts. It should also consider some tolerance so that the consequences need not be severe even if minor mistakes are committed.

It is said generally that road safety will be ensured by the proper attitude of the road user, supplemented with effective design as shown below, except during bad weather conditions:



Furthermore, several safety facilities should be provided, such as warning signs, guide boards, etc. However, these safety facilities are just auxiliary measures when the efficient road design seem impossible due to site conditions. It should be realized that excessive provision of these auxiliary measures can become obstacles as these may confuse drivers while on the road.

2.6 PLAN AND PROGRAMS ADDRESSING KEY ISSUES

2.6.1 MEDIUM-/LONG-TERM ROAD AND BRIDGE IMPROVEMENT AND MAINTENANCE PLANS

(1) Roads

The DPWH should have clear and stable policies, strategies and targets for road asset valuation and management. The PMS/HDM-4 assists in decision making on both medium and long-term investment requirements in terms of economic and technical aspects. The MYPS can incorporate national policy and social importance by adopting MCA. However, PMS/HDM-4 can not consider other transport modes and regional development policies and strategies.

JICA has development planning facilities for the preparation of nationwide highway planning and it is recommended that DPWH utilize such facilities. The results of the highway master plan should be the basis for REAPMP-Phase 2.

(2) Bridges

For planning medium-/long term bridge maintenance, there are assumptions needed for quantitative and reliable data on maintenance activities and life cycle costs. Data on maintenance should be related to type, timing, effectiveness of PM, RM, etc. Figure 2.6.1 shows the PM and RM in Philippines' bridge life cycle. Bridges in the Philippines has usually no/minimal maintenance, and hence, that bridge life of almost 50 years for concrete and 40 years for steel bridges are stipulated in the BMS of DPWH. However, bridge life may be extended to 100 years if effective PM and RM are conducted at the right time. It is important that bridge element detected in poor condition should be repaired using appropriate methods and upgraded

to good condition in PM. The repaired bridge should then be maintained in fair condition through RM.

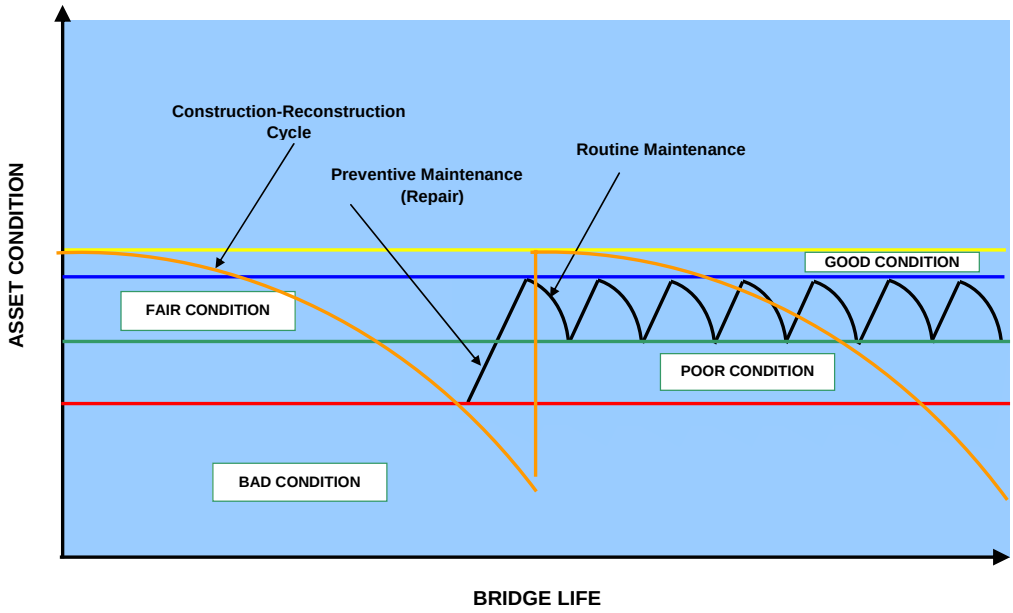


Figure 2.6.1 PM and RM in the Philippines' Bridge Life Cycle

For REAPMP, data on costs should include PM (repair) costs and RM costs borne during the bridge life cycle. When a bridge element is evaluated in poor condition, initial PM cost is borne by REAPMP with RM borne every year. PM cost is also borne every 11~25 years as shown in Table 2.6.1, to achieve an ideal maintenance plan.

Table 2.6.1 Maintenance Cost of Concrete Bridge in Bridge Life

Component	Maintenance Cost in Each 5 Year Intervals				
	1-5	6-10	11-15	16-20	21-25
Deck Slab	○		○		○
Expansion Joint	○		○		○
Concrete Beam/Girder	○				○
Steel Girder	○				○
Bearing	○				○
Railing	○		○		○
Pier/Abutment Concrete	○				○
Routine Maintenance	○	○	○	○	○

However, it is apparent that such maintenance activities to improve bridge performance depend more on the available budget than the technical necessity. Frequency of maintenance are not systematically executed by DPWH.

(3) Medium to Long-term Investment Plan

The investment of the GOP for the road sector is still insufficient. PMS/HDM-4 can provide future investment requirements for the existing road asset but not for new infrastructure requirements. There are a few investment requirement studies but their suggested amounts have large differences. Under these circumstances, reliable future investment estimate is essential for both asset management and infrastructure development when planning funding resources and

investment strategy.

2.6.2 LONG-TERM PERFORMANCE-BASED MAINTENANCE (LTPBM)

(1) Performance-based Maintenance and Management Contract (PMMC)

The PMMC is a new contract system aimed at reducing life cycle costs and increase in maintenance efficiency. Australia and New Zealand are advanced counties among the developed countries adapting PMMC. The PMMC has also been introduced to the developing countries, mostly with the World Bank support. The following figure shows application of PMMC in the world.

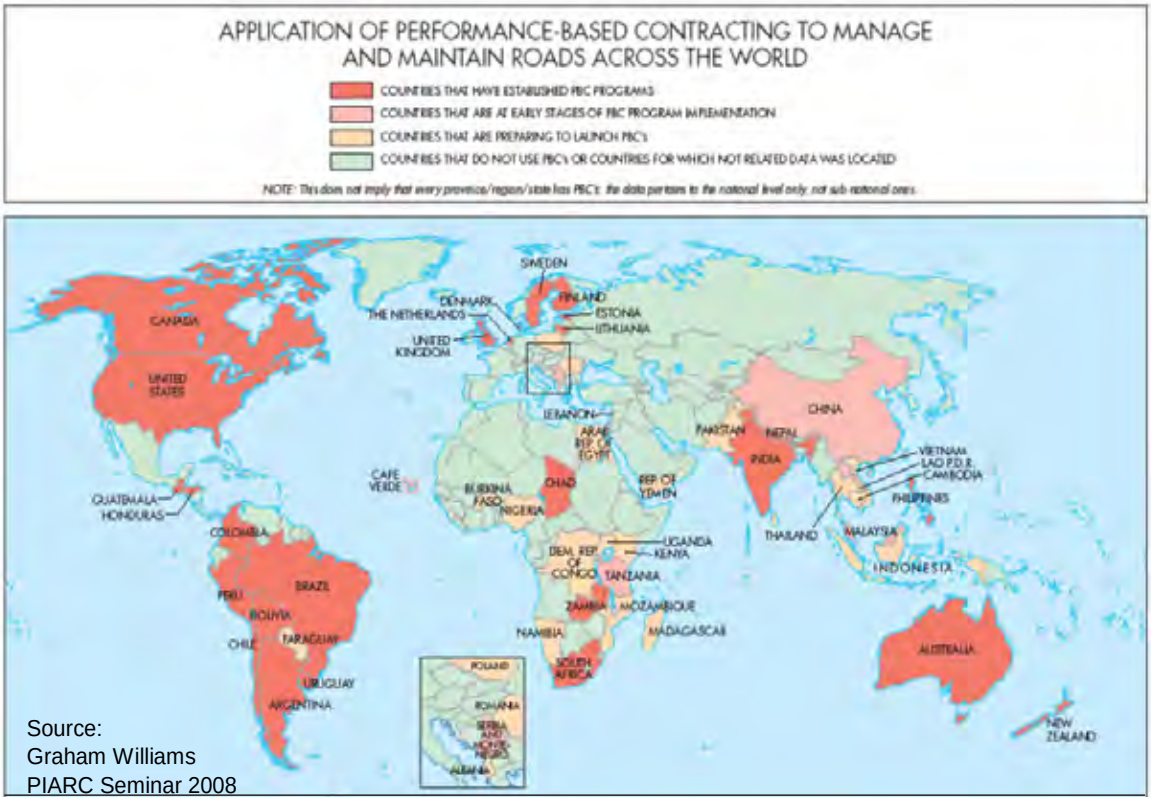
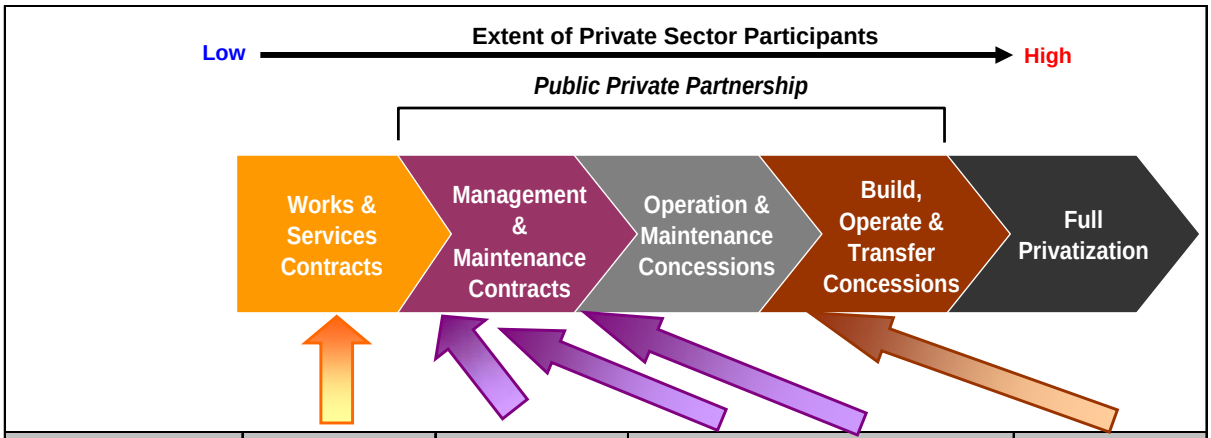


Figure 2.6.2 Application of Performance-based Road Maintenance Contract in the World

The private sector has more active participation and responsibility in operation and maintenance compared with conventional maintenance system by the GOP. The following figure summarizes the extent of private sector participation and Public Private Partnership (PPP) and LTPBM/OPRC schemes applied or planned by DPWH. The Output and Performance based Road Contract (OPRC), which giving all road improvement, maintenance and management responsibility to the private sector, is terminology mostly used by the World Bank. Lump-sum payment methods are applied for OPRC.

The scope of works of LTPBM under REAPMP is comprised of rehabilitation (RH), preventive maintenance (PM), backlog maintenance (BM) and routine maintenance (RM), including road safety. RH, PM and BM are paid based on quantity-unit price method while RM is paid based on monthly lump-sum.



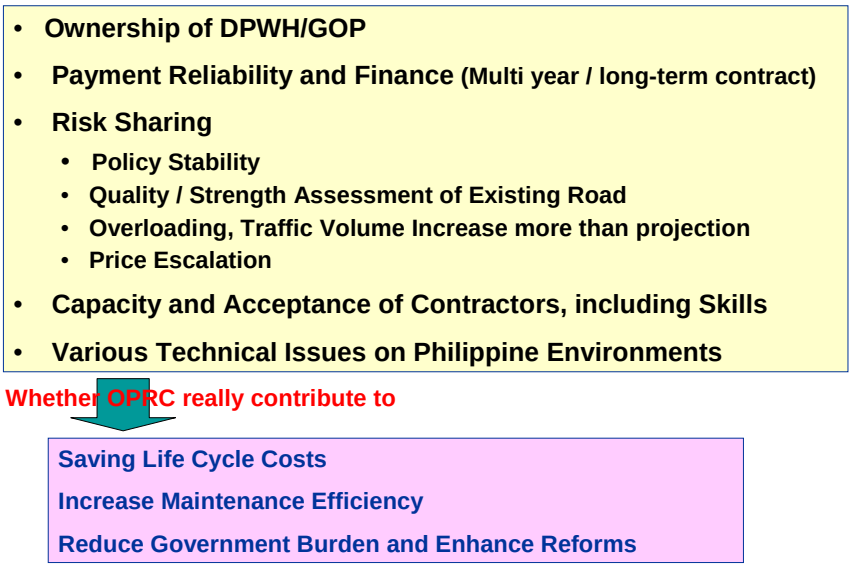
Category/ Project		RH/PM of DPWH	NRIMP-1(WB) LTPBM (pilot)	REAPMP (JICA) LTPBM	REAPMP (JICA) LTPBM	NRIMP-2 (WB) OPRC
Process	Design	●	●	●	☐ (Design-Build Pilot)	☐ (Design-Build)
	Construction (UI Work)	-	-	-	-	☐
	Maintenance (RH, PM & RM)	☐	☐	☐	☐	☐
	Operation/ Management	●	☐	☐	☐	☐
Contract Period		1 year + 1 year Warranty	3 years + 1 year Warranty	5 years	5 years	5 - 10 years
Payment	Construction	Q'ty x Unit Price	Q'ty x Unit Price	Q'ty x Unit Price	Q'ty x Unit Price	Lump-sum
	Routine Maintenance	included in PM	Lump-sum/month	Lump-sum/month	Lump-sum/month	Lump-sum/month
Agreement of DPWH		Yes	Yes	Yes	Yes	Partial (One Pilot)*
Advantages or disadvantages		Current System (Burden on DPWH)	Some risk share with contractor	Less risks compared with OPRC in Contractor's Acceptance	Transition to OPRC or Full LTPBMC	Management burden of DPWH be reduced
		Inefficiency on Maintenance Work	Contract period too short	Not much possibility for overall cost reduction	Not much possibility for overall cost reduction	Better possibility for reducing overall maintenance cost
			Not much difference to Current DPWH Method			Whether contractor is ready for acceptance

Notes: ● DPWH, ☐ Contractor Major difference between JICA LTPBM and WB OPRC
* DPWH and WB has recently agreed to implement one pilot OPRC under NRIMP-2.

Figure 2.6.3 Extent of Private Sector Participation and PPP

(2) Framework of LTPBM or OPRC in the Philippine Environment

Ownership by DPWH would be the most important aspect when introducing either LTPBM or OPRC. Risks should be carefully studied in advance and one-sided contracts should be avoided. The following is a framework for the introduction of the LTPBM in the Philippine environment.



The following table compares characteristic (advantage and disadvantage) of 5-year LTPBMC and 10-year LTPBMC.

5-year LTPBM Contract	10-year LTPBM Contract
- Risk reduction of a contractor's management - A reduction of risks, such as a policy change, fiscal deterioration, and an alternation of road use situation A appropriate price setting	- Cost saving by a long contract agreement - The possibilities of technical innovation are maximization and improvement in technical capabilities. - Reservation of a continuous quality A possibility that cost will not be save because a contractor's risk is large

The DPWH has decided at its Senior Management Committee to apply 5-year LTPBM scheme but not OPRC as the environment is still premature to apply OPRC in the Philippines. However, with further negotiations with the World Bank, the DPWH has agreed, in principle, on piloting one package for OPRC under NRIMP-2.

(3) Outline of Pilot LTPBM Projects in NRIMP-1

The performance-based contracts have become popular in developing countries lead by the WB. The DPWH under NRIMP-1 has implemented three pilot projects (254 km in total) of LTPBM contracts in Region IV-A.

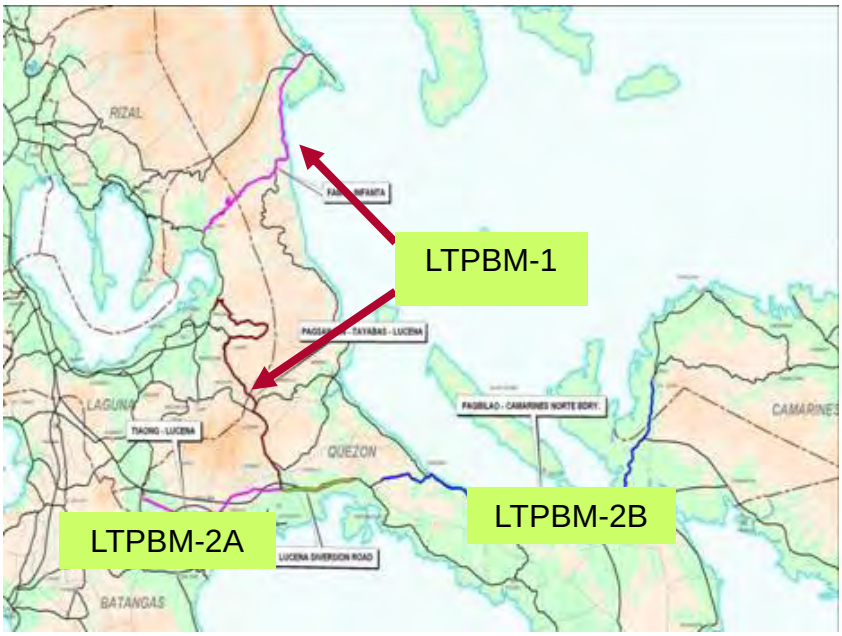


Figure 2.6.4 Location Map of LTPBM Pilot Projects under NRIMP-1

The LTPBM in NRIMP-1 is a hybrid-type contract. Its design was carried out by a consultant employed by the DPWH. Payment is mostly quantity-unit price based except for RM which is paid in lump-sum. The contract period is three years plus a one-year warranty period. The following table is outline of these pilot projects.

Table 2.6.2 Outline of LTPBM Pilot Projects in NRIMP-1

Project CP No.	LTPBM CP-1	LTPBM CP-2A	LTPBM CP-2B
Contract Name	Famy – Infanta Road / Pagasanjan – Luisiana – Tayaba – Jct.Lucena	Tiaong – Jct. Lecena Road (PPH)	Lagbilao – Camanines Norte Boundary Road (PPH)
Province	Laguna and Quezon	Quezon	Quezon
Contractor	R. D. Policarpio & Co., Inc.	A. M. Oreta and Co. lnc.	China State Eng'g Const. Corp.
Length (km)	109	33	112
AC Overlay Length (Approx.)	23 (1 layer)	33 (2 layers)	44 (1 layer)
Original Project Cost	P 179,267,342	P 241,442,270	P 286,645,724.
Revised Project Cost	P 179,267,342	P 263,913,166 (+ 9.31%)	P 314,526,153 (+ 9.73%)
Unit Price per km	**Php 7.8 million/km**	**Php 7.8 million/km**	**Php 7.1 million/km**
Contract Start Date	November 22, 2001	September 23, 2002	July 26, 2002
Revised Contact Start Date PBM PM (Year) PM (Year)	January 21, 2002 January 21, 2002 January 20, 2002 (Year 1 & 3) December 20, 2002 (Year 3)	 September 23, 2002 October 01, 2002 (Year 1 & 2) January 01, 2004 (Year 3)	 July 26, 2002 December 15, 2002 (Year 1) December 15, 2003 (Year 2)
Contract Duration	1,094 CD	1,094 CD	1,094 CD
PBM PM BM	90 CD (Year 1) 180 CD (Year 2 & 3) 217 CD	395 CD (Year 1) 120 CD (Year 2) 365 CD	350 CD (Year 1) 116 CD (Year 2) 340C D
Completion Date	January 18, 2005	September 20, 2005	July 23, 2005

No detailed project evaluation reports are available on these pilot projects. The BOM/DPWH

commented that the unit cost as given in the above table was seemed to be rather high compared with the conventional maintenance contract.

The WB planned the extended application of LTPBM under NRIMP-2 with eight packages and 1,080 km in total. The design build and lump-sum payment will be applied for 5-year period contracts. It requested the introduction of Output and Performance-based Road Contract (OPRC) instead of LTPBM, giving the contractor almost full responsibility and management of the road for a ten-year contract period. However, the DPWH did not fully agree to the WB proposal and decided to adopt the hybrid- type LTPBM contract, except at least one pilot OPRC. The duration of OPRC will be decided upon the physical condition of the road section, potential traffic volume and other elements specific for OPRC-type operations.

2.6.3 DONOR COOPERATION IN THE ROAD NETWORK DEVELOPMENT AND MAINTENANCE

(1) JICA / JBIC

The ODA of the GOJ had been extended mostly through two schemes. One is loan (Yen Loan) through OECF/JBIC and the other is technical cooperation such as dispatch of Japanese experts / JOCV, technical training, supply of equipment, and implementation of development studies in addition to grant aid through JICA. On October 1st, JICA has taken over on the implementation of concessionary loans which was previously undertaken by OECF/JBIC. New JICA will thus provide both loan and technical cooperation.

OECF/JBIC was the largest donor for road sector development and rehabilitation, and extended the 1st – 25th loans from 1977 – 2005. OECF/JBIC directed its financial cooperation on the North-South Axis to link Luzon with Leyte/Samar and Mindanao. Figure 2.6.5 shows the location map of the 1st to 25th loans for road improvement/upgrading projects.

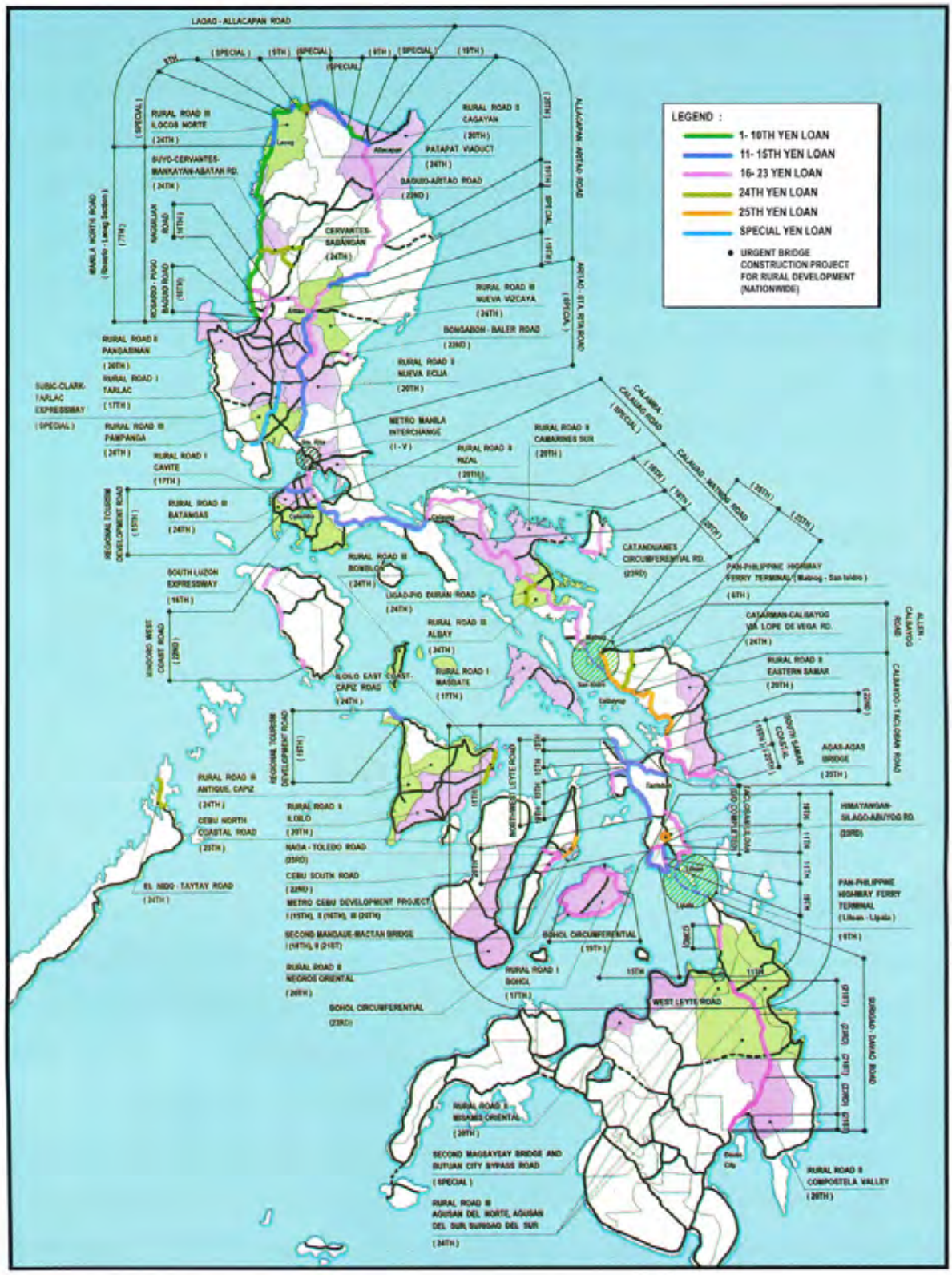


Figure 2.6.5 Road Improvement and Upgrading Projects by Yen Loans (1st – 25th)

(2) World Bank

1) Better Road Philippines

The overall objectives of the IBRD funded study, Better Roads Philippines (RBP) during the period from 1997 through 1999, is to develop a road management system which is efficient, effective and responsive to the stakeholders and enables them to contribute to the national good. These requirements can be summarized under two main headings:

- Management: Ensuring value for money through effective and efficient use of funds available
- Funding: The need to provide an adequate, stable, secure and sustainable source of funds for the network

A: Management

At first, establishment of a new Road Authority with the responsibility to act as the client for the maintenance of NR network and funding for it from road user fees were recommended. But the setting up of funding for road maintenance, road safety and clean air via MVUF had advanced fast, and establishment of a Road Fund Organization focused on funding operation was expedited. Having a clear separation between the Road Funding Organization and the Road Authority itself, the former concentrates on audit to ensure value for money and checks on the benefit viability for planned projects and related activities, while the latter would propose various plans, manage the works and arrange for plans approved to be implemented within available funds.

B: Funding

Among the considered sources of funding for NR maintenance such as levy, surcharge or tax on gasoline and diesel, vehicle registration and license fees, government appropriation, etc. it was concluded that the extra funds from road user charges are treated as an earmarked tax, collected by DOF and deposited in a special account. A Road Authority would act in an executive capacity and be responsible for ensuring that this fund is disbursed by DPWH in accordance with the wishes of the Road Authority.

2) NRIMP

The WB assisted the 1st – 6th IBRD road projects and HMP-1 for national roads improvement and upgrading. The NRIMP is a three-phase program (NRIMP 1, 2 and 3) of the government through the DPWH, originally from 2000 to 2009. Its goal is to establish management systems that would ensure the upgrading and preservation of the national roads system in an environmentally, socially and financially sustainable means.

To achieve this goal, the government established the following agenda:

a. Improvement of the delivery and provision of services on the national roads system through the development and establishment of business processes and system renewals within the DPWH.
b. Development and establishment of a sustainable financing mechanism, such as a road fund, dedicated to the preservation of the national roads system, to be funded from road user charges and based on the actual level of maintenance needs and road usage.
c. Involvement of road users in the prudent management of the maintenance funds.
d. Upgrading of the national roads system.

e. Establishment of modern maintenance practices.

f. Strengthening of the consulting and contracting industries.

NRIMP was to include the following components:

1. Road Upgrading (US$1,000 million). NRIMP would finance the rehabilitation and upgrading of about 2,200 km of national roads through international competitive bidding.
2. PM (US$900 million). NRIMP would finance annual PM of the national road system procured through national competitive bidding (NCB). The works were mainly to comprise AC overlays, bituminous resealing and various associated pavement repairs. About 9,000 km of roads would be improved.
3. LTPBM (US$35 million). This component aimed to test the performance of multi-year routine, periodic and PM contracts. Payments under these contracts would be based on outcomes in terms of minimum service levels, rather than on the quantities of physical works performed.
4. Business Improvements Implementation Projects (BIIPs) (US$60 million). The component aimed to improve the DPWH business processes, which would also be used by the proposed Road Maintenance Authority, supported by an integrated information system, including:
   - Core processes for managing (planning, building and operating) highways
   - Support processes for managing public works, including finances, physical and human resources, information, procurement and institutional strategy

   Forty-two BIIPs were to be completed by the end of NRIMP; 36 financed under NRIMP; three under a parallel project financed by ADB - Sixth Road Improvement Project; and four under the ongoing Highway Management Project (HMP).
5. Policy and Institutional Reforms (US$5 million). Studies and technical assistance shall be provided to support the reform agenda.

3) Implementation of NRIMP-1 and 2

NRIMP 1 and 2 will support national road improvement and asset preservation (Part A) and institutional and capacity development (Part B). Part A is comprised of national road improvement (UI), LTPBM and PM as summarized in the following.

Description	NRIMP-1	NRIMP-2
Project Cost and Loan Amount		
(1) Project Cost	US& 306 million	US$ 576 million
(2) Loan Amount	US$ 133 million	US$ 232 million
(3) Grant	-	US$ 10 million by AusAID
Part A: National Road Improvement and Asset Preservation		
A.1 National Road Improvement (UI)	382 km	450 km (including 1,000 m bridges) and Landslide Risk Mitigation, 12 packages, Consultancy Service
A.2 Road Asset Preservation		
A.2.1 LTPBM	254 km (pilot)	1,080 km (8 packages)
A.2.2 Preventive Maintenance (PM)	721 km	1,200 km (320 km for WB Portion)
A.2.3 Maintenance Services	―	Consultancy Services for LTPBM, PM and RM

The following table is summary of the project cost and financing plan for NRIMP-2 by project component.

Table 2.6.3 Financing Plan for NRIMP-2

Unit: US$ Mill.

Component	IBRD	GOP		Grant	Total	Share
		GAA	Road Fund	(AusAID)		
A Road Improvement and Preservation						
A.1 Road Network Improvement						
Civil Works	103.90	114.29			218.19	91.5%
Engineering Services	20.02	0.29			20.31	8.5%
Sub-Total	**123.92**	**114.58**	**0.00**	**0.00**	**238.50**	**100.0%**
	52.0%	48.0%	0.0%	0.0%	100.0%	
A.2 Road Asset Preservation						
Civil Works	84.14	6.95	186.98		278.07	99.0%
Engineering Services	2.77				2.77	1.0%
Sub-Total	**86.91**	**6.95**	**186.98**	**0.00**	**280.84**	**100.0%**
	30.9%	2.5%	66.6%	0.0%	100.0%	
Total of Road Works	**210.83**	**121.53**	**186.98**	**0.00**	**519.34**	
	40.6%	23.4%	36.0%	0.0%	100.0%	
B Institutional Capacity Development						
B.1 Business Process Improvement	17.96	25.01		4.10	47.07	
B.2 Corporate Effectiveness	1.14	0.00		6.40	7.54	
B.3 Road Sector Policy Reforms	1.24	0.00			1.24	
B.4 Training and Workshops	0.25	0.00			0.25	
Total of ICD	**20.59**	**25.01**	**0.00**	**10.50**	**56.10**	
	36.7%	44.6%	0.0%	18.7%	100.0%	
Total Cost	**231.42**	**146.54**	**186.98**	**10.50**	**575.44**	
	40.2%	25.5%	32.5%	1.8%	100.0%	
Front-End Fee	**0.58**				0.58	
Total Financing	**232.00**	**146.54**	**186.98**	**10.50**	**576.02**	
	40.3%	25.4%	32.5%	1.8%	100.0%	

Source: PAD/The World Bank, April 2008

(3) Asian Development Bank

The ADB-financed projects in the road sector were directed in support of socio-economic development and maintenance of the road network. ADB provided 13 loans for 10 projects, amounting to US$ 627 million for the improvement of about 4,000 km of national roads and about 1,500 km of local roads between 1970 and 2007.

Loan	Period	Loan Amount (US$ Million)	Classification	Length (km)
1 – 4th	1970-1997	627	National road improvement	4,500 km
			Local roads improvement	1,500 km
5th	1991-1998	150	National road improvement	282 km
			Local roads improvement	420 km
			PM of national roads	170 km
			PM of local roads	400 km
6th	1996-2007	167 (Co-finance GOJ, OPEC, etc)	National road improvement	840 km
			PM of national roads	800 km

The ADB is conducting a Project Preparatory Technical Assistance (PPTA) to provide a Road Sector Improvement Project (RSIP or 7th Loan). The purposes of RSIP are to improve the national road network by carrying out periodic (preventive) maintenance/asset preservation, to

rehabilitate/improve selected national roads, and to improve the DPWH's institutional capacity.

The RSIP is divided into three tranches (phases):

Tranche 1: Maintenance projects for asset preservation only, 2010-2011

Tranche 2: Maintenance projects including road improvement and rehabilitation (2012-2014)

Tranche 3: Road improvement and rehabilitation (2015-2017).

The contents and financing of each tranche will be agreed separately between ADB and the GOP.

Tranches 2 and 3 are not yet formally committed. The outline of the ADB 6th and RSIP (7th) is as follows:

ITEM	ADB 6th Road[1)]	RSIP (7th) [2)]	
		Tranche 1	Tranche 2and 3*
Project Cost (ADB Loan Amount)	US$540 million US$167 million	US$50 million	US$450 million
Road Improvement	840 km	-	18 road links
Periodic (Preventive) Maintenance	800 km	8 road links（383km）	-
Bridge retrofitting and repair	400 bridges		

Note：[1)] ADB Completion Report (Sixth Road Project)

(4) Others

Other funds and agencies that support national road development and maintenance include OPEC, the Kuwait Fund (KFAED), UK's Overseas Fund for International Development, etc.

CHAPTER 3 ORGANIZATION AND INSTITUTIONAL CAPACITY STRENGTHENING

3.1 ROAD ADMINISTRATION AND ORGANIZATION

The Department of Public Works and Highways (DPWH) is one of three government departments undertaking major infrastructure projects. It started with the creation of the Bureau of Public Highways (BPH) in 1954 under the Department of Public Works and Communications by virtue of RA 1192. In 1974, the BPH became the Department of Public Highways by virtue of AO No. 2. Subsequently, it was merged with the Ministry of Public Works into a Ministry of Public Works and Highways in 1981 by virtue of EO No. 710 in 1981 and EO No. 124 in 1987.

DPWH is mandated to undertake (a) the planning of infrastructure, such as roads and bridges, flood control, water resources projects and other public works, and (b) the design, construction, and maintenance of national roads and bridges, and major flood control systems. These activities are undertaken in support of the national development objectives as envisioned in the Medium-Term Philippine Development Plans (MTPDP).

The existing organizational structure of DPWH is illustrated in Figure 3.1.1. The existing staffing for DPWH in terms of number of regular positions as of October 2006 is summarized below.

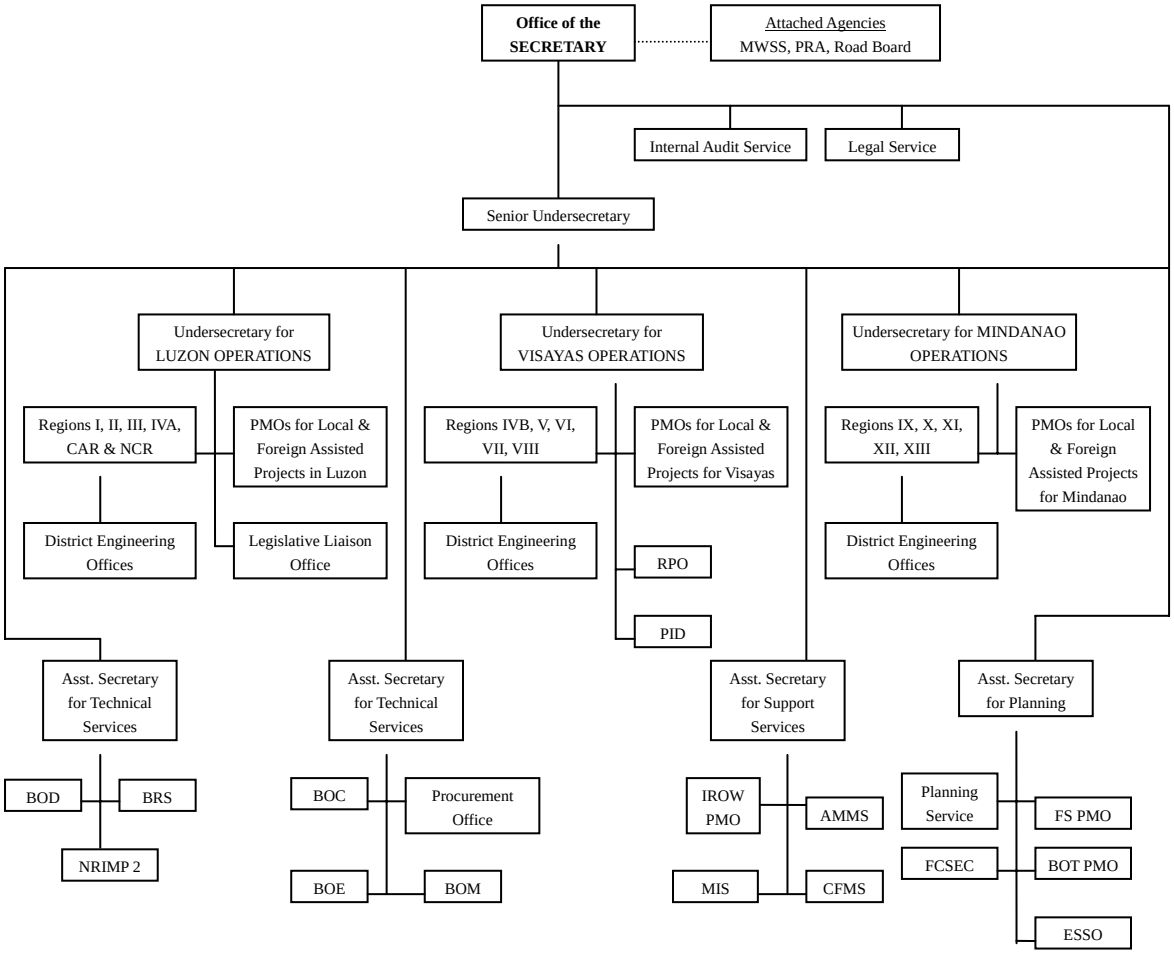
Table 3.1.1 Existing Number of Permanent Positions Under the Existing Organization Structure

No.	Office	Existing Positions
1	Central Office	
	Office of the Secretary	74
	CARBDP	26
	Sub-Total	100
2	Services	
	Planning Service	170
	Monitoring and Information Service	135
	Internal Audit Service	72
	Legal Service	64
	Administrative and Manpower Management Service	560
	Comptrollership and Financial Management	211
	Sub-Total	1,212
3	Bureaus	
	Bureau of Design	187
	Bureau of Construction	176
	Bureau of Maintenance	159
	Bureau of Research and Standards	167
	Bureau of Equipment	446
	Sub-Total	1,135
4	Regional and District Offices	
	Regional Office	3,080
	Regional Equipment Service	1,736
	District Office	9,398
	Area Equipment Service	2,339
	Sub-Total	16,533
5	Project Management Offices	
	Project Management Pool	112

No.	Office	Existing Positions
	Sub-Total	112
	GRAND TOTAL	19,112

SOURCE: DPWH Rationalization Plan, 2006

In addition to the permanent (plantilla) positions, there are approximately 10,551 contractual, job-order and casual employees, bringing DPWH's total manpower complement to about 29,663.

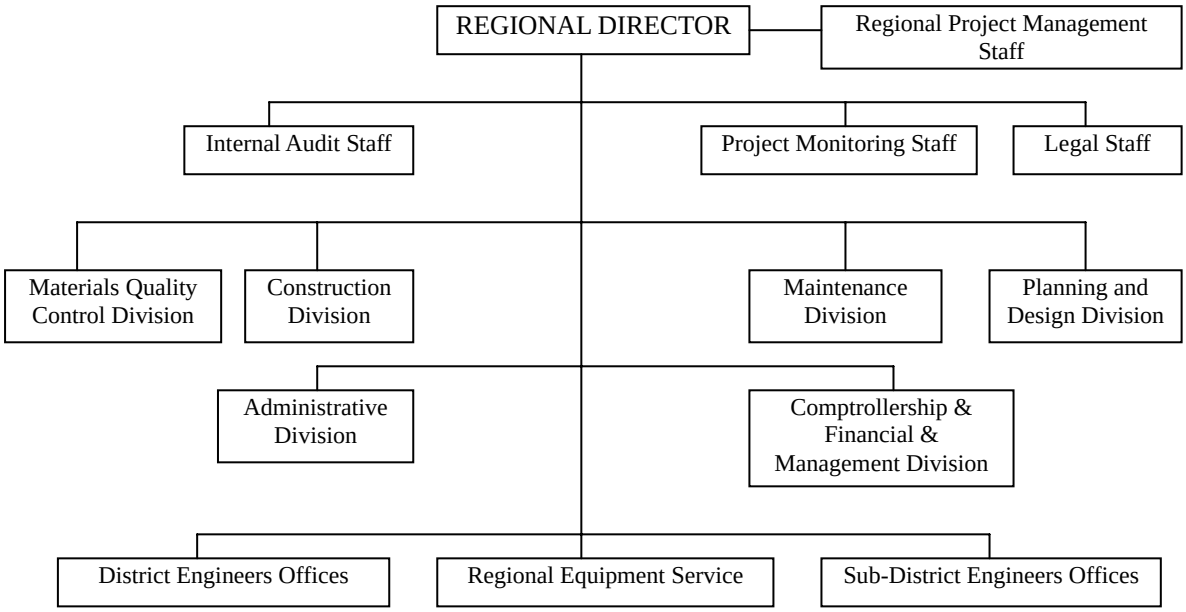


BRS – Bureau of Research and Standards	*CAR – Cordillera Administrative Region*
MIS – Monitoring and Information Service	*NCR – National Capital Region*
BOD – Bureau of Design	*PID – Public Information Division*
RPO – Road Program Office	*FCSEC – Flood Control and Sabo Engineering Center*
BOC – Bureau of Construction	*RB – Road Board*
BOM – Bureau of Maintenance	*IROW – Infrastructure Right-of-Way*
BOE – Bureau of Equipment	*MWSS – Metropolitan Water and Sewerage System*
CFMS – Comptrollership & Financial Management Service	*PRA – Philippine Reclamation Authority*
AMMS – Administrative and Manpower Management Service	
ESSO – Environmental and Social Services Office	

SOURCE: DPWH Website: www.dpwh.gov.ph

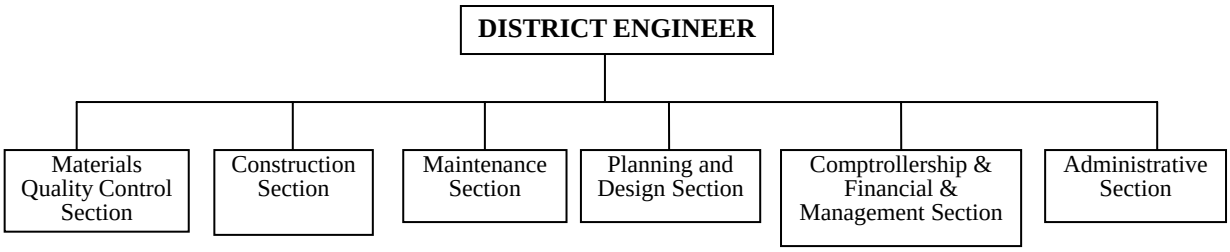
Figure 3.1.1 Existing Organizational Structure of DPWH

The existing typical organizational structures for the regional and district engineering offices are given in Figures 3.1.2 and 3.1.3.



SOURCE: DPWH Website: www.dpwh.gov.ph

Figure 3.1.2 Existing Typical Organizational Structure – Regional Office



SOURCE: DPWH Website: www.dpwh.gov.ph

Figure 3.1.3 Existing Typical Organizational Structure – District Engineering Office

3.2 REFORM PLANS AND ANTICORRUPTION INITIATIVES

3.2.1 REFORM PLANS

The "Government Rationalization Program" pursuant to Executive Order No. 366 signed by President Arroyo on 4 October 2004 (EO)" has resulted in a proposal for rationalizing the structure and manpower complement of the DPWH based on the objectives of the program as follows[1]:

- Focusing government efforts on its vital/core functions and the priority programs and projects under the 10-point Agenda of the Administration, and achieving the poverty-reduction targets under the Millennium Development Goals (MDG);
- Improving the quality and efficiency of government services by eliminating/minimizing overlaps and duplication, and by rationalizing delivery and support systems, organizational structures and staffing;
- Improving agency accountability for performance and results; and
- Implementing programs and projects of government within allowable resources.

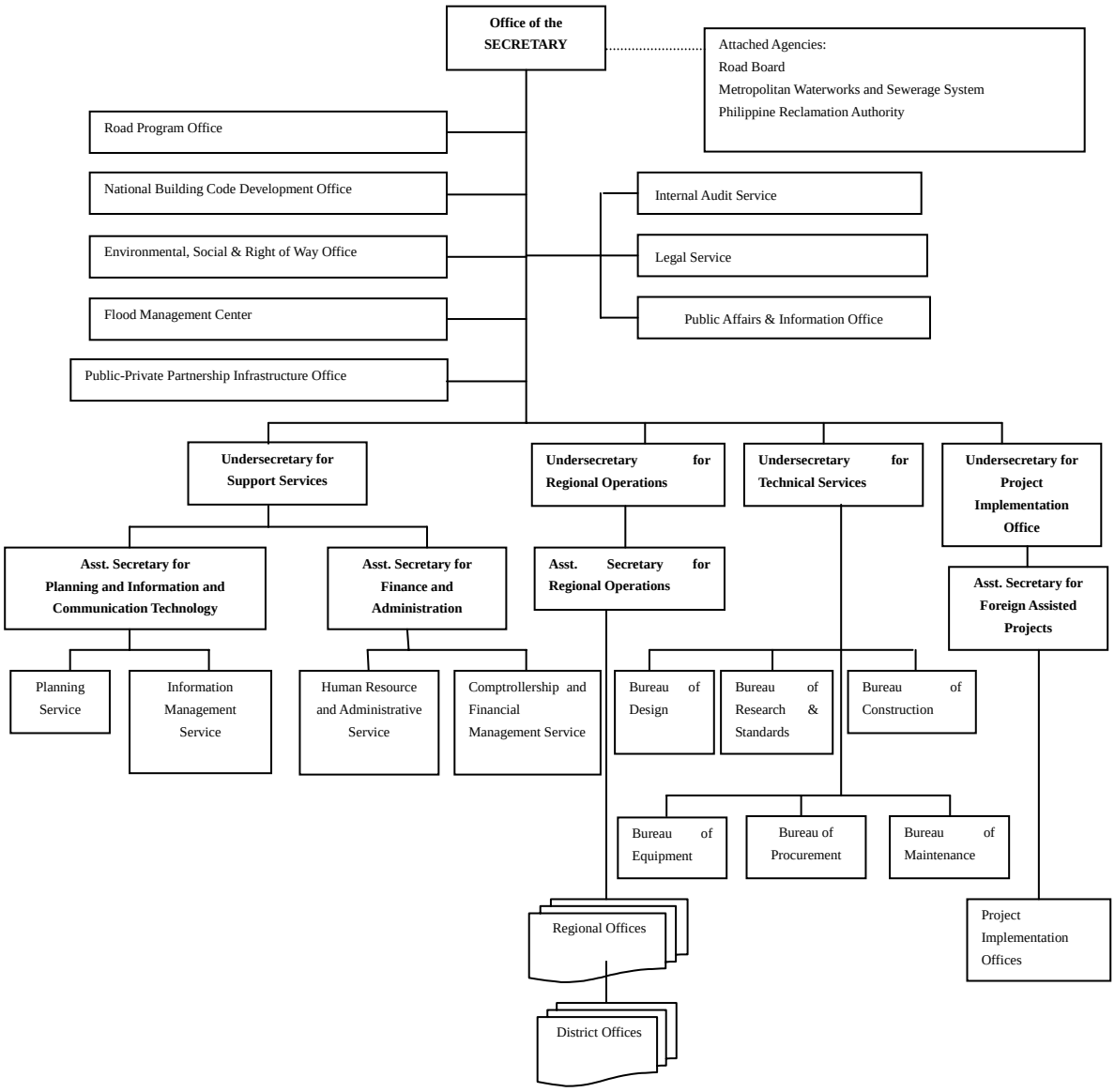
[1] Department of Public Works and Highways Proposed Rationalization Plan, 30 October 2006

As mandated in EO 366, the possible actions on the functions/programs/activities/ projects of a Department/Agency include (a) scaling down; (b) phasing out; (c) abolition; and (d) strengthening.

In DPWH's Strategic Plan for 2005-2010, its organizational goals focus on the following:

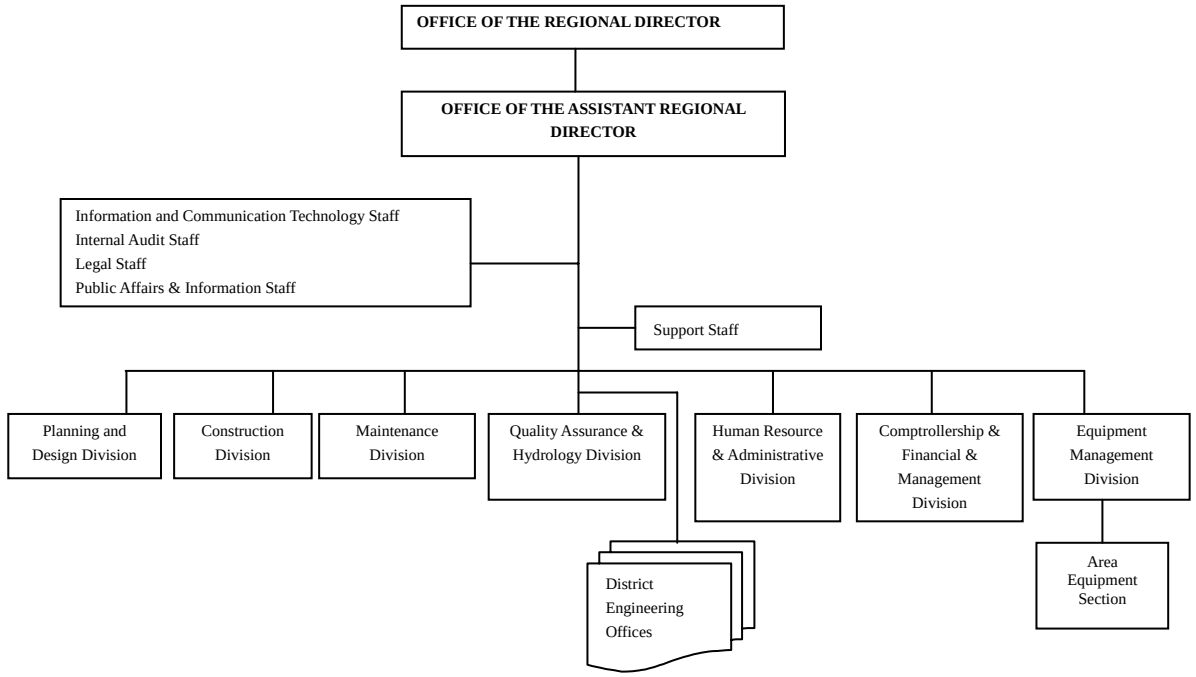
- Improved public access to activities, goods, and services through the preservation, improvement and expansion of the national road network;
- Protection and enhancement of communities and the environment through flood control and mitigation measures and the provision of other infrastructure facilities; and
- Improved public satisfaction of DPWH through organizational reforms and culture change living up to the values statement and effective delivery of quality goods and services.

The proposed structure of DPWH, consistent with the mandate provided for in the aforementioned EO, has been completed together with the conduct of consultation within and external to DPWH, i.e., Department of Budget and Management. DPWH's Change Management Team has prepared the proposed organizational structure and manpower requirements as illustrated in Figures 3.2.1, 3.2.2 and 3.2.3.



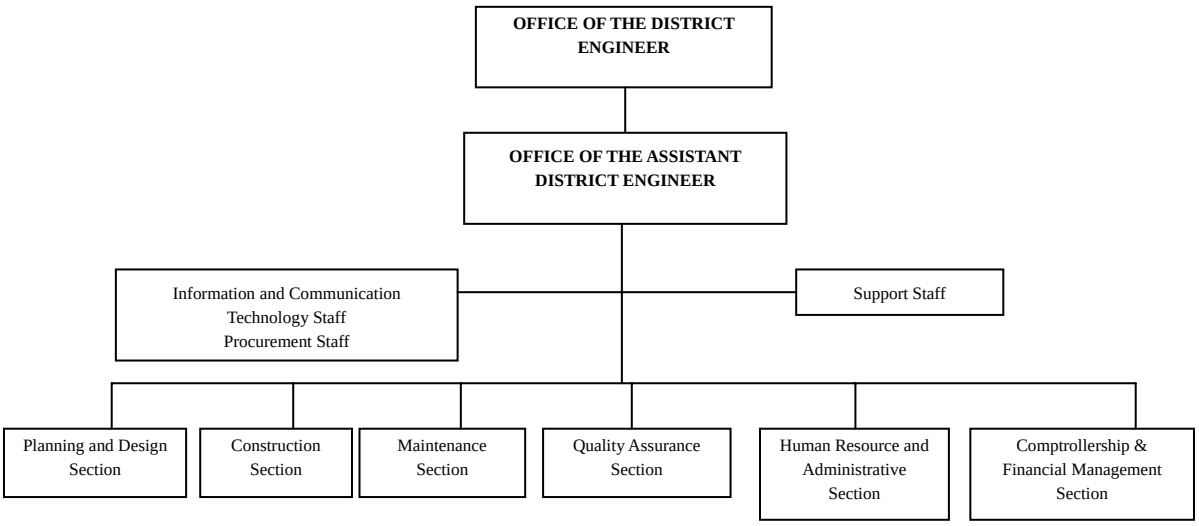
SOURCE: DPWH Proposed Rationalization Plan, October 2006

Figure 3.2.1 Proposed DPWH Organizational Structure Under the Rationalization Plan



SOURCE: DPWH Proposed Rationalization Plan, October 2006

Figure 3.2.2 Proposed Organizational Structure - Regional Offices



SOURCE: DPWH Proposed Rationalization Plan, October 2006

Figure 3.2.3 Proposed Organizational Structure – District Engineering Office

The DPWH's rationalization effort is characterized by the following strategic shifts:

- Gradual reduction of actual design, construction and maintenance activities;
- Wider private sector participation;
- Separation of highways management functions from all other infrastructure related functions;
- Streamlining and delineation of functions and elimination of overlaps;
- Leaner personnel complement;
- Rationalization and deployment of more personnel in frontline services;

- Standardization and leveling of positions;
- Utilization of information and communications technology and other management practices; and
- Focus on six major final outputs as follows:
  i) Expanded national road and bridge network;
  ii) Well-constructed/improved/rehabilitated and maintained national roads and bridges;
  iii) Properly maintained major flood control and drainage structures and facilities except for the National Capital Region (NCR);
  iv) Quality planning, programming, design, construction management and other engineering services for the construction and maintenance of the national road network and various other infrastructure facilities of non-infrastructure agencies;
  v) Expanded private sector participation in the funding, design, construction and maintenance of the national road and bridge network; and
  vi) Efficient organizational structures and culture that will carry out principal mandates.

The important policy changes in the proposed DPWH structure include the following:

(1) Proposed creation of the Road Maintenance Authority, commercialization, etc., has been deferred due to the DPWH rationalization plan implementation;

(2) The maintenance by contract and maintenance by administration ratio is targeted at 90:10;

(3) The Bureau of Equipment (BOE) and Bureau of Maintenance (BOM) will continue to exist, albeit with downsized manpower. BOM will just supervise/monitor maintenance activities, with only the District Engineering Offices (DEO) to implement; and

The Regional and District Engineering Offices will now have a standardized plantilla/organizational structure. For the DEOs, its authorized plantilla (permanent) positions would depend on its classification as illustrated below:

Office	Class	Basis	Personnel Complement	
			Regular	Allowed Additional
Regional Office	n.a.	n.a.	176	25%
District Engineering Offices	First	250 km and more	85	50%
	Second	Between 100 – 249 km	68	50%
	Third	Less than 100 km	49	50%

SOURCE: DPWH Proposed Rationalization Plan, October 2006

The rationalization plan will affect about 4,375 permanent personnel and an unspecified number of contractual/job order and casual employees. Implementation of DPWH's rationalization plan does not yet have a definite timetable, given the Department of Budget and Management's on-going efforts to thoroughly evaluate DPWH's proposal and determine the optimum/appropriate staffing requirements.

Based on the proposed organizational structure under the DPWH's Rationalization Plan, the number of proposed permanent positions is summarized in Table 3.2.1.

Table 3.2.1 Permanent Positions Under the Proposed Organizational Structure

Office	Proposed	TOTAL
Office of the Secretary	70	70
Internal Audit Service	70	70
Legal Service	47	47
Road Program Office	12	12
National Building Code Development Office	15	15
Environmental, Social and Right-of-Way Office	66	66
Public-Private Infrastructure Partnership Office	12	12
Flood Management Center	23	23
SERVICES		
Planning Service	160	160
Information Management Service	125	125
Human Resource and Administrative Service	422	422
Comptrollership and Financial Management Service	202	202
BUREAUS		0
Bureau of Design	173	173
Bureau of Construction	159	159
Bureau of Maintenance	89	89
Bureau of Equipment	114	114
Bureau of Research and Standards	150	150
Bureau of Procurement	74	74
Regional Office	176	176
Regional Breakdown	1,065	1,065
Marine Equipment Section (Region III)	53	53
Marine Equipment Section (Region VII)	11	11
Marine Equipment Section (Region XI)	16	16
Baguio-Bontoc-Kennon-Naguilian Toll Roads Office	47	47
District Engineering Office (First Class)	79	2,291
District Engineering Office (Second Class)	62	7,750
District Engineering Office (Third Class)	43	860
Unified Project Implementation Office	322	322
GRAND TOTAL	3,877	14,594

SOURCE: DPWH Proposed Rationalization Plan, October 2006

The estimated number of contractual/job order and casual employees that the DPWH will be allowed to hire or retain were not indicated in the Rationalization Plan.

3.2.2 REFORM PROGRESS IN DPWH CO, RO AND DEOS

(1) DPWH Central Office

As of the present time, the implementation of the Department's Rationalization Plan which had been submitted to DBM since October 2006, is still awaiting approval by the DBM. DBM is still requiring DPWH to further reduce its Personnel Services costs by about Php400 million. In essence, DBM is requesting DPWH to further reduce the number of plantilla positions in its proposed Rationalization Plan or to downgrade position levels to further decrease personnel costs. DBM and DPWH are in constant and frequent discussions to resolve the matter.

With the implementation of the Rationalization Plan in DPWH still uncertain, the Department has pursued organizational changes and partial implementation of its Rationalization Plan within

the limits of the authority of the Department Secretary. However, while the organizational structure has seen some changes since 2006, the Department has been hobbled by the deployment of personnel as filling-up of vacant and vacated positions (for various reasons such as retirement, resignation, etc.) has to be cleared with DBM and is disallowed under EO 366 Implementing Rules and Regulations.

Thus, DPWH organizational structure and personnel deployment remains in a state of flux until such time that the final Rationalization Plan is approved and implemented.

(2) DPWH Regional Offices

Given that the DPWH-wide Rationalization Plan remains pending in DBM, the DPWH ROs have suffered the same situation as the CO and its operations have been significantly affected by the retirement or resignation especially by the technical staff. To avoid further deterioration in manpower levels, the ROs have resorted to the hiring of temporary replacement personnel through job orders/contracts. The salary rate is usually substantially less than the position allows for, there are no benefits, appointment is temporary in nature and subject to availability of funds and there is no employer-employee relationship.

However, based on approval made by the CO, certain organizational changes have been authorized such as the appointment of two (2) Assistant Regional Directors.

The Study Team had interviewed selected high officials and division chiefs in Regions I, III, VII and XI to determine the current situation and issues in the ROs. These are as follows:

(a) The ROs are still awaiting instructions from the CO regarding the implementation of the Rationalization Plan;

(b) In the meantime, the ROs have complied with the instructions of the CO to freeze the hiring of additional or replacement personnel;

(c) The ROs require new equipment (office, engineering and road maintenance equipment) since its existing inventory shows these to be either no longer operational, in a dilapidated condition, obsolete or requires high maintenance costs and low productivity; and

(d) Funding for road maintenance remains inadequate and the ROs have to be resourceful in generating resources, especially during disasters. The ROs either borrow equipment from the LGUs or private contractors, mobilize equipment from one DEO for use in the affected DEO and negotiate for extended credit from suppliers.

(3) District Engineering Offices

None more is the impact of the failure to approve and implement DPWH's Rationalization Plan felt than in the DEOs, since these are actually the frontline office of the Department. As with the ROs, the DEOs are awaiting instructions from the CO to implement the Rationalization Plan for them. In the meantime, they have been seriously affected by the prohibition on the hiring of replacement staff for positions where the occupants had already retired or resigned. While the DEOs have resorted to the hiring of temporary technical staff through Job Orders/Contracts, the rates offered are usually low and for a short period only. In addition, training of the JO staff are needed to familiarize them with the work and standard operating procedures in the office. Given that funds for such training are not provided, the DEO officials have, using their own resources, resorted to training their own replacement staff..

The Study Team has interviewed selected DEO officials and technical staff in Regions I, III, VII and XI. The results indicated the seriousness of organizational and performance issues being

faced by the DEOs as follows:

(a) The DEOs are still awaiting instructions from their respective RO when they can implement the Rationalization Plan;

(b) Given the prolonged pendency of the implementation of the Rationalization Plan, the DEOs have lost technical staff either through retirement or resignation. Since the office is not allowed under EO 366 IRR to hire replacement personnel, they have resorted to the hiring of replacement staff through JOs/Contracts. In fact, even senior technical positions such as Area Engineers have been filled by JO staff, although the salary rates are normally at daily wage levels. This is to avoid creating internal dissatisfaction which can occur if the permanent technical staff receive lower salaries than JO hirees;

(c) There is a high turnover rate for JO hirees, given the perception that they have to wait too long to be made permanent. While they have been the receptor of in-house training in the DEO to upgrade their skills for the positions they have been contracted to, this had only resulted in either job offers from the private sector or enhanced opportunities for foreign work. In the meantime, the DEO has to constantly train new JO hirees to replace those that have retired;

(d) Given that the financial source for paying the JO hirees come from the MOE budget of the DEOs, this has resulted in the further depletion of maintenance funds that could have otherwise been used for road maintenance;

(e) The road maintenance equipment and service vehicles of the DEOs are either non-operational (awaiting repair or under repair), frequently breakdown resulting in low equipment productivity and failure to meet road maintenance performance targets or require high maintenance costs to operate further constraining already low road maintenance budget;

(f) Political interference in DEO operations has forced the DEOs to sacrifice performance to respond to the requests of politicians. Failure to satisfy the politicians often results in the replacement of the DEO, non-assignment to any post (floating status), among others;

(g) The alreaded constricted budget of the DEO requires that, in times of disaster and to keep the national roads open, they had to borrow equipment from the LGUs (if these are available) or from private contractors and have to borrow materials and fuel from suppliers, with only future assusrance for payment. The DEOs have to be resourceful in responding to immediate requirements of the national roads in their area; and

(h) Due to the various problems enumerated from (a) to (g) above, the condition of the national roads are usually less than satisfactory since the appropriate level of resources required (labor, materials, equipment and supervision) are not provided. To adequately respond to the DEO's needs, the national government has to provide sufficient funding.

On LTPBM, the DEOs have not been adequately briefed on the concept and how DPWH intends to implement this road maintenance modality at their level. While they have had mixed experiences in implementing MBC such as poor performance of the contractor, inability to provide the required equipment and personnel on site and slow response to road repair requirements including poor quality of work, they have indicated their willingness to try such modality.

3.2.3 ANTICORRUPTION INITIATIVES

(1) Anti-Corruption Initiative of DPWH/GOP

The improvement in DPWH's business processes under NRIMP 1 and 2 are intended not merely

to improve the effectiveness of the organization in undertaking its functions and delivering the desired quality of infrastructure facilities by users, but also to minimize, if not eradicate, opportunities for corruption that has marred the reputation of the whole organization.

RA 9184 an Act Providing for the Modernization, Standardization and Regulation of the Procurement Activities of the Government and for Other Purposes or the Philippine Procurement Law.

In 2003[2], RA 9184, a comprehensive act governing public procurement, was passed. The law and its implementing rules and regulations (IRR), standardizes public procurement conducted at all government levels, as well as by state-owned or state-controlled companies. The framework covers the procurement process from planning to implementation.

The law also established the Government Procurement Policy Board (GPPB), the central body that defines policies, implementing regulations, and standard documents; produces guidelines and manuals; and oversees the training conducted by procuring agencies.

The Philippines has not adopted a specific code of conduct for officials in public procurement that considers the particular corruption risks. Thus, the general law on the conduct of public officials is also applicable to procurement personnel. This law does address issues such as conflict of interest and the acceptance of gifts by public officials in the exercise of their duties. The procurement law provides for a number of institutional mechanisms to prevent favoritism in public procurement. Decisions throughout the procurement process are made by panels composed of five to seven officials. The personnel involved in procurement decisions are regularly rotated.

Further, civil society organizations are permitted to monitor all stages of the procurement process, and the Government is assessing ways for involving civil society in the monitoring of project implementation. Special training is conducted for these civil society representatives to strengthen their capability to monitor public procurement activities.

As regards the prosecution of corruption in public procurement, no reporting duties for public officials exist at this time, nor does a protection mechanism for those who come forward and report corruption in the procurement process or in a particular agency. Efforts to enact comprehensive whistleblower protection legislation or a reward system are ongoing but have not yet resulted in a law.

Aside from complaints by aggrieved bidders, which may lead to the detection of corruption in a procurement process, procuring entities are subject to audit. In addition, observers from civil society are entitled to develop and submit their own monitoring reports. These reports, which may be sent to the Office of the Ombudsman, evaluate whether an individual procuring entity did abide by the rules.

The country's framework for public procurement contains a number of comprehensive mechanisms that help curb corruption in public procurement.

(2) Anti-Corruption Mitigation Measures in NRIMP 2[3]

NRIMP-2 incorporates a comprehensive range of measures to build institutional capacity and

[2] Country Reports: Systems for Curbing Corruption in Public Procurement, www.adb.org/Documents/Books/Public-Procurement-Asia-Pacific/phi.pdf

[3] Project Appraisal Document on a Proposed Loan in the amount of US$232 million to the Republic of the Philippines in support of Phase 2 of the National Roads Improvement and Management Program, The World Bank, 15 April 2008. p.10

governance, to strengthen fiduciary controls over the use of loan proceeds and to strengthen social accountability and the demand for good governance. These measures have been strengthened as a result of lessons learned from NRIMP 1 and from discussions with Government on appropriate measures to mitigate the systemic risks identified in the NRIMP 1 INT investigation.

These measures are as follows:

a. Use of an Independent Procurement Evaluator (IPE) to improve the transparency and integrity of the procurement process, through independent monitoring of key steps of the procurement process;

b. Further Enhanced Procurement Controls to ensure the reliability of contract cost estimates, detect over-pricing through bid analysis, enhance supervision control over contract variations and disseminate complaints mechanism in bid documents;

c. Adoption by Government of the 2006 Guidelines for Procurement under IBRD Loans and Credits, which include enhanced provisions for combating fraud and corruption;

d. Strengthening Internal Controls and Internal Audit Capacity in DPWH in order to address key deficiencies revealed by official audits of the agency. Two conditions of project effectiveness cover: (i) internal audit assistance and internal control systems; and (ii) qualifications and sufficiency of project financial management staff;

e Adoption of Enhanced Business Processes. With increased use of computerized business systems and enhanced process for procurement and financial management (developed by DPWH under NRIMP 1), the efficiency of transaction processing would be improved and the opportunities for interference would be reduced;

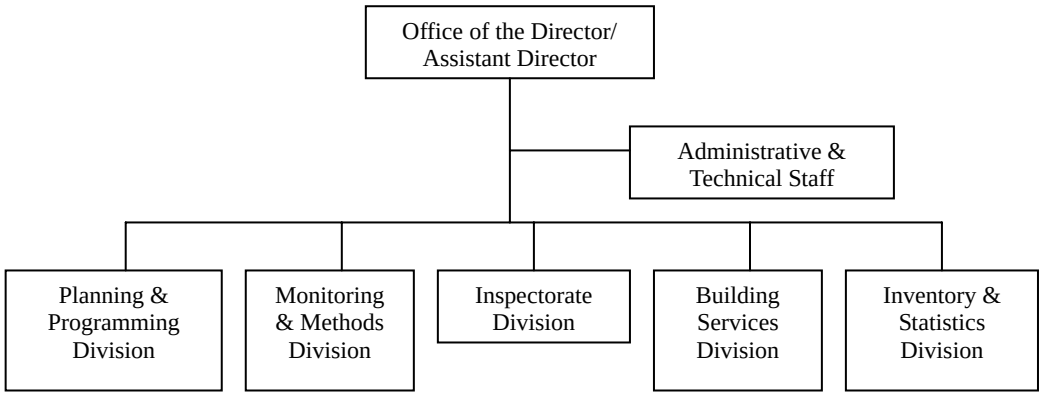
f. Independent Oversight by Civil Society. A coalition of citizen and road user groups has been established (Road Watch or Bantay Lansangan) to strengthen the voice and influence of citizens in ensuring transparency and proper use of public funds for roads and to counter corruption; and

g. Partnership with the Road Board in the Management of the Road Fund. Assistance to the Road Board and its Secretariat to apply strong transparent procedures for a administering the special funds, and to produce more efficient, equitable and needs-based expenditure programs.

3.3 MAINTENANCE SYSTEM AND ADMINISTRATION

The Bureau of Maintenance (BOM) is primarily tasked with the maintenance of the nation's infrastructures and also engaged in the continuous upgrading of the technical skill of its personnel. While overall policy directions for the maintenance programs is provided by the DPWH Central Office, overall planning and technical guidance is provided by the BOM to the regional and district offices. With the increasing use of HDM 4 to identify and prioritize specific road maintenance activities, the Planning Service at the Central Office coordinates with the BOM on the preparation of the annual road maintenance program to be funded from the General Appropriations Act and MVUC collections. The Road Program Office prepares the proposed listing of road maintenance projects to be funded out of the MVUC for the consideration and approval of the Road Board.

Field inspections are also done to effectively monitor maintenance activities of the district/city offices. The organizational structure of the BOM is given in Figure 3.3.1.



SOURCE: DPWH Website – www.dpwh.gov.ph

Figure 3.3.1 Existing Organizational Structure – Bureau of Maintenance

The Maintenance Division at the Regional level coordinates the maintenance activities undertaken by the Maintenance Section at the District level.

Two types of road maintenance modality are in use: (a) Maintenance by Administration (MBA) and Maintenance by Contract (MBC). MBA is road maintenance implemented by the DPWH regional and district offices on force account, with equipment and labor owned and managed by the respective DPWH regional and district offices.

MBC is road maintenance carried out by private contractors under civil works contract. The respective DPWH office specifies the location, type and quantity of maintenance works and corresponding detailed technical and procedural requirements under the contract. The private contractors undertake the maintenance works based on the bill of quantities and technical specifications as stated in the contract.

Sources and Use of Maintenance Funds Allocated under the 2009 GAA and MVUC

1) Preventive Maintenance of Roads and Bridges.

Under the 2009 GAA, the amount appropriated is to be used solely for the preventive maintenance of national roads and bridges, based on the list of priority projects generated by the Pavement Management System/ Highway Development and Management - 4 Programming System and Road and Bridge Information Application Database of the DPWH.

2) Maintenance of Roads and Bridges.

In addition to the amounts appropriated in the GAA, the requirements for maintenance of roads and bridges and improvement of road drainage is also sourced from the eighty percent (80%) collections from the Motor Vehicles User's Charge accruing to the Special Road Support Fund maintained by the DPWH. Release of said funds shall be subject to prior approval of the Road Board and submission of Special Budget. In the regional allocation of this fund, the DPWH is tasked to ensure that the requirements of ARMM are provided.

In the maintenance of national roads and bridges, a minimum of ninety percent (90%) may be contracted out to qualified entities including LGUs with demonstrated capability to undertake the work by themselves. The balance is used for maintenance by force account.

Five percent (5%) of the total road maintenance fund to be applied across-the-board to the allocation of each region is set aside for the maintenance of the roads which may be converted to, or taken over as national roads during the current year. This is to be released to the central office

of the DPWH for eventual sub-allotment to the concerned region and district. Any balance to the five percent (5%) shall be restored to the regions on a pro-rata basis for the maintenance of existing national roads.

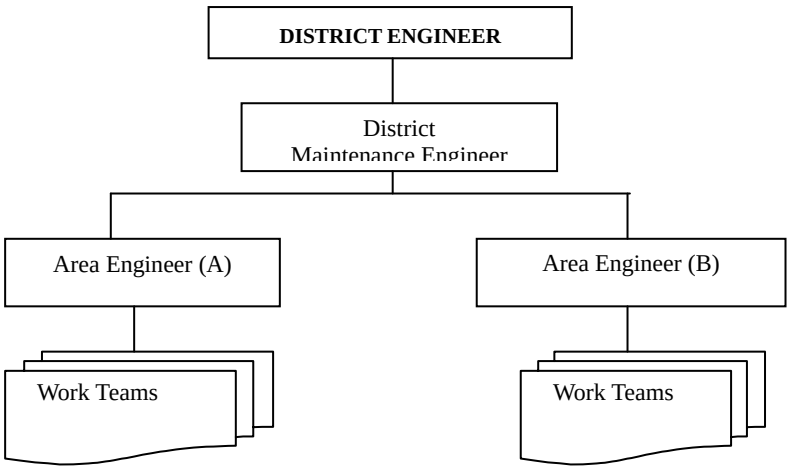
3) Road Safety and Maintenance of Local Roads.

In addition to the amounts appropriated in the GAA, the seven and one-half percent (7.5%) collections from the Motor Vehicles User's Charge accruing to the Special Road Safety Fund is to be used for the installation of adequate and efficient traffic lights and road safety devices. The five percent (5%) collections accruing to the Special Local Road Fund is to be used for the maintenance of local roads, traffic management and road safety devices. Again, in the regional allocation of said funds, the DPWH is to ensure that the requirements of ARMM are provided for. Release of these funds is subject to the submission of a Special Budget.

Implementation of the DEO's Road Maintenance Program by MBA

The implementation of the DEO's road maintenance program by MBA is undertaken by maintenance work teams led by a "kapatas or foreman" who is responsible for supervising the team's activities in the field. Their specific activities for a specified period are managed by the DEO's area engineers for the specified road sections, while overall supervision of the DEO's maintenance activities are under the Maintenance Engineer. The composition of the work teams vary by DEO with most of the members of the maintenance work teams being temporary personnel. The number of personnel seems to depend on the coverage/area of responsibility of the DEO.

The typical organizational structure of the DEO's maintenance unit is illustrated in Figure 3.3.2.



SOURCE: Survey of DEOs, 2007

Figure 3.3.2 Organizational Structure – DEO Maintenance Unit

The deployment of maintenance works teams is on a per road section basis. For example, for a district road maintenance works composed of 5 road sections, these have corresponding assigned foreman supervising laborers working on maintenance-related activities along the national roads and bridges under its territorial jurisdiction. Each team is assigned one road section permanently, although this can be pulled out/rotated if necessary or in emergency cases. The composition of the work teams are not standardized, that is a work team can be composed of from 4 – 34 members, with the average at 11 persons/team.

On the availability of sufficient road maintenance equipment, field observations have shown the limited number of equipment owned/leased by the DEO. Given the coverage area of a DEO, the

equipment complement seems inadequate for the DEO to respond to multiple disasters including road closure disasters in their area

3.4 CAPACITY OF THE PRIVATE SECTOR

3.4.1 CONTRACTORS LICENSING AND REGISTRATION – PHILIPPINE CONTRACTORS ACCREDITATION BOARD

In general, the qualifications of Philippine contractors are determined and governed by RA 4566, An Act Creating the Philippine Licensing Board for Contractors, Prescribing its Powers, Duties and Functions, Providing Funds and for other purposes as amended passed on June 19, 1965. Under Section 20 of RA 4566, to be qualified for a contractor's license, the applicant must show at least two (2) years of experience in the construction industry, and knowledge of the building, safety, health and lien laws of the Philippines and rudimentary administrative principles of the contracting business as the Licensing Board deems necessary for the safety of the contracting business of the public. The license issued permits the applicant to engage in business as a contractor, and it is necessary for prospective bidders to be equipped with such license before their bids may be considered.

The Philippine Licensing Board for Contractors has since been renamed the Philippine Contractors Accreditation Board (PCAB). Through a system of classification and categorization of contractors, the PCAB sees to it that only qualified and reliable contractors are issued the contractor's license. This is intended to ensure public safety by allowing only qualified and reliable contractors to undertake construction, demolition, repairs, rehabilitation, improvement of buildings, roads, bridges, dams, ports and other structures.

Under the PCAB system, the licensing of construction contractors is as follows:

Classification	GE, GB and Specialty
Categorization	AAA, AA, A, B, C, D & Trade

The registration and classification of government contractors are as follows:

By Project Kind	Roads, bridges, etc.
By Size Range	Large B, Large A, Medium B, Medium A, Small B & Small A

The PCAB License and Registration classifications are as follows:

General Engineering Construction	Specialty Construction
GE1 – Road highway, pavement & Bridges	SP – FP – Foundation work
GE2 – Irrigation or flood control	FP-1 Piling Work
GE3 – Dam, reservoir or tunneling	FP-2 – Soil stabilization/ slope protection/ reinforce earth
GE4 – Water supply	SP – SS – Structural steel work
GE5 – Port, harbor or offshore engineering	SP - CC - Concrete pre-casting & pre-stressing
General Building Construction	SP – PS – Plumbing & sanitary work
GB1 – Building or industrial plant	SP – EE – Electrical work
GB2 – Sewerage or sewerage treatment/ disposal plant & system	SP – AC – Airconditioning or refrigeration
GB3 – Water treatment plant & System	SP – ES – Elevator or escalator
GB4 – Park, playground or recreational work	SP – FP – Fire protection work
	SP – WP – Waterproofing work
	SP – PN – Painting
	SP – WD – Well drilling work
	SP – CF – Communication facilities
	SP – MS – Metal roofing & sidings installation
	SP – SD – Structural demolition
	SP – LS – Landscaping
	SP – EM – Electro-mechanical works
	SP – NF – Navigational facilities

The criteria/requirements used by the PCAB in the granting of the license include the following:

(a) Nationality

i. Regular license – 60% minimum Filipino equity

ii. Registration – 75% minimum Filipino equity

(b) Proprietor/Authorized Managing Officer have at least two (2) years of experience in construction contracting, business management and contract administration, and knowledge of Philippine laws on contracts, liens, taxation, labor and other construction business matters;

(c) Technical Personnel have at least two (2) years of construction implementation experience and knowledge of Philippine construction-building codes and ordinances, labor safety codes and other laws applicable to construction operation;

(d) Equipment. The equipment owned which are in operational condition including units under installment and/or lease purchase;

(e) Financial Capability. Must have a stockholders'/owner's equity or net worth of at least the amount required for the lowest constructor category; and

(g) Aggregate credit points in all categories as provided in the categorization criteria.

The criteria/requirements used by the PCAB in the registration of constructors wishing to undertake government projects are as follows:

(a) PCAB classification(s) and category

(b) Track record.

The size ranges and license category of constructors are given in Table 3.4.1.

Table 3.4.1 Size Ranges and License Categories of Constructors

Size Range	License Category	Single Largest Project/ Required Track Record	Allowable Range of Contract Cost
Large B	AAA	Above Php 150 M	< or above Php 300 M
Large A	AA	Above Php 100 M to Php 150 M	Up to Php 300 M
Medium B	A	Above Php 50 M to Php 100 M	Up to Php 200 M
Medium A	B	Above Php 10 M to Php 50 M	Up to Php 100 M
Small B	C & D	≤ Php 10 M	Up to Php 15 M
Small A	Trade	≤ Php 500,000	Up to Php 500,000

SOURCE: Philippine Contractors Accreditation Board

DPWH Registry System

To provide a standardized, transparent and efficient screening or processing of eligibility contract procurement, DPWH has installed a computerized National Registry of Contractors for Civil Works Contracts done by the central BAC-TWG. This provides for standardized, transparent and efficient screening or processing of the eligibility of contractors that express interest in bidding for specific contracts. It aims to ensure that only legally, technically and financially capable contractors are allowed to submit bids based on their ability to satisfactorily perform specific contracts.

The following group of documents comprises the prequalification or eligibility statements to be submitted by the contractor:

(a) Technical

(b) Legal

(c) Financial

A bidder must be found to be eligible to submit a bid for the contract to be bid based on his eligibility statements. Those who pass the screening process are issued Contractors' Registration Certificates ("CRCs") by the central DPWH BAC-TWG.

Central to determining the capability of the contractor to undertake specific projects for government agencies, a three-step process involving the PCAB and DPWH are undertaken: first, requirement for a PCAB Contractors' License; second, after the license has been obtained, registration with the PCAB to participate/undertake government projects must also be applied for and accreditation granted; and lastly, acquiring the Contractors' Registration Certificates ("CRCs") issued by the central DPWH BAC-TWG grants the contractor the eligibility to bid for and undertake the specified DPWH project.

Issues on Assessing Contractors' Capability for Road Maintenance

As can be deemed from the various criteria for assessing the qualification of private contractors, it is clear that this is limited only to construction and not to road maintenance. Based on the PCAB license and registration categories, it does not include assessment of the capability of local contractors to undertake road maintenance works.

In addition, the PCA had indicated that local contractors do not have the capability to undertake road maintenance works and are hesitant to be involved in DPWH's LTPBM contracts. They propose that initially, joint venture with foreign contractors with substantial experience in implementing road maintenance works under LTPBM contracts, is required until such time that sufficient local capacity has been developed.

The PCA had also indicated that local contractors are wary of the quality of road construction in the country and would require in-depth technical evaluation of the quality of the roads being proposed for LTPBM contracts, even if these roads are newly constructed.

3.4.2 CONSULTANTS

The Government procurement system for consultancy services since 1986 to the present, has been governed by NEDA Guidelines. NEDA recognizes COFILCO as the umbrella organization of all consulting organizations in the country based on NEDA Resolution No.01-99.

COFILCO[4] accredits its members on the types of services and fields of professions where these are technically and financially qualified to offer such services. At present, COFILCO accepts registration for subsequent accreditation upon submission of completed documents.

COFILCO certifies a consultant based on fields and area of expertise. The list is updated each time the COFILCO board approves the recommendation of any of its member organization. The member organization is given the authority to evaluate and verify the application of a consultant as a registered or accredited consultant in his area of practice.

The government consults and deals with COFILCO on matters relating to the industry. COFILCO represents the consulting industry and attends meetings of the NEDA Infracom, the Board of the Construction Industry Authority of the Philippines, and represents the private sector in the PEAC of government agencies.

COFILCO is composed of the following organizations:

(a) Council of Engineering Consultants, Inc. (CECOPHIL);
(b) Institute of Management Consultants of the Philippines (IMPHIL);
(c) Society of Philippine Accredited Consultants, Inc. (SPAC);
(d) Council of Consulting Architects and Planners of the Philippines, Inc. (CCAPP);
(e) Association of Consultants Civil Engineers of the Philippines, Inc. (ACCEP);
(f) Construction Project Managers Association of the Philippines, Inc. (CPMAP);
(g) Philippine Aggrupation of Geodetic Engineers Consultants, Inc. (PAGEC); and
(h) Philippine Environmental Management Professionals Association, Inc. (IPEMPA).

Accreditation is a major mandatory requirement of COFILCO. Each application for accreditation is subject to evaluation and verification by the respective Sub-committee of the member-organization. Upon favorable endorsement of the appropriate member-organization, the Board of the member organization recommends to the COFILCO Accreditation Committee the granting of the Certificate of Accreditation. Upon request and subsequent agreement with the Construction Industry Authority of the Philippines (CIAP), The CIAP-COFILCO Task Force was organized to monitor the accreditation system of the consultants. The Certificate of Accreditation is issued only with the concurrence of the two Chairmen of the Task Force.

Issue on Assessing Consultants' Capability for Road Maintenance

The accreditation procedure adopted by COFILCO does not adequately assess the Consultant's capability since its assessment criteria is unclear. Since the national government agencies themselves do not require COFILCO accreditation, its value may be considered insignificant.

[4] http://www.cofilco.org/downloads/COFILCO_PRIMER.pdf

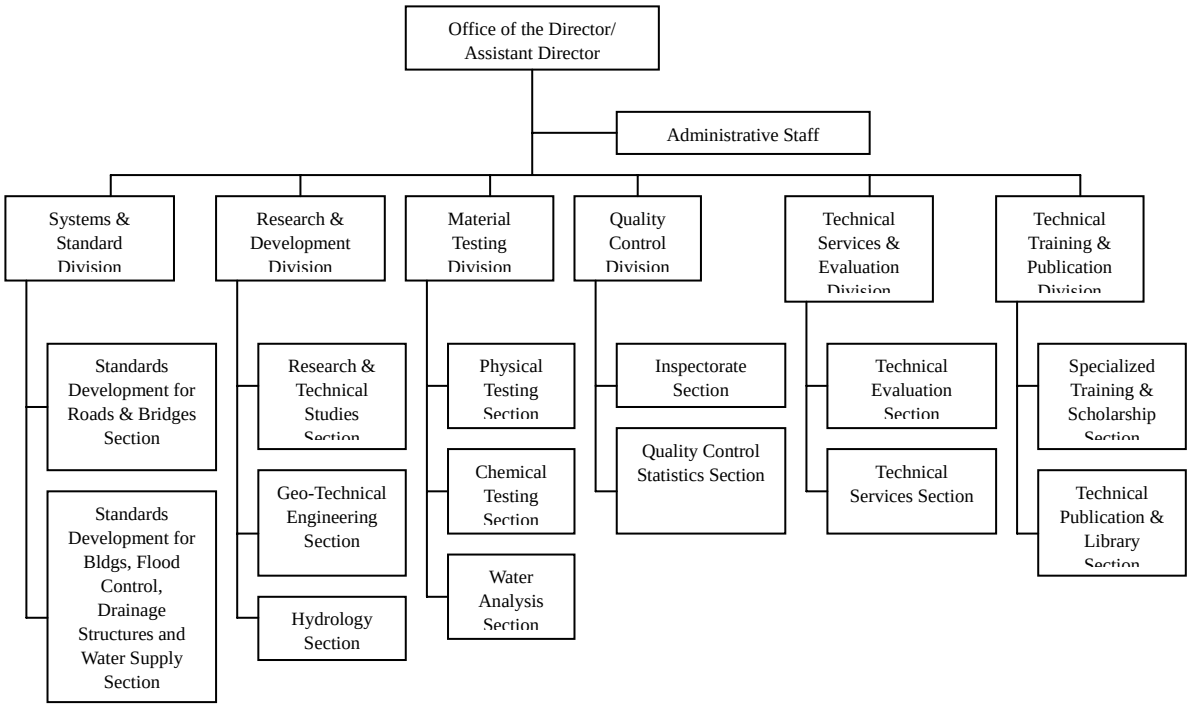
Given that consulting capacity in road maintenance is in short supply and required, there is need to develop such capabilities.

3.4.3 MATERIAL TESTING LABORATORIES

The Bureau of Research and Standards (BRS) of the DPWH is mandated to "develop and set effective standards and reasonable guidelines to ensure the safety of all infrastructure facilities in the country and to ensure efficiency and proper quality in the construction of government public works. Its main thrust is to identify the appropriate standards to be used in compliance with the agency's needs of infrastructures in coordination with the private manufacturing and construction industries. In terms of technological development, BRS supports the infrastructure program so that a well-focused research program can be designed with the assessment of every testing equipment used in the DPWH program.

The organizational structure of the BRS is illustrated in Figure 3.4.5.

The BRS implements the Guidelines for the Accreditation of Private Testing Laboratories. The Guidelines5 are used to evaluate the applicant laboratory's capability to comply with various conditions contained in said Guidelines. These include the following:



SOURCE: DPWH Website – www.dpwh.gov.ph

Figure 3.4.1 Organizational Structure of the BRS

- Organization of the Testing Laboratory
- Quality System
- Staff Qualifications
- Testing and Measuring Equipment
- Calibration of Equipment

[5] Guidelines for the Accreditation of Private Testing Laboratories, Bureau of Research and Standards, Department of Public Works and Highways.

- Test Methods and Procedures
- Testing Environment
- Handling of Items to be Tested

To ensure that the testing laboratories maintain the conditions of their accreditation, BRS conducts periodic visits of a minimum of once a year to determine whether the conditions upon which the accreditation certificate was granted are being observed and implemented. In addition, to monitor the quality of testing and reporting procedures, the BRS, requires, from time to time, the testing laboratory to carry out tests and prepare reports on test samples submitted by it.

There are 103 accredited private materials laboratories in the country. The regional distribution of these laboratories is given in Table 3.4.2. Laboratories of DPWH Regional and District offices do not undergo accreditation procedures.

Table 3.4.2 Regional Distribution of Accredited Private Materials Laboratories

Region	No.	% of Total	Region	No.	% of Total
I	1	0.97	VII	3	2.91
II	3	2.91	VIII	-	-
III	11	10.68	IX	5	4.85
IVA	20	19.42	X	4	3.88
IVB	6	5.83	XI	4	3.88
NCR	34	33.01	XII	-	-
V	3	2.91	XIII	3	2.91
VI	3	2.91	CAR	3	2.91
			Total	**103**	**100.00**

SOURCE: BRS and Study Team

Issue on Capability of Private Materials Testing Laboratories

(a) Given that BRS is mandated to accredit the private materials testing laboratories, it is presumed that it has the necessary equipment to test and calibrate the equipment of these laboratories to ensure the quality of its findings. There is therefore need to ensure that the BRS is properly equipped to undertake such tests on a regular basis and have the equipment necessary to undertake such tests and calibrate the equipment if required.

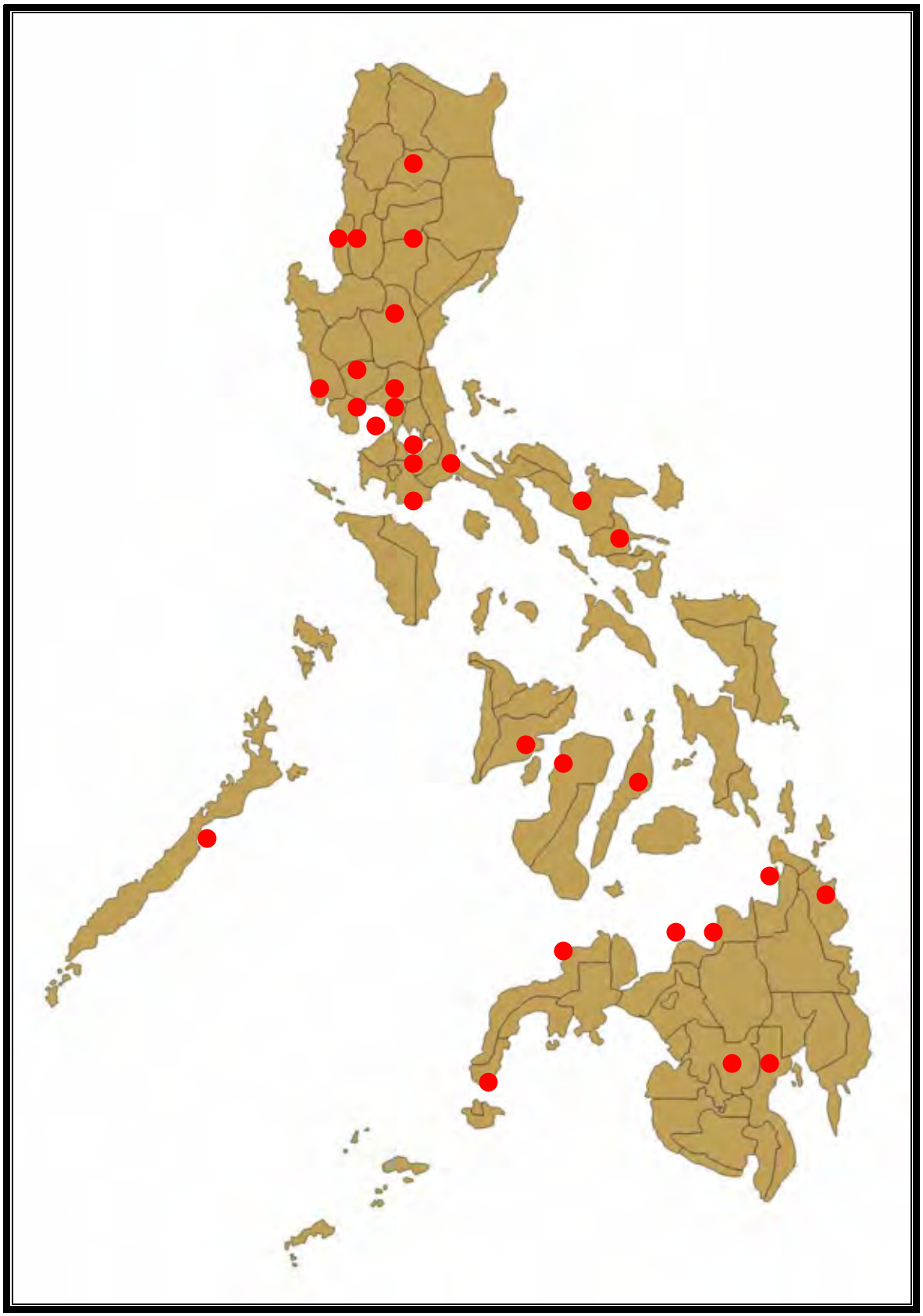
(b) The DPWH must evaluate the need to operate and maintain its own materials testing laboratories if private materials testing laboratories are already sufficient or present in the area.

3.5 MOTOR VEHICLE USER CHARGE (MVUC) AND ROAD BOARD

3.5.1 LAW AND IMPLEMENTING RULES AND REGULATIONS (IRR)

(1) Background on the Highway Special Fund

In the 1950's, the Philippine Congress legislated a highway special fund law funded out of a tax on motor fuel. RA 917 or "An Act to Provide for an Effective Highway Administration, Modify Apportionment of Highway Funds and Give Aid to the Provinces, Chartered Cities and Municipalities in the Construction of Roads and Streets and Other Purposes" was approved on 20 June 1953. It provided for the creation of the Division of Highways under the Bureau of Public Works (BPW), Department of Public Works and Communications (DPWC) and the method of disposition of highway revenues as set in Act 3992 as amended by Commonwealth Act 466 and Republic Act (RA) 314.



SOURCE: BRS and Study Team

Figure 3.5.1 Location of Accredited Private Materials Testing Laboratories

The disposition of highway revenues was provided under CA 466, as amended by RA 314. The

proceeds of the tax on motor fuel were deposited in a special trust account at the National Treasury to constitute the Highway Special Fund (HSF). The Funds were apportioned and spent in accordance with the Philippine Highway Act of 1953. As may be required but not exceeding 3% of all moneys accruing to the HSF was to be available for administering the provisions of the Act including expenditures for sundry expenses, salaries and wages of the necessary personnel of the Division of Highways such as:

(a) In-service training programs;

(b) Fiscal and cost accounting; and

(c) Statistical and investigation studies carried out independently or in cooperation with other fiscal and research agencies, and for publishing results thereof.

As may be needed but not exceeding P2.5 million or 1% of the HSF for each fiscal year, was made available and spent for highway equipment, machinery, laboratory and testing materials, equipment, motor vehicles, ferries and all necessary accessories and spare parts and for establishment and/or maintenance of the necessary repair shops, motor pools, storage depots, laboratories material testing and other highway construction aids and facilities.

For contingent emergency expenditures for the relief of provinces, cities and municipalities, which have suffered serious loss, damage or destruction beyond their reasonable capacity to bear, 6% of the HSF was to be set aside and made available.

Maintenance funding was to be released separately and regularly but not less often than every quarter irrespective of what amount has been accumulated. This was about 50% of all apportionable sums in the HSF, was intended for the maintenance of all existing and un-abandoned roads, streets and bridges and was to be distributed among the provinces, cities and municipalities.

The other 50% of the apportionable balances in the HSF was to be apportioned among the provinces, cities and municipalities for improvement, paving, reconstruction and other practicable treatments for the construction of roads, streets and bridges.

(2) RA No. 8794 and Implementing Rules and Regulations (IRR)

The result of the Better Roads Philippines efforts and Philippine Transport Strategy Study recommendations was Republic Act No. 8794 – An Act Imposing a Motor Vehicle User's Charge on Owners of All Types of Motor Vehicles and for Other Purposes. It provided for an institutional and funding mechanism both for the management of the Fund and the implementation of various activities to be undertaken under the Fund.

Pursuant to Section 2 of R.A 8794, it is the policy of the State to provide for and ensure the adequate maintenance of national and provincial roads, as well as minimize air pollution from motor vehicles, through sufficient funding. Under the law's Implementing Rules and Regulations (IRR), the attainment of this policy is undertaken as follows:

(a) Provide adequate maintenance of the national and provincial roads to ensure satisfactory service to road users, economic road transport operations, and the preservation of road assets;

(b) Determine the physical and financial maintenance needs of the national road network, as optimized in a multi-year program within projected funding resources to meet ongoing and backlog requirements, and inclusive of road safety requirements;

(c) Determine optimal medium-term funding needs and allocations for the national and local road networks in relation to the economic and functional performance of the road

networks, as a basis for evaluating the equity burden of road user charges;

(d) Establish priorities for action in attending to current road maintenance need as well as redressing and resolving maintenance backlogs, inclusive of road safety requirements;

(e) Provide for a system of contracting maintenance work through competitive bidding;

(f) Organize regular monitoring of the road networks and road works, inclusive of road safety requirements and local road maintenance, to ensure prompt objective assessment and feedback of system performance and quality;

(g) Formulate and implement a comprehensive program for the prevention, control and management of air pollution from mobile sources consistent with R.A. 8749, the Philippine Clean Air Act of 1999 and its Implementing Rules and Regulations, and

(h) Establish and implement the appropriate structural and procedural improvements to carry out these policies.

The law provided for the following:

(a) A Motor Vehicle User's Charge (MVUC) to be collected from and paid by the owner of the motor vehicle;

(b) Establishment of special accounts in the National Treasury where the MVUC proceeds are to be distributed, deposited and used for the purposes provided for (Special Road Support Fund (SRSF), Special Local Road Fund (SLRF), Special Road Safety Fund (SRSaF) and the Special Vehicle Pollution Control Fund (SVPCF));

(c) Establishment of the Road Board (RB) and Road Fund Secretariat (RFS);

(d) Apportionment and use of the Special Trust Fund; and

(e) Establishment of the penalty for vehicle overloading and setting the maximum allowable axle load at not more than thirteen thousand five hundred kilograms (13,500 kgs.).

The IRR provided for the establishment of the DPWH Road Program Office (RPO) to:

(a) Determine the annual needs of adequate road maintenance and road safety, and to formulate multi-year plans and programs, with a view to ensuring an ultimately current situation with no backlog in national road maintenance and road safety projects;

(b) Prepare Annual Work Programs (AWPs) and rolling Multi-year Work Programs (MWPs) of road maintenance and road safety utilizing the SRSF and the SRSaF for the consideration of the RB, as well as a report on the status of funds under the SLRF available for transfer to the various local governments;

(c) Prepare AWPs and rolling MWPs of road maintenance utilizing the regular DPWH maintenance fund (under the General Appropriations Act (GAA);

(d) Install and operate: (i) an approved budget tracking system for the purpose of monitoring and reporting on the disbursement and efficient utilization of project funds; (ii) a field implementation performance tracking system to monitor and report on the progress and quality of the funded works, and to reconcile them with the budget utilization data; and (iii) an effective Quality Assurance Program;

(e) Submit annual reports to the RB on the status of funds and progress of work on the SRSF and the SRSaF;

(f) Review and update the standards and procedures required of all local governments in their road maintenance operations and to provide technical assistance to local governments in preparing an inventory of the existing local road network and their conditions;

(g) Coordinate its program of work at all times with such other units within and outside of DPWH undertaking activities which may be related to road maintenance and road safety;

(h) Maintain the separate and distinct nature and accountabilities of monies received from each of the Special Road Funds (SRSF, SLRF and SRSaF);

(i) Expedite implementation of the approved road maintenance and road safety programs and projects through the appropriate district units, and in inter-district cases, through the relevant regional office; and

(j) Undertake all substantive road maintenance and road safety operations within DPWH.

(3) The Road Board (RB) and Road Board Secretariat (RBS)

RA 8794 mandated the creation of a Road Board (RB) "to implement the prudent and efficient management and utilization of the special funds". It is composed of seven (7) members, with the Secretary of the DPWH as ex-officio head, and the Secretaries of Finance, Budget and Management, and Transportation and Communications, as ex-officio members. Three (3) other members are from transport and motorist organizations, which should have been in existence and active for the five (5) years prior to the law. They are appointed to a term of two (2) years by the President upon the recommendation of the DPWH and DOTC Secretaries.

The RB has the following functions:

(a) Operation of the Special Funds;

(b) Management of the Special Funds;

(c) Approval of the Multiyear and Annual Work Programs submitted by DPWH and DOTC;

(d) Approval of Special Budgets for each Special Fund;

(e) Review of Work Programs;

(f) Complementary Work Programs under Other Funding;

(g) Procedures for Monitoring Performance and Managing Programs;

(h) Approval of Contracting Methods;

(i) Utilization of the Special Funds;

(j) Public Awareness and Reports;

(k) Supervisory Authority;

(l) Manual of Operating Procedures;

(m) Meetings, which shall not be less than once every three (3) months.

To assist the RB in the exercise of its functions, a Road Board Secretariat (RBS) was mandated in the IRR. The RBS has responsibility over the day-to-day management of the Funds and implement the decisions of the Board. The RBS is headed by the Executive Officer appointed by the Board and performs the functions that the Board may direct.

The RBS has responsibility over the following:

(a) Keeping proper accounts and records in respect of the Funds;

(b) Preparing and submitting for audit in respect of each financial year a balance sheet, a statement of income and expenditure, and a statement of cash flow in such forms and

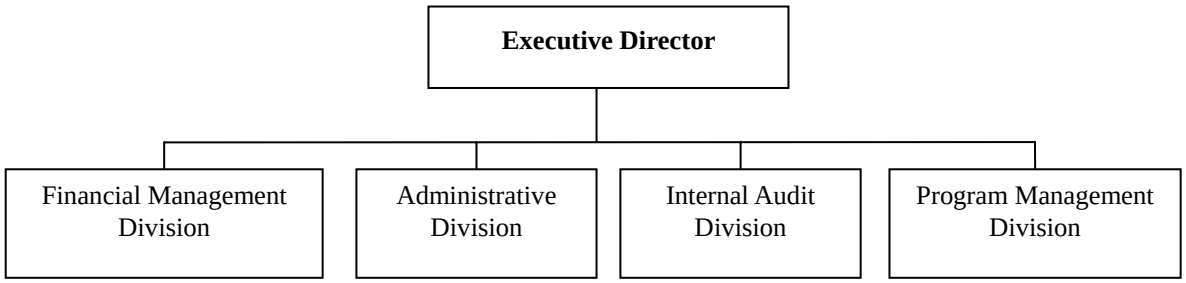
manners as the Commission of Audit (COA) may prescribe;

(c) Preparing the Annual Report of the Fund in such form and with such content as may be prescribed by the Board; and

(d) Arranging the business for meetings of the Board and its sub-committees.

The RBS may require, at such intervals as any oversight agency may require, the submission of reports and financial statements in such form as the agency may determine, regarding the operations and activities of the RB and the Fund.

The RBS is headed by the Executive Director and is comprised of four (4) divisions. The organizational structure of the RBS is illustrated in Figure 3.5.2.



SOURCE: Road Board Secretariat, 2007

Figure 3.5.2 Organizational Structure - Road Board Secretariat

3.5.2 DEVELOPMENT OF MVUC

Upon payment by the vehicle owner of his MVUC and its acceptance by the Land Transportation Office, the collection is deposited with the nearest Land Bank of the Philippines (LBP) branch. This is then remitted by LBP to the Bureau of Treasury (BT) and credited to the special trust funds as follows:

(a) DPWH – B5702-151 - Special Road Support Fund
80% of MVUC Collections

(b) DPWH-B5702-152 - Special Local Road Fund
5% of MVUC Collections

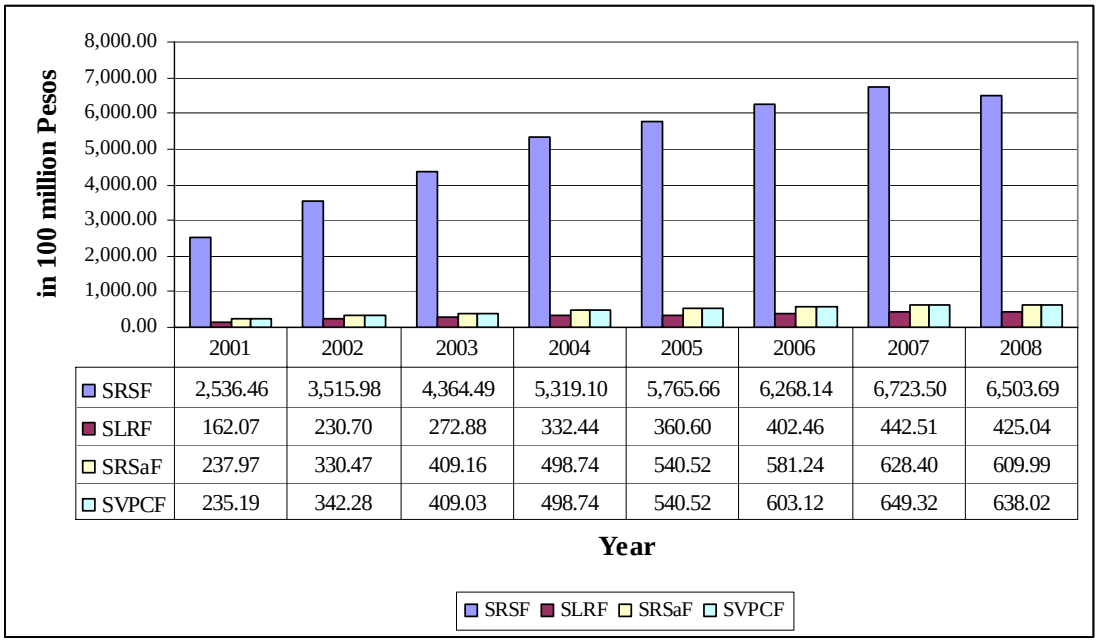
(c) DPWH-B5702-153 - Special Road Safety Fund
7.5% of MVUC Collections

(d) DOTC-B5082-151 - Special Vehicle Pollution Control Fund
7.5% of MVUC Collections

From 2001 to November 2008, the total MVUC collections amounted to Php 51.378 billion divided as follows:

- Php 40.997 Billion to the Special Road Support Fund (80%)
- Php 2.629 Billion to the Special Local Road Fund (5%)
- Php 3.837 Billion to the Special Road Safety Fund (7.5%)
- Php 3.916 Billion to the Special Vehicle Pollution Control Fund (7.5%)

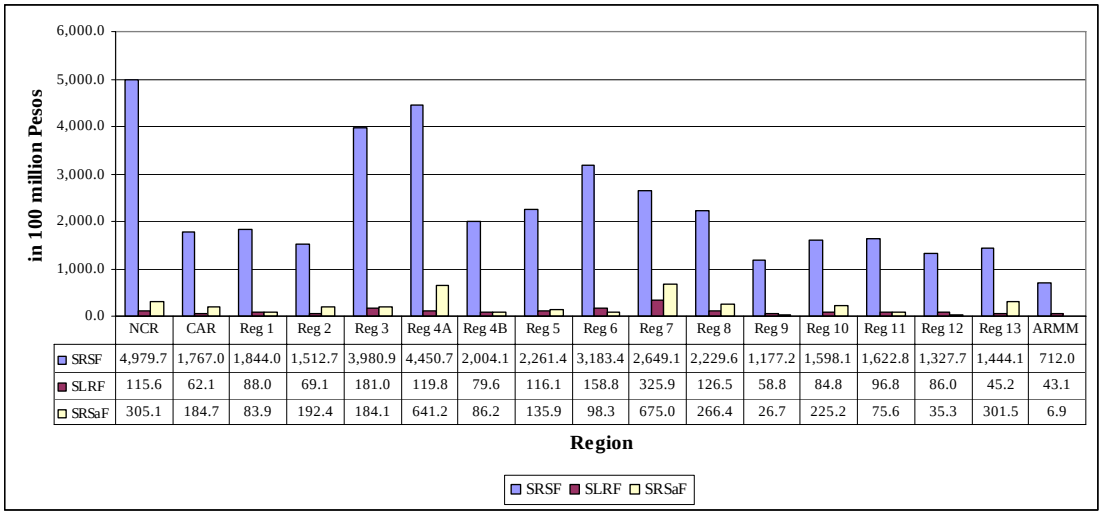
Figure 3.5.3 shows the annual distribution of MVUC collections to the different special funds.



	2001	2002	2003	2004	2005	2006	2007	2008
SRSF	2,536.46	3,515.98	4,364.49	5,319.10	5,765.66	6,268.14	6,723.50	6,503.69
SLRF	162.07	230.70	272.88	332.44	360.60	402.46	442.51	425.04
SRSaF	237.97	330.47	409.16	498.74	540.52	581.24	628.40	609.99
SVPCF	235.19	342.28	409.03	498.74	540.52	603.12	649.32	638.02

Figure 3.5.3 Distribution by Special Fund of MVUC Collections, 2001-Nov. 2008

Supposedly based on the Annual Work Programs submitted by the DPWH Road Program Office and the Department of Transportation and Communications (DOTC) and approved by the Road Board, the MVUC special funds are disbursed by the implementing units of the agencies. Figure 3.5.4 shows the share per region from MVUC collections approved for disbursement by the Road Board.



	NCR	CAR	Reg 1	Reg 2	Reg 3	Reg 4A	Reg 4B	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	ARMM
SRSF	4,979.7	1,767.0	1,844.0	1,512.7	3,980.9	4,450.7	2,004.1	2,261.4	3,183.4	2,649.1	2,229.6	1,177.2	1,598.1	1,622.8	1,327.7	1,444.1	712.0
SLRF	115.6	62.1	88.0	69.1	181.0	119.8	79.6	116.1	158.8	325.9	126.5	58.8	84.8	96.8	86.0	45.2	43.1
SRSaF	305.1	184.7	83.9	192.4	184.1	641.2	86.2	135.9	98.3	675.0	266.4	26.7	225.2	75.6	35.3	301.5	6.9

Figure 3.5.4 Disbursements of MVUC Special Funds by Region, 2001- Nov. 2008

The percentage allocation of MVUC funds by Region is shown in Figure 3.5.5.

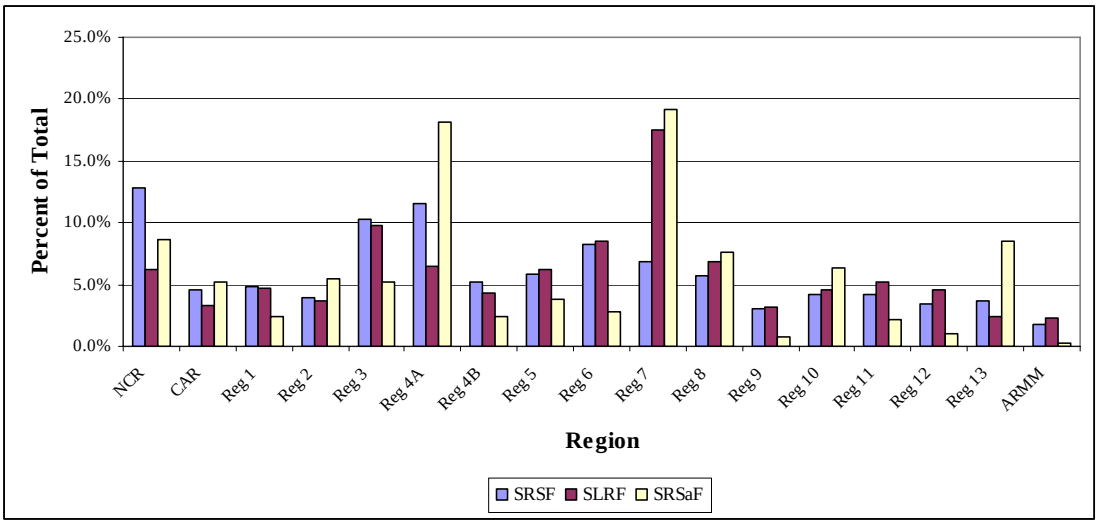


Figure 3.5.5 Allocation of MVUC Special Funds by Region, 2001- Nov. 2008

Section 6 of RA 8794 imposes a penalty for vehicle overloading in an "amount equivalent to twenty-five percent (25%) of the MVUC" to be "imposed on trucks and trailers for loading beyond their prescribed gross vehicle weight. The law further provides "That no axle load shall exceed thirteen thousand five hundred kilograms (13,500 kgs.)". However, it does not clearly define to whom the collection of penalties for violation of this section of the law would accrue. The stand of LTO on this matter is that it accrues to the General Fund and is thus treated as such. The amount in question is not substantial, about P4.83 million in 2004.

3.5.3 MAJOR ISSUES FOR MVUC AND ROAD BOARD

(1) The RBS has merely secretariat role and is tasked to monitor that the mandate of the RB is implemented. It does not essentially require a large complement of personnel since the Road Board can outsource some, if not most, of the tasks through the RBS.

Given that DPWH and DOTC implement activities funded by the RB, the RB has the responsibility to assure the road users that they are given "value for money". The RB has to undertake the monitoring of the two (2) agencies' use of the Special Funds to avoid a "conflict of interest" situation and provide the "check and balance" for an unbiased opinion on the use of the Special Funds.

Given the functions of the RB, its organizational structure and personnel complement requirements should be simple and lean. This is because most of the programming, budgeting and implementation of activities funded under the MVUC collections are undertaken by the specified national government agencies and local government units. All the RB has to do would be to either approve or disapprove the submissions of the agencies and LGUs.

The RB has been implementing its Operating Procedures Manual since 1 September 2001. It had also approved Office Order No. 04-05 series of 2004 on 17 December 2004 on the Road Board Financial Management Policies. This complements the Operating Procedures Manual.

Based on the two manuals, the responsibility of the RBS is essentially to calendar the submissions of the agencies and refer this to the RB. Any decision of the RB should then be referred back to the agencies for their appropriate action.

As to the monitoring of national agency performance on the use of the special funds, the RB can just contract the "audit" of the agency performance without need of developing its own capability. There is no justification for the RB/RBS proposing a large structure and additional

manpower complement, when its function is basically as a "board secretary".

(2) The utilization of the MVUC has become politicized, contrary to the objectives of its creation. Even with HDM 4 supposed to be used as the basis for the prioritization and programming of preventive maintenance projects under the Special Road Support Fund (SRSF), this is no longer the case, as pressure is exerted on the implementing agency and the Road Board to fund "pet projects" of legislators. Thus, a significant portion of the SRSF is allocated equitably to all DPWH District Engineer's Offices (say a minimum of Php10-20 million per DEO), even though the HDM 4 runs do not show the need for such preventive maintenance funds for the DEO. This seems to be also true for the utilization of the Special Road Safety Fund.

While there have been proposals to increase MVUC collections through alternative revenue sources such as a fuel levy given the presumed inadequacy of preventive maintenance funding, this needs to be validated. It will not result in any improvement in the condition of national roads whatsoever, if the method of allocation is flawed as is evidently the case at present. If utilized properly, the current level of available funding for maintenance from the MVUC and GAA may already be sufficient to result in significant improvements in the condition of the national road system.

3.5.4 REFORM PLAN FOR ROAD BOARD OPERATION

There are no existing proposed reform plans for Road Board operation. In fact, the Road Board Secretariat has not submitted any proposal to the Department of Budget and Management (DBM) or to the DPWH to which it is an attached agency, for its proposed organizational structure and manpower complement. Currently, the DBM has approved only five (5) permanent positions for the RBS to support RB operations.

Under NRIMP 2, advisory services are proposed to enhance operations of the RB. This recognizes the ineffectiveness of the RB in preventing political influence on the allocations and implementation of the maintenance program. However, this weakness of the RB may be structural in nature, as its activities are still primarily influenced by the largely political appointees to the Road Board. The private sector representatives fail to represent the interest of the road users and may have been silenced by the dominant numbers of national government agency representatives.

3.6 PLAN AND PROGRAMS ADDRESSING TO KEY ISSUES

3.6.1 REFORM PLANS OF DPWH

NRIMP 2 and the proposed JICA and ADB loan programs for the road sector have institutional and business process reforms embedded in the programs.

However, implementation of DPWH's proposed rationalization plan, which is a key element in DPWH's reform plans, is still a long way from implementation, as three (3) years have already passed since its initial submission to DBM in 2006. DPWH has continually failed to meet the target in the reduction in Personal Services (PS) expenditures, although it has already cut about 4,518 positions from its existing permanent plantilla positions. Per DBM, DPWH has still to meet about Php400 million in PS expenditure deductions before its rationalization plan is approved by DBM. Given the current impasse, DPWH needs to further streamline its rationalization plan to conform to the basic guidelines of EO 366.

3.6.2 ROAD FUND ENHANCEMENT

It has been presumed that, given the increased funding required to adequately maintain not only

the National Highways but local roads as well, GAA and MVUC funding at their current levels is grossly insufficient. As stated in Section 2.3.1 (3), "In order to maintain and improve road conditions, including road safety measures, Php 62.8 billion is required and another Php 463.2 billion is necessary for rehabilitation, reconstruction, new construction, and expansion of the National Roads (total estimated cost is Php 526 billion in 2006 prices). On the other hand, the budget allocations for national roads for the remaining MTPDP period (2007-2010) is only Php 239.8 billion excluding the allocation from Special Road Support Fund of the Motor Vehicle Users Charge (MVUC).

It is obviously difficult for DPWH to cover the expenditure requirements to maintain and expand the national roads within the medium-term plan period with only 46% of the budget required."

Failure to undertake the required maintenance works, for one, would further aggravate the already deteriorated condition of the National Highways and enlarge the maintenance backlog into unmanageable levels. The Philippines would be better off providing adequate funding for road maintenance in the short term, rather than having to rebuild a vastly deteriorated National Highways in the medium to long term. Thus, there is an urgent need to supplement existing funding sources through any of the following:

(a) As a first step, GOP in general and DPWH in particular, should improve the utilization of existing funds through improvement in the quality of new construction (improvement, upgrading and preventive maintenance), implementing the prioritized preventive maintenance works as determined using existing systems developed in NRIMP 1 (not political interference) and minimization of corrupt practices in road construction and maintenance;

(b) A second step would be to support the efforts of civil society in monitoring DPWH road works activities such as Road Watch/Bantay Lansangan to provide a neutral and unbiased opinion on the advances made in improving the quality of the road system, prudent and efficient utilization of funds (GAA and MVUC) and minimization of corrupt practices in road works;

(c) The third step would be to identify and quantify the amount that could be generated through potential funding sources. These would include the following:

   i. Fuel Levy – In the Better Roads Philippines Study, aside from the MVUC, a complementary funding source was the imposition of a Php1.00 per liter fuel levy. Given that road use is highly correlated with fuel consumption, such a levy could be easily justified. The potential amount that could be generated from the fuel levy is about Php 14.06 billion per annum at Php1.00 per liter and Php28.12 billion at Php2.00 per liter.

   ii. Increase in the MVUC – There is no indexation on the MVUC rate being implemented by GOP. Thus, the final rates set in 2004 (the MVUC rates were progressively increased from 2000 to 2004) have not been increased since. From 2004 to 2008, the core inflation rate increased by 28.7%. An increase of 30% in the MVUC rate would result in additional revenues of about Php2.22 billion.

   iii. Shadow Tolls – Another option to supplement funding sources for road maintenance is the imposition of so-called shadow tolls on national roads. A similar option would be the collection of congestion tolls imposed on vehicles entering a specific area, i.e., central business district. Such a concept has been successfully implemented in Singapore and the technology for such an option already exists. However, this would require far more extensive study and should be considered for the long term.

In summary, the impact of a fuel levy and increase in the MVUC rate would add an additional Php 16.28 billion (at Php1.00 fuel levy per liter) and Php 30.34 billion (at Php 2.00 fuel levy per

liter).

3.6.3 INSTITUTIONAL AND CAPACITY DEVELOPMENT

The institutional and capacity development requirements of the DPWH are oftentimes met with technical and funding assistance from the various international development assistance institutions. Such institutions include the World Bank through its NRIMP 1 and 2 Loan Programs, the Japan International Cooperation Agency, Asian Development Bank through its recently completed Sixth Road Project and the proposed Road Sector Improvement Project and AusAID through its participation under NRIMP 2 through PEGR.

Under NRIMP 2, which is the most significant and high impact institutional and capacity development program being undertaken within DPWH, this includes business process improvements, institutional effectiveness, sector reforms and other institutional building activities. These are summarized below:

(a) Component B.l: Business Process Improvements. The modern business tools for planning, financial management and procurement that were designed and piloted under NRIMP-1 will be institutionalized and implemented in all regional and a majority of district offices of DPWH including expansion o f the communications networks and computerization, conduct of regular asset surveys, and strengthening internal controls and internal audit.

(b) Component B.2: Corporate Effectiveness. This will upgrade and modernize the corporate structure, processes and operating codes of DPWH to make it a user responsive, transparent, and efficient public sector agency with high integrity standards, and will enable effective participation by road users and citizens, through four subcomponents, i.e. :

i. B.2.1: Organizational Effectiveness. Enhancement o f DPWH effectiveness through an institutional audit and organizational restructuring, including national initiatives on rationalization, corporate standards, integrity, performance management and leadership.

ii. B.2.2: Road Partnerships. Support for a multi-stakeholder partnership o f road users and non-governmental organizations for improving responsiveness and transparency in the road sector, for communicating with DPWH, Road Board and various government agencies.

iii. B.2.3: Road Management Service Delivery. Support for a pilot trial of options for commercializing the current operations of district engineering offices to improve service delivery of road maintenance and other functions.

iv. B2.4: Integrity Support. Support for strengthening the fiduciary integrity of the project implementation, through independent technical audit, parallel procurement evaluation, and strengthening institutional integrity.

(c) Component B.3: Strategic Sector Reform. Support to strengthen the operations of the Road Board and update its mandate, review road cost recovery, and to revisit options for restructuring the management and delivery of services in the sector.

(d) Component B.4: Training and Workshops. Activities for facilitating achievement of the Project objectives and related skills development.

3.6.4 DONOR COOPERATION IN INSTITUTIONAL CAPACITY DEVELOPMENT

(1) JICA TCP

JICA has an active development partner for the institutional capacity building of DPWH. The JICA has dispatched Japanese experts for highway and bridge planning sector capacity building. JICA has conducted many road master plan and feasibility studies.

In MTPDP (2004-2010), the GOP stipulated priority on maintenance of the existing road. In this regard, enhancement of the maintenance skill is a key issue to support MTPDP. While there are many road disaster prone areas and the capacity development for slope engineering is also an urgent issue for the DPWH engineers to sustain the existing road network system and services.

The technical cooperation for "the project for improvement of quality management for highway and bridge construction and maintenance" has been implemented as a joint effort of the GOP and GOJ, aiming capacity enhancement of the DPWH CAR, Region VII and Region XI engineers.

The JICA TCP forecasted on the ROs and DEOs where approximately 85% of the employees are belong to. They are implementing agencies for both development and maintenance projects for locally funded projects. The JICA assigned a TCP Team comprised of two long-term experts and 5 - 6 short-term experts. The phase 1 project is from February 2007 to February 2010. The DPWH has proposed to the GOJ for implementation of TCP Phase 2[6]. The JICA TCP adopted workshops and On-the-Job training methodologies. Phase 1 is mostly for training of OJT coaches.

The following table shows features and concept of the JICA TCP Phase 1 and Phase 2 if approved by the GOJ.

[6] The GOP (DPWH) has proposed GOJ for technical assistance in implementation of TCP Phase 2. However, GOJ has not made any commitment on it.

Item	Roads		Bridges	
	Phase 1	Phase 2	Phase 1	Phase 2
Contents of Technical Transfer	(1) Manual Preparation - Road Project Management and Construction Supervision Manual (RPMCSM) - Pocket Guidebook of Road Construction and Maintenance Management	(1) Manual Preparation - Road condition survey (IRI, rutting, Cracking) and evaluation techniques - Slope and scouring protection works	(1) Manual Preparation - Bridge Inspection Manual - Bridge Repair Manual	(1) Manual Preparation - Inspection Manual for Cable-stayed and suspension bridge - Road Project Management and Construction Supervision Manual (RPMCSM) for Bridge Projects
	(2) Workshops and OJT for Training of Coaches - Road inspection, evaluation and maintenance planning (slope, pavement, drainage, scouring) - Maintenance design - Quality assurance	(2) Implementation of OJT - OJT planning, implementation, evaluation - Maintenance design (pavement, drainage, slope protection works, etc.) - Project management and construction supervision applying the RPMCSM and Pocket Guidebook - Application of road condition survey and evaluation using survey vehicle/equipment - Transfer of slope protection works, including horizontal drilling for underground water treatment	- Long-Bridge Manual (New Mactan Bridge) - Concrete Quality Control Manual (2) Workshops and OJT for Training of Coaches - Application of the above manuals - OJT on bridge inspection, bridge maintenance, bridge repair and quality control through pilot projects - OJT on long bridge inspection (New Mactan Bridge)	(2) Implementation of OJT - Bridge repair and maintenance planning and design - OJT on bridge inspection, bridge maintenance, bridge repair and quality control through pilot projects - Project management and construction supervision applying the RPMCSM
Subjected Regional	CAR (Baguio), Region VII (Cebu)	RO and DEOs in CAR (Baguio), Region VII (Cebu) and Region XI (Davao)	Region VII (Cebu) and Region XI (Davao)	RO and DEOs in CAR (Baguio), Region VII (Cebu) and Region XI (Davao), Some other selected regions

Source: TWG/DPWH

(2) World Bank

Road sector reform was initiated in 1997 and articulated in the Better Roads Philippines 2000 Study. Since the road sector reforms in 1997-1999, the World Bank has been a key development partner in the sector. The reform strategy was anchored on sustainable financing through road user cost recovery and commercialization of road sector operation through the establishment of a road management authority and greater private sector participation.

The key policy and institutional aspects of the NRIMP program are as follows:

NRIMP-1:	- Establishing a road fund from user charges to maintain the National Road System (NRS) in a sustainable manner - Relating revenues to maintenance needs - Involving road users in overseeing NRS management and funding - Designing a Road Maintenance Authority (RMA) - Reviewing DPWH functions and those of the Department of Transportation and Communications (DOTC) if required, with regard to the regional structure, decentralization, scope of networks and DPWH's other infrastructure obligations
NRIMP-2:	- Raising road fund revenue to satisfy full road maintenance requirements - Starting the first stage of the transition to the new organizational structures, including the RMA
NRIMP-3:	- Fully implementing the new RMA to commercialize the management of services for the national road network, separating government policy and planning functions from service delivery activities which would be largely privatized - Improving road sector policy

The World Bank's NRIMP-1 and 2 will assist in the reform and rationalization of the DPWH through operation improvement, organization effectiveness and fiduciary control. The modern

business tools designed, developed and piloted in NRIMP-1 will be fully operation in NRIMP-2. The ICD component of NRIMP includes upgrading and modernizing the corporate structure, process and operating code of DPWH to make it user responsive, transparent, and an efficient public sector agency with high integrity standards. Outline of the NRIMP ICD are as follows.

Description	NRIMP-1	NRIMP-2
Part B: Institutional and Capacity Development (ICD)		
B.1 Business Process Improvement		
B.1.1 Planning	90%complete	Operation of MYPS, PMS, BMS, TARAS, RTIA, & RBIA
B.1.2 Financial Management	80-90% complete, CO and RO	System development and operation (e-NGAS, Internal Controls and Audit)
B.1.3 Procurement	70-80% complete, Consultancy services	System development and operation (CES, Bid and Award Support (PES, LAS), DoTS, CWR, PBD, ISAP)
B.1.4 Engineering Design	-	Design Standard (renewal), Design Review (consultancy services), RAP implementation, Quality Assurance (16 satellite laboratories), Technical Assistance
B.1.5 Information and Communication Technology	CO, 5 ROs, 20 DEOs	Connection of Class A districts
B.1.6 Research and Quality Assurance	IRI< 8m/km	IRI< 6m/km
B.1.7 Strengthening of Safeguards Support	Consultancy services	Consultancy services
B.1.8 Business Process Integration and Coordination	Partly operational	Full operation support
B.2 Corporate Effectiveness and Integrity		
B.2.1 Organizational Effectiveness		Corporate Modernization, Human Resources and Leadership Development, & Integrity Development (IDAP)
B.2.2 Road Partnerships		Road Board, Road Watch, Sector Monitoring
B.2.3 Road Management Service Delivery		Commercialization of DEOs (pilot)
B.2.4 Integrity Support		Independent Procurement Evaluator (IPE), Independent Technical Audit
B.2.5 Business Process Integration and Coordination		Review of progress, Joint Oversight
B.3 Strategic Sector Reform		Strengthening Road Board, Review IRR, Support expansion of revenue base (fuel levy and others)
B.4 Training and Workshops		Training for implementation of NRIMP

Note: NRIMP-2 includes operation support and assistance for the systems and organizations developed in NRIMP-1.

(3) Asian Development Bank

The ADB's 2003 Country Assistance Program Evaluation for the Philippines determined that the core problem of the road sector was the weakness of DPWH, specifically in the maintenance and development of the national road network. ADB is a key partner for institutional capacity development through its 6th Road Project and the planned RSIP. The ICD programs of ADB included 8 components, of which most were completed except one (Road Resealing Training). The major components of ADB assistance in the DPWH's ICD are as follows.

ICD in ADB 6th Road Project (1996-2007)	ICD Programs of ADB RSIP			
	Component	Tranche 1 (2010-2011)	Tranche 2 (2012-2014)	Tranche 3 (2015-2017)
Highway Planning (PMS, MTPIP)	1. Project Post Evaluation	O	O	
Routine Maintenance Management System (RMMS)*	2. Project Management Information System (PMIS)	O	O	
Road Resealing Training (not implemented)	3. Infrastructure Development and Quality Assurance	O	O	O
Pavement Investigation	4. Environmental and Social Safeguard	O	O	O
Hazard Mapping	5. Gender Mainstreaming	O	O	
Project Coordination	6. Communication Network	O	O	
Benefit Monitoring and Evaluation	7. IT Facilities	O	O	
	8. Comprehensive Human Resource Development (HRD)	O	O	
Road Safety (NRSP, TARAS)	9. Traffic Accident Reporting and Analysis System (TARAS)	O	O	
	10. Road Safety Audit (RSA) system	O	O	O
	11. Road Partnership (Bantay Lansangan) Phase II	O	O	

Note: * RMMS was complete but not in operational condition.

(4) Others (AusAID)

The Australian Agency for International Development (AusAID) provides grant co-financing in NRIMP-2. It supports selected governance and human resources capacity development (totaling US$10.5 million). The funding is provided through the following two (2) Technical Assistance Facilities:

- The Philippines-Australia Partnership for Economic Governance Reform (PEGR), March 2005
- The Philippines Australia Human Resource Development Facility (PAHRDF), August 2004

The AusAID activities support the NRIMP-2 programs in

- B.1.2 Financial management and internal control system
- B.2.1 Organizational effectiveness, including internal assessment and development of a reorganization plan for DPWH.
- B.2.2 Road partnerships, including operational support for Road Watch
- B.2.4 Integrity support, including independent procurement evaluation and technical audits.

3.6.5 RECOMMENDATIONS ON INSTITUTIONAL CAPACITY DEVELOPMENT (ICD) OF DPWH FOR REAPMP

The Survey Team recommended implementation of the following ICD programs for REAPMP:

- Overload Vehicle Control Enhancement

- Quality Assurance Enhancement
- Emergency Disaster Recovery Equipment for DPWH DEOs
- Communication Network and IT Equipment/Software
- Capacity Development Support for Remaining 13 RO (and DEOs)
- Consultancy Services for ICD

CHAPTER 4 DESCRIPTION OF JICA ASSISTED ROAD ASSET MANAGEMENT PROGRAM

4.1 PROGRAM OBJECTIVES

The priorities of the ODA of GOJ for the Philippines are the following 3 areas:

Sustainable Economic Growth aimed at creating employment opportunities	- Support for financial reforms / good governance - Investment promotion - Improvement of transport networks - Enhancing power and energy sectors - Tourism
Poverty Reduction	- Livelihood improvement - Enhancement of basic and special services - Environmental protection and disaster prevention
Peace and Stability in Mindanao	- Administrative capacity building - Enhancement of basic human needs - Economic development - Peace building

The objective of the Road Enhancement and Asset Preservation Management Program (REAPMP) is to assist the efforts of the GOP in the road sector to improve, preserve and manage its national road system in an economically, socially, financially and environmentally sustainable manner.

REAPMP focuses on the asset management, upgrading/improvement (asset quality improvement) and maintenance (asset preservation) to provide a more profound, efficient and lasting impact on the national road system.

The following is the rationale:

1. Many past highway loans were mostly used for upgrading, improvement and rehabilitation of national roads. However, these roads have shown premature deterioration due to management weakness, insufficient funding and inadequate maintenance.
2. JICA supports the policy of the GOP to give higher priority on asset preservation in the road sector and funding according to MTPDP (2004-2010). This is a cost-effective strategy that involves relatively low but sustained funding to preserve existing assets and prolong their life, minimize urgent and costly rehabilitation and reconstruction, and reduce transport costs of road users and road expenditures by the DPWH. These will contribute to the national economy and regional development.
3. JICA aims to enhance the initiatives of DPWH for asset management and business processes improvements for the delivery of better national roads and services, in coordination with other international development partners and, especially the WB assisted NRIMP and the ADB assisted RSIP.
4. The investment needs for national roads are huge and exceeds the limited available resources. DPWH intends to allocate said investment to the following:

<u>Asset Preservation</u>

- Rehabilitate and reconstruct approximately 5,950 km of the badly conditioned paved roads in short-term (2009-2012) for resolving the maintenance backlog.

- Rehabilitate approximately 1,100 km of the poorly conditioned paved roads, which are expected to worsen in the medium-term (2012-2015).
- Preservation works (preventive maintenance or PM) on 10,670 km of the paved roads in the short-/medium term (2009-2015).
- Annual preservation works (routine maintenance or RM) on 29,650 km roads.

Infrastructure Development

- Upgrading of approximately 7,200 km gravel roads to paved roads in the medium/long-term (2009-2020)
- Expressway construction
- Capacity expansion (additional lanes, flyovers, bypasses)
- Replacement of temporary bridges with permanent bridges (16,000 m) in the medium/long-term (2009-2020)
- Replacement of old bridges

The total investment required is estimated at Php 695 billion for the long-term (2009-2020) as indicated in Table 4.1.1 (refer to Table 4.1.2 for the unit cost for construction and maintenance used for the estimate).

NRIMP-2 will cover approximately 450 km of road improvement, 1,080 km of LTPBM and 320 km of PM over 2008-2012. ADB meanwhile will cover 370 km of PM in Tranche 1 (Phase 1) of RSIP. JICA will also make a remarkable contribution towards bridging the gap in resources to accelerate the road asset improvement and preservation programs.

Unit: km

Category	World Bank NRIMP-2	ADB RSIP, Tranche 1	JICA REAPMP	Total
Road Improvement	449		128	577
LTPBM	1,083 (or OPRC)		644	1,727
Preventive Maintenance	320	374	593	1,287
Total	1,852	374	1,365	3,591

Table 4.1.1 Tentative Short/Medium- Term Investment Estimate for the National Roads Sector

Investment Category			Better Road Philippine (2000-2009)*		JBIC/DPWH Pre-FS (2006-2015)*		Intial Estimate by JICA Preparatory Survey (2009-2020)				
					1st Year	For 10 years	2009-2012	2013-2015	2016-2020	Total (2009-2020)	Remarks
			(Bill.P/year)	(Bill.P/10-year)	(Bill.P/year)	(Bill.P/10-year)	(Bill.P)	(Bill.P)	(Bill.P)	(Bill.P)	
D. Infrastructure Investment (Development)	D.1	Road Upgrading (Gravel to paved roads)	0.8	8.0		204.2	21.0 km 718 10%	84.1 km 2,871 40%	84.1 km 2,871 40%	189.3 km 7,176 90%	27.2%
	D.2	Road Improvement (Widening, Additional lanes, flyovers, Bypasses)				114.0	6.0 10%	12.0 20%	42.0 70%	60.0 100%	8.6%
	D.3	Expressways (GOP Portion)					12.0 10%	24.0 20%	84.0 70%	120.0 100%	17.3%
	D.4	Road Backlog Maintenance (Poor/Bad to Good)**	2.6	26.0	43.2 km 3,907	103.0 km 6,631	50.6 km 2,114 30%	118.1 km 4,932 70%	- km - 0%	168.7 km 7,046 100%	24.3%
	D.5	Permanent Bridge (from temporary bridges)				15.0 m 16,000	1.2 m 1,605 10%	6.0 m 8,025 50%	4.8 m 6,420 40%	12.0 m 16,050 100%	1.7%
	D.6	Bridge construction, replacement/reconstruction				(included in D.2)	1.5 10%	4.6 30%	9.2 60%	15.4 100%	2.2%
Sub-Total			3.4	34.0	43.2	436.2	92.4	248.8	224.2	565.4	81.3%
M. Maintenance Investment	M.1	Road Normalized Annual Maintenance (PM)	10.0 (including Routine Maintenance)	100.0	15.0 km 3,347	35.1 km 8,452	21.6 km 2,555	19.5 km 2,782	37.4 km 5,337	78.5 km 10,674	11.3%
	M.2	Road Routine Maintenance (paved and unpaved roads)			3.2	32.0	8.3 km 118,601	6.2 km 88,951	10.4 km 148,252	24.9 km 355,804	3.6%
	M.3	Bridge Maintenance (Preventive Maintenance)					4.0	3.0	5.0	12.0	1.7%
	M.4	Bridge Maintenance (Routine Maintenance)					1.2	0.9	1.5	3.6	0.5%
	M.5	Emergency Maintenance					2.0	1.5	2.5	6.0	0.9%
	M.6	Others (Overlaod control. Road safety, etc)				4.1	1.6	1.2	2.0	4.8	0.7%
Sub-Total			10.0	100.0	18.2	71.2	38.7	32.3	58.7	129.8	18.7%
Total			13.4 (18.7 Billi.Phs/year and 187 Bill/10-year at 2007 price)	134.0	61.4	507.4	131.1	281.1	282.9	695.1	100.0%
Notes:				Maintenance + Backlog Maintenance: (% to the Total Investment Cost)			89.3 68%	150.4 53%	58.7 21%	298.4 43%	

* Pre-FS Report (HDM-4 unconstrained budget basis)

** Classified into Maintenance in the Betterment Road Study and JICA Pre-FS.

Table 4.1.2 Unit Costs for Road Improvement and Maintenance at 2009 Prices

Unit: Mill.Peso per km

Surface Type	Category	Work Activity		Carriageway Width			
				6.1m	6.7 m	From 6.1m to 6.7M	From 6.7 m to 13.4 m
Asphalt	New	New Construction	AC 50mm	26.48	32.91		
			AC 80mm	31.40	38.81		
			AC 100mm	35.21	43.44		
	UI	Improvement	AC 50mm				
		(Widening)	AC 80mm			15.87	
			AC 100mm			18.41	40.99
		Reconstruction/	AC 50mm	15.62	17.16		
		Rehabilitation	AC 80mm	21.07	23.15		
			AC 100mm	25.29	27.78		
	PM	AC Overlay	AC 50mm	5.60	6.15		
			AC 80mm	7.70	8.46		
			AC 100mm	9.27	10.18		
Concrete	New	New Construction	AC 200mm	25.33	30.70		
			AC 230mm	27.83	33.66		
			AC 250mm	30.61	37.03		
	UI	Improvement	AC 200mm			13.83	
		(Widening)	AC 230mm			14.29	31.73
			AC 250mm			14.88	34.90
		Reconstruction/	AC 200mm	19.37	23.48		
		Rehabilitation	AC 230mm	22.39	25.79		
			AC 250mm	24.62	28.37		
Gravel	UI	Upgrading	AC 50mm	22.57	29.06		
		to ACP	AC 80mm	27.61	32.91		
			AC 100mm	30.65	36.25		
		Upgrading	AC 200mm	21.00	25.81		
		to PCCP	AC 230mm	22.00	27.17		
			AC 250mm	24.20	29.89		
							13.4 m
ACP	RM	Routine Maintenance		0.084	0.093		0.140
PCCP		Routine Maintenance		0.049	0.054		0.081
Gravel		Routine Maintenance		0.076	0.084		

Source: By JICA Survey Team based on 2006 PMS/DPWH Cost

4.2 PROGRAM OUTLINES

4.2.1 PROGRAM SCOPE AND COMPONENTS

(1) Sector Program Type Approach

The REAPMP is a sector-program type of assistance that aims to enhance the efforts of the GOP to improve, preserve and manage its national road system in collaboration with other international development partners. This will reduce the problems experienced in the past project-based loans for development projects, particularly the time-consuming processes and stringent rules. The REAPMP is a comprehensive approach for the road sector enhancement and intends to address the major sector issues, including road network upgrading, road asset preservation, management enhancement and institutional capacity building.

The sub-projects for Upgrading and Improvement (UI) and Long-Term Performance Based Maintenance Enhancement (LTPBM) are pre-agreed road links and road sections. The PM has two categories. The first is the 93 km length of the three pre-fixed road sections which were

previously included in the original LTPBM links. The other PM is approximately 500 km to be selected during the REAPMP implementation, based on PMS/HDM-4. The programmed PM works must be assessed/ reassessed once a year to reflect the current road defects and conditions. It will also consider completed and on-going works.

The REAPMP will involve an agreement between JICA and the GOP to implement the following agenda for asset upgrading, preservation, management and enhancement of national roads:

(a) Adoption of an overall rolling multi-year program for asset preservation of the national roads system according to agreed objective, technical and economics criteria, and performance targets.

(b) A commitment by the GOP to provide the funds needed to undertake the multi-year program and to allocate them for the component works according to the agreed criteria.

(c) Adoption of an action plan for policy, institutional and process improvements or reforms to provide for a more efficient allocation and use of resources for the national roads.

(d) A cost-sharing arrangement for the funding of the different REAPMP components from the GOJ loan and the GOP counterpart funds from MVUC and GAA.

(e) Yearly selection, design, procurement, and implementation of specific PM programs by the DPWH during the program implementation, in compliance with the pre-agreed criteria, standards, requirements, and procedures.

(f) Establishment of a special account in the National Treasury into which the JBIC loan proceeds will be deposited. The DPWH may draw upon this account to pay eligible expenditures that may be financed from the loan.

(g) Actual disbursement from the loan shall be authorized by JICA only for program expenditures found complying with the pre-agreed criteria, standards, requirements and procedures.

(h) A set of measurable performance indicators and targets/milestones for the above elements of the agenda as described in Chapter 8.

(2) Program Scope and Components

The REAPMP consists of three components: road asset upgrading/improvement, road asset preservation and institutional capacity development as summarized in Table 4.2.1. The technical assistance proposed in Pre-FS related to the formulation and detailed engineering of REAPMP Phase 2 and PPP by grant will not be included in the REAPMP (Yen Loan). The Survey Team therefore recommended DPWH to apply the Technical Assistance facility of JICA for grant study.

Table 4.2.1 Program Scope and Components of REAPMP

Components	Sub-components	Scope
Road Asset Upgrading / Improvement	UI	Upgrading/Improvement of national roads, four sub-projects, 128 km in total Upgrading/Improvement of national bridges, 22 bridges (810 m) in total Road safety facilities
Road Asset Preservation	LTPBM	LTPBM of national road, four sub-projects, 644 km in total Repair and maintenance of about 190 bridges (8,180 m) in total, including replacement of two bridges (129 m) Road safety facilities
	PM	PM for pre-fixed road links of three sub-programs, which were moved from the original LTPBM proposal, 93 km in total PM for the included priority programs for road links to be selected by PMS (HDM-4), which is approximately 500 km in total.
Institutional Capacity Development	Capacity Development	Overloaded vehicle control facilities (installation of eight new weigh bridges and refurbishment of four existing weigh bridges) and operation systems Emergency disaster relief capacity strengthening (equipment supply) for ten DEOs. Quality enhancement (eight satellite laboratories and their operation systems)
	IT and communication capacity	Supply of IT equipment Information Management planning
	Human resources development	Capacity development of RO and DEO staff in providing nondestructive equipment for 13 regions Capacity development of private sectors (contractors and consultants)
	ICD Program Implementation and reform monitoring assistance	Consultancy services Reform monitoring assistance
Technical Assistance	Technical Assistance	Not included in REAPMP Recommended to be proposed under different facility of GOJ (JICA Development Study)

4.2.2 COMPARISON OF PROJECT SCOPE WITH ICC-NEDA APPROVAL

The NEDA ICC approved the REAPMP proposed by the DPWH effective by the 30th August 2009. The investment plan of REAPMP has been incorporated into the Medium Term Investment Plan (MTIP). The DPWH Secretary has endorsed the MVUC Resolution to the Road Board for deliberation and approval of Php 2.7 billion representing the Road Fund Contribution.

However, as there are some major scope changes in the NEDA-approved REAPMP, re-endorsement of NEDA ICC will be required if it is within the validity period[1]. New proposal and approval is required if expired. Said changes generally include the following:

- JLM 5 Calbiga – Tacloban and JLM 9 Calbayog-Allen Road were deleted as these have been implemented under GOP funding.
- The LTPBM road links were reduced from eight to four.
- The UI road links were increased from two to four.

[1] At the SC meeting on 27th August 2009, it was informed that the approval of NEDA ICC on REAPMP was in February 2008 and it will expire at the end of August 2009.

- The PM length was increased from 481 km to 593 km.
- Changes in the scope of Institutional Capacity Development (ICD).

Table 4.2.2 shows a comparison of the project scope of REAPMP and NEDA-ICC approval by category of work and length.

Table 4.2.2 Comparison of Project Scope with NEDA-ICC Approval

Component	Project Code No.		Project Name	Pre-FS / ICC-NEDA				JICA Survey				Difference to Pre-FS / ICC NEDA			
	New	Old		Project Length (km)	UI (km)	RH (km)	PM (km)	RM (km)	Project Length (km)	UI (km)	RH (km)	PM (km)	RM (km)	Project Length (km)	UI (km)	RH (km)	PM (km)	RM (km)
I. Road Upgrading / Improvement (UI)																		
	UI-1	(JLM 6)	Bongabon - Rizal/ Pantabangan - Baler	119.0	57.3	14.5	84.2		51.3	2.6				-67.7	-54.7	-14.5	-84.2	
	UI-2	(JLM 10)	Lipa - Alaminos	43.0	19.8		23.2		16.7	7.5				-26.3	-12.3		-23.2	
	UI-3	(JLM 8)	Mindoro West Coast Road	119.3	119.3				153.4	71.0				34.1	-48.3			
	UI-4	(JLM 11)	Catanduanes Circumferential Road	58.1	58.1				64.2	47.4				6.1	-10.7			
Sub-Total				**339.4**	**254.5**	**14.5**	**107.4**	**0.0**	**285.7**	**128.4**	**0.0**	**0.0**	**0.0**	**-53.7**	**-126.1**	**-14.5**	**-107.4**	**0.0**
II. Asset Preservation Programs																		
II.1 Long Term Performance Based Maintenance (LTPBM)																		
	PBM-1	(JLM 3)	Aringay - Laoag	242.0		94.1	278.9	1,210.0	242.1		93.0	149.1	1,210.5	0.1		-1.1	-129.8	0.5
	PBM-2	(JLM 1)	Sta.Rita-Bdr.N.Ecija	160.0		37.3	228.5	800.0	169.3		62.6	106.7	846.5	9.3		25.3	-121.8	46.5
	PBM-3	(JLM 2)	Sipocot - Baao	100.0		1.6	129.2	500.0	109.5		41.6	67.9	547.5	9.5		40.0	-61.3	47.5
	PBM-4	(JLM 4)	Surigao (Lipata) - Bdr.Agusan D.N.	161.1		37.5	206.3	805.5	123.5		44.5	79.0	617.5	-37.6		7.0	-127.3	-188.0
Sub-Total				**663.1**	**0.0**	**170.5**	**842.9**	**3,315.5**	**644.4**	**0.0**	**241.7**	**402.7**	**3,222.0**	**-18.7**	**0.0**	**71.2**	**-440.2**	**-93.5**
- Other LTPBM excluded by GOP																		
	JLM 5		Calbiga - Tacloban	100.0		6.4	100.0	500.0	0.0					-100.0		-6.4		-500.0
	JLM 9		Calbayog - Allen Roa	71.8		71.8		287.2	0.0					-71.8		-71.8		-287.2
Sub-Total				**171.8**	**0.0**	**78.2**	**100.0**	**787.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**-171.8**	**0.0**	**-78.2**	**0.0**	**-787.2**
II.2 Preventive Maintenance (PM)																		
	Pre-Fixed Road Links (moved from LTPBM)								93.0			93.0		93.0			93.0	0.0
	HDM-4 selected Road links			481.0			481.0		500.0			500.0		19.0			19.0	0.0
Sub-Total				**481.0**	**0.0**	**0.0**	**481.0**	**0.0**	**593.0**	**0.0**	**0.0**	**593.0**	**0.0**	**112.0**	**0.0**	**0.0**	**112.0**	**0.0**
Total of Road Works				**1,655.3**	**254.5**	**263.2**	**1,531.3**	**4,102.7**	**1,523.1**	**128.4**	**241.7**	**995.7**	**3,222.0**	**-132.2**	**-126.1**	**-21.5**	**-435.6**	**-880.7**
- Road Safety								Road Safety (123km)		(included in UI and LTPBM)								

Notes:
UI: Upgrading / Improvement
RH: Rehabilitation
PM: Preventive Maintenance

4.3 ROAD UI COMPONENT

4.3.1 REVIEW OF SUB-PROJECTS IN THE PRE-FS

(1) Roads

Eight LTPBM sub-projects and two UI sub-projects (outside LTPBM) were proposed in the pre-FS. Of these, Calbiga-Tacloban road (JLM 5) and Calbayog-Allen Road in Samar and Leyte were withdrawn in February 2009 as these have been implemented already by the GOP (SONA projects).

The Survey Team has reviewed the remaining six LTPBM subprojects in accordance with the field surveys conducted and discussions with the Technical Working Group (TWG)/DPWH. The following were therefore recommended based on the review (refer to Table 4.3.1 for details).

JLM No.	Road Section Name	Project Component Change
JLM6 (UI-1)	PPH/Talavera-Rizal - Bongabon - Pantabangan - Baler	Transfer Bongabon - Pantabangan – Baler section to the UI component as this section includes upgrading of gravel road to portland cement concrete (PCC) pavement and many slope protection works. Transfer PPH/Talavera-Rizal（25.5 km）to PM Component as this section involves a simple overlay works.
JLM10 (UI-2)	Lipa - Alaminos - San Pablo - Tiaong	Transfer Lipa – Alaminos section to the UI Component as this section includes upgrading of gravel road to PCC pavement and works for a landslide section. Transfer Alaminos - San Pablo – Tiaong (Pan Philippine Highway) to PM component as this section involves a simple overlay works.
JLM4 (PBM-4)	Surigau (Lipata) - Davao	Surigao City and Davao City is approximately 400 km apart and belong to different regions. It is recommended to transfer Surigao (Lipata) – Bdr.Agusan – D.N. section (124 km) in Region XIII to LTPBM Component. Transfer Carmen-Davao City section (48 km) to PM Component as this section only requires overlay works.

As a result, the REAPMP includes four UI sub-projects and four LTPBM sub-projects. As summarized in the following table, the total length of UI was reduced from 177 km to 128 km while the total length of LTPBM was reduced from 825 km to 644 km.

Component	Original Proposal (Feb.2009)		After Review by JICA Survey Team (Aug.2009)			Difference (km)
	No. of Sub-project	Length (km)	No. of Sub-project	Length (km)	Pavement Length (km)	
UI	2	177	4	286	128	109
LTPBM	6	825	4	644	644	-181
PM*	0	0	3	93	93	93
Total	8	1,002	11	1,023	866	21

Table 4.3.1 Review of UI and LTPBM Components

Unit: km

No	JLM No.	Island	Original Proposal (Pre-FS)		Proposal for REAMPMP						Remarks
			Road Section	Road Length (km)	Road Section	From (Km)	From (Km)	Road Improvement (UI)		LTPBM (km)	Preventive Maintenance (PM)	
								Project Length (km)	New Pavement Length (km)			
PBM-1	JLM3	Luzon	Aringay-Laoag	242.0	Aringay-Laoag	481.130	723.130			242.1		Start point meets the end point of OPRC/ NRIMP2
UI-1	JLM6	Luzon	PPH/Talavera-Rizal - Bongabon - Pantabangan - Baler	119.0	PPH/Talavera-Rizal	125.553	151.100				25.5	Moved to Preventive Maintenance (PM) Program because of short length
					Bongabon - Rizal - Pantabangan - Baler			51.3	2.6			Not appropriate for LTPBM because of mountainous terrain
PBM-2	JLM1	Luzon	Sta. Rita- Nueva Ecija	160.0	Sta. Rita- Bdr. Nueva Ecija	38.732	208.000			169.3		Needs confirmation of the starting point (Km) at RO-III
UI-2	JLM10	Luzon	Lipa - Alaminos - San Pablo - Tiaong	43.0	Lipa - Alaminos	0.000	16.730	16.7	7.5			Not appropriate for LTPBM because of inclusive of mountainous terrain
					Alaminos - San Pablo - Tiaong	75.115	95.510				19.5	Moved to Preventive Maintenance (PM) Program because of short length
PBM-3	JLM2	Luzon	Sipocot- Baao	100.0	Sipocot- Baao	371.160	480.146			109.5		Sipocot - Baao is only 70 km while proposal was 100 km. Requirement is 109 km from provincial boundary to
PBM-4	JLM4	Mindanao	Surigau (Lipata) - Davao	161.0	Surigao (Lipata) - Bdr.Agusan D.N.	1113.500	1237.000			123.5		Original proposal has two sections; one in Region XIII and other in Davao City (Region XI). One contract is difficult.
					Carmen - Davao City (6-lane road)	1468.000	1516.000				48.0	Moved to Preventive Maintenance (PM) Program because of short length
Sub-Total				825.0				68.0	10.1	644.4	93.0	
UI-3	JLM8	Mindoro	Mindoro West Coast Road	119.0	Mindoro West Coast Road	217.360	445.400	153.4	71.0			Omitted the length of GOP program in 2008-2010
UI-4	JLM11	Catanduanes	Circumferential Road	58.0	Circumferential Road (Viga-Pandan)	50.700	114.735	64.2	47.4			Sections II and III of Circumferential Road
Sub-Total				177.0				217.6	118.4	0.0	0.0	
Total				1,002.0				285.6	128.4	644.4	93.0	

Summary of Comparison between Original Proposal and JICA Survey

Component	Original Proposal/ Pre-FS (km)	JICA Preparatory Survey (km)	Pavement Length	Difference (km)	Remarks
UI	177	286	128	109	Some road links are changed from LTPBM to UI.
LTPBM	825	644	644	-181	Some road links are changed from LTPBM to UI.
PM *	0	93	93	93	Some road links/sections are changed to UI and PM.
Total	1,002	1,023	866	21	

Note: * Changed from LTPBM to PM

(2) Bridges

In the Pre-FS, there is no description and quantitative and reliable data on the bridges in the UI component. Based on the road and bridge survey, road sections applied for UI are selected while

bridges along the same road section were determined as shown in Table 4.3.2. Said bridges are mainly considered for either PM or rehabilitation (RH). The RH of bridges in the UI component involves reconstruction and widening of bridges.

Table 4.3.2 Bridges Selected for UI

Road Section		DEO	Unit	Existing Bridges	Preventive Maintenance	Rehabilitation	
						Reconstruction	Widening
1	Bongabon - Baler	Aurora District Engineering Office / Nueava Ecija 2nd District Engineer Office	Number	10	0	2	4
			Length (m)	835	0	89	106
2	Lipa - Alaminos	Laguna Sub-District Engineering Office	Number	4	3	0	0
			Length (m)	256	208	0	0
3	Catanduanes Circumferential Road	Cadanduanes District Engineering Office	Number	10	4	3	0
			Length (m)	669	206	250	0
4	Mindoro West Coast Road	Mindoro District Engineering Office	Number	30	13	8	5
			Length (m)	2,739	1,802	228	137
Total			Number	54	20	13	9
			Length (m)	4,499	2,216	567	243

4.3.2 SELECTION CRITERIA AND PRIORITY

The following criteria were adopted in the JBIC /DPWH Pre-FS report.

LTPBM & UI	
Long listing of candidate roads	Short listing criteria
National Arterial Roads, particularly north-south backbone and east-west laterals, which carry a minimum AADT of 5,000.	Project preparedness (maximum of 65 points): status of ICC processing, detailed design, economic viability, environmental assessment, social impact.
Roads whose upgrading/rehabilitation was/is funded under previous/on-going OECF/ JBIC loans (including gaps or additional links)	Road network importance (maximum of 20 points): road category and strategic significance.
Roads that support MTPDP and SONA Priorities – such as those boosting tourism, completing the nautical highways and promoting investments	Economic and social development policy (maximum of 15 points): access to basic services, development of underdeveloped/depressed areas, improvement of law and order, support to agricultural modernization, support to traffic decongestion, support to industrial and tourism development.
Roads that complement the proposed NRIMP-II programs for similar works.	[U/I] only They had been partly improved under recent JBIC loans but have gaps which need to be further upgraded to complete the network. (These are Bongabon-Baler Road, Mindoro West Coast Road and Catanduanes Circumferential Road)
PM : Preventive Maintenance	a. Must be National Arterial Roads. b. Must have a minimum AADT of 1,000. c. Paved sections rated fair and poor based on IRI d. Minimum contract length of 10-15 km.

(Source: Pre-FS Report Chapter 4.2)

Criteria and procedures for disbursement of JBIC LOAN for eligible REAPMP components were

defined in the pre-FS report as follows:

a. The project selection complies with the agreed criteria, e.g., **HDM-4** for PM.

b. The design conforms to the prescribed standards, including **value engineering,** where applicable.

c. The procurement is done through competitive bidding with at least five submitted bids and complies with the guidelines on ABC as cap, eligibility, post-qualification and award.

d. The **work performance** conforms to the set quality and performance standards.

e. The expenditures are within the approved contract cost and budget.

f. Overall, the project passes the technical audit.

However, based on the actual site survey results, the Survey Team recommended transferring Bongabon-Baler and Lipa-Alaminos sections from LTPBM to UI, and PPH-Rizal and Alaminos-Tiaong sections to the PM category as in the following table.

JLM No	REAPMP No	Road Section	Length (km)	Length by Category（km）					
				UI	RH	BM	PM	RM	RS
LTPBM									
JLM1	PBM-2	CVR Sta. Rita (Bulacan) - Nueva Ecija	160	-	37	61	229	694	19
JLM2	PBM-3	Daang Maharlika (Sipocot - Baao）	100	-	2	49	129	469	12
JLM3	PBM-1	MNR - Aringay - La Union - Laoag City	242	-	94	73	279	1,079	34
JLM4	PBM-4	Surigao (Lipata) - Davao City	161	-	38	62	206	723	30
JLM6	UI-1	Jct. PPH-Bongabon - Pantabangan - Baler Rd - Aurora - N.E.	119	**57**	14	23	84	533	0
JLM10	UI-2	Lipa-Alaminos-San Pablo-Tiaong Road	43		**20**	12	23	215	0
Total			825	57	205	280	950	3,714	95
UI									
JLM8	UI-3	Mindoro West Coast Road	119	119	-	-	-	-	0
JLM11	UI-4	Catanduanes Circumferential Road	58	58	-	-	-	-	2
Total			177	177	0	0	0	0	2

The comparison between the proposed LTPBM and UI roads based on the criteria, and that of JICA study results are as follows.

Proposed Roads for LTPBM & UI						JICA Survey Results and Recommendations			
JLM	Section Name	MCA Rating	NPV/ CAP	Length (km)	Category	Section Name	Length (km)	Category	Remarks
1	St.Rita-NuevaEcja	75	225	160	LTPBM	St.Rita-NuevaEcja	169	LTPBM	
2	Sipocot-Baao	75	117	100	LTPBM	Sipocot-Baao	109	LTPBM	
3	Aringay-Laoag	75	97	242	LTPBM	Aringay-Laoag	242	LTPBM	
4	Surigao-Davao	90	44	161	LTPBM	Surigao – Bdr,Agusan D.N	124	LTPBM	
5	Calbiga-Tacloban	85	30	100	LTPBM	Deleted			Implemented by GOP
6	PPH-Bongabon-Baler	82	14	119	LTPBM	PPH-Rizal	26	PM	
						Bongabon – Rizal-Baler	3	UI	Sections I and III, Excluding Rizal Bypass and Aurora Bypass and paved length. Project length 51 km
8	Mindoro West Coast Road	78	5	119	UI	West Mindoro Coast Road	71	UI	Sections II, III, IV and V Project Length: 153 km
7	Northern Samar	100	41	72	LTPBM	Deleted			Implemented by GOP
10	Lipa-Alaminos-Tiaong	86	271	43	LTPBM	Lipa-Alaminos	7	UI	Project Length 17 km
						Alaminos-Tiaong	20	PM	
11	Catanduanes Circumferential Road	78	6	58	UI	Catanduanes Circumferential Road	47	UI	Section II&III, Project length 64 km

4.3.3 DESIGN STANDARDS

On the execution of UI for the existing roads, some road widening will be required depending on the site and road conditions. The traffic volume is one of the most important factors for the determining the road width.

The total traffic volume (without Motorcycle) of UI sections are summarized as follows:

Table 4.3.3 Estimated Traffic Volume of UI Sections

Year	Mindoro West Coast Road	Catanduanes Circumferential Road	Rizal-M.Aurora Road	Lipa-Alaminos Road
2008	424	709	928	766
2014	556	925	1,126	1,055
2019	723	1,075	1,367	1,318
2024	900	1,226	1,666	1,603
2029	1,087	1,392	1,956	1,937
2033	1,312	1,544	2,308	2,254

Source: RTIA/DPWH

DPWH design standard criteria are shown in the following Tables:

Table 4.3.4 Design Standard of DPWH

ADT	<200	200-400	400-1000		1000-2000		More than 2000	
Opening			Min.	Desirable	Min.	Desirable	Min.	Desirable
Design speed (km/h)								
Flat topography	60	70	70	90	80	95	90	100
Rolling	40	50	60	80	60	80	70	90
Mountainous	30	40	40	50	50	60	60	70
Radius (m)								
Flat topography	120	160	160	280	220	220	260	350
Rolling	55	65	120	220	120	220	160	280
Mountainous	30	50	50	60	80	120	150	160
Grade (%)								
Flat topography	6	6	5	3	4	3	4	3
Rolling	8	7	6	5	5	5	5	4
Mountainous	10	9	8	6	7	6	7	5
Pavement width(m)	4	5.5-6	6.1		6.7		6.7	7.5
Shoulder width	0.5	1.0	1.5	2.0	2.5	3.0	3.0	
Right of way width	20	30	30		30		60	
Super-elevation	0.10(m/ m) (max)		0.10(m/ m) (max)		0.10(m/ m) (max)		0.01(m/ m) (max)	
Non-passing sight distance (m)								
Flat topography	70	90	90	135	115	150	135	160
Rolling	40	60	70	115	70	115	90	135
Mountainous	40	40	40	60	60	70	70	90
Passing sight distance (m)								
Flat topography	420	490	490	615	560	645	615	675
Rolling	270	350	420	560	420	560	490	615
Mountainous	190	270	270	350	360	420	420	490
Type of surface	Gravel, Surface treatment, Macadam		Macadam, Asphalt concrete,		Asphalt concrete,		Asphalt concrete,, Portland Concrete	

Source: Design Standard Vol 2 Table 3.2 (p736)
Note: This Table is improved in Road Safety Design Manual Table 16.1

The required width and actual width based on above standard are as follows:

Year	Mindoro West Coast Road	Catanduanes Circular Road	Rizal-M.Aurora Road	Lipa-Alaminos Road
According to Design Standard	6.1-6.7m	5.5-6.0m	6.7m	6.1-6.7m
Paved Area Actual Width in 2009	6.1-8.0m	6.1-7.0m	6.1m	6.1m
Unpaved Area Actual width in 2009	5.3-7.6m	4.0-10m	5.1-7.8m	5.0-5.5m
Road side Conditions	Widening has no problems in suburban area. But houses are proximity to road at Town/Urban area.		No houses along road between Pantapangan and Aurora	Some houses exist at the entrance of Lipa side.

According to above information, DPWH adopted PCC pavement of 6.1 m width for the above UI sections based on their estimated traffic volume.

After the studies conducted for REAPMP by the Survey Team, the recommended road section width for the proposed roads should be as follows:

Normal Sections:

Right-of-way (ROW) will be acquired at most sections without resettlement concerns, as shown in Figure 4.3.1.

Town proper area:

The Survey Team studied alternative typical sections (Figure 4.3.2) applicable for town proper areas along the UI roads. On the traffic level and town sizes, the Survey Team recommended 12.1 m road width with a carriageway width of 6.1 m and 1.0 m side strips. This 12.1 m total ROW is also better than the 14.1 m ROW as it will reduce resettlements.

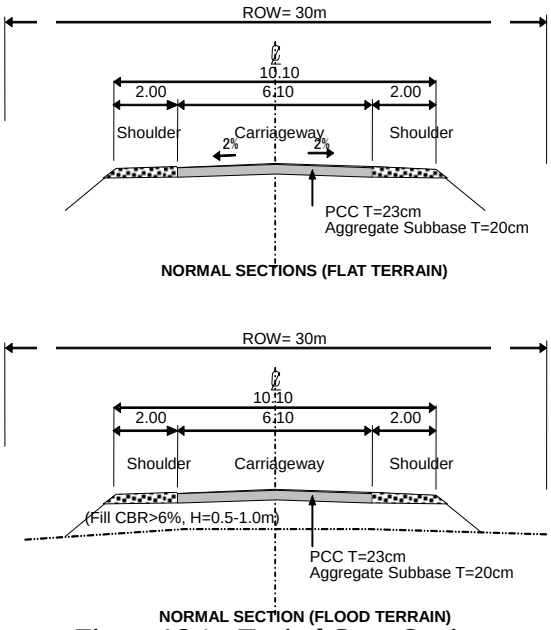


Figure 4.3.1 Typical Cross Sections

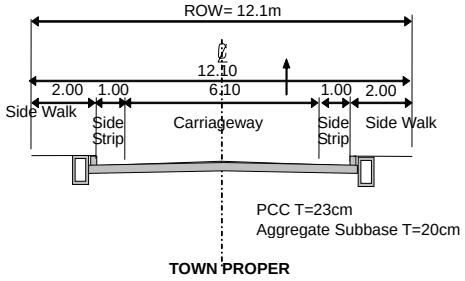


Figure 4.3.2 Typical Cross Sections

The number of houses required to be resettled are summarized below:

ROW	Mindoro West Coast Road		Catanduanes Circumferential Road				Rizal-M. Aurora Road	Lipa-Malarayat Golf Course
	Sabalayan Town Proper	Calintaan Town Proper	Viga	Panganiban	Bagamanoc	Pandan		
14.1m	22	19	1	12	5	20	0	8
12.0m	6	7	1	3	4	8	0	3
10.1m	1	3	1	1	1	2	0	0
9.1m	0	0	1	1	0	2	0	0

For the calculation of the land acquisition costs, the necessary acquisition widths are tentatively approximated in the Study, as follows:

	Town Area	Flat Area	Rolling Area	Mountainous Area
Width at both sides	4.0 m	8.0 m	12.0 m	15.0 m

4.3.4 ROAD SAFETY MEASURES

The major works in UI sections are paving of existing gravel roads with PCC which have fixed alignment and widening to appropriate width. Road safety should be considered at the time of detailed engineering design or design review stage on the alignment and safety facilities.

Both start/end intersections at Lipa−Alaminos road should be improved by acquiring necessary lands, because the current traffic volume along Laurel highway (Lipa side) and PPH (Alaminos side) are high.

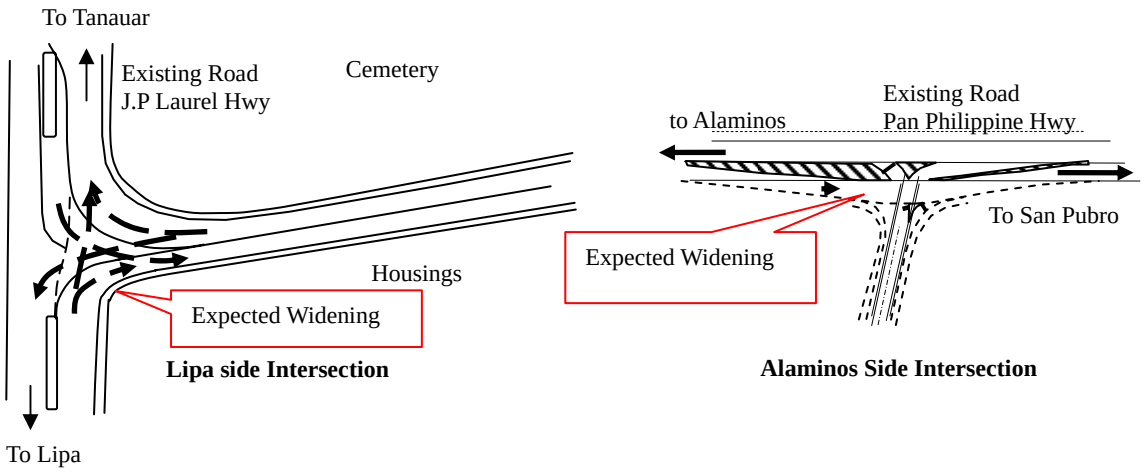


Figure 4.3.3 Intersections for Lipa – Alaminos Access

Road safety components in UI sections are as follows:

	Rizal-Baler	Mindoro West Coast	Lipa-Alaminos	Catanduanes
Bypass	2	-	-	-
Intersection improvement	-	-	Lipa & Alaminos	-
Slope Protection	o	-	o	o
Centerline	o	o	o	o
Side edge line	o	o	o	o
Guard railing	o	o	o	o
Delineator	o	o	o	o
Hump	-	-	o	-
Noise Line	o	o	-	o
Chevrons	o	o	-	o
Road Lighting	-	-	-	-

4.3.5 CONTRACT PACKAGING

The project should be implemented through appropriate contract packages to be determined, taking into consideration the size of contracts (amount and quantity), characteristics of the section, technical difficulty, construction period, funding source, and type of competitive bidding.

The JICA Survey Team recommended the implementation of the UI project in nine packages, as detailed in Section 7.5.1 in Chapter 7. Adjustment of contract sizes should be made appropriate for the contract packages of UI-3 (Mindoro West Coast Road) and UI-4 (Catanduanes Circumferential Road), during the detailed design stage to provide a balanced size.

4.3.6 COST ESTIMATES

(1) Unit Prices

1) Roads

Establishment of Unit Prices of Major Pay Items (Part C to Part H)

Average unit prices were derived from the unit prices adopted in 11 large projects, which include two construction supervision final reports, one variation order, four DPWH-approved contract budget and four bid documents. Details of these documents are shown in the following table:

Table 4.3.5 Reference Documents/Data used for Establishment for Unit Prices

No	Title	Date
1	Final Report of Mindoro West Coast Road Improvement Project Package VI p4-26~35	Sep.2005
2	Final Report of Mindoro West Coast Road Improvement Project Package IV p4-52~8-12	Nov.2005
3	Approved Budget for the Contract of Pantabangan-MaAurora (Canili-Bazal)	Jun 2007
4	Variation Order Report of Catanduanes Package 1	Nov 2007
5	Bid Documents of project in Agusan Del Norte / Agusan Del Sur (Butuan~Bayugan	May 2008
6	Bid Documents of El Nido-Batanza Road Package 2A Segement 1-10, Palawan Province	Jun 2008
7	Approved Budget for the Contract of Agusan Del Sur / Surigao Del Sur (Prosperidad~Lianga)	May 2008
8	Approved Budget for the Contract of Bongabon-Baler Road Package2 (Pantabangan-Canili)	Jun 2008
9	Approved Budget for the Contract for Nasugbu-Ternate Road, Ternate, Cavite	Jun 2008
10	Bid Documents of Bacold (Silay) Airport Access Road Project	Aug 2008
11	Bid Documents of Pandan~Antique/Aklan Boundary Road Project	Aug 2008

Unit prices from the above projects were converted to Jun 2009 prices using escalation adjustment factors, computed based on the historical Consumer Price Indices issued by National Statistical Coordination Board (NSCB).

The factors used to convert the base unit prices for the above 11 projects are shown in the following table.

Table 4.3.6 Adjustment Factors for Unit Price Escalation

Year	CPI	Adjustment Factor (CPI of 2009Jun / CPI as of the Project)	Applicable Project
2000	100	1.598	
2002		1.453	Mindoro West Coast
2003		1.404	Catanduanes
2007 Jun	141.3	1.131	Canili-Bazal
2008 May	153.8	1.039	Agusan
2008 Jun	157.4	1.015	Palawan/Lianga/Panta-Canili /Tamate-Cavitr
2008 Aug	160.4	0.996	Bacold/AntiqueAklan
2009 Jun	159.8	1.000	

The average unit prices were calculated as the *trimmed mean*, derived by excluding a percentage of data points from the top and bottom tails of a data set. This was performed using the statistical routine functions of Microsoft Excel, referred to as "**TRIMMEAN (Array, Percent).**" Said function returns the mean of the interior portion of a set of data values, where:

Array is the array or range of values to trim and average.
Percent is the fractional number of data points to exclude from the calculation.

For example, if **Percent** =20%, four points are trimmed from a data set of 20 points (20x20), two from the top and two from the bottom of the set

The average unit prices for UI projects under the Study are calculated by equating the formula parameter Percent to 30%, in view of the significant variability of the data. The resulting unit prices for typical pay items are summarized in the following table.

Table 4.3.7 Average Unit Prices of Major Pay Items (Pesos)

PAY ITEM		Unit	Unit Price
PART C	EARTHWORK		
Item 100	Clearing and Grubbing		
100 (1)	Clearing and Grubbing	Hectare	136,000
100 (3)	Individual Removal of Trees, Small	Each	680
100 (4)	Individual removal of Trees, Large	Each	2,300
101 (1)	Removal of Existing Structures and Obstructions	Cu. Meter	2,720
101 (2)	Removal of Existing PCCP	Sq.M.	530
101 (3)	Removal of Existing Asphalt Concrete Pavement (ACP)	Sq.M.	420
101 (4)	Removal of Existing RC Pipe Culvert D300~760	Li. Meter	1,020
101 (5)	Removal of Existing Arc Culvert	Li. Meter	1,020
102 (1)	Unsuitable Excavation	Cu. Meter	360
102 (2)	Surplus Common Excavation	Cu. Meter	370
102 (3)	Surplus Rock Excavation	Cu. Meter	1,290
102 (4)	Surplus Unclassified Excavation(Ditch)	Cu. Meter	220
103 (1)	Structure Excavation	Cu. Meter	470
103 (3)	Foundation Fill/ Sand Bedding	Cu. Meter	870
103 (6)	Pipe culverts and drain excavation	Cu. Meter	340
Item 104	Embankment		
104 (1)	Embankment from Roadway Excavation	Cu. Meter	500
104 (2)	Embankment from Borrow	Cu. Meter	620
Item 105	Subgrade Preparation	Sq.M.	50
PART D	SUBBASE AND BASE COURSE		
Item 200	Aggregate Subbase Course	Cu. Meter	1,080
PART E	SURFACE COURSES		
Item 311(1)	Portland Cement Concrete Pavement(t=230mm)	Sq. M.	1,960
Item 311(2)	Portland Cement Concrete Pavement(t=150mm)	Sq.M.	1,510
SPL312	Sealing Cracks & Joints in Exiting PCCP	Li. Meter	490
PART F	STRUCTURES		
Item 400			
404	Reinforcing Steel (Cut, Bend, Place)	Kgs.	110
405(1)	Structural Concrete A (Box Culvert)	Cu. Meter	10,210
405(2)	Structural Concrete B (Minor Structure)	Cu. Meter	10,540
405(3)	Lean Concrete	Cu. Meter	5,900
PART G	DRAINAGE AND SLOPE PROTECTION STRUCTURES		
Item 500	Pipe Culverts and Storm Drains		
500(1)	R.C. Pipe Culverts, 0.61m dia.	Li. Meter	4,230
500(2)	R.C. Pipe Culverts, 0.76m dia.	Li. Meter	5,340
500(3)	R.C. Pipe Culverts, 0.91m dia.	Li. Meter	7,200
500(4)	R.C. Pipe Culverts, 1.07m dia.	Li. Meter	9,790
500(5)	R.C. Pipe Culverts, 1.22m dia.	Li. Meter	11,880
500(6)	R.C. Pipe Culverts, 1.52m dia.	Li. Meter	14,060
Item 502	Manholes, Inlets and Catch Basins		
502(1a)	Catch Basin for 910mm RCPC	Each	53,100
502(1b)	Catch Basin for 1070mm RCPC	Each	71,500
502(1c)	Catch Basin for 1220mm RCPC	Each	115,000
502(2a)	Headwall for 1-0.91m dia. RCPC, S-Type	Each	48,400
502(2b)	Headwall for 2-0.91m dia. RCPC, S-Type	Each	80,700

PAY ITEM		Unit	Unit Price
502(2c)	Headwall for 1-0.91m dia. RCPC, L-Type	Each	29,500
502(2d)	Headwall for 1-0.91m dia. RCPC, D-Type	Each	37,200
Item 504	Cleaning and Reconditioning Existing Drainage Structures		
504(1)	Removing Clearing Stockpiling Salvaged Culvert Pipe	Li. Meter	2,800
504(2)	Removing Clearing Relaing Salvaged Culvert Pipe	Li. Meter	1,180
504(3)	Clearing Pipe Culvert in Site	Li. Meter	410
504(4)	Clearing Box Culvert in Site	Li. Meter	500
Item 505	Riprap and Grouted Riprap		
505(5)	Grouted riprap, Class A	Cu. Meter	4,260
505(6)	Riprap (Cut Slope Protection)	Cu. Meter	3,400
505(9)	Filter Layer of Granular Materials	Cu. Meter	1,120
505(10a)	Grouted Riprap Lined Canal, Type-A	Li. Meter	2,750
505(10b)	Grouted Riprap Lined Canal, Type-B	Li. Meter	2,220
505(10c)	Grouted Riprap Lined Canal, Type-C	Li. Meter	2,710
505(10d)	Grouted Riprap Lined Canal, Type-D	Li. Meter	2,450
Item 506	Stone Masonry	Cu. Meter	4,970
Item 507	Rubble Concrete Slope Protection (t=.3m)	Cu. Meter	5,840
Item 508	Hand-Laid Rock Embankment	Cu. Meter	2,620
Item 511	Gabions and Mattresses		
511(1)	Gabions (2.0x1.0x1.0)	Cu. Meter	4,380
511(2)	Mattress (2.0mx1.0mx0.30m)	Cu. Meter	5,000
SPL 512	Dump Rock/Armour Rock	Cu. Meter	2,120
SPL513	CHB lined canal without cover	Li. Meter	8,280
SPL514	CHB lined canal with cover	Li. Meter	10,150
SPL515	Concrete Lined Ditch	Li. Meter	14,560
SPL 516	Filter Fabric (non wooven)	Sq.M.	500
SPL517	Seed Mud Spray	Sq.M.	420
SPL519	Shotcrete	Sq.M.	14,820
PART H	MISCELLANEOUS STRUCTURES		
Item 600	Curb and Gutter	Li. Meter	1,360
Item 601	Concrete Sidewalk,100mm thick	Sq.M.	890
Item 602	Monuments, Markers and Guide Posts		
602(1)	Right-of-Way Monument	Each	2,190
602(2)	Kilometer Post	Each	4,190
Item 603	Metal Beam Guardrail	Li. Meter	3,840
Item 605	Road Sign		
605(1)	Warning Sign, Type A	Each	12,590
605(2)	Reguratory Sign, Type-A	Each	9,520
605(3)	Reguratory Sign, Type -B	Each	17,410
605(4)	Informatory Sign, Type-C	Each	21,840
605(5)	Informatory Sign, Type-D	Each	18,900
Item 610	Sodding	Sq.M.	370
Item 611	Tree Planting (Furnishing and Transplanting)	Each	440
Item 612	Reflective Thermoplastic Stripping Material (Solid Form)	Sq.M.	2,220
SPL613	Project Signboard	L..S.	24,600

Note: Unit prices are inclusive of Mark-up and VAT

Estimation of Indirect Cost and Other Pay Items (Part A, B, K)

Parts A, B and K are calculated as a percentage of the direct cost which includes Part C to Part H. The following percentages are established by project size based on the past projects executed:

PART A: Facilities for the Engineer	1-3 % of Direct Cost
PART B: Other General Requirements (including mobilization cost)	2-4 % of Direct Cost
PART K: Daywork / Provisional Sum	1 % of Direct Cost

Table 4.3.8 Cost Component of 11 Projects used in the Unit Price Derivation (Php 1,000)

Project Document	1	2	3	4	5	6	7	8	9	10	11	Trimmed Average
Date	5-Sep	5-Nov	7-Jun	7-Jul	8-May	8-Jun	8-Jun	8-Jun	8-Jun	Aug 08	8-Aug	
Part A Facilities for Engineer	15,375 1.80%	15,375 1.70%	4,331 2.40%	22,294 1.80%	110,299 6.40%	47,867 2.60%	17,211 4.90%	32,854 1.90%	28,540 4.80%	39,946 2.60%	3,802 0.80%	2.50%
Part B Other Requirements (Including Mobilization/	23,915 2.80%	7,087 0.80%	2,051 1.10%	19,000 1.50%	35,968 2.10%	18,000 1.00%	3,791 1.10%	15,212 0.90%	51,144 8.60%	26,880 1.70%	8,500 1.90%	1.50%
Part C Earthwork	144,339 16.80%	123,984 13.70%	27,651 15.30%	520,754 41.90%	165,024 9.50%	298,135 16.30%	18,272 5.30%	235,880 13.40%	0.00%	284,548 18.20%	58,231 13.00%	14.00%
Part D Sub-base	69,480 8.10%	67,382 7.50%	14,493 8.00%	41,745 3.40%	132,003 7.60%	366,353 20.00%	33,582 9.70%	155,028 8.80%	0.00%	165,112 10.60%	108,590 24.20%	8.60%
Part E Surface Course	231,520 27.00%	218,066 24.20%	67,604 37.50%	232,316 18.70%	513,510 29.60%	800,655 43.70%	204,214 58.70%	466,660 26.50%	229,405 38.60%	190,698 12.20%	187,080 41.70%	32.10%
Part F Bridge	185,518 21.60%	194,098 21.50%	18,920 10.50%	174,622 14.00%	534,386 30.80%	116,693 6.40%		588,737 33.40%	32,024 5.40%	693,946 44.50%	0.00%	17.50%
Tunnel									222,785 37.50%			37.50%
Part G Drainage & Slope Protection	161,811 18.90%	227,837 25.20%	31,781 17.60%	178,083 14.30%	157,766 9.10%	109,833 6.00%	51,465 14.80%	163,536 9.30%		48,612 3.10%	72,003 16.10%	13.50%
Part H Miscellaneous Structures	24,071 2.80%	23,264 2.60%	10,683 5.90%	29,947 2.40%	52,825 3.00%	41,470 2.30%	18,887 5.40%	54,395 3.10%	13,367 2.20%	92,548 5.90%	80 0.00%	3.10%
Part K Provisional Sum/Day- Work	1,196 0.10%	17,750 2.00%	3,000 1.70%	25,000 2.00%	33,000 1.90%	0.00%	500 0.10%	72,000 4.10%	16,917 2.80%	18,450 1.20%	10,000 2.20%	1.60%
Grand Total	857,228 100.00%	902,819 100.00%	180,516 100.00%	1,243,793 100.00%	1,734,786 100.00%	1,831,019 100.00%	347,925 100.00%	1,764,269 100.00%	594,185 100.00%	1,560,744 100.00%	448,288 100.00%	100.00%

Note: These costs include contractor's mark-up and VAT.

2) Bridges

The unit prices applied for cost estimation of reconstructed and widened bridges were derived considering the following four available reference estimate documents:

1. Priority Highway Projects (SONA), Contract Package 2A: El Nido-Taytay-Roxas Road Section, Palawan (2008)
2. Priority Highway Projects (SONA), Contract Package VII: Butuan City-Las Nieves-Esperanza-Bayugan Road (2008)
3. New Bacolod (Silay) Airport Access Road Project (2009)
4. Updated Implementation Program for Bongabon-Baler Road Improvement Project under the REAPMP (May, 2009)

Each applied unit price value was computed based on data availability for each item:

a) If only one reference unit cost for an item is available, the lone data is considered.

b) If two reference unit costs for an item are available, the maximum value is used

c) If three or four reference unit costs are available, the following formulated equation was adopted:

Applied value = [2 X Average + (Lowest value + Highest value)/2]/3

Table 4.3.9 Establishment of Unit Prices for Bridge Works (Reconstruction/Widening)

Item No.	Description	Unit	Unit Cost				
			Reference 1	Reference 2	Reference 3	Reference 4	Applied Value
ESCALATION FACTOR			1.02	1.04	1	1	
101(1)	Removal of superstructure	LS					
103(2)a	Bridge Excavation (Above Ordinary Water Level)	m^3	366	692	911	390	606
103(2)b	Bridge Excavation (Below Ordinary Water Level)	m^3		864	1,304	771	999
103(5)a	Shoring, cribbing and other related works	LS/pier				875,918	875,918
SPL-1	Riverbed trimming and excavation	m^2				76	76
400(5)a	Precast concrete piles (400mmX400mm, furnished)	m	9,136	9,464		4,235	7,358
400(5)b	Precast concrete piles (450mmX450mm, furnished)	m		11,648			11,648
400(14)	Precast concrete piles, driven	m	2,935	5,096		1,397	3,177
400(15)a	Precast concrete test piles (400mmX400mm, furnished & driven)	m	8,218	8,513		2,253	6,013
400(15)b	Precast concrete test piles (450mmX450mm, furnished & driven)	m		10,478			10,478
400(16)a	Concrete piles cast in drilled holes, 1.00Ø	m				22,389	22,389
400(16)b	Concrete piles cast in drilled holes, 1.20Ø	m				25,731	25,731
401	Concrete railing	m	7,210	7,903	7,560	4,166	6,485
402(2)	Composite detour span	span				171,281	171,281
404(1)	Reinforcing steel (cut, bend and place), Grade 40	kg	120	115	118	70	102
404(2)	Reinforcing steel (cut, bend and place), Grade 60	kg	125	117	118	72	105
405(1)a	Structural concrete class A (bridge substructures)	m^3	11,447	9,489	7,641	11,370	9,839
405(1)b	Structural concrete class A (bridge superstructure)	m^3	11,447	9,489	7,641	15,168	11,092
405(1)c	Structural concrete class A for cut-off wall, box. cul	m^3				10,990	10,990
405(7)	Lean concrete	m^3	8,409	6,603	5,382	4,449	6,283
406(1)f	Precast concrete girder, AASHTO Type IV-B, 29.6 m	ea			4,088,932	741,176	4,088,932
SPL-412	Ultrasonic Testing (Cross hole loggin)	ea		728,000	800,000	53,836	493,825
SPL-413	High strain dynamic testing (PDA)	ea		1,310,400	1,000,000	163,894	795,559
SPL-2	Modificfation of existing abutment	LS/abut					
SPL-3	Repair and installation of existing girder	LS/gir					
504(5)	Grouted Riprap, Class A	m^3	3,918	5,040	3,408	2,891	3,865
504(9)	Filter layer of granular materials	m^3				604	604
505	Stone Masonry	m^3	4,368	5,178	3,879		4,492
509 (1a)	Gabions (2 x 1.0 x 1.0)	m^3	4,538	3,067			4,538
509 (1b)	Gabions (2 x 1.0 x 0.5)	m^3	4,538	3,067			4,538
509 (1b)	Mattress (2.0 x 1.0 x 0.3)	m^3				2,155	2,155
SPL-4	Rubble concrete (t=0.3 m)	m^3				4,526	4,526

References:
1 Prioroity Highway Projects (SONA), Contract Package 2A: El Nido-Taytay-Roxas Road Sectioin, Palawan (2008)
2 Prioroity Highway Projects (SONA), Contract Package VII: Butuan City-Las Nieves-Esperanza-Bayugan Road (2008)
3 New Bacolod (Silay) Airport Access Road Project (2008)
4 Updated Implementation Program for Bongabon-Balere Road Improvement Project under the REAPMP (May, 2009)
5 For SPL 412 and 413 in Reference 3, combined cost of testing is provided (P1,800,000). Value is distributed for each type of test based on approximate proportion deived from Reference 1.
6 Computation of applied value:
- If three or four refenece unit costs are available use general formula: (2XAverage+[(Low+High)/2])/3
- If only one or two reference unit costs are availabe, use the maximum value

The unit prices for cost estimation of bridges subject to repairs were based on available information related to similar works executed in the Philippines through the DPWH and Repair Manual provided under the JICA Technical Cooperation Project (TCP).

(2) Major Quantities

1) Roads

The major quantities were derived using a three-stage adjustment process. The process utilized available detailed design reports and visual inspection of road conditions. Three road projects have available detailed design report and drawings for reference, namely:

1. Catanduanes Circumferential Road Package II, III and IV (Nippon Koei, 2002)

   (Note: Construction of Package I, Condon-Virac-Viga Section was completed in November 2007)

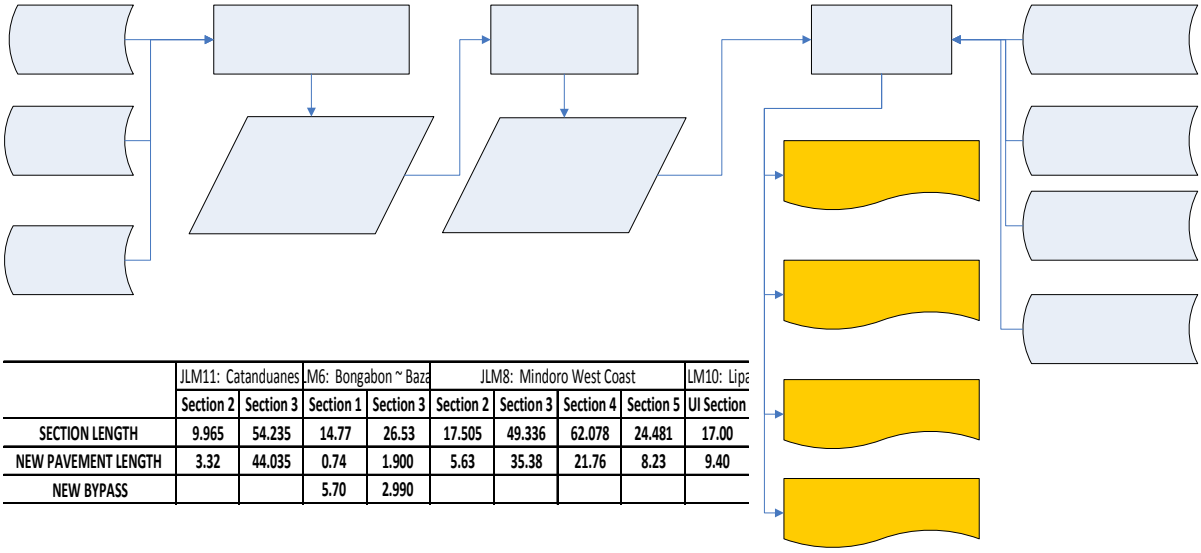
2. Mindoro West Coast Road Package I and IV (Nippon Koei, 2001)

   (Note: Construction of Package I was competed. 40.32 km of Package IV was completed and the remaining 21.76 km will be constructed under REAPMP. However, no detailed design exists for this remaining section)

3. Bongabon-Baler Road Packages I and III (NEC, 2002)

Process for Estimation of Quantities:

First step: The quantities in the detailed design reports were distributed proportionally to the road project packages based on the remaining length required for improvement/upgrading. This was adopted in the Catanduanes Circumferential Road, Mindoro West Coast Road and Bonagbon-Baler Road. For road sections with no detailed design reports, the result of the visual inspection, with data collected at every kilometer interval, was used as the basis for quantity estimation. The process is summarized in Figure 4.3.4.



	JLM11: Catanduanes		LM6: Bongabon ~ Baza		JLM8: Mindoro West Coast				LM10: Lipa
	Section 2	Section 3	Section 1	Section 3	Section 2	Section 3	Section 4	Section 5	UI Section
SECTION LENGTH	9.965	54.235	14.77	26.53	17.505	49.336	62.078	24.481	17.00
NEW PAVEMENT LENGTH	3.32	44.035	0.74	1.900	5.63	35.38	21.76	8.23	9.40
NEW BYPASS			5.70	2.990					

Figure 4.3.4 Quantity Estimation Procedures for UI Projects

Second step: The resulting provisional quantities were adjusted by reviewing the quantities against the detailed design drawings. For Example, some items in Bongabon-Baler Road were added as per request of PMO-FS, based on the implementation program prepared by Nippon Engineering Consultants on May 2009. These include slope protection, drainage and miscellaneous which were mostly not executed during the pavement works performed by DPWH. The details are described in Annex 4-3-06.

Third step, the quantities were further adjusted based on the result of the visual inspection of road condition. In the case of Bongabon-Baler Road, a bypass was proposed for Packages II and III. However, since said bypass was not in the original scope of REAPMP and has no FS, these were not included.

Table 4.3.10 Estimated Quantities for UI Projects

PAY ITEMS		UNIT	COST SUMMARY - UI PROJECTS								
			JLM11: Catanduanes		M6: Bongabon ~ Baz		JLM8: Mindoro West Coast				JLM10: Lipa
			Section 2	Section 3	Section 1	Section 3	Section 2	Section 3	Section 4	Section 5	UI Section
Item 100	**Clearing and Grubbing**										
100 (1)	Clearing and Grubbing	Hectare	3	24	7	1	12	50	52	18	10
100 (3)	Individual Removal of Trees, Small	Each	0	900	7	9	120	750	460	180	140
100 (4)	Individual removal of Trees, Large	Each	0	50	2	5	7	40	25	10	7
101 (1)	Removal of Existing Structures and Obstructions	Cu. Meter	600	800	600	500	200	1,000	500	300	0
101 (2)	Removal of Existing PCCP	Sq.M.	900	4,600	3,210	300	0	9,950	810	0	90
101 (3)	Removal of Existing Asphalt Concrete Pavement (ACP)	Sq.M.	0	0	0	0	2,200	13,500	8,300	3,200	1,000
101 (4)	Removal of Existing RC Pipe Culvert D300~760	Li. Meter	30	360	60	50	60	360	218	82	13
101 (5)	Removal of Existing Arc Culvert	Li. Meter	20	1,800	0	0	0	0	0	0	0
102 (1)	Unsuitable Excavation	Cu. Meter	700	2,100	2,400	0	2,300	14,400	8,900	3,400	1,000
102 (2)	Surplus Common Excavation	Cu. Meter	3,767	252,033	22,000	1,300	0	44,900	116,400	0	800
102 (3)	Surplus Rock Excavation	Cu. Meter	0	27,800	2,200	130	400	2,400	1,500	600	500
103 (1)	Structure Excavation	Cu. Meter	1,100	7,800	1,872	0	1,200	7,100	4,400	1,700	1,300
103 (3)	Foundation Fill/ Sand Bedding	Cu. Meter	140	830	24	5,348	50	320	200	80	60
103 (6)	Pipe culverts and drain excavation	Cu. Meter	2,200	8,600	1,980	2,556	2,900	18,100	11,100	4,200	3,000
Item 104	**Embankment**										
104 (1)	Embankment from Roadway Excavation	Cu. Meter	8,800	48,750	1,849	3,600	2,940	26,916	69,780	3,048	17,000
104 (2)	Embankment from Borrow	Cu. Meter	0	34,550	0	6,200	16,206	124,464	27,720	29,922	25,000
Item 105	**Subgrade Preparation**	Sq.M.	1,100	2,400	4,662	11,970	72,650	273,960	302,700	105,340	3,100
PART D	**SUBBASE AND BASE COURSE**										
Item 200	Aggregate Subbase Course	Cu. Meter	5,300	79,800	1,354	3,477	17,510	90,080	75,500	26,420	9,500
PART E	**SURFACE COURSES**										
Item 311(1)	Portland Cement Concrete Pavement(t=230mm)	Sq. M.	20,100	226,000	4,514	11,590	37,990	247,210	166,630	60,940	46,000
Item 311(2)	Portland Cement Concrete Pavement(t=150mm)	Sq.M.	667	8,300	740	1,900	0	0	0	0	800
SPL312	Sealing Cracks & Joints in Exiting PCCP	Li. Meter	100	500	100	100	100	300	200	100	200
PART F	**STRUCTURES**										
Item 400a	**Bridges for Reconstruction/Widening**										
SPL-6	Bridges for Preventive Maintenance	LS									
Item 400b	**Road Structures**										
Item 404	Reinforcing Steel (Cut, Bend, Place)	Kgs.	26,580	128,390	62,882	7,815	0	10,150	0	0	60,000
405(1)	Structural Concrete A (Box Culvert)	Cu. Meter	320	1,470	164	5	0	7,250	0	0	450
405(2)	Structural Concrete B (Minor Structure)	Cu. Meter	20	330	0	0	0	0	0	0	0
405(3)	Lean Concrete	Cu. Meter	40	190	24	28	40	230	140	60	40
PART G	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**										
Item 500	**Pipe Culverts and Storm Drains**										
500(1)	R.C. Pipe Culverts, 0.61m dia.	Li. Meter	80	260	337	126	0	0	0	0	0
500(2)	R.C. Pipe Culverts, 0.76m dia.	Li. Meter	50	190	0	0	30	180	110	50	40
500(3)	R.C. Pipe Culverts, 0.91m dia.	Li. Meter	70	230	467	740	190	1,160	710	270	200
500(4)	R.C. Pipe Culverts, 1.07m dia.	Li. Meter	20	730	0	0	50	280	180	70	50
500(5)	R.C. Pipe Culverts, 1.22m dia.	Li. Meter	20	310	0	0	30	150	100	40	30
500(6)	R.C. Pipe Culverts, 1.52m dia.	Li. Meter	0	0	0	0	10	10	10	10	0
Item 502	**Manholes, Inlets and Catch Basins**										
502(1a)	Catch Basin for 910mm RCPC	Each	0	2	0	0	6	35	22	9	7
502(1b)	Catch Basin for 1070mm RCPC	Each	0	1	0	0	3	4	5	3	4
502(1c)	Catch Basin for 1220mm RCPC	Each	0	0	0	0	1	4	3	1	2
502(2a)	Headwall for 1-0.91m dia. RCPC, S-Type	Each	0	0	25	75	3	3	5	3	4
502(2b)	Headwall for 2-0.91m dia. RCPC, S-Type	Each	0	0	4	-0	30	150	90	40	30
502(2c)	Headwall for 1-0.91m dia. RCPC, L-Type	Each	0	0	3	15	0	0	0	0	0
502(2d)	Headwall for 1-0.91m dia. RCPC, D-Type	Each	0	0	2	8	10	50	30	20	10
Item 504	**Cleaning and Reconditioning Existing Drainage Structures**										
504(1)	Removing Clearing Stockpiling Salvaged Culvert Pipe	Li. Meter	90	960	1,600	150	160	1,000	610	230	0
504(2)	Removing Clearing Relaing Salvaged Culvert Pipe	Li. Meter	4	81	10	10	20	100	40	30	0
504(3)	Clearing Pipe Culvert in Site	Li. Meter	4	30	150	60	50	260	160	60	0
504(4)	Clearing Box Culvert in Site	Li. Meter	0	110	20	10	10	10	10	10	0
Item 505	**Riprap and Grouted Riprap**										
505(5)	Grouted riprap, Class A	Cu. Meter	234	28,573	265	1,939	0	9,875	880	590	200
505(6)	Riprap (Cut Slope Protection)	Cu. Meter	68	8,415	600	0	280	860	530	200	300
505(10a)	Grouted Riprap Lined Canal, Type-A	Li. Meter	0	0	470	1,240	0	0	0	0	1,700
505(10b)	Grouted Riprap Lined Canal, Type-B	Li. Meter	430	2,320	980	1,480	0	0	0	0	1,700
505(10c)	Grouted Riprap Lined Canal, Type-C	Li. Meter	0	0	0	7,250	430	2,670	1,640	620	400
505(10d)	Grouted Riprap Lined Canal, Type-D	Li. Meter	123	2,320	0	140	1,815	11,400	7,015	2,655	4,000
Item 506	Stone Masonry	Cu. Meter	213	7,647	1,250	17,340	100	590	360	140	100
Item 507	Rubble Concrete Slope Protection (t=.3m)	Cu. Meter			21,990	5,170					
Item 508	Hand-Laid Rock Embankment	Cu. Meter	0	2,200	0	0	0	0	0	0	0
Item 511	**Gabions and Mattresses**										
511(1)	Gabions (2.0x1.0x1.0)	Cu. Meter	10	580	0	0	0	0	0	0	0
511(2)	Mattress (2.0mx1.0mx0.30m)	Cu. Meter	60	600	0	0	20	80	50	20	20
SPL 512	Dump Rock/Armour Rock	Cu. Meter	40	1,287	0	0	0	0	0	0	0
SPL513	CHB lined canal without cover	Li. Meter	0	4,177	0	0	0	0	0	0	0
SPL514	CHB lined canal with cover	Li. Meter	628	1,060	0	0	0	0	0	0	0
SPL515	Concrete Lined Ditch	Li. Meter	133	6,137	0	0	0	0	0	0	0
SPL519	Shotcrete	Sq.M.	0	1,600	1,000	1,000	0	0	300	0	200
PART H	**MISCELLANEOUS STRUCTURES**										
Item 600	Curb and Gutter	Li. Meter	50	90	30	60	140	860	530	200	150
600(3)	Combination Concrete Curb and Gutter	Li. Meter	550	2,100	0	0	210	2,680	6,160	2,750	0
Item 601	Concrete Sidewalk,100mm thick	Sq.M.	550	2,200	0	0	420	5,350	12,320	5,500	0
Item 602	**Monuments, Markers and Guide Posts**										
602(1)	Right-of-Way Monument	Each	80	434	277	1,402	45	283	174	66	134
602(2)	Kilometer Post	Each	4	38	-2	15	6	36	22	9	17
Item 603	Metal Beam Guardrail	Li. Meter	710	2,290	1,229	6,970	260	1,600	990	380	2,000
Item 605	**Road Sign**										
605(1)	Warning Sign, Type A	Each	4	30	11	9	5	28	18	7	5
605(2)	Reguratory Sign, Type-A	Each	13	2	0	33	2	10	6	3	4
605(3)	Reguratory Sign, Type -B	Each	16	0	0	43	0	0	0	0	0
605(4)	Informatory Sign, Type-C	Each	1	2	2	2	4	4	4	4	4
605(5)	Informatory Sign, Type-D	Each	2	0	4	5	0	0	0	0	0
Item 610	Sodding	Sq.M.	2,435	19,850	700	1,800	17,100	107,410	66,060	24,990	20,000
Item 611	Tree Planting (Furnishing and Transplanting)	Each	900	0	996	2,403	600	3,500	2,200	900	600
Item 612	Reflective Thermoplastic Stripping Material (Solid Form	Sq.M.	820	8,940	369	976	1,380	8,640	5,310	2,010	3,400
	Noise marking	Sq.M.	76	31	0	0	0	0	0	0	61
SPL613	Project Signboard	L..S.	1	1	1	1	1	1	1	1	1

2) Bridges

Major quantities of bridges were derived from the existing drawings of the Catanduanes and Bongabon-Baler projects. The bridge quantities of West Mindoro were adjusted proportionally by bridge length based on a similar type of bridge in Phase 1 project drawings.

For bridges proposed for either reconstruction or widening, the major quantities were identified under the DPWH specification:

- Excavation
- Piles
- Reinforcing steel
- Structural Concrete

Meanwhile, for bridges subject to preventive maintenance/repairs, quantities were determined for the following bridge components:

- Deck slab (patching)
- Concrete superstructure (patching)
- Steel superstructure (painting)
- Substructure (patching)
- Bridge Accessories (seamless joint, bearing pads and railings)
- Protection works (slope protection and gabion mattress for scouring)

(3) Construction Cost

Using the quantities and unit Prices in the foregoing sections, the construction cost of the UI projects were estimated at Php 4,440 million as shown in the following summary table (refer to Annex 8 for details).

Table 4.3.11 Estimated Construction Costs for UI Projects

Unit : Php

ITEM / DESCRIPTION		UI 4/JLM11: Catanduanes				UI 1/JLM6: Bongabon ~ Bazal (without bypasses)				UI 3/JLM8: Mindoro West Coast								UI 2/JLM10: Lipa		Total	
		Section 2		Section 3		Section 1		Section 3		Section 2		Section 3		Section 4		Section 5		UI Section		UI Section	
CONTRACT ROAD LENGTH (km)		9.97 km		54.24 km		27.26 km		24.08 km		17.51 km		49.34 km		62.08 km		24.48 km		16.73 km		285.67 km	
NEW PAVEMENT LENGTH (Km)		3.32 km		44.04 km		0.74 km		1.90 km		5.63 km		35.38 km		21.76 km		8.23 km		7.46 km		128.46 km	
PART A	FACILITIES FOR THE ENGINEER	3,448,000	2.3%	12,768,000	1.0%	4,636,000	2.8%	6,840,000	2.3%	4,538,000	2.8%	15,787,000	1.4%	10,082,000	1.4%	7,104,000	2.3%	4,909,000	2.3%	70,112,000	1.6%
PART B	OTHER GENERAL REQUIREMENTS	5,517,000	3.7%	31,920,000	2.4%	6,182,000	3.7%	9,576,000	3.3%	6,051,000	3.7%	31,574,000	2.8%	20,164,000	2.8%	10,087,000	3.3%	7,855,000	3.7%	128,926,000	2.9%
PART C	EARTHWORK	8,896,000	6.0%	182,627,000	13.7%	17,364,000	10.4%	13,037,000	4.5%	20,671,000	12.7%	154,401,000	13.9%	126,620,000	17.9%	33,537,000	11.0%	27,854,000	13.2%	585,007,000	13.2%
PART D	SUBBASE AND BASE COURSE	5,459,000	3.7%	82,194,000	6.2%	1,395,000	0.8%	3,581,000	1.2%	18,035,000	11.0%	92,782,000	8.4%	77,765,000	11.0%	27,213,000	8.9%	9,785,000	4.6%	318,209,000	7.2%
PART E	SURFACE COURSES	40,105,000	27.1%	451,758,000	33.9%	9,808,000	5.9%	25,127,000	8.6%	74,118,000	45.4%	482,171,000	43.4%	325,003,000	45.8%	118,870,000	39.1%	90,822,000	43.0%	1,617,782,000	36.4%
PART F(B)	STRUCTURES (Bridges)	56,269,000	38.0%	116,932,000	8.8%	0	0.0%	72,067,000	24.6%	13,929,000	8.5%	67,227,000	6.1%	37,540,000	5.3%	63,315,000	20.8%	3,276,000	1.6%	430,555,000	9.7%
PART F(R)	STRUCTURES (Roads)	6,488,000	4.4%	32,923,000	2.5%	8,663,000	5.2%	1,065,000	0.4%	224,000	0.1%	73,530,000	6.6%	785,000	0.1%	337,000	0.1%	11,239,000	5.3%	135,254,000	3.0%
PART G	DRAINAGE AND SLOPE PROTECTION	13,666,000	9.2%	372,713,000	27.9%	110,661,000	66.3%	125,959,000	43.0%	13,389,000	8.2%	112,290,000	10.1%	53,200,000	7.5%	20,637,000	6.8%	30,849,000	14.6%	853,364,000	19.2%
PART H	MISCELLANEOUS STRUCTURES	7,035,000	4.7%	37,639,000	2.8%	6,649,000	4.0%	32,752,000	11.2%	10,914,000	6.7%	70,065,000	6.3%	51,207,000	7.2%	20,241,000	6.7%	22,553,000	10.7%	259,055,000	5.8%
PART K	DAYWORK/PROVISIONAL SUM	1,379,000	0.9%	12,768,000	1.0%	1,545,000	0.9%	2,736,000	0.9%	1,513,000	0.9%	10,525,000	0.9%	6,721,000	0.9%	2,841,000	0.9%	1,964,000	0.9%	41,992,000	0.9%
Total		148,262,000	100.0%	1,334,242,000	100.0%	166,903,000	100.0%	292,740,000	100.0%	163,382,000	100.0%	1,110,352,000	100.0%	709,087,000	100.0%	304,182,000	100.0%	211,106,000	100.0%	4,440,256,000	100.0%
Unit COST (Php/km)		44,657,000		30,300,000		225,545,000		154,074,000		29,020,000		31,384,000		32,587,000		36,960,000		28,298,000		34,567,000	
Grand Total				1,482,504,000	33.4%			459,643,000	10.4%							2,287,003,000	51.5%	211,106,000	4.8%	4,440,256,000	100.0%
Notes:																					
(1)	Bridge Replacement, widening and Repair (Part F(B))	56,269,000	38.0%	116,932,000	8.8%	0	0.0%	72,067,000	24.6%	13,929,000	8.5%	67,227,000	6.1%	37,540,000	5.3%	63,315,000	20.8%	3,276,000	1.6%	430,555,000	9.7%
(2)	Total Cost without Bridge Replacement, widening and Repair	91,993,000	62.0%	1,217,310,000	91.2%	166,903,000	100.0%	220,673,000	75.4%	149,453,000	91.5%	1,043,125,000	93.9%	671,547,000	94.7%	240,867,000	79.2%	207,830,000	98.4%	4,009,701,000	90.3%
(3)	Unit Price for Road Improvement Only (Php/km)	27,708,735		27,644,147		225,544,595		116,143,684		26,545,826		29,483,465		30,861,535		29,266,950		27,859,249		31,214,830	
(4)	Bridge Length (m):																				
	Replacement	140.0	(1 No.)	110.0	(2 No.)	0.0	(No.)	88.6	(2 No.)	8.0	(1 No.)	92.0	(4 No.)	66.0	(2 No.)	62.0	(1 No.)	0	(No.)	566.6	(13 No.)
	Widening (1 lane to 2 lanes)	0.0	(No.)	0.0	(No.)	0.0	(No.)	105.5	(4 No.)	0.0	(No.)	63.2	(2 No.)	10.0	(1 No.)	64.0	(2 No.)	0	(No.)	242.7	(9 No.)

The summarized construction costs and list of UI bridges for each sub-project are presented in Table 4.3.12. Detailed cost estimates are presented in Annex 8.

Table 4.3.12 Construction Cost of UI Bridges

No.	Road Section	Sub-project	No. of Bridges	Cost per Package (PhP)
UI-1	Bongabon-Baler	Package III	6	72,067,000
UI-2	Lipa-Alaminos	Package I	3	3,276,000
UI-3	Mindoro West Coast Road	Package II	2	13,929,000
		Package III	9	67,227,000
		Package IV	6	37,540,000
		Package V	9	63,315,000
UI-4	Catanduanes Circumferential Road	Package II	4	56,269,000
		Package III	3	116,932,000
TOTAL			43	430,555,000

Table 4.3.13 List of UI Bridges and Corresponding Improvement/Repair Methods

NO.	ROAD SECTION	SECTION	BRIDGE NAME	STATION	BRIDGE LENGTH (m)	CONSTRUCTION COST (PhP)	TOTAL COST PER SECTION (PhP)	REHABILITATION METHOD	COST OF PER METER (PhP)
UI-1	Bongabon-Baler	Section 3	Dimutol Bridge	202 + 570.00	24	12,479,000	72,067,000	Widening	520,000
			Dimasalan Bridge	209 + 650.00	14	5,254,000		Widening	375,000
			Dianawan Bridge	211 + 450.00	48	17,783,000		Reconstruction	370,000
			Dimanlat Bridge	215 + 880.00	48	7,218,000		Widening	150,000
			Binuangan Bridge	217 + 920.00	19.5	8,501,000		Widening	436,000
			Diome Bridge	220 + 350.00	40.6	20,832,000		New construction	513,000
UI-2	Lipa-Alaminos	Section 1	Lumbang 1 Bridge	+	44	1,577,000	3,276,000	Preventive Maintenance	36,000
			Lumbang 2 Bridge	+	112	914,000		Preventive Maintenance	8,000
			Sukol Bridge	+	52	785,000		Preventive Maintenance	15,000
UI-3	West Mindoro Coast Road	Section 2	Mangat Bridge	257 + 512.00	8	3,361,000	13,929,000.00	Reconstruction	420,000
			Lamintao	263 + 005.00	352	10,568,000		Preventive Maintenance	30,000
		Section 3	Anahawin Bridge	273 + 815.00	45.2	12,324,000	67,227,000	Widening	273,000
			Nagapi Bridge	278 + 536.00	120	1,115,000		Preventive Maintenance	9,000
			Busuangan Bridge	287 + 684.00	122	5,036,000		Preventive Maintenance	41,000
			Burgos Bridge	290 + 215.00	30	13,054,000		Reconstruction	435,000
			Pasugui Bridge	296 + 670.00	46	1,099,000		Preventive Maintenance	24,000
			Tagunla Bridge	308 + 756.00	24	10,878,000		Reconstruction	453,000
			Idarag Bridge	314 + 570.00	14	7,252,000		Reconstruction	518,000
			Busaran Bridge	319 + 046.00	24	10,878,000		Reconstruction	453,000
			Panayupan Bridge	319 + 695.00	18	5,591,000		Widening	311,000
UI-3	West Mindoro Coast Road	Section 4	Sablayan Bridge	320 + 485.00	10	3,437,000	37,540,000	Widening	344,000
			Tulaong Bridge	324 + 527.00	20	7,252,000		Reconstruction	363,000
			Alipid Bridge	326 + 338.00	46	18,524,000		Reconstruction	403,000
			Patrick Bridge	343 + 909.00	228	3,364,000		Preventive Maintenance	15,000
			Amnay Bridge	355 + 003.00	409	2,131,000		Preventive Maintenance	5,000
			Baclaran Bridge	363 + 826.00	82	2,832,000		Preventive Maintenance	35,000
		Section 5	Puntabanga Bridge	386 + 723.00	24	6,951,000	63,315,000	Widening	290,000
			Ramayan Buboy Bridge	387 + 335.00	40	10,966,000		Widening	274,000
			Pagbahan Bridge	389 + 815.00	165	2,674,000		Preventive Maintenance	16,000
			Maculbo Bridge	397 + 835.00	18	978,000		Preventive Maintenance	54,000
			Sugsugin Bridge	398 + 397.00	56	1,140,000		Preventive Maintenance	20,000
			Mingpin Bridge	400 + 922.00	46	1,702,000		Preventive Maintenance	37,000
			Taberna Bridge	402 + 658.00	62	33,028,000		Reconstruction	533,000
			Boribor Bridge	404 + 008.00	38	276,000		Preventive Maintenance	7,000
			Mamburao Bridge	408 + 576.00	120	5,600,000		Preventive Maintenance	47,000
UI-4	Catanduanes Circumferential Road	Section II	Pilot	0049 + 102.00	35.4	3,216,000	56,269,000	Preventive Maintenance	91,000
			Quiambag (Viga) Bridge	0051 + 173.00	90	2,821,000		Preventive Maintenance	31,000
			Banquerohan Bridge	0053 + 513.60	140	46,330,000		Reconstruction	331,000
			Kanparel	0057 + 172.30	47.48	3,902,000		Preventive Maintenance	82,000
		Section III	Paday Bridge	0065 + 158.50	32.75	975,000	116,932,000	Preventive Maintenance	30,000
			Bugao Bridge	0077 + 193.20	30	16,398,000		Reconstruction	547,000
			Minaili Bridge	0083 + 036.40	80	99,559,000		Reconstruction	1,244,000
		Total				430,555,000			

Note: The Survey Team identified no major widening/reconstruction is required for bridges in Section 1 of UI-1.

(4) Maintenance Cost Estimate

The RM cost of the UI roads and bridges after completion (taking over) was estimated based on Equivalent Maintenance Kilometer (EMK) formula adopted by DPWH for economic analysis. The base cost for RM was derived as follows:

- EMK at Year 2002: Php 70,798/km
- Inflation Factor (Inflation Index from 2006 to June 2009): 1.45
- Base Cost for Routine Maintenance at June 2009: Php 70,798 x 1.45 = Php 102,700/k

The estimated RM cost per year is computed in the following table.

Table 4.3.14 RM Cost Estimate for UI Projects

Project No.	Project Name	Base Cost (Php/km-year)	Road Length (km)	Pavement Type	Paved Width Factor	AADT&Surafce Factor		Bridge			EMK	Maintenance Cost (Mill Php/year)
						AADT	Factor	Length (m)	Type	Bridge Factor		
UI-1	Bongabon - Rizal/ Pantabangan - Baler	102,700	2.6	PCC	1.00	1,000	0.85	324.1 -	Concrete Steel	0.010	0.86	233,170
UI-2	Lipa - Alaminos	102,700	7.5	PCC	1.00	600	0.80	256.0 -	Concrete Steel	0.010	0.81	620,575
UI-3	Mindoro West Coast Road	102,700	71.0	PCC	1.00	600	0.80	2,663.2 76.0	Concrete Steel	0.011	0.81	5,913,569
UI-4	Catanduanes Circumferential	102,700	47.4	PCC	1.00	600	0.80	668.5 -	Concrete Steel	0.010	0.81	3,939,320

(5) Consultancy Service Costs

The consultancy service for the UI project was estimated at Php 613.6 million, including:

- Detailed engineering design (design review for UI-1 and UI-4) and tender documents preparation. The exiting detailed design for UI-4 should be reviewed to meet the project budget, minimizing required realignments.
- Procurement assistance to civil works contractor
- Construction supervision and project management.

Project No.	Project Name	Project Length (km)	Pavement (UI) Length (km)	Construction Cost (Mill Php)	Central Team (DD + CS) (Mill Php)	Field Supervision Teams (CS) (Mill Php)	Total	
							(Mill Php)	(%)
UI-1	Bongabon - Rizal/ Pantabangan -	51.34	2.64	459.6	29.1 47.7%	31.9 52.3%	61.0 100.0%	11.0%
UI-2	Lipa - Alaminos	16.73	7.46	211.1	13.4 52.4%	12.1 47.6%	25.5 100.0%	4.6%
UI-3	Mindoro West Coast Road	153.40	71.00	2,287.0	144.6 52.5%	130.8 47.5%	275.5 100.0%	49.9%
UI-4	Catanduanes Circumferential Road	64.20	47.36	1,482.5	93.8 49.2%	96.8 50.8%	190.5 100.0%	34.5%
Total		285.67	128.46	4,440.3	280.8 6.3%	271.6 6.1%	552.5 12.4%	100.0%

(6) Other Costs, including Tax, ROW Acquisition and Administration

1) ROW/Land Acquisition and Related Activities.

The cost of ROW acquisition normally covers costs for the (a) land to be acquired for the project, (b) demolition and replacement of affected household/residential structures, (c) compensation to affected households/families, and (d) relocation and resettlement of affected informal settlers.

Based on the scope of works envisioned for the proposed road improvement projects, an aggregate total area of about 131 hectares of land needs to be acquired as shown in the following table.

Table 4.3.15 Required Land Acquisition for UI Projects

Unit: sq.m

Road Project	Package	Town Area	Flat Area	Rolling Area	Mountainous Area	Total
	(ROW Width)	4 m	8 m	12 m	15 m	
Catanduanes Circumferential Road	Package II	6,600		17,640		
	Package III	9,440		157,968	460,740	652,388
Mindoro West Coast Road	Package II	0	45,040			
	Package III	4,160	274,720			
	Package IV	7,720	158,640			
	Package V	16,160	33,520			539,960
Bongabon - Baler	Package I			15,600		
	Package III			22,800		38,400
Lipa-Alaminos	Road				77,700	
	Intersection 2	600				
	Intersection 2	600				78,900
Total		45,280	511,920	214,008	538,440	1,309,648 (131 ha)

Presently, the lands to be acquired are valued depending on the land use type and location of the area, as classified by the Bureau of Internal Revenue (BIR). BIR classifies the affected areas into the following types:

CODE	CLASSIFICATION	CODE	CLASSIFICATION
RR	*Residential Regular*	*GL*	*Government Land*
CR	*Commercial Regular*	*GP**	*General Purposes*
RC	*Residential Condominium*	*I*	*Industrial*
CC	*Commercial Condominium*	*X*	*Institutional*
CL	*Cemetery Lot*	*APD*	*Area for Priority Development*
A	*Agricultural*	*PS*	*Parking Slot*

The agricultural classification is further subdivided into 25 other sub-categories, ranging from A1 to A25. The prevailing average estimated unit prices of the land affected is shown in Table 4.3.16.

Table 4.3.16 Estimated Land Unit Prices

Unit: sq.m

Road Project	Package	Town Area	Flat Area	Rolling Area	Mountainous Area	Total
	(ROW Width)	4 m	8 m	12 m	15 m	
Catanduanes Circumferential Road	Package II	6,600		17,640		
	Package III	9,440		157,968	460,740	652,388
Mindoro West Coast Road	Package II	0	45,040			
	Package III	4,160	274,720			
	Package IV	7,720	158,640			
	Package V	16,160	33,520			539,960
Bongabon - Baler	Package I			15,600		
	Rizal Bypass				52,815	
	Package III			22,800		
	Aurola				31,395	122,610
Lipa-Alaminos	Road				77,700	
	Inter Section	600				
	Inter Section	600				78,900
Total		45,280	511,920	214,008	622,650	1,393,858
Note:						(139 ha)

On the basis of the foregoing unit prices and affected areas, the total cost of land acquisition valued at the prevailing BIR zonal prices is estimated to be about Php 35 million. The breakdown of this total cost is shown in Table 4.3.17.

Table 4.3.17 Estimated Cost of ROW Acquisition

Unit: Php

Road Project	Package	Town Area	Flat Area	Rolling Area	Mountainous Area	Total
Catanduanes Circumferential Road	Package II	726,000		103,194		829,194
	Package III	1,274,400		434,412	2,487,996	4,196,808
West Mindoro Coast Road	Package II	0	135,120			135,120
	Package III	1,456,000	824,160			2,280,160
	Package IV	3,620,680	475,920			4,096,600
	Package V	8,484,000	134,080			8,618,080
Bongabon - Baler	Package I			74,880		74,880
	Package III			273,600		273,600
Lipa-Alaminos	Road				13,306,125	13,306,125
	Intersection 2	300,000				300,000
	Intersection 2	300,000				300,000
Other (Road Station, etc)						646,433
Total		16,161,080	1,569,280	886,086	15,794,121	35,057,000

Based on the results of the ocular surveys that were carried out during the conduct of the Study, there are about 32 household structures affected by the acquisition of the required land area and the implementation of the proposed improvement projects. Estimated figures are shown in Table 4.3.18.

Table 4.3.18 Estimated Number, Size and Condition of Houses/Structures Affected

Project	Number of households to be relocated	Less than 50 sq.m.	50 - 100 sq.m.	More than 100 sq.m.
Lipa City - Alaminos Road	3	1(P)	1(G)	1(F)
Catanduanes Circumferential Road	16	1(G), 1(P)	5(F), 5(G)	2(F) 2(G)
Mindoro West Coast Road	13	1(G)	8(G)	3(F), 1(G)

Note : P:Poor, F:Fair, G:Good

Table 4.3.19 Approximate Typical Value of Houses Affected (Php)

Type of Structure	Size of Structure		
	Less than 50 sq.m.	50 - 100 sq.m.	More than 100 sq.m.
Concrete (Good)	357,594	520,701	1,650,000
Semi-concrete(Fair)	149,849	416,561	1,320,000
Temporary (Poor)	61,302	208,280	660,000

The resulting estimated total value of the structures is about Php 24 million, as shown in Table 4.3.20.

Table 4.3.20 Approximated Cost of Compensation for Affected Houses/Structures (Pesos)

Project	Number of households relaocated	Less than 50 sq.m.	50 -100 sq.m.	More than 100 sq.m.	Total
Lipa City - Alaminos Road	3	61,302	520,701	1,320,000	1,902,003
Catanduanes Circumferential Road	16	418,896	4,686,309	5,940,000	11,045,205
Mindoro West Coast Road	13	357,594	4,165,608	5,610,000	10,133,202
				Grand Total:	23,081,000

As there are no informal settlers at the land area needed to be acquired for the project, no related expenses are foreseen for such compensation.

2) Administration Cost and VAT

This covers expenses related to the operation and maintenance of an office facility that is expected to be built for overseeing the day-to-day project activities. Said expenses shall be incurred solely in local currency. The cost of project administration is estimated at 2.5% of the estimated total project cost. Value Added Tax (VAT) of 12% is also considered.

4.3.7 ECONOMIC EVALUATION AND MULTI-CRITERIA ANALYSIS OF UI PROJECTS

(1) Roads for Evaluation of UI Projects

The UI Projects subject to economic evaluation are the following four roads:

Project ID	Road/ Section	Project Length (km)	AADT (2008)
UI-1	Bongabon-Rizal-Pantabangan-Baler	2.6	2,077
UI-2	Lipa-Alaminos	7.5	766
UI-3	Mindoro West Coast Road	71.0	1,125
UI-4	Catanduanes Circumferential Road (Viga-Pandan section)	47.4	709(*)

Note: (*): 2006 AADT

(2) Benefits Estimated in REAPMP

The benefits estimated quantitatively in the evaluation are:

- Savings in Vehicle Operating Cost (VOC), and
- Savings in Passenger Travel Time Cost (TTC)

The benefit of traffic accident reduction was not included due to unavailability of necessary data. The Basic VOC data (BVOC) updated to 2008/09 prices were provided by DPWH, which combined the time cost of passengers with VOC (=Running cost + Fixed Cost + Time cost).

(3) Methodology for Economic Evaluation

The methodology and procedures for the economic evaluation for UI projects (except for the Lipa-Alaminos Road) are illustrated in Figure 4.3.5 For the Lipa-Alaminos Road (UI-2), a different methodology is necessary because the road is closed at present and there is no expected traffic for around 15 years due to the landslide that occurred in 1995. Furthermore, for the Bongabon-Rizal-Baler Road (UI-1), additional benefit due to the drainage and slope protection works was also estimated.

The JBIC Pre-FS applied HDM-4 Model in its economic evaluation. However, due to the complexity in calibrating all parameters in HDM-4 Model to reflect local conditions within a given timeframe, an alternative approach was adopted in this Survey as explained below:

1) Collection of Necessary Data

For the benefit estimation, the following data/ information were collected mainly from DPWH and from the results of the JBIC Pre-FS.

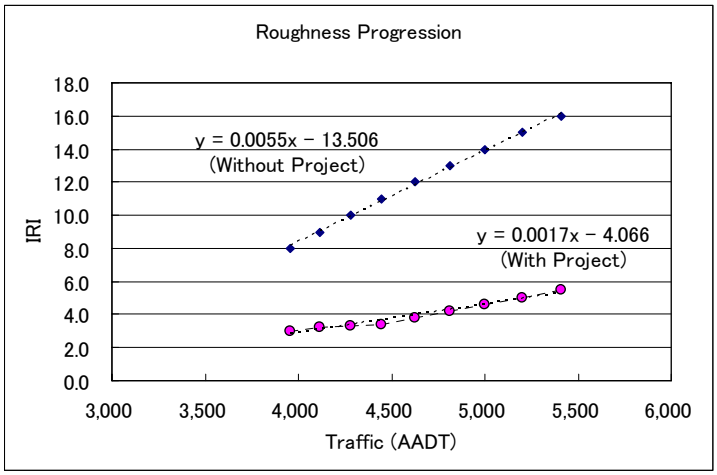
- Traffic volume (AADT) by vehicle type (12 types) and future growth rates
- Unit VOC (as Road User Cost (RUC) including passenger time cost: Php/km)
- Road surface type (asphalt, concrete, gravel) and condition (good, fair, poor, and bad)
- Roughness Progression calculated in the JBIC Pre-FS for both “With” and “Without” project situations.

Based on the above data, the economic benefits were estimated using the following steps (The methodology applied to the Lipa-Alaminos Road is separately presented in the latter part of this section)

Step 1: Analysis on Roughness Progression

The JBIC Pre-FS presented the results of roughness progression with AADT for each road section, which were downloaded from the results of HDM-runs. Considering these results,

regression analyses were conducted to relate the roughness (IRI) with AADT. One of examples of the regression analysis is shown below.



Step 2: Forecast of IRI by applying future traffic volume

The future roughness progression was estimated by inputting the future traffic volume to the equations derived from the above regression analysis.

Step 3: Estimation of Relationship between IRI and Unit VOC (including time cost) by surface type (paved and gravel)

Since the benefits due to the implementation of the REAPMP projects will be generated mainly from the roughness improvement (from "Bad" to "Good" condition, for example), it is necessary to examine the relationship between IRI and VOC. The road condition and values of IRI relations are given by PMS as below:

Roughness Category	IRI in PMS		
	Asphalt	Concrete	Gravel
Good	2.5	3.5	5.0
Fair	4.0	5.0	7.5
Poor	6.0	7.0	10.0
Bad	8.0	9.0	14.0

At the same time, values of VOC by road condition are presented as follows:

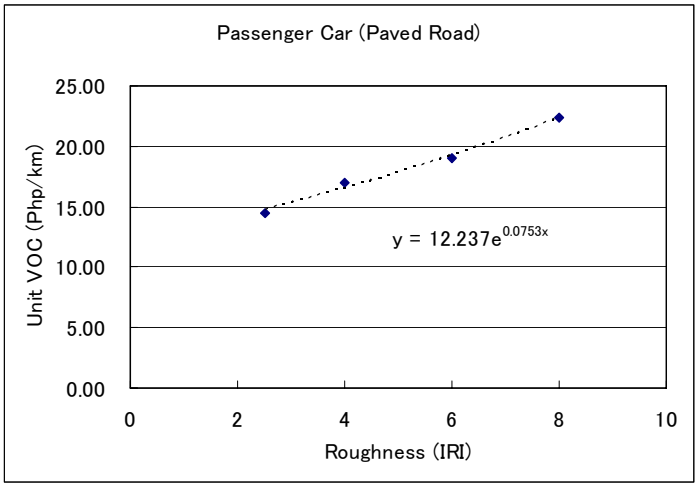
Pavement Type & Condition	Vehicle Operating Cost (VOC=R+F+T), 2005 Prices, Php/km									
	Car	Ratio	Jeepney	Ratio	Buses	Ratio	Trucks	Ratio	Motorcycle	Ratio
Paved Good	9.639	1.00	8.873	1.00	16.902	1.00	13.814	1.00	1.812	1.00
Paved Fair	11.294	1.17	10.419	1.17	19.868	1.18	16.189	1.17	2.143	1.18
Paved Poor	12.649	1.31	11.938	1.35	23.027	1.36	18.170	1.32	2.891	1.60
Paved Bad	14.811	1.54	15.034	1.69	30.008	1.78	21.426	1.55	3.816	2.11
Gravel Good	12.146	1.26	10.788	1.22	20.165	1.19	17.351	1.26	2.267	1.25
Gravel Fair	15.003	1.56	13.241	1.49	24.665	1.46	21.421	1.55	2.821	1.56
Gravel Poor	16.446	1.71	14.958	1.69	28.318	1.68	23.544	1.70	3.335	1.84
Gravel Bad	18.438	1.91	17.537	1.98	33.957	2.01	26.505	1.92	4.270	2.36

Original Source: DPWH. Ratios were calculated by JICA Survey Team.

The values of VOC in 2008/09 price by pavement type/condition were obtained by applying the

above ratios per vehicle type to the VOC values of paved "Good" condition in 2008 prices (as values of VOC in 2008/09 price are available only for "Paved Good Condition" at present).

Given the values of IRI by surface condition and corresponding VOC values, another regression analyses were carried out to estimate VOC values for both "Without" and "With" project situations. Below is an example of regression analysis for passenger car in the case of paved surface type.



Step 4: Estimation of Unit VOC for both "Without" and "With" project cases

Unit VOCs (Php/km) in "Without" and "With" situations are obtained by inputting the future values of IRI (estimated in the above Step 2) to the equations in Step 3.

Step 5: Estimation of Total Benefit

The Road User Costs (VOC including the time cost) were calculated in the both "Without" and "With" project situations by multiplying the section length and traffic volume to the Unit VOC estimated in the Step 4. The difference of VOC between both situations is identified as the "Benefit".

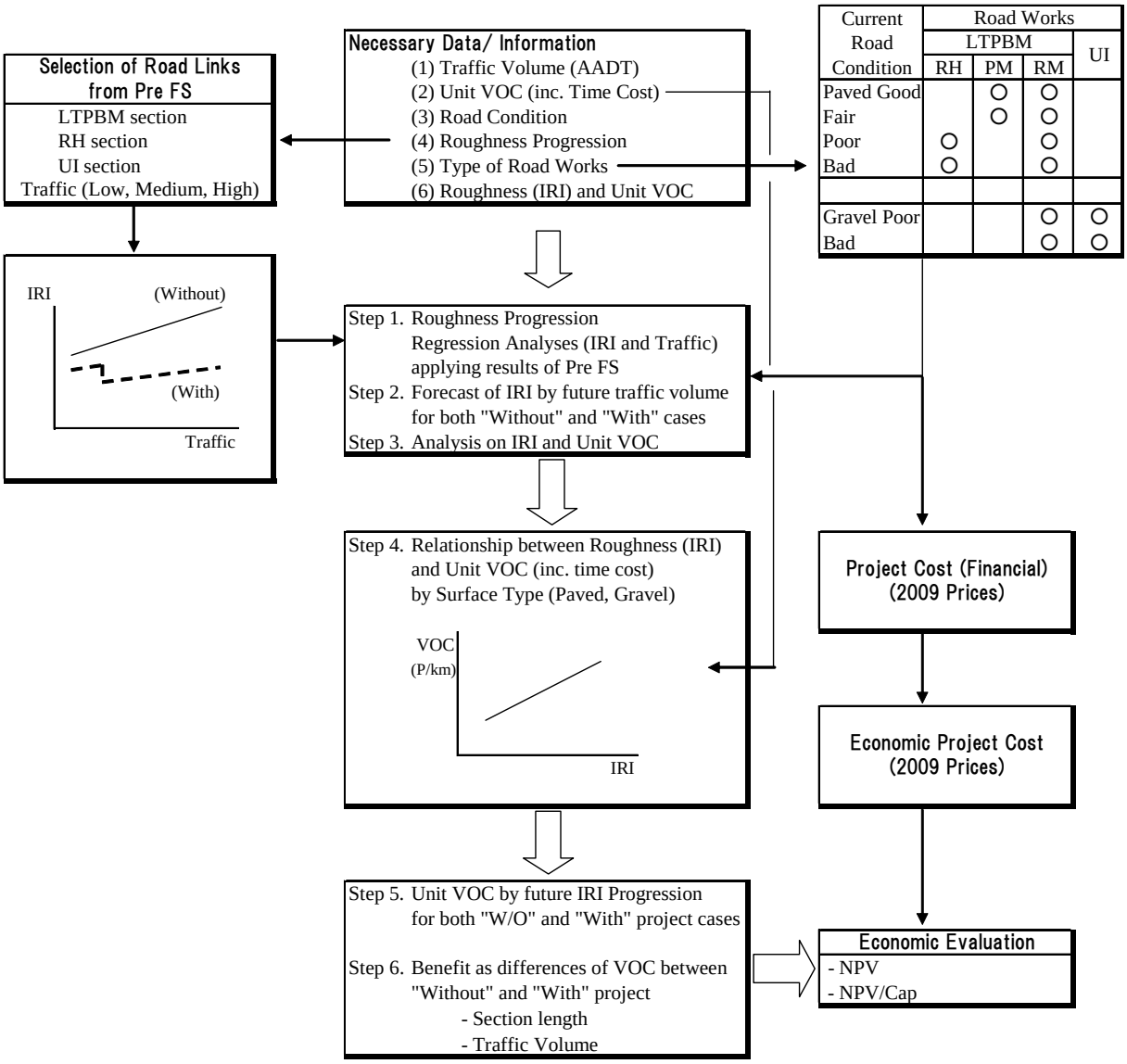


Figure 4.3.5 Flowchart Showing Benefit Estimation Procedure

■ Lipa-Alaminos Road

For the Lipa-Alaminos Road, the steps explained above were not applied since the project road is currently closed and there is no traffic. DPWH carried out related feasibility study for this road in December 2002. In said study, traffic demand which will be diverted from the existing roads was forecasted based on the results of the origin-destination survey as shown below:

a) Route 1: Alaminos-Sto Toms-Lipa City: 2002AADT = 506/day in 2002 (diversion rate = 50%).

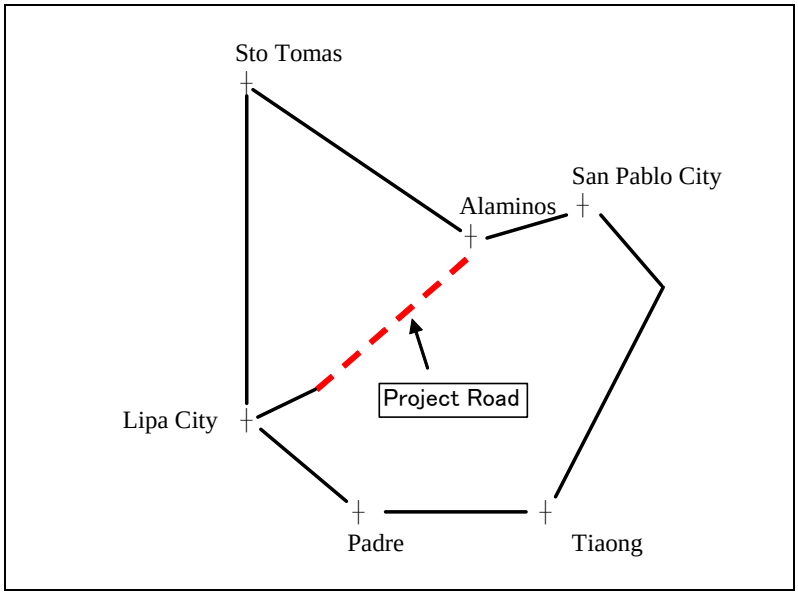
b) Route 2: San Pablo City-Tiaong-Padre-Lipa City: 2002 AADT=60/day in 2002 (diversion rate =25%).

At same time, distance of each route and via project road is as below:

- Route 1: 27.2 km
- Route 2: 44.2 km

- Via project road section (Lipa-Alaminos): 19.8 km from Alaminos to Lipa City and 28.9 km from San Pablo City- Alaminos-Lipa City.

Therefore, saving distance by the project road is 7.4 km (=27.2 km - 19.8 km) compared to the existing Route 1, and 15.3 km (44.2 km – 28.9 km) compared to the existing Route 2:



The economic benefit for the Lipa-Alaminos road was estimated based on the distance savings above and forecasted traffic diversion, by applying the updated (2008/09 price) basic VOC (including time cost). The benefit of generated (induced) traffic for Lipa-Alaminos road was also estimated.

■ Bongabon-Rizal Road

In addition to the benefit estimated through the above procedure (from step 1 to step 5), additional benefit was realized from the economic evaluation. Since the road section passes through the mountainous area, the drainage and slope protection works are essential. Hence, costs for its related works will be about 60% of total cost. This cost (for drainage and slope protection) cannot be covered by the sole benefit from the 2.6 km surface improvement. Therefore, additional benefit from the drainage and slope protection was taken into account under assumed situation. If the above slope protection works are not implemented, there will be a risk of land slide and road closure. In this situation, vehicles using this route will take an alternative route (south route between Rizal to Baler). It is also assumed that the road will be closed for about half a month (15 days intermittent, but particularly during the rainy season). If the drainage and slope protection works are not executed, AADT multiplied by 15 days will move to the higher VOC route (south route). This higher VOC will be saved when the slope protection works are implemented and will eventually become part of the project benefits. The length of project road (north route in paved good condition) and the south route (paved bad condition) from Rizal to Baler are 98.3 km and 119.2 km, respectively. Based on the above situation, additional benefit was quantified and included in the economic evaluation.

2) Benefit of Generated (Induced) Traffic for UI Roads

The UI projects are defined as upgrading/ improvement of existing roads from the non-paved gravel to PCC pavement. The effects of this intervention will be significant in savings not only of VOC but also of travel time. However, surface improvement length of UI-1 project is only 2.6 km and the time savings on this section is less than 5 minutes (assuming the speed of 30 km/hr to

50 km/hr). This time saving is not expected to generate new additional traffic. Therefore, the benefit of generated traffic for UI-1 project was not considered. On the other hand, in the cases of UI-3 and UI-4, surface improvement lengths are 71.0 km and 47.4 km. respectively. Therefore, the effects of time savings and VOC savings that will generate new traffic could not be ignored. In order to forecast the generated traffic, Origin-Destination (O-D) information is necessary. However, there is no such kind of basic information available for both projects. The results from the traffic count data in UI-4 (at 3 stations) and assuming O-D traffic from the very limited count data show that the generated traffic, after improvement, was roughly around 30% of the normal traffic. This rate was applied to the cases of UI-2, UI-3 and UI-4. The unit benefit (benefit/ per vehicle) of the generated traffic is assumed to be 50% of the normal traffic.

(4) Economic Costs

For the purpose of economic evaluation, the financial project costs (capital cost and RM cost) were converted to economic costs. In this evaluation, the Standard Conversion Factor (SCF=0.82) was applied based on the information provided by DPWH.

(5) Premises of Economic Evaluation

The following pre-conditions were established for the cost-benefit cash flow analysis:

1) Price Level: 2009 prices
2) Evaluation Period: 20 years after opening year
3) Residual Value: No residual values were counted
4) Opportunity Cost of Capital (Discount Rate): 15%

Cost Benefit Stream by each project is shown in Table 4.3.22 to Table 4.3.25.

(6) Results of Economic Evaluation

The results of economic evaluation of the four UI projects are summarized in Table 4.3.21:

Table 4.3.21 Results of Economic Evaluation (UI Projects)

Project No	Road/ Section	Project Length (km)	UI Length (km)	NPV (Mil.Php)	NPV/C	B/C	EIRR (%)
UI-1	Bangabon-Rizal-Pantabangan-Baler	51.3	2.6	47	0.2	1.2	17.5
UI-2	Lipa-Alaminos	16.7	7.5	147	1.1	2.1	28.1
UI-3	Mindoro West Coast Road	153.4	71.0	1,735	1.3	2.3	31.9
UI-4	Catanduanes Circumferential Road (Viga-Pandan Section)	64.2	47.4	157	0.2	1.2	17.9

All UI projects are economically feasible with positive values of NPV/cap, applying the 15% of discount rate.

The following table shows sensitivity analysis of the UI projects. All EIRRs stay above 15% in the case either 10% cost increase or 10% benefit down. However they are slightly below 15% in the case of occurrence of 10% cost increase and 10% benefit down for UI-1 and UI-4.

Summary of Sensitivity Analysis for UI Projects

Project No.	UI Project	Economic Internal Rate of Return (EIRR:%)			
		Base Case	Cost + 10%	Benefit - 10%	Cost +10% & Benefit -10%
UI-1	Bongabon-Baler	17.5	16.0	15.8	14.4
UI-2	Lipa-Alaminos	28.1	26.1	25.9	24.0
UI-3	Mindoro West Coast Road	31.9	29.3	29.1	26.7
UI-4	Catanduanes Circumferential Road	17.8	16.2	16.1	14.5

Table 4.3.22 Cost Benefit Stream: UI-1: Bongabon-Rizal-Pantabangan-Baler

Million Php/Year

No.	Year	Cost			Benefit			B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	PCC Pavement Benefit	Slope Protection Benefit	Total Benefit		PV Cost	PV Benefit
	2008									
	2009			0.0			0.0	0.00	0.00	0.00
	2010	7.7		7.7			0.0	-7.66	6.66	0.00
	2011	8.5		8.5			0.0	-8.50	6.43	0.00
	2012	213.6		213.6	0.0	0.0	0.0	-213.58	140.44	0.00
0	2013	208.5		208.5	16.0	0.0	16.0	-192.45	119.20	9.16
1	2014		0.2	0.2	34.1	36.4	70.5	70.26	0.10	35.03
2	2015		0.2	0.2	35.9	37.8	73.7	73.52	0.08	31.87
3	2016		0.2	0.2	37.0	39.3	76.3	76.11	0.07	28.68
4	2017		0.2	0.2	38.0	40.9	79.0	78.78	0.06	25.82
5	2018		0.2	0.2	39.2	42.6	81.7	81.54	0.05	23.23
6	2019		0.2	0.2	40.3	44.3	84.6	84.39	0.05	20.91
7	2020		0.2	0.2	41.4	46.1	87.5	87.33	0.04	18.81
8	2021		0.2	0.2	42.5	48.0	90.6	90.37	0.04	16.93
9	2022		0.2	0.2	43.7	50.0	93.7	93.49	0.03	15.23
10	2023		0.2	0.2	45.1	52.1	97.2	97.03	0.03	13.74
11	2024		0.2	0.2	46.9	54.3	101.2	100.97	0.02	12.43
12	2025		0.2	0.2	48.3	56.0	104.4	104.19	0.02	11.15
13	2026		0.2	0.2	49.8	57.9	107.7	107.52	0.02	10.01
14	2027		0.2	0.2	51.3	59.8	111.2	110.99	0.02	8.98
15	2028		0.2	0.2	52.9	61.8	114.8	114.59	0.01	8.06
16	2029		0.2	0.2	54.6	63.9	118.5	118.32	0.01	7.24
17	2030		0.2	0.2	56.7	66.6	123.3	123.15	0.01	6.55
18	2031		0.2	0.2	59.0	69.5	128.4	128.22	0.01	5.93
19	2032		0.2	0.2	61.3	72.4	133.7	133.53	0.01	5.37
20	2033		0.2	0.2	63.7	75.6	139.3	139.11	0.01	4.87
	Total	438.2	3.8	442.0	957.8	1,075.5	2,033.3	1,591.2	273.4	320.0

NPV at 15%	46.6
NPV/Cap	0.17
B/C	1.17

Table 4.3.23 Cost Benefit Stream: UI-2: Lipa-Alaminos

Million Php/Year

No.	Year	Cost			RUC Benefit	B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost			PV Cost	PV Benefit
	2008							
	2009			0.0	0.0	0.0	0.00	0.0
	2010	3.2		3.2	0.0	-3.2	2.78	0.0
	2011	16.5		16.5	0.0	-16.5	12.46	0.0
	2012	97.2		97.2	0.0	-97.2	63.94	0.0
0	2013	95.1		95.1	0.0	-95.1	54.38	0.0
1	2014		0.5	0.5	61.6	61.1	0.25	30.6
2	2015		0.5	0.5	64.4	63.9	0.22	27.9
3	2016		0.5	0.5	67.4	66.9	0.19	25.3
4	2017		0.5	0.5	70.5	70.0	0.17	23.0
5	2018		0.5	0.5	73.7	73.2	0.14	21.0
6	2019		0.5	0.5	77.1	76.6	0.13	19.1
7	2020		0.5	0.5	80.6	80.1	0.11	17.3
8	2021		0.5	0.5	83.7	83.2	0.10	15.6
9	2022		0.5	0.5	86.9	86.4	0.08	14.1
10	2023		0.5	0.5	90.3	89.8	0.07	12.8
11	2024		0.5	0.5	93.8	93.3	0.06	11.5
12	2025		0.5	0.5	97.4	96.9	0.05	10.4
13	2026		0.5	0.5	101.1	100.6	0.05	9.4
14	2027		0.5	0.5	105.0	104.5	0.04	8.5
15	2028		0.5	0.5	109.1	108.5	0.04	7.7
16	2029		0.5	0.5	113.2	112.7	0.03	6.9
17	2030		0.5	0.5	117.6	117.1	0.03	6.2
18	2031		0.5	0.5	122.1	121.6	0.02	5.6
19	2032		0.5	0.5	126.8	126.3	0.02	5.1
20	2033		0.5	0.5	131.7	131.2	0.02	4.6
Total		212.0	10.2	222.2	1,874.1	1,651.9	135.4	282.7

NPV at 15%	147.3
NPV/Cap	1.09
B/C	2.09

Table 4.3.24 Cost Benefit Stream: UI-3: Mindoro West Coast Road

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV Cost	PV Benefit
					Length by Condition (km)				71.0			
					0.0	0.0	71.0	0.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	34.7		34.7	0.0	0.0	0.0	0.0	0.0	-34.7	30.2	0.0
	2011	56.0		56.0	0.0	0.0	0.0	0.0	0.0	-56.0	42.3	0.0
	2012	1,053.7		1,053.7	0.0	0.0	0.0	0.0	0.0	-1,053.7	692.8	0.0
0	2013	1,030.6		1,030.6	0.0	0.0	314.9	0.0	314.9	-715.7	589.2	180.1
1	2014		4.8	4.8	0.0	0.0	648.4	0.0	648.4	643.5	2.4	322.4
2	2015		4.8	4.8	0.0	0.0	669.1	0.0	669.1	664.3	2.1	289.3
3	2016		4.8	4.8	0.0	0.0	688.8	0.0	688.8	684.0	1.8	259.0
4	2017		4.8	4.8	0.0	0.0	713.0	0.0	713.0	708.1	1.6	233.1
5	2018		4.8	4.8	0.0	0.0	751.3	0.0	751.3	746.5	1.4	213.6
6	2019		4.8	4.8	0.0	0.0	791.8	0.0	791.8	787.0	1.2	195.7
7	2020		4.8	4.8	0.0	0.0	826.3	0.0	826.3	821.4	1.0	177.6
8	2021		4.8	4.8	0.0	0.0	862.2	0.0	862.2	857.4	0.9	161.2
9	2022		4.8	4.8	0.0	0.0	899.8	0.0	899.8	894.9	0.8	146.2
10	2023		4.8	4.8	0.0	0.0	939.0	0.0	939.0	934.2	0.7	132.7
11	2024		4.8	4.8	0.0	0.0	980.0	0.0	980.0	975.1	0.6	120.4
12	2025		4.8	4.8	0.0	0.0	1,016.7	0.0	1,016.7	1,011.9	0.5	108.7
13	2026		4.8	4.8	0.0	0.0	1,054.9	0.0	1,054.9	1,050.0	0.5	98.0
14	2027		4.8	4.8	0.0	0.0	1,094.5	0.0	1,094.5	1,089.6	0.4	88.4
15	2028		4.8	4.8	0.0	0.0	1,135.5	0.0	1,135.5	1,130.7	0.3	79.8
16	2029		4.8	4.8	0.0	0.0	1,178.2	0.0	1,178.2	1,173.3	0.3	72.0
17	2030		4.8	4.8	0.0	0.0	1,233.4	0.0	1,233.4	1,228.6	0.3	65.5
18	2031		4.8	4.8	0.0	0.0	1,291.3	0.0	1,291.3	1,286.4	0.2	59.7
19	2032		4.8	4.8	0.0	0.0	1,351.8	0.0	1,351.8	1,347.0	0.2	54.3
20	2033		4.8	4.8	0.0	0.0	1,415.3	0.0	1,415.3	1,410.4	0.2	49.4
	Total	2,175.0	97.0	2,272.0	0.0	0.0	19,856.1	0.0	19,856.1	17,584.1	1,372.0	3,107.0

NPV at 15%	1,735.0
NPV/Cap	1.26
B/C	2.26

Table 4.3.25 Cost Benefit Stream: UI-4: Catanduanes Circumferential Road

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV Cost	PV Benefit
					Length by Condition (km)				47.4			
					0.0	0.0	47.4	0.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	23.9		23.9	0.0	0.0	0.0	0.0	0.0	-23.9	20.8	0.0
	2011	33.4		33.4	0.0	0.0	0.0	0.0	0.0	-33.4	25.2	0.0
	2012	417.7		417.7	0.0	0.0	0.0	0.0	0.0	-417.7	274.7	0.0
	2013	538.3		538.3	0.0	0.0	77.4	0.0	77.4	-460.8	307.8	44.3
0	2014	405.7		405.7	0.0	0.0	158.3	0.0	158.3	-247.4	201.7	78.7
1	2015		3.2	3.2	0.0	0.0	241.5	0.0	241.5	238.2	1.4	104.4
2	2016		3.2	3.2	0.0	0.0	245.2	0.0	245.2	241.9	1.2	92.2
3	2017		3.2	3.2	0.0	0.0	248.5	0.0	248.5	245.3	1.1	81.2
4	2018		3.2	3.2	0.0	0.0	256.9	0.0	256.9	253.7	0.9	73.0
5	2019		3.2	3.2	0.0	0.0	265.8	0.0	265.8	262.6	0.8	65.7
6	2020		3.2	3.2	0.0	0.0	275.1	0.0	275.1	271.9	0.7	59.1
7	2021		3.2	3.2	0.0	0.0	283.2	0.0	283.2	279.9	0.6	52.9
8	2022		3.2	3.2	0.0	0.0	291.5	0.0	291.5	288.3	0.5	47.4
9	2023		3.2	3.2	0.0	0.0	300.1	0.0	300.1	296.8	0.5	42.4
10	2024		3.2	3.2	0.0	0.0	308.9	0.0	308.9	305.7	0.4	38.0
11	2025		3.2	3.2	0.0	0.0	318.1	0.0	318.1	314.9	0.3	34.0
12	2026		3.2	3.2	0.0	0.0	327.6	0.0	327.6	324.3	0.3	30.4
13	2027		3.2	3.2	0.0	0.0	337.3	0.0	337.3	334.1	0.3	27.3
14	2028		3.2	3.2	0.0	0.0	347.4	0.0	347.4	344.2	0.2	24.4
15	2029		3.2	3.2	0.0	0.0	357.8	0.0	357.8	354.6	0.2	21.9
16	2030		3.2	3.2	0.0	0.0	368.5	0.0	368.5	365.3	0.2	19.6
17	2031		3.2	3.2	0.0	0.0	379.6	0.0	379.6	376.4	0.1	17.5
18	2032		3.2	3.2	0.0	0.0	391.1	0.0	391.1	387.9	0.1	15.7
19	2033		3.2	3.2	0.0	0.0	402.9	0.0	402.9	399.7	0.1	14.1
20	2034		3.2	3.2	0.0	0.0	415.2	0.0	415.2	412.0	0.1	12.6
	Total	1,419.0	64.6	1,483.6	0.0	0.0	6,598.1	0.0	6,598.1	5,114.4	840.2	996.8

NPV at 15%	156.6
NPV/Cap	0.186
B/C	1.19

(7) Multi-Criteria Analysis

In order to prioritize the UI projects, a Multi-Criteria Analysis (MCA) was carried out. The selected criteria (indicators) and their weight (score points) prepared by DPWH are shown below.

Indicators for New Projects			Score Points	Max. Points
1.	**Project Preparedness**			65
1.1	Current Project Status			10
1.1.1		Approved by the ICC (within 18 months validity)	10	
1.1.2		Approved by the ICC (within 18 months validity) but deferred by lending institution	8	
1.1.3		Approved by the ICC (after 18 months) but deferred by lending institution	4	
1.1.4		Not approved by the ICC. New proposal needs to be submitted to the ICC	0	
1.2	Detailed Design carried out		5	5
1.3	Economic Viability			30
1.3.1		NPV/C >= 2.0	30	
1.3.2		NPV/C < 2.0 but >= 1.0	25	
1.3.3		NPV/C < 1.0 but >= 0.5	20	
1.3.4		NPV/C < 0.5 but >= 0.3	15	
1.3.5		NPV/C < 0.3 but > 0	10	
1.4	Environmental Assessment (project with IEE or EIS or EIA, otherwise 0)			10
1.4.1		Minor or negligible impact and any mitigation accounted for in project costs	10	
1.4.2		Moderate negative impact but mitigation accounted for in project costs	8	
1.4.3		Considerable negative impact but mitigation accounted for in project costs	4	
1.5	Social Impact (projects with LAPRAP, if required, otherwise 0)			10
1.5.1		No resettlement	10	
1.5.2		Minor resettlement but mitigation accounted for in project costs	8	
1.5.3		Major resettlement but mitigation accounted for in project costs	4	
2.	Road Network Importance			20
2.1	Road Category			
2.1.1		North-South Backbone, Arterial National Roads	15	
2.1.2		East-West Laterals, Arterial National Roads	12	
2.1.3		Other Arterial Roads of Strategic Importance	8	
2.1.4		Secondary National Roads	4	
2.2	Road Strategic Network			
2.2.1		Identified under major DPWH studies	5	
2.2.2		Not identified under 2.2.1	0	
3.	Economic and Social Development Policy			15
	a) Provide access to basic services which currently are not available (basic human needs)			
	b) Develop economically and socially underdeveloped/ depressed areas provided a resource base is available			
	c) Improve law and order			
	d) Support agricultural modernization			
	e) Support traffic decongestion			
	f) Support industrial and tourism development			
3.1.1		All points met	15	
3.1.2		Point 3b) and another four out of the six points met	12	
3.1.3		Point 3b) and another two out of the six points met	8	
3.1.4		Only point 3b) met	4	
3.1.5		None of the points met	0	
		Total Maximum Score		100

Original Source: Highway Planning Manual, DPWH

The results of MCA are presented as follows:

Multi-Criteria Analysis for Evaluation of Projects for REAPMP (by HPM Weight)

Indicators for New Projects	Score Points	Max. Points	UI-1 Bongabon-Baler	UI-2 Lipa-Alaminos	UI-3 Mindoro West	UI-4 Catanduanes
1. Project Preparedness		65				
1.1 Current Project Status		10				
1.1.1 Approved by the ICC (within 18 months validity)	10		10	10	10	10
1.1.2 Approved by the ICC (within 18 months validity) but deferred by lending institution	8					
1.1.3 Approved by the ICC (after 18 months) but deferred by lending institution	4					
1.1.4 Not approved by the ICC. New proposal needs to be submitted to the ICC	0					
1.2 Detailed Design carried out	5	5	5			5
1.3 Economic Viability		30				
1.3.1 NPV/C >= 2.0	30					
1.3.2 NPV/C < 2.0 but >= 1.0	25			25	25	
1.3.3 NPV/C < 1.0 but >= 0.5	20					
1.3.4 NPV/C < 0.5 but >= 0.3	15					
1.3.5 NPV/C < 0.3 but > 0	10		10			10
1.4 Environmental Assessment (project with IEE or EIS or EIA, otherwise 0)		10				
1.4.1 Minor or negligible impact and any mitigation accounted for in project costs	10					
1.4.2 Moderate negative impact but mitigation accounted for in project costs	8				8	
1.4.3 Considerable negative impact but mitigation accounted for in project costs	4		4	4		4
1.5 Social Impact (projects with LAPRAP, if required, otherwise 0)		10				
1.5.1 No resettlement	10		10			
1.5.2 Minor resettlement but mitigation accounted for in project costs	8			8	8	8
1.5.3 Major resettlement but mitigation accounted for in project costs	4					
2. Road Network Importance		20				
2.1 Road Category						
2.1.1 North-South Backbone, Arterial National Roads	15					
2.1.2 East-West Laterals, Arterial National Roads	12					
2.1.3 Other Arterial Roads of Strategic Importance	8				8	8
2.1.4 Secondary National Roads	4		4	4		
2.2 Road Strategic Network						
2.2.1 Identified under major DPWH studies	5		5	5	5	5
2.2.2 Not identified under 2.2.1	0					
3. Economic and Social Development Policy		15				
a) Provide access to basic services which currently are not available (basic human needs)						
b) Develop economically and socially underdeveloped/ depressed areas provided a resource base is available						
c) Improve law and order						
d) Support agricultural modernization						
e) Support traffic decongestion						
f) Support industrial and tourism development						
3.1.1 All points met	15					
3.1.2 Point 3b) and another four out of the six points met	12		12		12	12
3.1.3 Point 3b) and another two out of the six points met	8					
3.1.4 Only point 3b) met	4					
3.1.5 None of the points met	0					
Total Maximum Score		100	60	56	76	62

The total score of each UI project is summarized below:

- UI-1: Bongabon-Rizal-Pantabangan-Baler = 60
- UI-2: Lipa-Alaminos = 56
- UI-3: Mindoro West Cost Road = 76
- UI-4: Catanduanes Circumferential Road = 62

(8) Project Effects and Effect Indicators

For the purpose of evaluation of the effects by the implementation of the REAPMP, various effect indicators could be provided as listed below.

1) Traffic Demand (AADT)
2) Savings in Travel Time on project road sections
3) Saving in Vehicle Operating Cost (VOC)
4) Average Velocity Increase
5) Decrease of Annual Traffic Impassability (No. of days impassable/ year) due to

Disaster

6) Degree of Poverty Reduction

7) Economic Internal Rate of Return (EIRR)

Regarding the indicator of the Poverty Reduction, evaluations were made from the qualitative aspect due to the difficulty of quantification of contribution of projects to poverty reduction.

In addition, it is noted that the purpose of REAPMP projects is, in principle, to maintain, prevent, rehabilitate, and upgrade/ improve the existing road assets to keep them in "paved good condition", and not for capacity augmentation (widening) nor construction of new roads (including expressways) to mitigate the traffic congestion. Traffic volume is basically the same in "Without project" and "With project" situations if newly generated traffic is not taken into account. Therefore, effects on velocity (speed) increase and resulting time savings are secondary effects of the projects. Furthermore, for road sections presently in good/fair condition, the preventive maintenance (PM) is planned to keep/maintain good/fair condition for long term. In this case, it will be difficult to estimate future velocity decrease when PM is not implemented.

The results of estimation of effect indicators for UI roads are summarized in the following table:

	1	2	3	4	5	6	7
Indicator / Project	AADT Including Motorcycles	Time Saving (minutes)	VOC Saving (Mil.Php/ year)	Average Velocity Increase (km/hr) (Estimate)	Decrease of impassable days/year	Poverty Reduction	EIRR (%)
UI-1:Bongabon	(2008) 2,077 (2018) 2,814	5	(2015) 74 (2018) 82	30→50	15 days (*)	Significant	17.5
UI-2: Lipa	(2008) 768 (2018) 1,639	20-30	(2015) 64 (2018) 73	30→50	365 days	moderate	28.1
UI-3: Mindoro	(2008) 1,125 (2018) 2,418	20	(2015) 669 (2018) 751	50→65	-	Significant	31.9
UI-4: Catanduanes	(2006) 709 (2018) 1,356	110	(2015) 242 (2018) 257	15→35	-	Significant	17.9

Note: (*) Probable number of dates.

In addition above, the beneficiary population along the project roads is presented below:

Indicator / Project	Beneficiary population along the project roads	
UI-1: Bongabon	190,000	Aurora
UI-2: Lipa	540,000	Lipa City, San Pablo City, Alaminos
UI-3: Mindoro	420,000	Occidental Mindoro
UI-4: Ctanduanes	230,000	Catanduanes

■ Qualitative Effects of UI Roads

a) Bongabon-Rizal-Baler Road

- Contribution to the logistic activities connecting the Maria Aurora district and the Central Luzon.
- Agricultural development along the corridor
- Tourism development in the area near Baler
- Contribution to poverty reduction through expansion of markets for agricultural and marine foods, particularly to the Manila Metropolitan Region

b) Lipa-Alaminos Road

- Regional development providing the direct access to Pan Philippines Highway (PPH)

c) Mindoro West Coast Road

- Enhancement of agricultural development
- Poverty reduction through the market expansion of agricultural products to the Manila Metropolitan Region.

d) Catanduanes Circumferential Road

- Development and access to tourism resources
- Provide reliable and permanent access to lifelines (hospitals, schools and other public facilities concentrated in Virac City at present, and contribute to poverty reduction.

4.4 LONG TERM PERFORMANCE-BASED MAINTENANCE (LTPBM) COMPONENT

4.4.1 SELECTION CRITERIA OF LTPBM ROAD LINKS

In preparing the long list of candidate roads for LTPBM in the Pre-FS of REAPMP, priority was given to the following roads:

- National Arterial Roads, particularly north-south backbone and east-west laterals, which carry a minimum AADT of 5,000.
- Roads subject to upgrading/rehabilitation funded under previous/on-going OECF/ JBIC loans (including gaps or additional links).
- Roads that support MTPDP and SONA priorities – such as those supporting national logistics, completion of the nautical highways and investment promotion.
- Roads that complement the proposed NRIMP-2 LTPBM programs.

In short-listing the above candidate roads or sections thereof to comprise Phase I of REAPMP, the MCA of the DPWH was used to determine the higher priority projects, based on the following criteria ratings:

(1) Project Preparedness – 65 points maximum:

- Current project status: highest rating to those already approved by ICC, followed by those being processed.
- Detailed design: highest rating to those with completed design.
- Economic viability: rating is based on NPV/cap.
- Environmental assessment: highest rating to those with minor or negligible impact and mitigation, based on Initial Environmental Examination (IEE) or Environmental Impact Statement (EIS).
- Social impact: highest rating to those with no resettlement or with minor resettlement issues.

(2) Road Network Importance – 20 points maximum:

- Road category: highest rating to north-south arterial backbone and followed by east-west laterals
- Road strategic network: highest score to those identified under major DPWH studies.

(3) Economic and Social Development Policy – 15 points maximum:

The highest rating is given to roads that best attain the following objectives:

- Develop economically and socially underdeveloped/depressed areas.
- Support agricultural modernization
- Support traffic decongestion
- Support industrial and tourism development.

The introduction of LTPBM is related to the reforms adopted by DPWH as it will contribute to reducing the maintenance administration burden while promoting private sector participation. The Survey Team suggests that the DPWH should establish concrete policy and strategy on the introduction of LTPBM and selection of the subjected road links. The LTPBM should be limited to the road links of north-south arterial backbone and east- west laterals in the mid-long term. The minimum contract length should be approximately 100 km to encourage participation of large contractors in the LTPBM contract.

4.4.2 REVIEW OF LTPBM ROAD LINKS OF THE PRE-FS REPORT AND PROPOSAL FOR REAPMP

As described in Section 3.3.1, the originally proposed LTPBM road links were reviewed and will be applied to four road links of 644 km total length (refer to Figure 3.4.1 as to location map).

No.	Road Section	From (Km)	To (Km)	LTPBM Length (km)	Remarks (Road Function)
PBM-1	Aringay-Laoag	481.13	723.13	242	North Manila Road
PBM-2	Sta. Rita- Bdr. Nueva Ecija	38.73	208.00	169	Pan -Pacific Highway (PPH)
PBM-3	Sipocot- Baao (Bdr. Camarines Norta - Bdr.Albay)	371.16	480.15	109	Pan -Pacific Highway (PPH)
PBM-4	Surigao (Lipata) - Bdr Agusan D.N.	1113.50	1237.00	124	Pan -Pacific Highway (PPH)
Total				644	

Except for Aringay- Laoag road, these LTPBM road links are along the Pan-Pacific Highway, which were developed through the financial and technical cooperation of the GOJ. The Aringay-Laoag road meanwhile is part of the Manila North Road and is a continuation of the NIRIMP-2 LTPBM (LM-2.1). The traffic volume on these roads is higher than other road links and, therefore, higher level of service is envisaged.

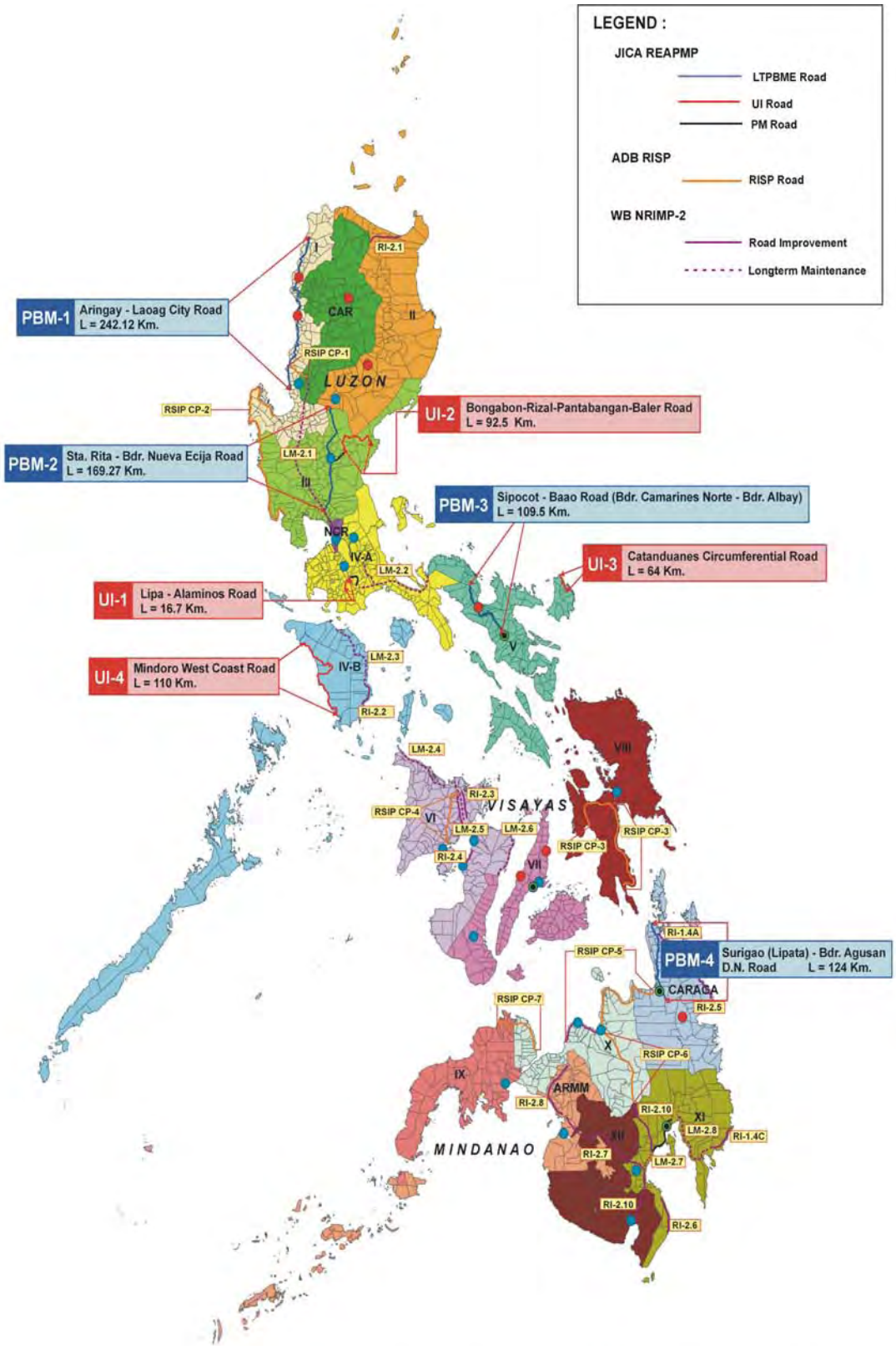


Figure 4.4.1 Location Map of LTPBM Road Links under REAPMP and Road Links of NRIMP-2 and RSIP

4.4.3 SCOPE OF LTPBM PROJECT

(1) Design-Build Scheme and Value Engineering

The DPWH has been experimenting with a wide variety of innovative project delivery strategies aimed at lowering the costs while increasing efficiency for the national road services. One of these strategies is design-build scheme in combination with LTPBM. The following table shows general advantages and disadvantages of a design-build contract.

Table 4.4.1 Advantages and Disadvantages of Design-Build Contract

Advantages	Disadvantages
▪ One Contractor bears all risks and responsibilities ▪ Reduced design and construction periods and final project cost ▪ Assured quality of the structure	▪ Too much discretion given to contractor ▪ Difficulty in predicting the final cost ▪ The end –result may not exactly be in accordance with what the procuring entity required

Source: Dennis Lorne S. Nacarrio, GPPB

Value Engineering is defined as the systematic application of recognized techniques by a multi-disciplined team to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking, and provide the needed functions to accomplish the original purpose of the project. This shall be carried out considering lowest life-cycle cost without compromising safety, necessary quality, and environmental attributes of the project[2].

More simply, it is defined by an equation of Value = Function / Cost

Value Engineering is a tool applicable in various stages of project development such as functional analysis, feasibility study and evaluation matrix (multi criteria matrix). This is more effective in large and complicated projects but not for simple and small undertakings.

The Sipocot - Baao Road was selected for a pilot design-built scheme under REAPMP-LTPBM. As this road link was originally constructed and rehabilitated through Yen-loan, its historical records are clear compared with other road links. Monitoring is also easy due to its proximity to Manila.

In a design-build scheme, one entity (contractor) assumes the responsibility for the design and construction. However, concept design will be required to initially define the project, design conditions and cost estimation. The value engineering will be also introduced in the design-build scheme.

The evaluation on soundness of existing pavement and foundation are one of the inevitable information for the engineering design. As majority of the pavement types in the Philippines is of PCC and AC overlays on PCC (composite pavement), of which cracks are not visible from the surface, Falling Weight Deflectometer (FWD) should be used for the existing pavement survey and evaluation (effective thickness determination). In the case of flexible pavement (AC pavement), conventional Benkelman beam can be applied for deflection measurement which will indicate the strength of the existing pavement.

[2] The definition of “value engineering” by Federal Highway Administration (FHWA), USA

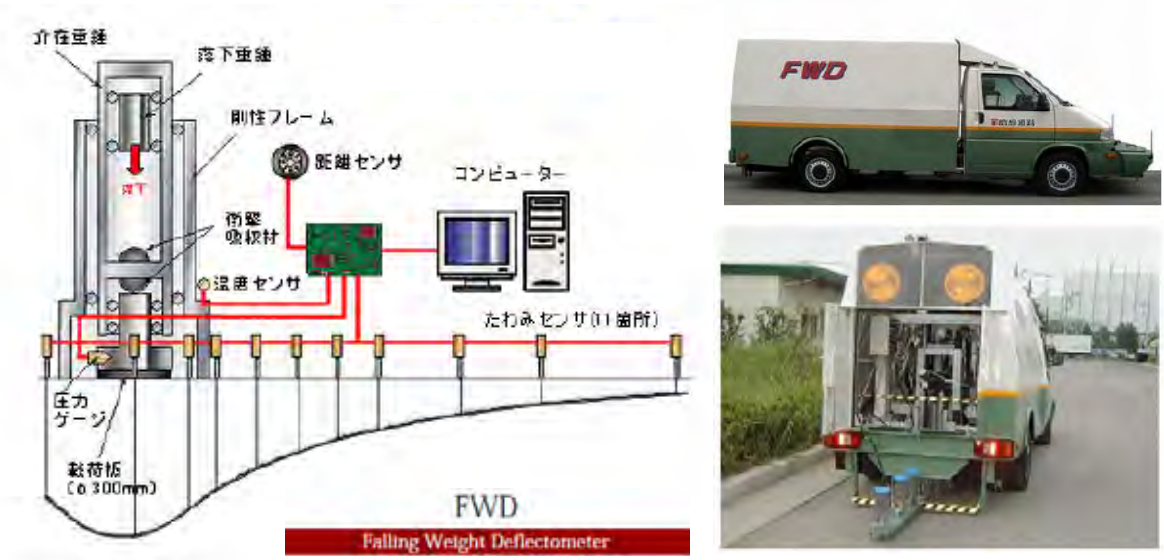


Figure 4.4.2 Falling Weight Deflectometer (FWD)

The FWD measurement should be included in the terms of reference for consultancy services of the detailed engineering design.

(2) Scope of LTPBM Contract

The LTPBM projects under the REAPMP are of a hybrid type, which includes a combination of RH, PM, backlog maintenance, RM and road safety.

1) Rehabilitation (RH)

RH/reconstruction will be applied to paved road sections which are assessed to be in bad condition. It also involves restoring them to their original condition as designed and constructed. The major works include partial reconstruction, replacement of shattered concrete pavement slabs and AC overlay (single or 2 layers) on the existing pavement. The works also include drainage improvement and slope and scour protection works.

2) Road Maintenance and Safety Facilities

The maintenance for the LTPBM projects will include:

Preventive Maintenance (PM):	Asphalt overlay on paved road sections in fair and poor condition to improve surface condition and/or strengthening the exiting pavement structures. Thickness of AC overlay will also be planned for roads in good condition as it is expected to deteriorate and subject to fair condition during 5-year contract period.
Backlog Maintenance (BM):	Restoration of shoulders, reconditioning or provision of new drainage, and minor improvements such as localized slope protection.
Routine Maintenance (RM):	Maintaining the road condition through routine repairs, including pothole patching, sealing of cracks on pavement, shoulder grading, drainage cleaning, vegetation control, road markings maintenance and bridge maintenance.
Road Safety (RS):	Road safety works include installation of road safety facilities (guard rails, guide posts, warning and information signs), road marking and public information

(3) Bridge Repair and Maintenance

Regarding bridge works, the scope of LTPBM includes PM and RM. The UI (rehabilitation) includes reconstruction, widening, retrofit and total replacement of deck slab. However, in the REAPMP, this mainly involves reconstruction and widening. LTPBM bridges form part of the LTPBM road sections as they are both supposed to be covered under the same contract package. The bridges selected for PM (repairs) are those which were detected to have at least one major defect, assessed as poor in condition. RM meanwhile is proposed for all bridges along the LTPBM road links. Two bridges evaluated with bad condition can be categorized as UI bridges, along the LTPBM section. However, such bridges can be reconstructed in LTPBM contract because of the limited number of bridges and since LTPBM in REAPMP is of hybrid type which could also accommodate UI works.

Table 4.4.2 Bridges on LTPBM Road Links

Road Section		DEO	Routine Maintenance		Preventive Maintenance	
			Number	Length (m)	Number	Length (m)
1	Aringay - Laoag	Ilocos Norte 2nd D.E.O	14	427.00	7	160.00
		Ilocos Sur 1st D.E.O	23	970	15	431
		Ilocos Sur 2nd D.E.O	38	1,965	23	1,280
		La Union 1st D.E.O	10	536	4	350
		La Union 2nd D.E.O	10	940	8	893
	Sub-Total		95	4,837	57	3,113
2	Sta. Rita - Nueva Ecija	Bulacan 1st D.E.O	12	562	10	453
		Bulacan 2nd D.E.O	17	500	16	411
		Nueva Ecija 1st D.E.O	21	622	19	558
		Nueva Ecija 2nd D.E.O	11	1,069	7	1,005
	Sub-Total		61	2,753	52	2,427
3	Sipoco - Baao	Camarines Sur 1st D.E.O	30	798	23	601
		Camarines Sur 2nd D.E.O	8	271	6	135
		Camarines Sur 4th D.E.O	9	216	7	168
	Sub-Total		47	1,285	36	904
4	Surigao - Bdr Agusan D.N.	Agusan Del Norte D.E.O	24	1,175	21	1,024
		Surigao Del Norte D.E.O	25	778	24	753
	Sub-Total		49	1,953	45	1,776
Total			252	10,829	190	8,221

Remark: Castellano bridge in Nueva Ecija and Paypay bridge in Agusan del Norte are recommended to reconstruction.

4.4.4 PERFORMANCE STANDARD AND INTERVENTION SCHEDULE OF LTPBM

(1) Performance Indicators

Performance standards/requirements represent the desired level of performance or output of the of LTPBM road link, in terms of quality, quantity, timeliness and other aspects of the output and service, against which the actual output will be measured and compared. The objectives of performance standards/requirements are (a) to satisfy the road users in terms of accessibility, comfort, travel speed and safety; (b) to minimize the total road system cost, including cost to road users and the DPWH over the life cycle cost of the assets; and (c) to minimize environmental impacts.

The LTPBM roads should aim to achieve good to fair conditions only. The following table indicates road condition categories to be adopted for the LTPBM.

Table 4.4.3 Road Condition Category

Road Condition	General Condition	Treatment Measures
Good	New pavement or with slight minor defects (pop-outs, map cracking, partial loss of joint	Little or no maintenance required.
	First signs of cracks (all tight); First utility patch; moderate scaling in some locations.	Needs joint and cracking sealing (routine maintenance). Scaled areas could be
Fair	Moderate to severe scaling/raveling, spalling or rutting over 25% of the surface. Moderate settlement, several narrow cracks	Needs some partial/full depth repairs, grinding and/or asphalt overlay to correct surface defects.
Poor	Many cracks, open and severely spalled. Severe faulting, spalling or rutting. Extensive patching in fair to condition, Moderate settlement	Needs extensive full depth patching plus some full slab replacement (for concrete).
Bad	Extensive cracking, severely spalled and patched (in poor condition). Severe and extensive settlements/potholes	Needs to rebuild pavement/total reconstruction.

Roughness Category	Roughness (IRI) in PMS (HDM-4)						VIC Ranges in ROCOND
	Asphalt		Concrete		Gravel		
	Range	Rep Value	Range	Rep Value	Range	Rep Value	
Good	≤ 3.0	2.5	≤ 4.0	3.5	≤ 6.0	5.0	1 - 20
Fair	3.1 – 5.0	4.0	4.1 – 6.0	5.0	6.1 – 9.0	7.5	20.1 - 40
Poor	5.1 – 7.0	6.0	6.1 – 8.0	7.0	9.1 - 12.0	10.0	40.1 - 70
Bad	> 7.0	8.0	> 8.0	9.0	> 12.0	14.0	70.1 - 100

Source: PMS/DPWH

The performance standards/requirements for LTPBM indicate the following:

- Type of feature: potholes, pavement damage, joints/cracks, shoulder vegetation, drainage
- Corresponding requirements: allowable time to remedy defects - such as within 24 hours for potholes and 10 days for pavement damage/cracks; maximum tolerable degree of defect - such as not more than 15 cm of vegetation at any time, etc.
- Penalty for non-compliance: For example, Php 5,000 per pothole not repaired for each day, Php 5,000 per pavement damage/crack not sealed within the scheduled period, Php 5,000/km for excessive vegetation if not remedied within one month, etc.
- Roughness for overlay: IRI level of 3.1 to 5.0 (m/km) on AC roads in fair condition.

The proposed performance standards/requirements for LTPBM will be adopted from those used in NRIMP-1 but a detailed study on appropriate intervention and acceptance level (IRI, cracks, rutting depth, etc.) will be conducted during the concept design for REAPMP. Transparency, accuracy and equality of both the employer and the contractor are essential when adopting performance indicators and intervention level decisions. Visual measurement of IRI is inaccurate and a modern equipment (following figure) is available but costly. If functions is limited to only IRI measurement, its cost is approximately Php 35-40 million per unit.

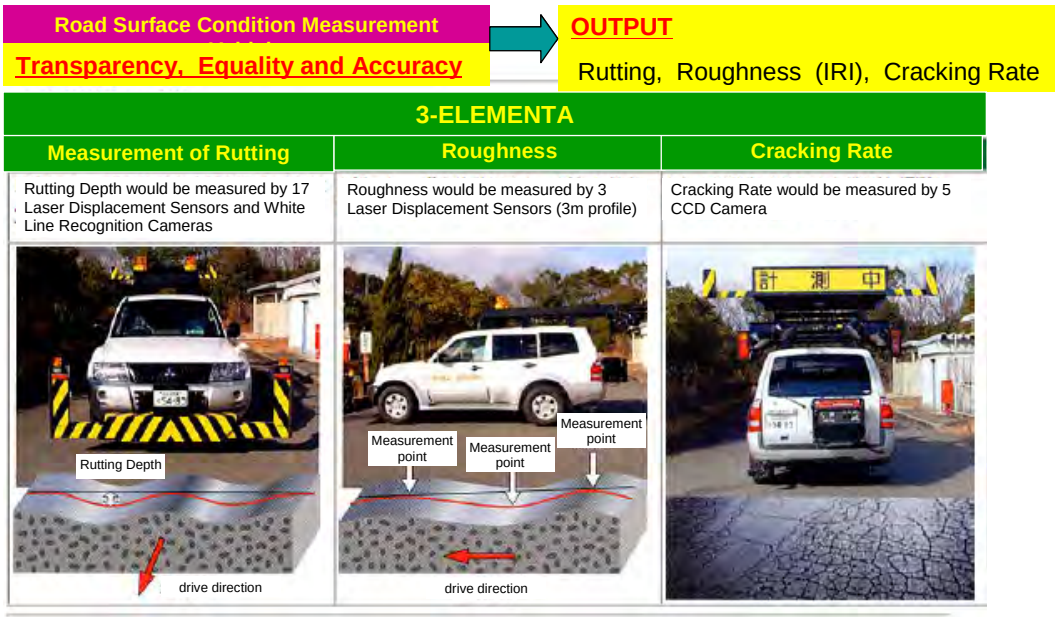


Figure 4.4.3 Modern Road Surface Condition Measurement Equipment

The JICA TCP Phase 2 has proposed to grant IRI measurement equipment under its program for nationwide periodic IRI measurement. If that proposal is approved by GOJ, the equipment can also be used for LTPBM design and supervision of REAPMP. Otherwise, IRI equipment should be rented from abroad by the design consultant.

(2) Intervention Schedule and Length

The five types of interventions are as follows:

1.	Routine Maintenance (RM)	: Through the year
2.	Backlog Maintenance (BM)	: At the start of project
3.	Preventive Maintenance (PM), AC overlay	: When IRI > specified value (IRI 4 which is representative value of fair conditioned road of AC pavement)
4.	Rehabilitation (RH)	: At the start of project

The intervention IRI for the overlay should be defined based on a pavement deterioration curve reflecting the existing pavement strength and soundness, traffic level and function of road. Even if the current road condition is good, it would require PM if it accommodates heavy truck traffic. The following table shows typical intervention pattern on LTPBM Road.

Table 4.4.4 Typical Intervention Pattern on LTPBM Road

Pavement Condition	Year				
	1	2	3	4	5
Good	Fair* RM**	Fair **PM**	Good RM	Good RM	Good RM
	Fair RM	Fair RM	Fair **PM**	Good RM	Good RM
	Good RM	Fair RM	Fair RM	Fair **PM**	Good RM
Fair	Fair **PM**	Good RM	Good RM	Good RM	Fair RM
Poor	Poor **RH**	Good RM	Good RM	Good RM	Fair RM
Bad	Bad **RH**	Good RM	Good RM	Good RM	Fair RM

Notes: * Classification of Road Condition, Good, Fair, Poor and Bad
** Corresponding Rehabilitation and Maintenance Works
(RH: Rehabilitation, PM: Preventive Maintenance (Overlay),
RM: Routine Maintenance)

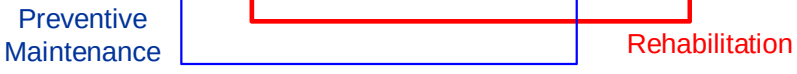
It is necessary to establish a rational deterioration model of pavement to design appropriate intervention (overlay) timing on economic aspects. The HDM-4 deterioration model is principally for AC pavement and not for PCC pavement. It is not applicable to the Philippine environment in which PCC pavement, or composite pavement (AC overlay on the existing PCCP) is most common, unless adjustments are made.

The LTPBM contract length is 644.4 km in total (refer to Table 4.4.4). Poor and bad condition roads of 240.7 km (37.3%) require RH during the 1st contract year. Fair condition road of 344.9 km (53.5%) will require PM (AC overlay) from the 1st to the 3rd contract years. Even good condition road of 58.5 km (9.1%) would require AC overlay during the 5-year contract period as heavy trucks frequently pass on these LTPBM roads, causing the road to deteriorate to fair condition.

Table 4.4.5 LTPBM Length by Road Condition and Intervention Type

ROAD CONDITION & LENGTH (KM)

PROJECT NO.	ROAD SECTION	LENGTH (KM)	PCC PAVEMENT						ASPHALT CONCRETE OVERLAY					
			GOOD	FAIR	POOR	BAD	TOTAL	SHARE	GOOD	FAIR	POOR	BAD	TOTAL	SHARE
PBM-1	ARINGAY - LAOAG CITY	242.12	6.00	29.70	32.32	1.00	**69.02**	28.5%	15.00	98.40	55.10	4.60	**173.10**	71.5%
PBM-2	STA. RITA - BDRY. NUEVA ECIJA	169.27	0.40	3.27	20.14	2.00	**25.81**	15.2%	24.10	79.91	39.45	-	**143.46**	84.8%
PBM-3	SIPOCOT - BAAO (BDRY. CAMARINES NORTE - BDRY. ALBAY)	109.48	-	2.84	-	-	**2.84**	2.6%	1.00	64.09	41.55	-	**106.64**	97.4%
PBM-4	SURIGAO (LIPATA) - BDRY. AGUSAN DEL NORTE	123.50	3.00	39.80	34.50	-	**77.30**	62.6%	9.00	27.20	10.00	-	**46.20**	37.4%
TOTAL LENGTH (KM)		**644.37**	**9.40**	**75.61**	**86.96**	**3.00**	**174.97**	27.2%	**49.10**	**269.60**	**146.10**	**4.60**	**469.40**	72.8%
SHARE			5.4%	43.2%	49.7%	1.7%	100.0%		10.5%	57.4%	31.1%	1.0%	100.0%	



(3) Bridge

Evaluation and measurement of bridge performance is the most critical attribute in repairing bridge defects (deficiencies) and in providing the ability to design and build bridges with optimal life cycle costs, higher performance, lower maintenance, and generally optimal operation in the future. Generally, there is a lack of information on how to measure bridge performance, which can be related to many factors. These include bridge type and geometry, material properties, design and construction, environment, traffic volumes and loading, traffic congestion, maintenance activities, costs (user and agency), vulnerability to hazards, etc. These factors may collectively impact bridge safety and its level of service. However, when the DPWH implements the LTPBM in the initial stage, the performance indicators for bridge should be simply determined through condition rating based on the BMS. This clearly classifies the conditions into four categories such as good, fair, poor and bad. The BMS is widely used, specially by the maintenance staff in DPWH. Table 3 shows the summary of performance indicators for each defect of bridge element. The performance indicators in the table are described with quantitative relevant data or description to measure the performance.

In order to meet the performance level for bridges under the LTPBM, it must be maintained in fair condition as per BMS rating, and determined to be structurally or functionally stable. Bridges classified under PM are those with, at least more than one defect rated in poor condition. Bridges subject to RH, are those rated as bad condition and are structurally or functionally unstable.

Table 4.4.6 Summary of Condition Rating for Each Bridge Defect

Materials	Defect	Condition	Criteria (mm)
Concrete	Cracking	Good	Hairline crack or no crack
		Fair	Width ≦0.3, 1direction, spacing >500
		Poor	Width >0.3 to ≦1.0, 2 directions, spacing <500 to ≧200
		Bad	Width >1.0, 2 directions, spacing <500
	Spalling/Scalling Disintegration	Good	Affected area ≦150 wide in any direction, depth is less than 25
		Fair	Affected area >150 to ≦300 wide any direction, depth is 20 to 50
		Poor	Affected area >300 to ≦600 wide any direction, depth is 50 to 100
		Bad	Affected area >600 wide any direction, depth is more than 100
	Rebar Exposure /Corrosion	Good	No damage
		Fair	Major rebar exposed is ≦500 wide, corroded or flaking only
		Poor	Main rebar exposed is >500 to ≦1000 wide, corroded
		Bad	Main rebar exposed is >1000, corroded.
	Delamination	Good	Delamination area measuring ≦150 in any direction
		Fair	Delamination area measuring >150 to ≦300 in any direction
		Poor	Delamination area measuring >300 to ≦600 in any direction
		Bad	Delamination area measuring >600 in any direction
	Honeycomb	Good	Affected area ≦150 wide in any direction
		Fair	Affected area >150 to ≦300 wide any direction
		Poor	Affected area >300 to ≦600 wide any direction
		Bad	Affected area >300 to ≦600 wide any direction
	Water Leaking	Good	No visible
		Fair	Water leak in one spot with area of ≦200 wide
		Poor	Water leak in one spot with area of >200 to ≦500 wide
		Bad	Water leak in one spot with area of >500 wide
Steel Plate	Corrosion/ Section Loss	Good	Loose rust formation &pitting on paint surface, no section loss.
		Fair	Loose rust formation with scales/flakes, ≦10% section loss.
		Poor	Stratified rust with pitting on surface, >10% to ≦20% section loss.
		Bad	Extensive rust with local perforation >10% section loss.
	Cracking	Good	No crack.
		Fair	Spot cracking on secondary member.
		Poor	Cracking on secondary member is severe.
		Bad	Cracking on primary members, especially in welding parts .
	Paint Peel off	Good	Surface area affected is ≦10% in a member.
		Fair	Surface area affected is >10 % to ≦20% in a member.
		Poor	Surface area affected is >20 % to ≦30% in a member.
		Bad	Surface area affected is >30% in a member.
Bearing	Corrosion	Good	Loose rust formation and pitting on surface. No section loss
		Fair	Loose rust formation with scales/flakes, ≦10% section loss.
		Poor	Stratified rust with pitting on surface >10 % to ≦20% section loss
		Bad	Extensive rusting with local perforation >20 % section loss.
	Bulging	Good	No bulging.
		Fair	Slight bulging is noticeable.
		Poor	Minor bulging is noticeable
		Bad	Severe crack, abnormal bulging,worn out and aged.
	Loose Connection	Good	Up to 20% of fasteners loose or missing in one location.
		Fair	>20% to ≦40% of fasteners loose or missing in one location.
		Poor	>40% to ≦60% of fasteners loose or missing in one location.
		Bad	>40% of fasteners loose or missing in one location.
	Abnormal Displacement	Good	No abnormal displacement.
		Fair	Bearing has been displaced by ≦10%.
		Poor	Bearing has been displaced by >10 % to ≦20%.
		Bad	Bearing has been displaced by >20 %.
	Paint Deterioration	Good	No damage.
		Fair	Paint system starts to fail.
		Poor	Paint system has failed and is not effective.
		Bad	Paint system has completely failed.
	Bed (Support) Damage	Good	No damage
		Fair	Partial (≦50% of area at one location) cracking or spalling.
		Poor	Wide range (>50 % of area at one location) cracking or spalling.
		Bad	Major splitting of bearing block which losses bearing function.

Materials	Defect	Condition	Criteria (mm)
Expansion Joint	Water Leaking	Good	No leakage.
		Fair	Detected area measures ≦25% and 1m below bearing shelf.
		Poor	Detected area measures >25 % to ≦50%.
		Bad	Detected area measures >50 % .
	Abnormal Space/Noise	Good	No detected.
		Fair	No detected.
		Poor	No detected.
		Bad	Detected.
	Difference in Elevation	Good	Difference in elevation is ≦10 at expansion joint.
		Fair	Difference in elevation is >10 to ≦20 at expansion joint.
		Poor	Difference in elevation is >20 to ≦30 at expansion joint.
		Bad	Difference in elevation is >30 at expansion joint.
	Deterioration of Sealant	Good	No detected.
		Fair	Sealer starts to flow out of the joint.
		Poor	Overfilled sealer heavily impacted by traffic.
		Bad	Pourable joint sealer maybe almost completely lost.
	Displacement	Good	Bolts/anchorage/armoring are firmly in place.
		Fair	Slight loosing bolts/anchorage/armoring but still in place.
		Poor	Bolts/anchorage/armoring may have failed.
		Bad	Bolts/anchorage/armoring may have missed.
	Cracking	Good	No crack
		Fair	Spot cracking on secondary member only.
		Poor	Spot cracking on primary bridge component.
		Bad	Cracking on primary members especially in welded parts.
	Rupture	Good	Fine or hairline crack is detected on rubber seal.
		Fair	Minor crack is detected on rubber seal.
		Poor	Wide or large crack is detected on rubber seal.
		Bad	Rubber seal dislodge or peel off from original location.
Slope Protection	Cracking	Good	No cracking or hairline cracks only
		Fair	Narrow cracks.
		Poor	Cracks with spalling.
		Bad	Severe cracks.
	Bank Erosion	Good	≦10 % loss embankment material
		Fair	>10% to ≦30% loss embankment material
		Poor	>30% to ≦40% loss embankment material
		Bad	>40% loss embankment material
	Slope Erosion	Good	Eroded area ≦5 % on total area of slope protection
		Fair	Eroded area >5% to ≦15% total area of slope protection
		Poor	Eroded area >15% to ≦20% total area of slope protection
		Bad	Eroded area >20% total area of slope protection
	Material Loss / Disintegration	Good	Loss of stones ≦50 in depth
		Fair	Loss of stones >50 to ≦100 in depth
		Poor	Loss of stones >100 to ≦150 in depth
		Bad	Loss of stones >150 in depth
Gabion Mattress	Damage on Containing Wire	Good	No damage.
		Fair	Protective paint is peeling off.
		Poor	Wires are heavily corroded with some broken portion.
		Bad	Wires are severely damaged and no longerfunctioning.
	Material Loss / Disintegration	Good	Loss of stones ≦50 in depth
		Fair	Loss of stones >50 to ≦100 in depth
		Poor	Loss of stones >100 to ≦150 in depth
		Bad	Loss of stones >150 in depth
	Bank Erosion	Good	≦10 % loss embankment material
		Fair	>10% to ≦30% loss embankment material
		Poor	>30% to ≦40% loss embankment material
		Bad	>40% loss embankment material
	Slope Erosion	Good	Eroded area ≦5 % on total area of slope protection
		Fair	Eroded area >5% to ≦15% total area of slope protection
		Poor	Eroded area >15% to ≦20% total area of slope protection
		Bad	Eroded area >20% total area of slope protection

Source: BMS/DPWH

Such information could provide valuable resources for cost-effective monitoring performance for bridges.

4.4.5 CONTRACT PACKAGING

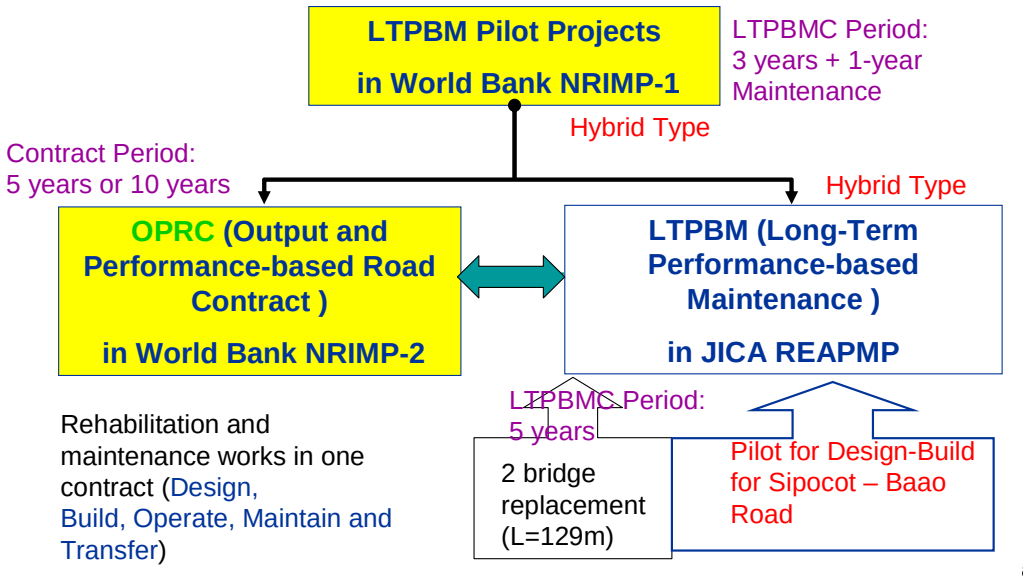
Since the contract period is relatively long (five years), sound management, stable financial background and good maintenance engineering are vital for the success of the LTPBM. The AC overlay, which is a major intervention for the LTPBM, requires costly asphalt batching plant, pavement equipment and aggregate crushing plant. To encourage participation of financially and technically capable contractors, including international firms, larger LTPBM contract will be more favorable. Hence, it is recommended that only one contractor should be selected for each LTPBM road link.

The LTPBM contract of REAPMP will be a hybrid type as illustrated in the figure below and defined by the following characteristics:

- A combination of quantity-unit price payment for overlay and emergency maintenance

works and lump-sum payment for RM works.

- Design by DPWH consultants, except for a pilot design-build scheme for Sipocot–Baao Road
- Construction supervision and monitoring by DPWH (consultants)
- Inclusive of two bridge replacements.



Note: The World Bank has requested DPWH to adopt OPRC for NRIMP-2 but the Senior Management Committee of DPWH has decided to apply LTPBM. However, the both agreed in the recent discussion that at least one OPRC will be implemented under NRIMP-2.

4.4.6 ROAD SAFETY MEASURES

Road safety component proposed for REAPMP is presented in the Pre-FS Report. The proposed major safety works are:

(a) Pavement markings

(b) Road signs and information

(c) Guardrails

A total of 123 km of accident black-spots were identified on the LTPBM road links based on TARAS as summarized in the following table. The Survey Team incorporated required costs in the construction cost estimate.

Unit: Php Million

Road Section	Total length (km)	Black-spots (km)	Pavement Marking				Road signs		Guardrails		Total Base Cost
			Center Line		Edge Line						
			Qty(km)	Cost	Qty(km)	Cost	Qty	Cost	Qty(km)	Cost	
Aringay-Laong	242	34	4.53	2.72	68.0	27.2	68.0	1.36	1.7	8.5	39.78
St Rita-N Ecija	169	19	2.53	1.52	38.0	15.2	76.8	0.76	0.95	4.75	27.23
Sipocot-Baao	109	12	1.60	0.96	24.0	9.6	24.0	0.48	0.6	3.00	14.04
Surigao~Bdr. Adusan D.N.	124	30	4.00	2.4	60.0	24.0	60.0	1.2	1.5	7.5	35.1
Others (UI Roads)		2									8.43
Total	644	123	16.13	9.68	242.0	96.8	242.0	4.84	6.05	30.75	150.0

Source: Table VI-1 Proposed Road Safety Facilities on LTPBM Roads of JBIC Pre-FS Report in July 2007.

The Study Team obtained from DPWH the following accumulated accident data of four years (2004-2007), and the anticipated countermeasures:

Road Section	High severity accidents	Accidents ratio per km	Pavement Marking Center	Pavement Marking Edge	Raised Pavement Markings	Road signs	Guard rails	Chevrons
	no	no	km	km	km	pcs	lm	lm
Aringay~Laong	209	0.86	26.67	480.00		480	12,000	
St Rita~N Ecja	19	0.12	2.53		322.0	38	950	
Bonngabo~Baler	12	0.10	110.94		16.00	238	6,387	230
Mindoro W Coast	11	0.09	210.00					
Sipocot~Baao	543	**5.43**	11.11		200.00	200	7,150	
Surigao~Davao	951	**5.90**	70.68		9.79	4,967	6,050	2,461
Catanduanes	21	0.10	22.45	404.00		404	10,100	

Source: Planning Service, Project Evaluation Division, June 11, 2009

Accident ratios are significant along Sipocot ~ Baao and Surigao ~ Bdr.Agusan D.N. roads. The Project Evaluation Division of PS/DPWH provided the Survey Team a detailed breakdown of the high severity accidents, as follows:

Road	Link No.	Location	Length (km)	Total number	Number/km
Sipocot~Baao, Region V					
	S03491LZ	**KM431.1-433.9**	2.8	22	**8**
	S03492LZ	**KM434.1-434.8**	0.7	11	**16**
	S03493LZ	**KM442.0-455.1**	13.1	113	**9**
	S03528LZ	KM456.5-479.9	23.4	101	4
Surigao~Bdr.Agusan D.N, Region XIII					
	S00339MN	KM1123.0-1166.0	43	72	2
	S00418MN	KM1168.0-1221.0	47	63	1

Source: Planning Service, Project Evaluation Division, June 2009

It is expected that a study on the cause of the accidents and corresponding countermeasures will be carried out for the locations highlighted on the above Table. Said study should be performed during the detailed engineering stage to incorporate safety facilities and traffic management in the LTPBM contracts.

The Survey Team recommends prioritizing installation of the safety facilities along the sections with high accident ratios is high and at accident prone areas. However, the data of accident prone areas are not available at present.

The following facilities are initially recommended:

Road Section	High severity accidents	Accidents ratio per km	Pavement Marking Center	Pavement Marking Edge	Raised Pavement Markings	Road signs	Guard rails	Chevrons
	no	no	km	km	km	pcs	lm	lm
Aringay-Laong	209	0.86	2	4		20		
St Rita-N Ecija	19	0.12	1	2				
Bonngabon-Baler	12	0.10						
Mindoro W. Coast	11	0.09						
Sipocot-Baao	543	**5.43**	10	20	1	30		20
Surigao-Davao	951	**5.90**	10	20	1	30		20
Total	1,972		30	60	2	110	1000	40

4.4.7 COST ESTIMATES

(1) General

1) Roads

Figure 4.4.4 shows the flowchart showing the procedure adopted by the JICA Survey Team for conducting the LTPBM planning and construction cost estimates. The cost estimate is a combined result of the existing road condition evaluation, future traffic and design load estimation, intervention planning on pavement and associated facilities (drainage, shoulder, slope and road furniture and safety).

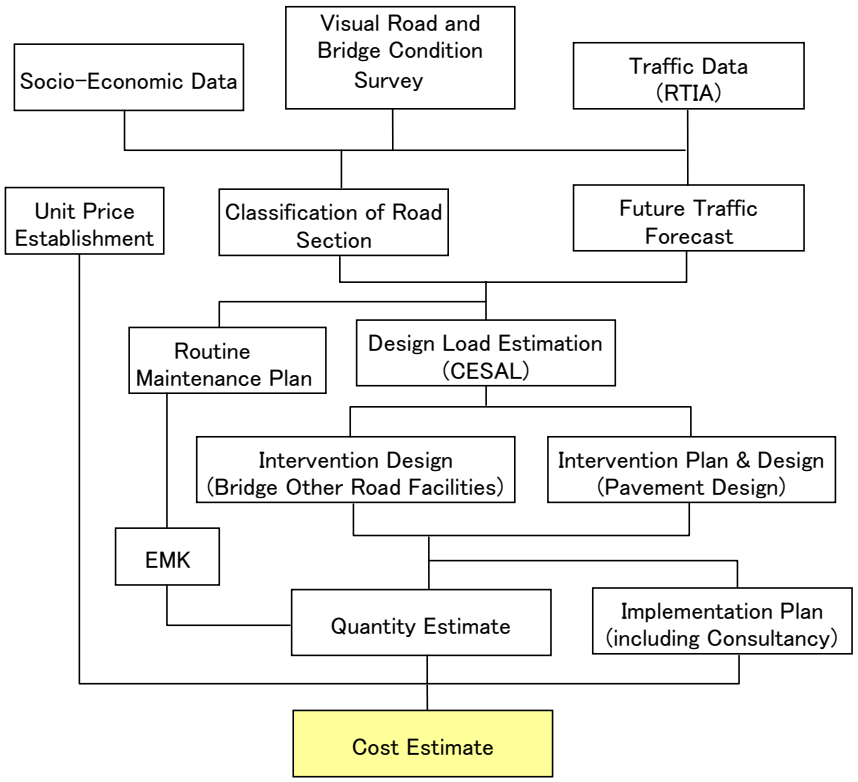


Figure 4.4.4 Flowchart showing Procedure for Conducting Construction Cost Estimate

2) Bridges

The proposed LTPBM bridge works were determined based on information obtained from the following:

- Bridge inventory data from field inspection conducted by designated JICA survey team, assisted by DPWH representatives from PMO-FS office and DEOs
- Road inventory data base (RBIA) data and straight line diagrams obtained from DEOs
- Discussions with district engineers
- Road Operation and Maintenance Sector Study Final Report by JBIC dated 31 July 2007

(2) Unit Prices

1) Roads

The LTPBM contracts under REAPMP adopt a combination of unit price quantity basis payment for RH, PM and backlog maintenance, and monthly lump-sum payment for RM. Emergency maintenance will be covered by dayworks rates/provisional sum in the bills of Quantities.

Therefore, unit prices established for the UI projects, except for AC pavement, are also applied for the LTPBM projects. Unit prices of AC pavement works are derived as shown in the following table.

Pay Item No.	Description	Unit	Unit Price (Php)			
			NRIMP-2 a)	ADB RSIP b)	**REAPMP c)**	PMS/HDM-4 d)
310(2)	Bituminous Concrete Wearing Course, Hot - Laid (50 mm thick)	m^2	798	655	840	985
310(6)	Bituminous Concrete Wearing Course, Hot - Laid (80 mm thick)	m^2	1,098	1,029	1,340	1,313
310(7)	Bituminous Concrete Wearing Course, Hot - Laid (100 mm thick)	m^2	1,321	1,378	1,680	1,642

Notes: a) Sep.2006 prices, b) Feb.2009 prices, c) Jun.2009 prices, excluding DD and Administration costs.
d) DPWH Mar.2009, including 4%DD, 8% CS and 3.5% of administration costs
e) Slab replacement (reblocking)

2) Bridges

The unit prices applied for cost estimation of LTPBM bridges were based on available information related to bridge repairs executed in the Philippines through the DPWH, including those under the JICA TCP.

Table 4.4.7 Unit Prices of Major Bridge Repair Works of LTPBM

Item	Unit	Unit Price
Epoxy Injection	m	2,527
Caulking & Epoxy Injection	m	6,347
Patching (Type-A)	Sq.M.	4,185
Patching (Type-B)	Sq.M.	7,824
Waterproofing (Rubber Type)	Sq.M.	1,706
Waterproofing (Asphalt Type)	Sq.M.	1,071
Removal of Asphalt Overlay	Sq.M.	1,000
Asphalt Overlay	Sq.M.	2,000
Superstructure for Concrete		
Epoxy Injection	m	2,527
Patching (Type-A)	Sq.M.	4,185
Patching (Type-B)	Sq.M.	8,332
Recasting with Concrete	Cu. M	42,475
Recasting with Grout	Cu. M	58,113
Superstructure for Steel		
Repainting on Steel (1st Grade)	Sq.M.	800
Anti-corrosion Paint	Sq.M.	1,295
Substructure		
Caulking & Epoxy Injection	m	6,347
Patching (Type-A)	Sq.M	4,185
Patching (Type-B)	Sq.M	6,665
Jacketing with Concrete	Cu. M	4,059
Bridge Accessories		
Replacement of Seamless Joint	m	26,174
Replacement to Rubber Bearing	m	55,355
Protection Works		
Slope Protection	Cu. M	2622
Gabion Mattress for Scoring	Cu. M	5,362

(3) Major Quantities

1) Roads

Major quantities for LTPBM ware estimated based on the field survey (visual inspection) and preliminary pavement design. Approximately 70% of the LTPBM cost is for pavement intervention (RH and AC overlay). The following figure shows overlay thickness design methodology applied for the LTPBM road links. Straight line diagrams were prepared for the pavement RH and overlay, by sub-project. The quantity estimate of LTPBM contract packages are given in Annex 4 and Annex 8.

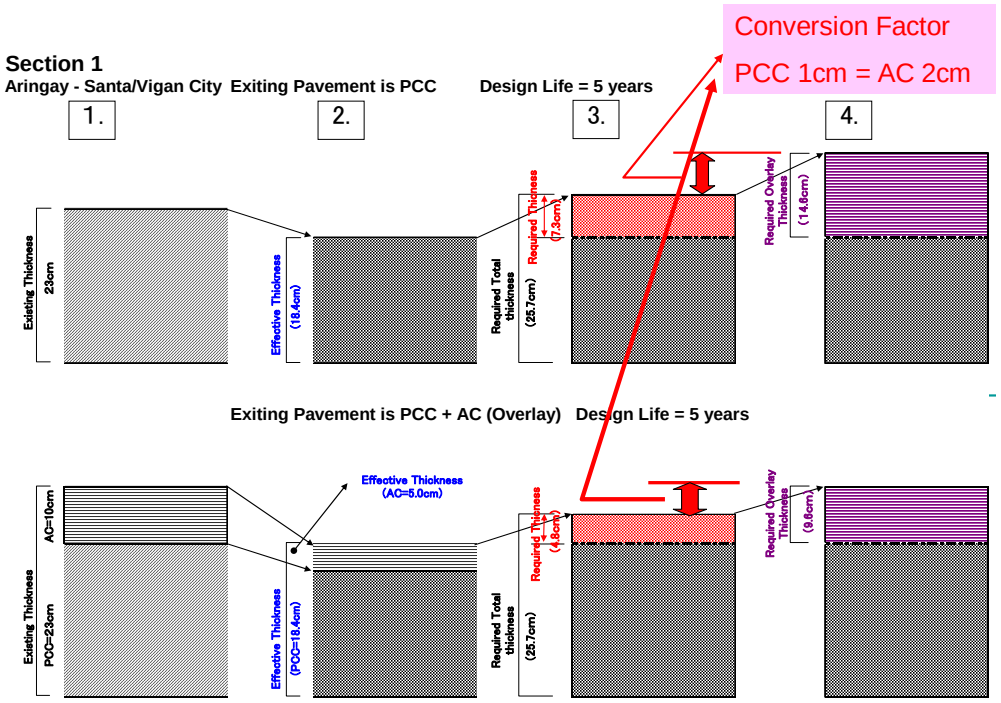


Figure 4.4.5 Basis of AC Overlay in LTPBM Intervention

About 10% of the cost will be allocated for RM which shall be paid monthly on a lump-sum basis. EMK method of DPWH is the basis for the cost estimate. The following table shows an example for determining the basis of RM quantity and cost estimate (refer to Annex 8 for other projects).

Table 4.4.8 Basis of Quantity and Cost Estimate of LTPBM (Example)

PBM 1-1 Aringay - Santa/Vigan City

Estimate of Quantities and Cost for Part M Routine Maintenance

Routine Maintenance: Road Length 146.0 km Bridge Length 570 m

Part / Item No.	Description	Unit	Unit Price	Quantity (For 5 yeas)	Amount (Php)	%
PART M	**Routine Maintenance**					
M.1	Road Surface Maintenance	km-month	10,587	8,760	92,740,368	53.2%
M.2	Shoulder Maintenance	km-month	3,980	8,760	34,864,800	20.0%
M.3	Drainage Maintenance	km-month	1,990	8,760	17,432,400	10.0%
M.4	Road Furniture Maintenance and Marking	km-month	1,990	8,760	17,432,400	10.0%
M.5	Bridge Maintenance	m-month	92	34,176	3,137,832	1.8%
M.6	Others (Emergency Maintenance)	Provisional Sum.			8,716,200	5.0%
	TOTAL				**174,324,000**	100.0%

Note: Routine Maintenance for 5 year contract period.

2) Bridges

Major quantities of bridges for LTPBM were estimated, considering the following:

- Repair or maintenance methods were selected for each identified poorly and badly conditioned existing bridge elements.

- Quantities of the damaged portions were approximated ,based on visual inspection

For bridges subject to PM/repairs, major quantities were determined for the following components:

- Deck slab (patching)
- Concrete superstructure (patching)
- Steel superstructure (painting)
- Substructure (patching)
- Bridge Accessories (seamless joint, bearing pads and railings)
- Protection works (slope protection and gabion mattress for scouring)

(4) Construction cost

1) Roads

Using the quantities and unit prices in the foregoing sections, the construction cost of the LTPBM projects were estimated at Php 8,392 million as shown in the following Table 4.4.9 (refer to Annex 8 for details).

Indirect costs for Parts A, B and K are calculated as a percentage of the direct cost which includes Part C to Part H. Meanwhile, Part G is estimated to be at 1.0 – 2.0% of Part C to Part D. The percentage rates as shown below are established by project size, based on the past undertakings of DPWH:

Work Items		Contract Size (Mill Php)	% to Direct Cost (C to H)
Part A:	Facility for the Engineer	500-1,000	1.50%
		1,000-1,500	1.25%
		1,500-2,000	1.00%
		2,000-3,000	0.75%
Part B:	Other General Requirements,	>3,000	2.25%
	including mobilization cost	500-1,000	2.00%
		1,000-1,500	1.75%
		1,500-2,000	1.50%
		2,000-3,000	1.25%
Part G:	Drainage and Slope Protection		(% to C,D,E)
	- Cross Drainage		1.0% - 2.0 %
	- Lateral Drainage		1.0% - 2.0 %
	- Slope Protection		1.0% - 2.0 %

Table 4.4.9 Estimated Construction Costs for LTPBM Projects

WORK ITEMS		PBM 1/JLM3: Aringay ~ Laoag				PBM 2/JLM8: Sta. Rita ~ Nueva Ecija				PBM 3 Sipocot ~ Baao				PBM 4 Surigao ~ Davao				Total	
		Section 1		Section 2		Section 1		Section 2		Section 1				Section 1					
SECTION LENGTH (Km)		146.00		96.12		73.77		95.50		109.48				123.50				644.37	
PART A	FACILITIES FOR THE ENGINEER	18,731,904	0.7%	8,142,832	1.2%	12,814,180	1.1%	8,806,773	1.2%	15,897,982	1.1%			18,477,639	1.1%			82,871,310	1.0%
PART B	OTHER GENERAL REQUIREMENTS	31,219,841	1.1%	10,857,109	1.6%	17,939,852	1.6%	11,742,364	1.6%	22,257,175	1.5%			25,868,694	1.6%			119,885,035	1.4%
PART C	EARTHWORK	78,447,820	2.9%	17,375,800	2.6%	25,029,900	2.2%	39,408,000	5.4%	103,289,060	7.2%			46,559,600	2.8%			310,110,180	3.7%
PART D	SUBBASE AND BASE COURSE	111,995,900	4.1%	19,546,640	2.9%	29,367,780	2.6%	12,865,130	1.8%	35,411,000	2.5%			45,496,960	2.7%			254,683,410	3.0%
PART E	SURFACE COURSES	2,081,779,540	76.1%	424,193,000	62.5%	781,332,730	68.0%	450,013,060	62.2%	976,625,520	67.8%			1,157,044,550	69.5%			5,870,988,400	70.0%
PART F	STRUCTURES	80,276,000	2.9%	24,109,000	3.6%	115,264,000	10.0%	28,086,000	3.9%	64,772,000	4.5%			111,608,000	6.7%			424,115,000	5.1%
PART G	DRAINAGE AND SLOPE PROTECTION	65,778,000	2.4%	23,056,000	3.4%	33,429,000	2.9%	25,113,000	3.5%	44,613,000	3.1%			49,963,000	3.0%			241,952,000	2.9%
PART H	MISCELLANEOUS STRUCTURES	79,310,000	2.9%	34,575,000	5.1%	40,711,000	3.5%	31,633,000	4.4%	47,128,000	3.3%			67,539,000	4.1%			300,896,000	3.6%
PART K	DAYWORK/PROVISIONAL SUM	12,487,936	0.5%	2,714,277	0.4%	5,125,672	0.4%	2,935,591	0.4%	6,359,193	0.4%			7,391,056	0.4%			37,013,725	0.4%
PART M	PREVENTIVE MAINTENANCE	174,324,000	6.4%	114,166,800	16.8%	88,117,200	7.7%	113,454,000	15.7%	124,260,000	8.6%			134,862,000	8.1%			749,184,000	8.9%
Total		2,734,350,942	100.0%	678,736,458	100.0%	1,149,131,314	100.0%	724,056,918	100.0%	1,440,612,930	100.0%			1,664,810,499	100.0%			8,391,699,060	100.0%
UNIT COST Php / KM		18,728,000		7,061,000		15,578,000		7,582,000		13,159,000				13,480,000				13,023,000	
Grand Total				3,413,087,399	40.7%			1,873,188,232	22.3%	1,440,612,930	17.2%			1,664,810,499	19.8%			8,391,699,060	37.0%

Note: refer to Annex 8 as to details.

The RM cost of the LTPBM was estimated based on EMK formula of DPWH for economic analysis. The base cost for RM was derived as follows:

- EMK at Year 2002: Php 70,798 /km

- Inflation Factor (Inflation Index from 2006 to June 2009): 1.45
- Base Cost for Routine Maintenance at June 2009: 70,798 x 1.45 = Php 102,700 /km

The estimated RM cost per year was computed as shown in the following table.

Project No.	Project Name	Base Cost (Php/km-year)	Road Length (km)	Pavement Type	Paved Width Factor	AADT&Surafce Factor		Bridge			EMK	Maintenance Cost (Mill Php/year)	Maintenance Cost (Php/km-month)	Total Maint. Cost (Php/5years)
						AADT	Factor	Length (m)	Type	Bridge Factor				
PBM 1-1	Aringay - Santa/Vigan City	102,700	146.0	AC	1.00	15,000	2.30	328.9 240.7	Concrete Steel	0.021	2.32	34,801,538	19,900	174,324,000
PBM 1-2	Santa/Vigan City - Laoag	102,700	96.1	AC	1.00	15,000	2.30	1,906.8 336.1	Concrete Steel	0.014	2.31	22,837,954	19,800	114,166,800
PBM 2-1	Sta.Rita-Cabanatuan	102,700	73.8	AC	1.00	15,000	2.30	325.0 232.0	Concrete Steel	0.020	2.32	17,583,883	19,900	88,117,200
PBM 2-2	Cabanatuan-Bdr.N.Ecija	102,700	95.5	AC	1.00	15,000	2.30	1,579.2 365.9	Concrete Steel	0.015	2.32	22,705,173	19,800	113,454,000
PBM-3	Sipocot - Baao	102,700	109.0	AC	1.00	10,000	2.20	407.1 504.2	Concrete Steel	0.024	2.22	24,896,123	19,000	124,260,000
PBM-4	Surigao (Lipata) - Bdr.Agusan D.N.	102,700	123.5	AC	1.00	5,000	2.10	1,043.9 909.9	Concrete Steel	0.022	2.12	26,914,281	18,200	134,862,000
													Total	749,184,000

2) Bridges

The summarized computed construction costs for each package and bridges are presented in the following table. Detailed cost estimates are presented in Annex 8 of this report.

Table 4.4.10 Repair and Maintenance Cost of LTPBM Bridges

No	Package (Road Section)	Sub-section	No. of Bridges	Cost per Package (Php)
PBM-1	Aringay-Laoag	Santa(Vigan)-Laoag	22	24,109,000
		Aringay-Santa(Vigan)	35	80,275,000
PBM-2	Sta. Rita-Nueva Ecija	Cabanatuan-Nueva Ecjija	17	28,086,000
		Sta. Rita-Cabanatuan	35	115,263,000
PBM-3	Sipocot-Baao		36	64,771,000
PBM-4	Surigao(Lipata)-Agusan		45	111,606,000
TOTAL			190	424,110,000

Table 4.4.11 Bridge Lists and Costs of LTPBM (1/4)

Section		No.	Name of Bridge	Location (Km)	Bridge Length (m)	Repair Cost (Php)
LTPBM-1	Santa(Vigan) - Laoag Sction		Ilocos Norte 2nd			
		1	Nagbibingcaan Br.	474+795	18.0	591,000
		2	Garasgas Bridge	471+840	33.2	1,516,000
		3	Tabug Bridge 2	466+693	6.0	238,000
		4	Maglaoi Bridge	457+340	4.0	88,000
		5	Apatot Bridge	452 +540	32.0	443,000
		6	Banas Bridge	448+724	30.0	2,881,000
		7	Sta Cruz Bridge	444+727	15.4	830,000
			Sub-total		138.6	6,587,000
			Ilocos Sur 1st			
		1	Sinait Bridge 2	441+429	31.3	126,000
		2	Sinait Bridge 1	440+634	7.8	316,000
		3	Teppeng Bridge	438+122	29.7	2,499,000
		4	Sapilang Bridge	437+291	30.0	626,000
		5	Bimmeclat Bridge	436+386	40.5	3,867,000
		6	San Juan Bridge	426+017	56.5	3,948,000
		7	Bical Bridge	424+200	84.0	3,100,000
		8	Parsua Bridge	421+682	60.0	503,000
		9	Bussawit Br. 3	417+055	22.0	119,000
		10	Bussawit Br. 2	416+965	10.8	249,000
		11	Gongogong Br.	410+417	7.0	157,000
		12	Barecbec Bridge	409+596	14.4	106,000
		13	Sinabaan Bridge 1	403+039	21.0	1,649,000
		14	Bulag Bridge 1	400+726	7.0	72,000
		15	Paing Bridge 2	399+216	9.0	185,000
			Sub-total		431.0	17,522,000
	Aringay-Santa(Vigan) Section		Ilocos Sur 2nd			
		1	Bantay Abut Br. 1	378+379	16.0	621,000
		2	Quinarayan Bridge	378+000	20.0	3,883,000
		3	Tulay Bridge	375+739	46.0	1,772,000
		4	San Antonio Bridge 2	374+740	19.4	1,521,000
		5	San Antonio Br. 1	373+757	60.0	1,133,000
		6	Sta Maria Centennial	371+844	320.6	5,418,000
		7	Santiago Bridge	358+274	7.7	368,000
		8	Dan-ar Bridge	352+404	6.0	322,000
		9	Bucong Bridge	352+079	131.3	13,280,000
		10	Langlangka Bridge 2	350+947	6.9	666,000
		11	Langlangka Bridge 1	350+200	18.0	496,000
		12	Alambique Bridge	345+462	9.8	1,344,000
		13	Nagbaudan Bridge	345+052	15.6	1,653,000
		14	Cavite Bridge 2	338+916	21.0	840,000
		15	Sta Lucia Bridge	337+776	17.6	1,628,000
		16	Sawat Bridge 2	334+484	6.8	269,000
		17	Sawat Bridge 1	333+200	35.6	3,754,000
		18	Bayugao Bridge	330+748	90.0	3,149,000
		19	Dili Bridge	328+264	89.4	226,000
		20	Casilagan Bridge	325+846	6.6	142,000
		21	Sevilla Bridge	324+968	26.6	1,965,000
		22	Borono Bridge	321+607	14.0	188,000
		23	Taliawen Bridge 2	317+961	15.6	315,000
			Sub-total		1,000.5	44,953,000
			La Union 1st			
		1	Borobor Bridge	303+197	60.0	189,000
		2	Pantar Bridge	300+958	42.8	881,000
		3	Maragayap East Br.	278+721	50.0	769,000
		4	Baroro Bridge	282+224	196.7	1,235,000
			Sub-total		349.5	3,074,000
			La Union 2nd			
		1	Lossoc Bridge	262+614	36.0	2,572,000
		2	Magsaoang Br.	262+108	10.0	772,000
		3	Bauang Bridge 2	258+349	220.3	5,030,000
		4	Bauang Bridge 1	257+860	245.8	5,075,000
		5	Maning Bridge	255+938	12.8	263,000
		6	Bagbag Bridge	252+169	30.6	1,487,000
		7	Caba Bridge	247+488	60.8	3,566,000
		8	Aringay Bridge	243+147	276.6	13,483,000
			Sub-total		616.3	32,248,000
Total of PBM-1					2,535.9	104,384,000

Table 4.4.11 Bridge Lists and Costs of LTPBM (2/4)

Section		No.	Name of Bridge	Location (Km)	Bridge Length (m)	Repair Cost (Php)
LTPBM-2	Cabanatuan-Nueva Ecija Section		Nueva Ecija 1st			
		1	Sicsican Bridge	132+570	150.0	1,049,000
		2	Lomboy Bridge 1	135+115	23.0	2,975,000
		3	Didabuyan Bridge	135+859	24.0	1,064,000
		4	Malasin Bridge	160+840	16.0	51,000
		5	Manicla Bridge	164+476	19.0	625,000
		6	Lomboy Bridge 2	170+992	12.0	316,000
		7	Tuntunin Bridge	172+567	16.0	815,000
		8	Ese-ese Bridge	173+538	12.0	1,114,000
		9	Puncan Bridge 2	176+692	77.0	2,009,000
		10	DancayBridge	180+646	16.0	1,068,000
		11	Digdig Bridge	181+594	66.0	8,110,000
		12	Putlan Bridge	194+893	46.8	2,135,000
		13	Minuli Bridge 1	198+008	12.2	563,000
		14	Minuli Bridge 2	198+250	16.0	2,574,000
		15	Amawinan Br.	200+427	7.5	186,000
		16	Capintalan Br. 1	202+109	24.0	1,498,000
		17	Capintalan Br. 2	206+465	20.0	1,934,000
			Sub-total		557.5	28,086,000
	Sta. Rita-Cabanatuan Section		Nueva Ecija 2nd			
		1	Baluarte Bridge 1	84+620	10.0	1,238,000
		2	Baluarte Bridge 2	85+762	10.0	222,000
		3	Baluarte Bridge 3	86+322	10.0	24,000
		4	Malimba Bridge	87+101	30.4	4,015,000
		5	Dona Josefa Br.	94+060	279.4	6,056,000
		6	Castellano Bridge*	94+758	45.0	23,085,000
		7	Tabuating Bridge	104+195	60.0	785,000
		8	Mamalacol Bridge	105+392	30.0	1,535,000
		9	Gen Luna Bridge	119+779	606.0	32,897,000
			Sub-total		1,080.8	69,857,000
			Bulacan 1st			
		1	Tabang Bridge	35+800	86.9	9,891,000
		2	Sta Rita Bridge	38+400	71.5	1,926,000
		3	Irrigation Bridge	41+180	16.0	371,000
		4	Plaridel-Pulilan Br.	42+000	175.3	2,593,000
		5	Cut-cut Bridge 1	42+900	18.8	1,185,000
		6	Cut-cut Bridge 2	45+600	21.9	3,142,000
		7	Sto Cristo Bridge	46+600	15.7	1,906,000
		8	Mucha Bridge	48+000	15.7	1,516,000
		9	Tarcan Bridge	48+940	15.4	965,000
		10	Tangos Bridge 1	50+40	15.7	592,000
			Sub-total		452.9	24,087,000
			Bulacan 2nd			
		1	Ulingao Bridge 1	52+800	15.7	1,183,000
		2	Ulingao Bridge 2	52+970	15.7	1,564,000
		3	Maasim Bridge 1	60+900	24.0	822,000
		4	Magasawang Sapa Br.	68+000	9.0	411,000
		5	Anyatam Bridge 1	68+700	24.0	1,218,000
		6	Anyatam Bridge 2	69+083	36.0	2,365,000
		7	Marugay-rugay Br. 1	70+200	31.0	436,000
		8	Marugay-rugay Br. 2	70+250	25.0	803,000
		9	Garlang Bridge	71+200	12.0	772,000
		10	Oriente Bridge	74+180	54.0	5,079,000
		11	C. de Leon Bridge 1	74+850	15.0	3,594,000
		12	C. de Leon Bridge 2	74+950	15.0	45,000
		13	Tigpalas Bridge	75+646	48.0	602,000
		14	Ilog Bakod Bridge	79+000	15.0	9,000
		15	Salakot Bridge	69+650	36.0	1,001,000
		16	Labnoan Bridge	81+000	36.0	1,415,000
			Sub-total		411.4	21,319,000
Total of PBM-2					1,945.1	143,349,000

Table 4.4.11 Bridge Lists and Costs of LTPBM (3/4)

Section		No.	Name of Bridge	Location (Km)	Bridge Length (m)	Repair Cost (Php)
LTPBM-3	Sipocot-Baao (Bdr. Camarines Norte-Bdr. Albay)		Camarines Sur 1st			
		1	Baraca Bridge 2	430+131	40.0	3,640,000
		2	Baraca Bridge 1	429+571	16.0	884,000
		3	San Fernando Br.	428+362	22.0	1,339,000
		4	Pamukid Bridge	424+961	23.0	3,528,000
		5	San Isidro Bridge	422+922	23.0	3,528,000
		6	San Gabriel Bridge	422+426	18.0	893,000
		7	Pahoho Bridge	421+869	12.0	2,086,000
		8	Tiniguiban Bridge	421+328	25.0	392,000
		9	Sgt Matias Bridge	419+978	16.0	392,000
		10	Malansad Bridge	411+875	25.0	392,000
		11	Nagkupa Bridge	410+760	14.0	2,502,000
		12	Naubod Bridge 2	410+169	12.0	3,196,000
		13	Naubod Bridge 1	410+130	14.0	2,147,000
		14	Aslong Bridge	406+070	72.0	11,769,000
		15	Impig Bridge 1	392+595	22.0	393,000
		16	Impig Bridge 2	392+124	22.3	3,730,000
		17	Abobo Bridge	389+053	22.0	3,139,000
		18	Aga Bridge	384+874	38.0	284,000
		19	Calagbangan Br.	382+929	36.0	1,257,000
		20	Sipang Bridge	379+665	24.0	393,000
		21	Yabo Bridge	378+869	44.0	785,000
		22	Sook Bridge	377+756	36.0	3,586,000
		23	Napolidan Bridge	374+791	32.0	720,000
			Sub-total		608.3	50,975,000
			Camarines Sur 2nd			
		1	Anayan Bridge	452+202	22.4	29,000
		2	Hamorawon Br.	450+595	12.5	521,000
		3	San Jose Bridge	448+684	60.0	4,509,000
		4	Cadlan Bridge	445+506	11.6	521,000
		5	Milaor Bridge 2	445+129	12.0	1,165,000
		6	Milaor Bridge 1	432+579	16.4	685,000
			Sub-total		134.9	7,430,000
			Camarines Sur 4th			
		1	Unknown Bridge 2	479+466	6.0	105,000
		2	Santiago Bridge	473+200	7.1	76,000
		3	Cagas Bridge	472+800	36.0	1,868,000
		4	San Miguel Bridge	472+330	19.0	544,000
		5	Francisco Bridge	466+350	24.0	96,000
		6	Agdangan Bridge	459+093	11.0	101,000
		7	Pawili Bridge	457+110	65.0	3,576,000
			Sub-total			6,366,000
Total of PBM-3					743.2	64,771,000

Table 4.4.11 Bridge Lists and Costs of LTPBM (4/4)

Section		No.	Name of Bridge	Location (Km)	Bridge Length (m)	Repair Cost (Php)
PBM-4	Surigao (Lipata) - Bdr. Agusan		Agusan del Norte			
		1	Baleguian Bridge	1181+112.5	28.0	188,000
		2	Bangonay Bridge	1187+112.5	168.1	2,248,000
		3	Cabadbaran Bridge	1210+597.5	221.6	3,173,000
		4	Calo-oy Bridge	1205+034	21.0	440,000
		5	Capudlosan Bridge	1219+394	18.0	960,000
		6	Comagascas Bridge	1208+260	30.0	1,226,000
		7	Guinoyoran Bridge	1197+534	19.0	172,000
		8	Humilog Bridge	1219+629	18.0	960,000
		9	Jagupit Bridge	1196+734.4	18.0	1,001,000
		10	Jaliobong Bridge	1175+287	30.0	746,000
		11	Mamkas Bridge	1168+007.5	50.5	874,000
		12	Maraput Bridge	1207+192	28.0	2,167,000
		13	Mina-ano Bridge	1220+354.5	16.0	838,000
		14	Minusuang Bridge	1206+561	28.0	1,832,000
		15	Panaytayon Bridge	1221+563	12.0	1,030,000
		16	Pandanon Bridge	1214+317	24.0	686,000
		17	Paypay (Twin) Bridge**	1194+008	84.0	34,326,000
		18	Puyo Bridge	1186+717	123.7	2,704,000
		19	Sanghan Bridge	1217+338	26.0	633,000
		20	Sayadion Bridge	1183+566.58	18.0	543,000
		21	Sta. Ana Bridge	1202+817.5	99.1	1,411,000
		22	Tagmamarkay Bridge	1199+298.5	26.6	2,513,000
			Sub-total		1,107.5	60,671,000
			Surigao del Norte			
		1	Alimpatayan Bridge	1162+247.52	22.4	2,261,000
		2	Alipao Bridge	1162+377.25	14.6	1,383,000
		3	Baloran Bridge	1163+144.76	18.0	838,000
		4	Cagbayoc Bridge	1128+715	15.0	1,006,000
		5	Candiis Bridge	1163+317.67	15.8	1,047,000
		6	Kinabutan Bridge I	1121+658	16.0	1,042,000
		7	Kinabutan Bridge II	1121+807	92.4	3,729,000
		8	Lamintao Bridge	1121+062	25.1	1,053,000
		9	Lipata Bridge	1115+750	16.0	61,000
		10	Mabuhay Bridge	1136+151.16	48.0	3,015,000
		11	Magtiaco Bridge	1164+590.26	187.0	11,770,000
		12	Malico Bridge	1122+068	30.7	2,977,000
		13	Marga Bridge	1153+578	14.6	1,864,000
		14	Maypayang Bridge II	1158+223.92	6.6	1,064,000
		15	Motorpool Bridge	1151+705.03	8.9	1,817,000
		16	Payao Bridge	1146+438.68	30.0	3,274,000
		17	Pingaping Bridge	1152+110.96	15.6	401,000
		18	Pongtud Bridge	1158+552.23	36.5	1,608,000
		19	Reyes Bridge	1130+733	28.5	2,423,000
		20	San Pedro Bridge	1165+704.41	44.0	576,000
		21	Siana Bridge	1157+169.16	15.5	1,957,000
		22	Timamana Bridge	1151+097.87	15.6	2,876,000
		23	Tubod Bridge	1155+794	25.4	1,512,000
		23	Tugbongon Bridge	1163+506.08	10.6	1,381,000
			Sub-total		752.6	50,935,000
Total of PBM-4					1,860.2	111,606,000
Grand Total					7,084.4	424,110,000

Note: * and ** are recommended as reconstruction in LTPBME

(5) Consultancy Service Costs

The consultancy service for the LTPBM project was estimated at Php 820.7 million, including:

- Detailed engineering design (concept design for PBM-3) and preparation of tender documents.
- Procurement assistance for the contractor
- Training (workshops) for the selected contractors
- Construction supervision and project management.

Project No.	Project Name	Road Length (km)	Construction Cost (Mill Php)	Central Team (DD + CS) (Mill Php)	Field Supervision Teams (CS) (Mill Php)	Total	
						(Mill Php)	(%)
PBM 1-1	Aringay - Santa/Vigan City	146.0	2,734.4	157.7	83.9	241.6	29.4%
PBM 1-2	Santa/Vigan City - Laoag	96.1	678.7	39.2	20.8	60.0	7.3%
PBM 2-1	Sta.Rita-Cabanatuan	73.8	1,149.1	66.3	50.4	116.7	14.2%
PBM 2-2	Cabanatuan-Bdr.N.Ecija	95.5	724.1	41.8	31.7	73.5	9.0%
PBM-3	Sipocot - Baao	109.5	1,440.6	83.1	67.2	150.3	18.3%
PBM-4	Surigao (Lipata) - Bdr.Agusan D.N.	123.5	1,664.8	96.0	82.6	178.7	21.8%
Total		644.4	8,391.7	484.1	336.7	820.7	100.0%
% to the Construction Cost				5.8%	4.0%	9.8%	

Note: Cost including VAT (12%)

(6) Other Costs including Tax, ROW Acquisition and Administration

The ROW acquisition and resettlement costs are required since the project involves RH and maintenance of the existing roads.

The cost of project administration is established to be approximately 2.5% of the estimated total project cost. Value-added tax (VAT) considered is 12%.

4.4.8 ECONOMIC EVALUATION AND MULTI-CRITERIA ANALYSIS OF LTPBM

(1) Roads for Evaluation of LTPBM Projects

The LTPBM Projects considered for economic evaluation are the following:

Project ID	Road/ Section	Project Length (km)	AADT (2008)
PBM-1-(1)	Aringay-Laoag (Section 1)	146.0	9,297
PBM-1-(2)	Aringay-Laoag (Section 2)	96.1	8,429
PBM-2-(1)	Sta.Rita-Bdr.Nueva Ecija (Section 1)	73.8	11,711
PBM-2-(2)	Sta.Rita-Bdr.Nueva Ecija (Section 2)	95.5	9,765
PBM-3	Sipocot-Baao	109.5	7,746
PBM-4	Srigao (Lipata)-Bdr.Agusan D.N.	123.5	4,493

(2) Benefits Estimated in REAPMP

The benefits estimated quantitatively in the evaluation are:

- Savings in VOC, and
- Savings in Passenger TTC

The benefit of traffic accident reduction was not included due to unavailability of necessary data. The BVOC in updated 2008/09 prices were provided by DPWH, which combines the cost the passenger TTC with VOC (=Running cost + Fixed Cost + Time cost).

(3) Methodology for Economic Evaluation

The methodology and procedures for the economic evaluation are basically similar to that of UI projects as illustrated in Figure 4.4.6. It is noted that the Pre-FS applied the HDM-4 Model in their economic evaluation. However, due to the difficulty in calibrating all parameters in the HDM-4 Model to reflect local conditions within a given timeframe, an alternative approach was adopted in this Survey as explained below:

Collection of Necessary Data

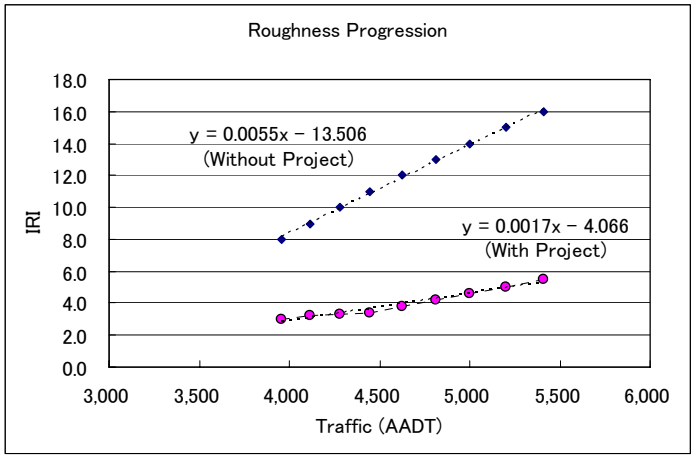
For the benefit estimation, the following information was collected mainly from DPWH and from the results of the JBIC Pre-FS.

- Traffic volume (AADT) by vehicle type (12 types) and future growth rates
- Unit VOC (as Road User Cost (RUC) including passenger time cost: Php/km)
- Road surface type (asphalt, concrete, gravel) and condition (good, fair, poor, and bad)
- Roughness Progression calculated in the JBIC Pre-FS for both “With” and “Without” project situations.

Considering the above data, the economic benefits were estimated using the following steps:

Step 1: Analysis on Roughness Progression

The JBIC Pre-FS presented the results of roughness progression with AADT by each road section which were downloaded from the results of HDM-runs. Regression analyses were conducted by applying these results, to determine the relationship between the roughness (IRI) and AADT. Example of the regression analysis is shown below.



Step 2: Forecasting IRI by applying future traffic volume

The future IRI was estimated by inputting future traffic volume to the equations obtained in the above regression analysis.

Step 3: Estimation of Relationship between IRI and Unit VOC (including time cost) by surface type (paved and gravel)

As the benefits by the implementation of the REAPMP projects will be generated mainly from the roughness improvement (from "Bad" to "Good" condition, for example), it is necessary to examine the relationship between IRI and VOC. The road condition and values of IRI are given by PMS, as shown below:

Roughness Category	Roughness (IRI) in PMS		
	Asphalt	Concrete	Gravel
Good	2.5	3.5	5.0
Fair	4.0	5.0	7.5
Poor	6.0	7.0	10.0
Bad	8.0	9.0	14.0

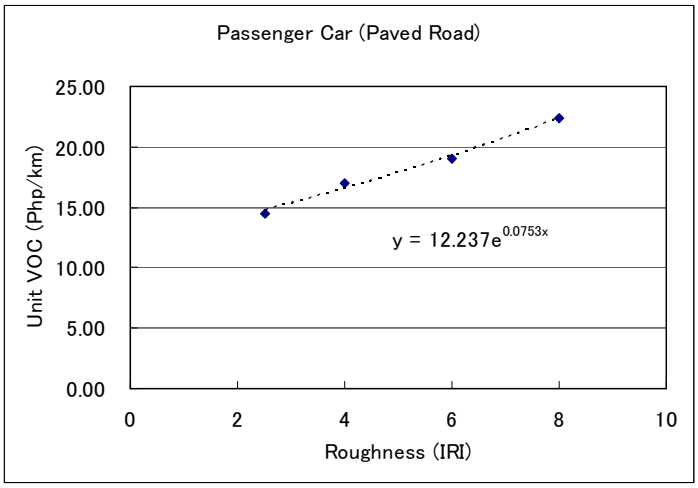
Values of VOC by road condition are presented as follows:

Pavement Type & Condition	Vehicle Operating Cost (VOC=R+F+T), 2005 Prices, Php/km									
	Car	Ratio	Jeepney	Ratio	Buses	Ratio	Trucks	Ratio	Motorcycle	Ratio
Paved Good	9.639	1.00	8.873	1.00	16.902	1.00	13.814	1.00	1.812	1.00
Paved Fair	11.294	1.17	10.419	1.17	19.868	1.18	16.189	1.17	2.143	1.18
Paved Poor	12.649	1.31	11.938	1.35	23.027	1.36	18.170	1.32	2.891	1.60
Paved Bad	14.811	1.54	15.034	1.69	30.008	1.78	21.426	1.55	3.816	2.11
Gravel Good	12.146	1.26	10.788	1.22	20.165	1.19	17.351	1.26	2.267	1.25
Gravel Fair	15.003	1.56	13.241	1.49	24.665	1.46	21.421	1.55	2.821	1.56
Gravel Poor	16.446	1.71	14.958	1.69	28.318	1.68	23.544	1.70	3.335	1.84
Gravel Bad	18.438	1.91	17.537	1.98	33.957	2.01	26.505	1.92	4.270	2.36

Original Source: DPWH. Ratios were calculated by JICA Survey Team.

The values of VOC in 2008/09 price by pavement type/condition were obtained by applying the above ratios per vehicle type to the 2008 VOC values of good condition paved roads (as values of VOC in 2008/09 price are available only for good condition paved roads at present).

Given the values of IRI by surface condition and corresponding VOC values, another regression analyses were carried out to estimate VOC in both "Without" and "With" project situations. Below is an example of regression analysis for passenger car in the case of paved surface type.



Step 4: Estimation of Unit VOC in both "Without" and "With" project cases

Since the future values of IRI were already estimated in the above Step 2, unit VOCs (Php/km) in "Without" and "With" situations were obtained by inputting them to the equations in Step 3.

Step 5: Estimation of Total Benefit

The road user costs (VOC including the time cost) were calculated in both "Without" and "With" project situations by multiplying the section length and traffic volume to the unit VOCs estimated in Step 4. The differences of VOC for both situations are considered as the "Benefit".

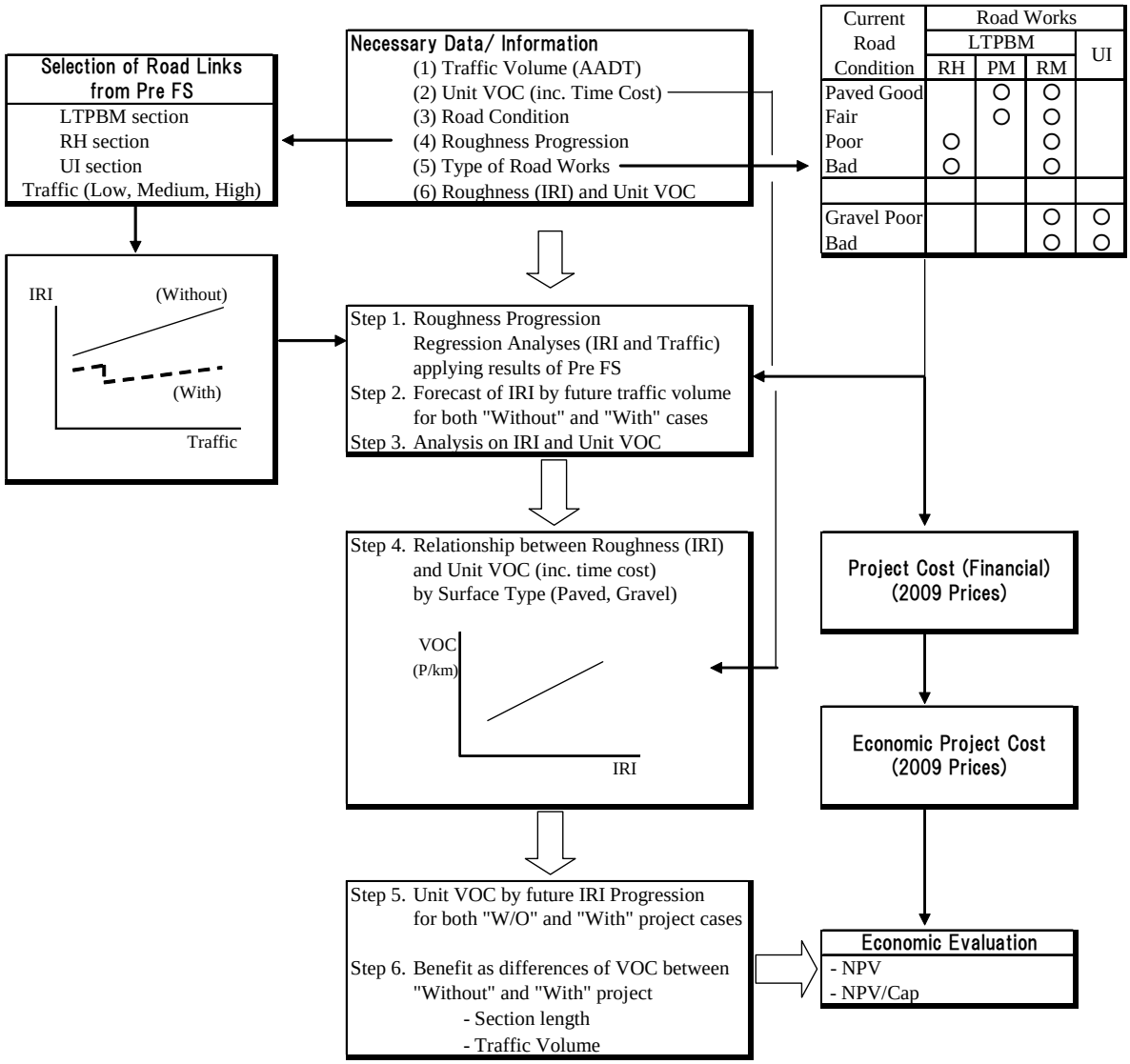


Figure 4.4.6 Flowchart Showing Benefit Estimation Procedure

(4) Economic Costs

For the purpose of economic evaluation, the financial project costs (capital cost and RM cost) were converted to economic costs. In this evaluation, the Standard Conversion Factor (SCF = 0.82) was applied based on the information provided by DPWH.

(5) Premises of Economic Evaluation

The following pre-conditions were established for the cost-benefit cash flow analysis:

1) Price Level: 2009 prices
2) Evaluation Period: 10 years after opening year
3) Residual Value: No residual values were counted
4) Opportunity Cost of Capital (Discount Rate): 15%

Cost Benefit Stream by each project is shown in Table 4.4.13 to Table 4.4.18.

(6) Results of Economic Evaluation

The results of economic evaluation of the four LTPBM projects and six road sections are summarized in Table 4.4.12:

Table 4.4.12 Results of Economic Evaluation (LTPBM Projects)

Project ID	Road/ Section	Project Length (km)	NPV (Mil.Php)	NPV/C	B/C	EIRR (%)
PBM-1-(1)	Aringay-Laoag (Section 1)	146.0	62,865	35.1	36.1	1021
PBM-1-(2)	Aringay-Laoag (Section 2)	96.1	27,086	46.9	47.9	952
PBM-2-(1)	Sta.Rita-Bdr.Nueva Ecija (Section 1)	73.8	22,619	28.8	29.8	573
PBM-2-(2)	Sta.Rita-Bdr.Nueva Ecija (Section 2)	95.5	10,832	18.1	19.1	517
PBM-3	Sipocot-Baao	109.5	20,006	19.4	20.4	434
PBM-4	Surigao (Lipata)-Bdr.Agusan D.N.	123.5	10,242	8.6	9.6	183

All LTPB projects are economically feasible with positive values of NPV/cap, applying the 15% discount rate.

Table 4.4.13 Cost Benefit Stream: PBM-1-(1): Aringay-Laoag (Section 1)

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV2009 Cost	PV2009 Benefit
					Length by Condition (km)				146.0			
					18.0	75.5	46.9	5.6	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	20.3		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	2011	20.3		20.3	0.0	0.0	0.0	0.0	0.0	-20.3	15.4	0.0
1	2012	1,577.8		1,577.8	0.0	877.4	0.0	0.0	877.4	-700.4	1037.4	576.9
2	2013	374.5		374.5	151.2	2,119.9	6,497.9	630.5	9,399.5	9,025.0	214.1	5374.2
3	2014	328.6		328.6	414.8	3,482.3	9,242.1	788.2	13,927.5	13,599.0	163.4	6924.4
4	2015	129.5		129.5	845.6	4,271.8	13,435.1	908.1	19,460.6	19,331.1	56.0	8413.3
5	2016	50.4		50.4	1,063.5	5,248.3	14,516.2	932.8	21,760.8	21,710.4	18.9	8180.7
6	2017		502.1	502.1	1,335.1	6,461.3	14,958.5	954.9	23,709.8	23,207.7	164.1	7750.8
7	2018		195.0	195.0	1,674.7	7,975.0	15,374.1	973.5	25,997.3	25,802.3	55.4	7390.1
8	2019		180.6	180.6	2,034.5	9,576.1	15,707.1	984.5	28,302.2	28,121.5	44.7	6995.9
9	2020		74.5	74.5	2,473.3	11,527.5	16,004.2	991.2	30,996.2	30,921.8	16.0	6662.4
10	2021		28.5	28.5	3,010.3	13,915.9	16,254.9	992.7	34,173.8	34,145.2	5.3	6387.3
	Total	2,501.3	980.7	3,461.7	13,003.1	65,455.6	121,990.0	8,156.4	208,605.0	205,143.3	1,790.7	64,656.0

NPV	62,865.3
NPV/Cap	35.11
B/C	36.11

Table 4.4.14 Cost Benefit Stream: PBM-1-(2): Aringay-Laoag (Section 2)

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length			
					Length by Condition (km)				96.1		PV2009 Cost	PV2009 Benefit
					3.0	50.6	42.5	0.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	5.0		5.0	0.0	0.0	0.0	0.0	0.0	-5.0	4.4	0.0
0	2011	5.0		5.0	0.0	0.0	0.0	0.0	0.0	-5.0	3.8	0.0
1	2012	425.9		425.9	0.0	601.5	0.0	0.0	601.5	175.6	280.0	395.5
2	2013	93.0		93.0	12.0	1,457.7	2,609.9	0.0	4,079.5	3,986.5	53.2	2332.5
3	2014	64.4		64.4	30.0	2,387.1	3,166.7	0.0	5,583.8	5,519.4	32.0	2776.2
4	2015	15.0		15.0	56.3	2,917.4	3,846.9	0.0	6,820.6	6,805.6	6.5	2948.7
5	2016	12.5		12.5	65.4	3,569.0	4,681.0	0.0	8,315.3	8,302.8	4.7	3126.0
6	2017		377.5	377.5	76.0	4,372.6	5,707.9	0.0	10,156.5	9,779.0	123.4	3320.2
7	2018		139.3	139.3	88.4	5,367.8	6,462.1	0.0	11,918.3	11,779.0	39.6	3387.9
8	2019		91.1	91.1	101.1	6,445.0	6,556.1	0.0	13,102.2	13,011.1	22.5	3238.7
9	2020		18.7	18.7	115.7	7,754.9	6,629.4	0.0	14,500.0	14,481.3	4.0	3116.7
10	2021		18.7	18.7	132.7	9,353.7	6,677.3	0.0	16,163.6	16,144.9	3.5	3021.1
	Total	620.9	645.3	1,266.2	677.5	44,226.6	46,337.2	0.0	91,241.4	89,975.3	577.6	27,663.5

NPV	27,085.8
NPV/Cap	46.89
B/C	47.89

Table 4.4.15 Cost Benefit Stream: PBM-2-(1): Sta.Rita-Bdr.Nueva Ecija (Section 1)

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length			
					Length by Condition (km)				73.8		PV2009 Cost	PV 2009 Benefit
					11.0	38.8	24.0	0.0	Total Benefit			
	2008				0.0	0.0	0.0	0.0	0.0			
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	9.8		9.8	0.0	0.0	0.0	0.0	0.0	-9.8	8.5	0.0
0	2011	9.8		9.8	0.0	0.0	0.0	0.0	0.0	-9.8	7.4	0.0
1	2012	628.2		628.2	0.0	564.1	0.0	0.0	564.1	-64.1	413.1	370.9
2	2013	178.9		178.9	71.7	1,293.4	1,868.7	0.0	3,233.9	3,054.9	102.3	1,849.0
3	2014	159.6		159.6	153.0	2,186.6	2,244.9	0.0	4,584.5	4,424.9	79.4	2,279.3
4	2015	55.7		55.7	215.9	2,640.3	2,699.1	0.0	5,555.3	5,499.6	24.1	2,401.7
5	2016	21.8		21.8	228.8	3,190.8	3,249.5	0.0	6,669.1	6,647.3	8.2	2,507.2
6	2017		238.3	238.3	242.4	3,861.3	3,919.0	0.0	8,022.8	7,784.5	77.9	2,622.7
7	2018		112.0	112.0	256.8	4,681.0	4,736.8	0.0	9,674.6	9,562.6	31.8	2,750.1
8	2019		99.2	99.2	269.5	5,516.9	5,570.3	0.0	11,356.8	11,257.6	24.5	2,807.2
9	2020		31.6	31.6	282.6	6,514.1	6,564.3	0.0	13,361.0	13,329.4	6.8	2,871.9
10	2021		14.4	14.4	296.2	7,707.5	7,753.8	0.0	15,757.5	15,743.1	2.7	2,945.2
	Total	1,063.9	495.5	1,559.4	2,017.0	38,156.1	38,606.5	0.0	78,779.7	77,220.3	786.7	23,405.2

NPV	22,618.5
NPV/Cap	28.75
B/C	29.75

Table 4.4.16 Cost Benefit Stream: PBM-2-(2): Sta.Rita-Bdr.Nueva Ecija (Section 2)

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV2009 Cost	PV2009 Benefit
					Length by Condition (km)				95.5			
					13.1	43.8	36.6	2.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	6.2		6.2	0.0	0.0	0.0	0.0	0.0	-6.2	5.4	0.0
0	2011	6.2		6.2	0.0	0.0	0.0	0.0	0.0	-6.2	4.7	0.0
1	2012	432.4		432.4	0.0	294.9	0.0	0.0	294.9	-137.5	284.3	193.9
2	2013	94.5		94.5	33.6	630.7	1,337.1	103.7	2,105.2	2,010.7	54.0	1,203.6
3	2014	88.4		88.4	69.5	1,010.8	1,504.0	114.3	2,698.6	2,610.2	44.0	1,341.7
4	2015	29.0		29.0	95.0	1,155.9	1,693.2	126.1	3,070.1	3,041.1	12.5	1,327.3
5	2016	13.7		13.7	97.3	1,321.2	1,908.0	139.3	3,465.9	3,452.1	5.2	1,303.0
6	2017		337.7	337.7	99.6	1,509.9	2,152.4	154.2	3,916.1	3,578.4	110.4	1,280.2
7	2018		127.7	127.7	101.7	1,725.7	2,431.0	170.9	4,429.3	4,301.6	36.3	1,259.1
8	2019		121.4	121.4	103.3	1,930.1	2,694.5	186.6	4,914.5	4,793.0	30.0	1,214.8
9	2020		35.8	35.8	104.8	2,159.4	2,989.4	203.9	5,457.4	5,421.6	7.7	1,173.0
10	2021		18.6	18.6	106.1	2,416.8	3,320.0	223.0	6,065.9	6,047.3	3.5	1,133.8
	Total	670.3	641.3	1,311.6	810.9	14,155.4	20,029.4	1,422.1	36,417.9	35,106.2	597.9	11,430.3

NPV at 15%	10,832.4
NPV/Cap	18.12
B/C	19.12

Table 4.4.17 Cost Benefit Stream: PBM-3: Sipocot-Baao

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV2009 Cost	PV2009 Benefit
					Length by Condition (km)				109.5			
					1.0	66.9	41.6	0.0	Total Benefit			
	2008				0.0	0.0	0.0	0.0	0.0			
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	12.6		12.6	0.0	0.0	0.0	0.0	0.0	-12.6	11.0	0.0
0	2011	12.6		12.6	0.0	0.0	0.0	0.0	0.0	-12.6	9.6	0.0
1	2012	839.5		839.5	0.0	485.5	0.0	0.0	485.5	-354.0	552.0	319.2
2	2013	203.1		203.1	0.0	1,267.6	2,040.0	0.0	3,307.6	3,104.5	116.1	1,891.1
3	2014	203.1		203.1	8.7	2,248.0	2,366.2	0.0	4,622.8	4,419.7	101.0	2,298.4
4	2015	36.2		36.2	14.6	2,621.4	2,744.9	0.0	5,380.9	5,344.6	15.7	2,326.3
5	2016	29.9		29.9	16.4	3,055.7	3,185.4	0.0	6,257.6	6,227.6	11.3	2,352.5
6	2017		379.6	379.6	18.4	3,561.9	3,699.1	0.0	7,279.4	6,899.8	124.1	2,379.6
7	2018		152.5	152.5	20.7	4,152.8	4,299.3	0.0	8,472.8	8,320.3	43.4	2,408.5
8	2019		157.8	157.8	22.8	4,727.8	4,884.1	0.0	9,634.8	9,477.0	39.0	2,381.6
9	2020		20.5	20.5	25.2	5,385.6	5,554.0	0.0	10,964.8	10,944.3	4.4	2,356.8
10	2021		20.5	20.5	27.8	6,139.5	6,263.4	0.0	12,430.7	12,410.2	3.8	2,323.4
	Total	1,337.2	730.9	2,068.1	154.6	33,645.9	35,036.4	0.0	68,836.8	66,768.8	1,031.2	21,037.4

NPV at 15%	20,006.1
NPV/Cap	19.40
B/C	20.40

Table 4.4.18 Cost Benefit Stream: PBM-4: Surigao (Lipata)-Bdr.Agusan D.N.

Million Php/Year

No.	Year	Cost			Benefit				B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	Total Length		PV2009 Cost	PV2009 Benefit
					Length by Condition (km)			123.5			
					12.0	67.0	44.5	Total Benefit			
	2008				0.0	0.0	0.0	0.0			
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	15.0		15.0	0.0	0.0	0.0	0.0	-15.0	13.1	0.0
0	2011	15.0		15.0	0.0	0.0	0.0	0.0	-15.0	11.4	0.0
1	2012	968.6		968.6	0.0	227.1	0.0	227.1	-741.4	636.9	149.3
2	2013	246.7		246.7	23.7	503.2	1,037.9	1,564.9	1,318.2	141.0	894.7
3	2014	204.7		204.7	59.6	804.9	1,278.1	2,142.7	1,938.0	101.8	1,065.3
4	2015	67.5		67.5	111.1	960.1	1,570.4	2,641.6	2,574.1	29.2	1,142.0
5	2016	32.0		32.0	136.7	1,142.7	1,927.0	3,206.3	3,174.3	12.0	1,205.4
6	2017		429.6	429.6	167.1	1,357.7	2,363.4	3,888.1	3,458.5	140.4	1,271.0
7	2018		180.5	180.5	203.2	1,611.3	2,899.4	4,713.9	4,533.4	51.3	1,340.0
8	2019		142.0	142.0	242.9	1,888.4	3,509.9	5,641.3	5,499.2	35.1	1,394.4
9	2020		45.0	45.0	289.6	2,212.4	4,253.7	6,755.7	6,710.7	9.7	1,452.1
10	2021		22.1	22.1	344.6	2,592.0	5,163.0	8,099.6	8,077.6	4.1	1,513.9
	Total	1,549.4	819.2	2,368.7	1,578.6	13,299.9	24,002.9	38,881.4	36,512.7	1,185.9	11,428.2

NPV	10,242.3
NPV/Cap	8.64
B/C	9.64

(7) Multi-Criteria Analysis

In order to prioritize the LTPBM projects, a MCA was carried out.

The criteria (indicators) and their weights (score points) were set in the Highway Planning Manual of DPWH. Corresponding results are shown below:

Indicators for New Projects	Score Points	Max. Points	PBM-1 Aringay-Laoag	PBM-2 Sta. Rita-N. Ecija	PBM-3 Sipocot-Baao	PBM-4 Srigao-Agusan
1. Project Preparedness		65				
1.1 Current Project Status		10				
1.1.1 Approved by the ICC (within 18 months validity)	10		10	10	10	10
1.1.2 Approved by the ICC (within 18 months validity) but deferred by lending institution	8					
1.1.3 Approved by the ICC (after 18 months) but deferred by lending institution	4					
1.1.4 Not approved by the ICC. New proposal needs to be submitted to the ICC	0					
1.2 Detailed Design carried out	5	5				
1.3 Economic Viability		30				
1.3.1 NPV/C ? 2.0	30		30	30	30	30
1.3.2 NPV/C < 2.0 but ? 1.0	25					
1.3.3 NPV/C < 1.0 but ? 0.5	20					
1.3.4 NPV/C < 0.5 but ? 0.3	15					
1.3.5 NPV/C < 0.3 but > 0	10					
1.4 Environmental Assessment (project with IEE or EIS or EIA, otherwise 0)		10				
1.4.1 Minor or negligible impact and any mitigation accounted for in project costs	10		10	10	10	10
1.4.2 Moderate negative impact but mitigation accounted for in project costs	8					
1.4.3 Considerable negative impact but mitigation accounted for in project costs	4					
1.5 Social Impact (projects with LAPRAP, if required, otherwise 0)		10				
1.5.1 No resettlement	10		10	10	10	10
1.5.2 Minor resettlement but mitigation accounted for in project costs	8					
1.5.3 Major resettlement but mitigation accounted for in project costs	4					
2. Road Network Importance		20				
2.1 Road Category						
2.1.1 North-South Backbone, Arterial National Roads	15		15	15	15	15
2.1.2 East-West Laterals, Arterial National Roads	12					
2.1.3 Other Arterial Roads of Strategic Importance	8					
2.1.4 Secondary National Roads	4					
2.2 Road Strategic Network						
2.2.1 Identified under major DPWH studies	5				5	5
2.2.2 Not identified under 2.2.1	0					
3. Economic and Social Development Policy		15				
a) Provide access to basic services which currently are not available (basic human needs)						
b) Develop economically and socially underdeveloped/ depressed areas provided a resource base is available						
c) Improve law and order						
d) Support agricultural modernization						
e) Support traffic decongestion						
f) Support industrial and tourism development						
3.1.1 All points met	15					
3.1.2 Point 3b) and another four out of the six points met	12					
3.1.3 Point 3b) and another two out of the six points met	8					
3.1.4 Only point 3b) met	4					
3.1.5 None of the points met	0					
Total Maximum Score		100	75	75	80	80

The total score of each LTPBM project is summarized below:

- PBM-1: Aringay-Laoag: = 75
- PBM-2: Sta.Rita-Bdr.Nueva Ecija: = 75
- PBM-3: Sipocot-Baao: = 80
- PBM-4: Surigao (Lipata)-Bdr.Agusan D.N.: = 80

(8) Project Effects and Effect Indicator

For the purpose of evaluation of the effects by the implementation of the REAPMP projects, various effect indicators were prepared as listed below.

- Traffic Demand (AADT)
- Savings in Travel Time on project road sections

- Saving in Vehicle Operating Cost (VOC)
- Average Velocity Increase
- Decrease of Annual Traffic Impassability (No. of days impassable/ year) due to Disaster
- Degree of Poverty Reduction
- Economic Internal Rate of Return (EIRR)

Regarding the indicator of the Poverty Reduction, evaluations were made from the qualitative aspect due to the difficulty of quantification of contribution of projects to poverty reduction.

In addition, it is noted that the purpose of REAPMP projects is, in principle, to maintain, prevent, rehabilitate, and upgrade/ improve the existing road assets to keep them in "paved good condition", and not for capacity augmentation (widening) nor construction of new roads (including expressways) to mitigate the traffic congestion. Traffic volume is basically the same in "Without project" and "With project" situations if newly generated traffic is not taken into account. Therefore, effects on velocity (speed) increase and resulting time savings are secondary effects of the projects. Furthermore, for road sections presently in good/fair condition, the preventive maintenance (PM) is planned to keep/maintain good/fair condition for long term. In this case, it will be difficult to estimate future velocity decrease when PM is not implemented.

The results of estimation of effect indicators for LTPBM roads are summarized in the following table:

	1	2	3	4	5	6	7
Indicator / Project	AADT Including Motorcycles	Time Saving (minutes)	VOC Saving (Mil.Php/ year)	Average Velocity Increase (km/hr) (Estimate)	Decrease of impassable days/year	Poverty Reduction	EIRR (%)
PBM-1: Aringay	(2008) 8,400-9,300 (2018) 14,200-15,900	70	(2015) 6,820-19,460 (2018) 11,918-25,997	40→50	-	moderate	1021 (Sec1) 952 (Sec 2)
PBM-2: Sta. Rita	(2008) 9,800-11,700 (2018) 13,600-17,600	50	(2015) 3,100-5,560 (2018) 4,430-9,675	40→50	-	moderate	573 (Sec 1) 517 (Sec 2)
PBM-3: Sipocot	(2008) 7,746 (2018) 11,357	20	(2015) 5,380 (2018) 8,473	50→60	-	moderate	433.9
PBM-4: Surigao	(2008) 4,493 (2018) 6,205	25	(2015) 2,640 (2018) 4,714	50→60	-	moderate	183.1

In addition above, the beneficiary population along the project roads is presented below:

Indicator / Project	Beneficiary population along the project roads	
PBM-1: Aringay	1,900,000	Ilocos Norte, Ilocos Sur, La Union
PBM-2: Sta.Rita	3,890,000	Bulakan, Nueva Ecija
PBM-3: Sipocot	1,530,000	Camarines Sur
PBM-4: Surigao	1,030,000	Surigau del Norte, Agusan del Norte, Butuan City

■ Quantitative Effects of LTPBM Roads

- Contribution to realization of logistic efficiency by strengthening the roles/functions as "North-South Backbone" in the Luzon Island and the Mindanao Island.

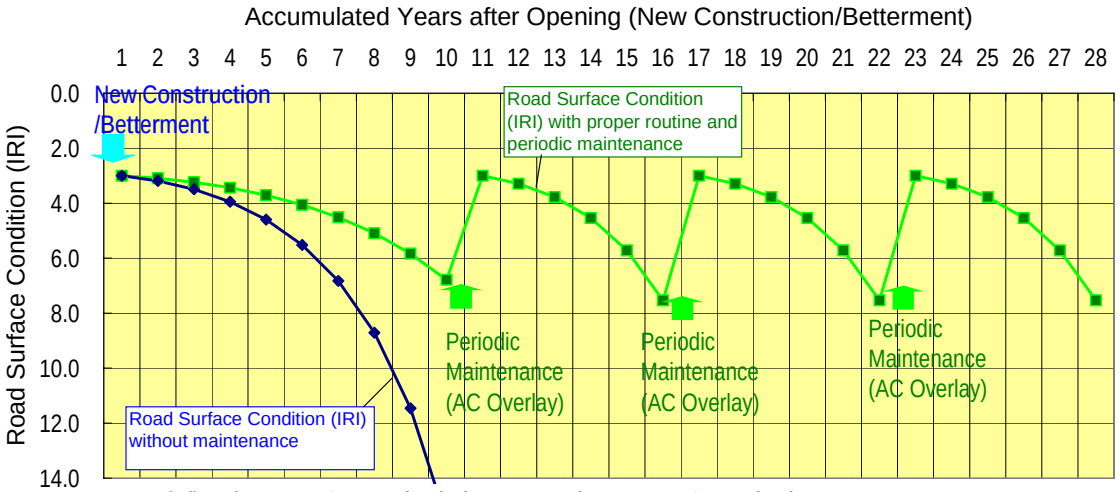
- Realization of balanced regional development through mitigation of excessive concentration of population to the Manila Metropolitan Region.
- Provide the access to tourism resources.

4.5 PM COMPONENT

4.5.1 SCOPE OF PM

Sustainability of the road facilities after development or RH is the most important issue. New or rehabilitated roads are expected to deteriorate due to vehicle loadings, weathering and aging. Appropriate maintenance reduces the rate of pavement deterioration, lowers VOC, saves passenger TTC, and provides uninterrupted service for road users and communities. On the other hand, overloaded heavy vehicles (e.g. trucks) shorten the pavement life significantly.

The following figure illustrates a typical road surface deterioration of AC pavement with no maintenance, and for that with proper maintenance for a typical road of approximately ADT 3,000 pcu.



Note: Periodic Maintenance 10 years after the betterment and at every 5 or 6 year after that.
Source: JICA Study Team

Figure 4.5.1 Typical Road Surface Deterioration With and Without Maintenance

The IRI for a new pavement is approximately 2.5-3.0 and its deterioration accelerates after it exceeds approximately 6-7, if proper maintenance (PM) is not implemented.

The PM for roads refers to works carried out before any serious defects occur.. PM involves the application of a suitable surface treatment to a achieve a reasonable sound existing pavement in order to preserve the road, retard future deterioration due to normal wear, tear and weathering, and maintain or improve the functional condition of the system without significantly increasing its structural capacity. PM, if properly carried out, is usually the most economical approach to road asset preservation, minimizing the infrastructure investment and maintaining VOC at an optimum level.

The PM works under REAPMP, as well as for other projects of the DPWH, consist mainly of asphalt overlays on the existing paved road identified to be in fair and poor conditions. The overlay will have a thickness of 50, 80 or 100 mm, depending on the results of the HDM-4 program analysis. PM may also include selective concrete re-blocking not exceeding four continuous lane blocks. PM is normally undertaken once every 5-10 years, depending on traffic level, structural strength and previous treatment.

The PM works in PMS/HDM-4 include preventive treatment, resurfacing, RH and reconstruction as shown in the following work categories.

Works	Works Class	Works Type	Works Activity
Asset Preservation	Routine Maintenance	Routine (Pavement) or Surface	patching, edge-repair, crack sealing, spot-regravelling, shoulders repair,
		Drainage	culvert repairs, clearing side drains,
		Routine Miscellaneous	vegetation control, line-markings, signs, etc.
	Periodic Maintenance (Preventive Maintenance)	Preventive Treatment	load transfer dowel retrofit, joint sealing, etc.
		Resurfacing	surface dressing, slurry seal, regravelling, slab replacement,
		Rehabilitation	thick overlay, mill and replace, inlay, bonded concrete overlay, un-bonded concrete overlay
		Reconstruction	partial reconstruction, full pavement reconstruction
	Special	Emergency	clearing debris, repairing washout/subsidence, traffic accident removal, etc.
		Winter	snow removal, salting/gritting
Network Development	Improvement	Widening	partial widening, lane addition
		Realignment	horizontal and vertical geometric improvements, junction improvement
		Off-carriageway	shoulders addition, shoulders upgrading, NMT lane addition, side drain improvement, etc.
	Construction	Upgrading	upgrading by changing the surface
		New section	dualization of an existing section, new section (link)

Source: PMS/DPWH

4.5.2 ROAD LINK SELECTION CRITERIA

The PM component is comprised of two categories. One is for pre-fixed road links of three sub-programs transferred from LTPBM to PM, with 93 km total length. The other is the priority PM programs for road links to be selected by PMS/HDM-4, approximately 500 km total length.

The specific PM projects will be selected on the basis of the HDM-4 program which uses the criteria shown in the following table. The PM component of REAPMP focuses on national roads with the following characteristics:

- Primary highway network (North-South Backbone, East-West Laterals and - Other Roads of Strategic Importance)
- AADT of more than 1,000 vehicles
- Road conditions of paved sections (PCC or AC) which are rated as fair and poor condition, with the following IRI:

Road Condition	Concrete Pavement (PCCP)	Asphalt Concrete Pavement (ACP)
Fair (IRI)	4.1 – 6.0	3.1 - 5.0
Poor (IRI)	6.1 – 8.0	5.1 - 7.0

- The proposed intervention works must show a positive NPV/Cap based on the HDM-4 runs. In case there are alternative intervention works for the same section, the alternative with the highest positive NPV/Cap shall be selected.
- The PM component under REAPMP will exclude road sections covered by the LTPBM under NRIMP-2 and JICA LTPBM component
- The preference of priority will be given to the road links constructed or rehabilitated under the GOJ Yen loans.

The road sections will be packaged into contracts with a minimum overlay length of 15 km each, since AC overlay is costly as it requires batching plant, crushing plant and paving equipment and quality control laboratory. Within a contract, there could be short intermittent sections of badly paved roads which, as analyzed by HDM-4, warrant rehabilitation or reconstruction. In this case, apart from AC overlays, the scope of the contract works will include the reconstruction of such badly paved sections provided that it does not exceed 20% of the total length of the contract package. The contracted section may include some roads rated as good which does not require treatment but subject to RM. Furthermore, the overlays may differ in thicknesses for different sections in each contract package, depending on the specific conditions planned based on the HDM-4 results, and designed by RO, prior to tendering and implementation.

4.5.3 MULTI-YEAR WORK PROGRAMS

The HDM-4 will select road links where PM will be required, based on RBIA as an annual rolling plan. The DPWH (PS and BOM) will distribute the selected PM links to funding sources, including JICA REAPMP, WB NRIMP-2, ADB RSIP, MVUC (Road Fund) and GAA.

The actual work program to be funded and implemented under REAMPP, starting in 2011 will be based on the updated HDM-4 based on the ROCOND data of 2010. Thereafter, the DPWH will select respective program for 2012 and 2013 in order to reflect the latest technical and economic conditions. The DPWH will submit the annual work programs for PM to the Road Board for approval of funding from the MVUC. The program list should also be sent to JICA for their reference.

4.5.4 PROPOSED PM ROAD LINKS FOR JICA LOAN

(1) Pre-fixed Road Links moved from LTPBM to PM

The pre-fixed road links for three sub-programs transferred from LTPBM to PM are shown in Table 4.5.1.

Table 4.5.1 Pre-fixed Preventive Maintenance Road Links

No	Island	Region	Road Section	From (Km)	To (Km)	PM Length (km)	Remarks
PM1	Luzon	III	PPH/Talavera-Rizal	125.55	151.10	25.5	Moved from LTPBM to PM because of short length
PM2	Luzon	IV-A	Alaminos - San Pablo - Tiaong (PPH)	75.12	95.51	19.5	Moved from LTPBM to PM because of short length
PM3	Mindanao	XI	Carmen - Davao City (6-lane road), (PPH)	1468.00	1516.00	48.0	Moved to PM Program because this section is far from LTPBM Road Link (Surigao - Bdr. Agusan D.N.)
Total						93.0	

(2) Indicative Road Links for PM based on PMS HDM-4

The indicative PM program for the road links selected by PMS/HDM-4 in the Pre-FS 2007 was 481 km in total. The updated indicative PM program determined in August 2009 for REAPMP (using also PMS/HDM-4) is approximately 500 km, as shown in the regional distribution in Table 4.5.2. This list is subject to update based on yearly RBIA and HDM-4 operations at the time of REAPMP implementation.

Table 4.5.2 HDM 4-selected Preventive Maintenance Road Links (1/2)

No.	Region	District	Section Name	Road Class	Km. Start	Km. End	No. of Lane	Length (km)	AADT	Pavement Type	Surface Condition	Preventive Work (AC)	NVP/CAP	Cost** (Mill Phn)
A. Pre-Fixed Road Links														
PM-A1	III	Nueva Ecija	PPH/Talavera-Rizal	Secondary	K125.550	K151.100	2	25.50	2,080	PCCP	Fair-Poor	50mm		186.2
PM-A2	IV-A	Laguna	Alaminos - San Pablo - Tiaong (PPH)	N-S Backbone	K75.120	K95.510	2	19.51	11,800	AC	Fair-Poor	80mm		227.9
PM-A3	XI	Davao Del Sur / Davao De Norte	Carmen - Davao City (2- 7 lane road), (PPH)	N-S Backbone	K1468.000	K1516.000	2/3/4/6/7* (Ave.4 lanes)	48.00	19,000	PCCP	Fair-Poor	80mm		1,121.3
							Sub-Total:	93.01	(* equivalent to 96 km of 2-lane road)					1,535.3
							Average Length (km):	31.0	Average Unit Price (Mill Php/km):					16.5
B. PMS/HDM-4 2009 PM Road Links*														
PM-B1	CAR	Abra	Abra-Ilocos Norte Road	Secondary	K409+-890	K420+424		10.00	8,932	PCCP	Fair	50 mm	5.3	66.0
							Sub-Total:	**10.00**						**66.0**
PM-B2	I	Pangasinan Sub	Camiling-Wawa-Bayanbang-Malasiqui-Sta.Barbara	Secondary	K181.000	K196.000	2	14.36	9,222	AC/PCCP			7.2	94.8
PM-B3		Ilocos Norte 1st	Manila North Road	Arterial	KM568+000	KM589+060	2	13.28	1,324	PCCP	Poor	50 mm	8.2	87.6
PM-B4		La Union 1st	Bacnotan-Luna-Balaoan Road	Secondary	KM284+000	KM307+717	2	15.31	6,678	Asphalt	Fair	50 mm	21.8	101.0
PM-B5		Pangasinan 3rd	Bakit-Bakit Junction Umingan Road	Arterial	KM179+000	KM204+1030	2	12.80	2,366	PCCP	Poor	50 mm	3.2	84.5
							Sub-Total:	**55.75**						**367.95**
PM-B6	II	Isabela 2nd	Santiago-Tuguegarao Road	Secondary	K365+1440	K376	2	10.72	4,973	PCCP	Fair	50 mm	21.7	70.8
PM-B7		Isabela 2nd	Gamu-Roxas Road	Secondary	KM396+000	KM413+802	2	11.45	2,397	Asphalt	Poor	50 mm	4.7	75.6
PM-B8		Cagayan 2nd	Manila North Road		K664+916	K681+000	2	14.31	1,752	PCCP	Poor-Fair	50 mm	2.3	94.4
							Sub-Total:	**36.48**						**240.76**
PM-B9	III	Bataan 2nd	C. Gov. JJ Linao Road	Secondary	K126+069	K144+000	2	15.69	4,594	PCCP	Fair-Poor	50 mm	5.9	103.6
PM-B10		Nueva Ecija 1st	Rizal-Pantabangan Rd. Jct.Pinagpanaan		K149+000	K1657+086	2	14.84	2,466	PCCP	Poor-Fair	50 mm	3.7	97.9
PM-B11		Nueva Ecija 2nd	Magsaysay Road (Bangad-Arayat-Magalang Road		K124+344	K135+835	2	11.50	6,176	PCCP	Poor	50 mm	5.4	75.9
PM-B12		Pampanga 1st			K89+237	K100+568	2	11.81	4,901	PCCP	Poor-Fair	50 mm	2.9	77.8
							Sub-Total:	**53.84**						**355.23**
PM-B13	IV-A	Batangas 3rd	Talisay-Laurel Agoncillo	Secondary	K81+224	K94+003	2	12.81	3,301	PCCP			17.5	84.5
PM-B14		Cavite Sub	Sia-Rosa-Ulat-Tagaytay Road	Secondary	K59+660	K72+672.5	2	11.84	13,152	PCCP	Fair	50 mm	24.4	78.1
PM-B15		Cavite	Manila-Cavite Road	Secondary	K22+436	K34+441	2	10.17	18,705	AC/PCCP	Fair-Poor	50 mm	152.5	67.1
PM-B16		Quezon 1st	Famy-Real-Infanta-Dinahican Port Road	Secondary	KM113+012	KM139+45	2	16.81	2,844	Asphalt	Poor/Fair	50 mm	5.5	110.9
							Sub-Total:	**51.63**						**340.76**
PM-B17	IV-B	Mindoro Oriental	CSR Junction-Pola Road	Secondary	K62+000	K73+109	2	10.91	1,992	PCCP	Poor	50 mm	1.6	72.0
PM-B18		Southern Mindoro	Calapan South Road	Arterial	KM140+000	KM154+514	2	12.31	3,821	PCCP	Poor	50 mm	7.5	81.2
							Sub-Total:	**23.22**						**153.25**
PM-B19	V	Camarines Sur 3rd	Pili-Tigaon-Albay Boundary Road	Arterial	KM491+000	KM507+1002	2	11.77	2,223	PCCP	Fair	50 mm	1.3	77.7
							Sub-Total:	**11.77**						**77.68**

Table 4.5.2 HDM 4-selected Preventive Maintenance Road Links (2/2)

No.	Region	District	Section Name	Road Class	Km. Start	Km. End	No. of Lane	Length (km)	AADT	Pavement Type	Surface Condition	Preventive Work (AC)	NVP/CAP	Cost** (Mill Php)
PM-B20	VI	Negros Occidental 1st	Bacolod-Mucia-DS Benedicto-San Carlos Citv Rod	Arterial	K53+81	K87+000	2	14.86	2,573	PCCP	Poor-Fair	50 mm	11.8	78.1
PM-B21		Negros Occidental 3rd	Junction National Road Sagay-Bajo-Dian-Marcelo-Balea Jct Road	Secondary	K97+000	K112+150	2	14.61	2,012	PCCP	Fair	50 mm	5.4	96.4
							Sub-Total:	**29.47**						**174.57**
PM-B22	VII	Negros Oriental 1st	Dumaguete North Road (Bais City to Vallehermoso)	Arterial	KM57+0073	KM148+360	2	19.64	5,754	Asphalt/PCCP	Poor/Fair	50 mm	22.9	129.6
PM-B23		Negros Oriental 3rd	Bayanan-Kabankalan Road	Secondary	K105+000	K121+404	2	16.43	10,657	PCCP	Fair	50 mm	4.2	108.4
PM-B24		Cebu 3rd	Pinamungahan-Aloguisan-Mantalongon Road	Arterial	K50+000	K66+001	2	14.05	5,512	PCCP	Fair	50 mm	8.1	92.7
PM-B25		Cebu 4th	N. Bacalso Ave. (Cebu South Road)	Arterial	K98+000	K141+002	2	23.93	1,968	PCCP	Fair	50mm	7.5	157.9
PM-B26		Siquijor	Siquijor Circumferential Road	Arterial	K48+500	K75+499	2	16.16	5,493	Asphalt	Poor	50 mm	8.7	106.7
							Sub-Total:	**90.21**						**595.35**
PM-B27	VIII	Leyte 1st	Palo-Carigara-Ormoc Road	Arterial	K916+027	K933+-4	2	17.78	5,103	PCCP	Poor	50 mm	14.4	117.3
PM-B28		Leyte 4th	Palo-Carigara-Ormoc Road	Arterial	KM995+1001	KM1010+4.1	2	10.22	4,542	PCCP	Poor	50 mm	5.7	67.5
							Sub-Total:	**28.00**						**184.80**
PM-B29	IX	Zamboanga Sibugay	Lanao-Pagadian-Zamboanga City Road	Arterial	K1724+-1593	K1790+005	2	41.40	2,568	PCCP	Poor-Fair	50 mm	11.9	273.2
							Sub-Total:	**41.40**						**273.24**
PM-B30	X	Cagayan de Oro	CDO-Airport-Bukidnon Road	Secondary	K1443+000	K1466+266.61	2	23.40	1,571	PCCP	Poor	50 mm	88.4	154.4
							Sub-Total:	**23.40**						**154.44**
PM-B31	XI	Davao City Sub	Davao-Bukidnon Road	Arterial	K1679+000	K1693+-1	2	13.37	5,863	Asphalt	Fair	50 mm	15.9	88.2
							Sub-Total:	**13.37**						**88.24**
PM-B32	XII	Saranggani	Saranggani-Sultan Kudarat Coasta Road	Arterial	K1725+-272	K1743+-70	2	18.49	1,740	Asphalt	Fair-Poor	50 mm	4.0	122.0
PM-B33		Saranggani	Saranggani-Sultan Kudarat Coasta Road	Arterial	K1743+-59	K1763+-59	2	20.41	1,340	Asphalt	Poor-Fair	50 mm	6.0	134.7
PM-B34		Sultan Kudarat	Marbel-Allah Valley-Cotabato Rod	Arterial	K1766+31	K1789+-415	2	23.35	5,319	PCCP	Fair	50 mm	10.5	154.1
							Sub-Total:	**62.25**						**410.85**
								Adjustment:	**-30.79**	**to make a total length of 500 km**				**-215.53**
								Total:	**500.00**					**3,267.59**
								Average Length (km):	**15.6**			Average Unit Price (Mill Php/km):		**6.6**
								Grand Total Length (km):	**593.0**	Grand Total Cost (Mill Php) including DD/CS/Adm:				**4,802.9**
										Grand Total Cost (Mill Php) excluding DD/CS/Adm:				**4,058.4**

Notes: * The PMS/HDM Road Links are selected every year based on the road condition survey (RBIA).
** June 2009, including 4%DD, 8% CS and 3.5% of administration costs

4.5.5 DESIGN AND IMPLEMENTATION

(1) PM Design

As the overlay thickness given in HDM-4 (asphalt overlays of 50 mm, 80 mm and 100 mm) is for planning and budgeting purposes, the ROs or the DEOs need to conduct an overlay design based on the detailed field survey of the DEOs. The design will include selected concrete re-blocking (not more than four continuous lane blocks in general), improvement of shoulders and drainage. These may also include RH works not exceeding 20 percent of the total contract length.

The principle of structural overlay is to determine the difference between the required structural thicknesses and the evaluated existing thickness. However, capacity development for the ROs or the DEOs engineers is recommended through OJT programs under the proposed JICA TCP-Phase 2 to further impart knowledge related to overlay design.

(2) Implementation Plan

The PM contract size will be mostly in the range of about Php 100-200 million for 10-20 km length of AC overlay, and hence, is suitable for national competitive bidding. The procurement guidelines applicable for the PM shall be as follows:

	Guidelines	Content	Issued by
1.	Handbook on Philippine Government Procurement (4th Edition)	Includes Amended IRR-A of R.A. 9184 and Latest GPPB[3] issuances (Jul.2009)	GPPB/DBM, Sep.2007
2.	Philippine Bidding Documents (PBDs), Procurement of Works, 2nd Edition	Bidding procedures and practices of R.A. 9184, harmonized with ADB, JICA and WB	GPPB/GOP, May 2005
3.	DPWH Procurement Manual (DPM) for Locally-funded Infrastructure Project through Public Bidding	Procurement Guidelines, Manuals, Standard Forms, Standard Bidding Documents in compliance with IRR-A of R.A.9184	DPWH, Jan.2006

The DPM is the specific manual complying with IRR-A of R.A.9184 and suit the particular needs of the DPWH. However, as the standard bidding documents have some identified one-sided general conditions, these need to be amended considering the particular application of GCC to meet the JICA (JBIC) procurement guidelines.

As earlier mentioned the AC overlay requires costly plants and equipment such as asphalt mixing plant, aggregate production plant (crushing plant), asphalt finisher and rollers. Thus, it is recommended to include this into only one contract package to attract medium to large contractors.

(3) Implementation Schedule

The implementation schedule of the PM will be as described in Section 7.2.4 in Chapter 7. The PM in REAPMP has one pre-fixed road link program and three annual work programs. These are single year contracts and must be completed by the end of each fiscal year (December).

4.5.6 COST ESTIMATE

(1) Unit Prices

The unit price for PM work is estimated at Php 6.6 million /km, including 4% detailed design,

[3] GPPB: Government Procurement Policy Board

8% construction supervision and 3.5% administration costs, as planned in HDM-4 2009. It is about Php 5.5 million /km for one layer of 50 mm AC overlay on 6.1 m width carriageway, without consultancy and administration cost. It will be almost double for two layers AC overlay (100 mm) on 6.7 m width carriageway.

(2) PM Quantity and Cost

The PM of REAPMP is classified into two categories: one for 93 km length pre-fixed road links and the other for 500 km based on HDM-4 selected annual work programs. The total construction cost of the pre-fixed road links was estimated at Php 1,297 million while that for HDM-4 selected road links was Php 2,761 million (refer to the following tables).

Table 4.5.3 Cost of Pre-fixed PM Road Links

Project No.	PM-A1	PM-A2	PM-A3	Total	Remarks
Project Name	PPH/Talavera-Rizal	Alaminos - San Pablo - Tiaong (PPH)	Carmen - Davao City (2- 7 lane road), (PPH)		
Length (km)	25.5	19.5	48.0	93.0	PM-A3 (2-7 lanes road) is equivalent to 96 km of 2-lane road)
Cost (Mill Php)					
Construction	157.3	192.6	947.5	1,297.3	84.5% of Total Cost
Consultant (DD & CS)	22.3	27.3	134.6	184.2	4% + 8% of Civil Works
Land Acquisition & Compensation Cost	0.0	0.0	0.0	0.0	No widening
Administration	6.5	8.0	39.2	53.7	3.5% of Civil Works
Total	186.2	227.9	1,121.3	1,535.3	
Unit Cost Mill Php/km	6.2	9.9	9.9	9.2	
Number of AC Overlay layers	(1 layer)	(2 layers)	(2 layers)		

Table 4.5.4 Cost of HDM 4-selected PM Road Links

Project No.	AWP-1	AWP-2	AWP-3	Total
Project Name	Annual Work Program for 2011	Annual Work Program for 2012	Annual Work Program for 2013	
Length (km)	150.0	150.0	200.0	500.0
Cost (Mill Php)				
Construction	828.3	828.3	1,104.4	2,761.1
Consultant (DD & CS)	117.6	117.6	156.8	392.1
Land Acquisition & Compensation Cost	0.0	0.0	0.0	0.0
Administration	34.3	34.3	45.7	114.4
Total	980.3	980.3	1,307.0	3,267.6
Unit Cost Mill Php/km	5.5	5.5	5.5	5.5
Number of AC Overlay layers	(1 layer)	(1 layer)	(1 layer)	(1 layer)

(3) Consultancy Service Costs and Other Cost.

HDM-4 included 12% consultancy service cost in its program. However, this should only be

applicable to local consultants or DPWH. No ROW and compensation costs are required as the work is limited to AC overlay on existing pavement. Other costs include administration cost of 3.5% and VAT at 12%.

4.5.7 ECONOMIC EVALUATION OF PM PROJECTS

(1) Roads for Evaluation of PM Projects

The PM Projects for the economic evaluation are the following roads/sections:

Project ID	Road/ Section	Project Length (km)	AADT (2008)
PM-1	JCT.PPH-Rizal	25.6	2,077
PM-2	Alaminos-San Pablo-Tiaong	19.5	14,010
PM-3	Carmen-Davao City (2-7 lane road)	48.0	19,212

(2) Benefits Estimated in REAPMP

The benefits estimated quantitatively in this evaluation are:

- Savings in VOC, and
- Savings in Passenger TTC

The benefit of traffic accident reduction was not included due to unavailability of necessary data. The BVOC in updated 2008/09 prices were provided by DPWH which combines the passenger TTC with VOC (=Running cost + Fixed Cost + Time cost).

(3) Methodology for Economic Evaluation

The methodology and procedures for the economic evaluation are basically similar to that of UI projects as illustrated in Figure 4.5.2. The JBIC Pre-FS applied HDM-4 Model in its economic evaluation. However, due to the difficulty in calibrating all parameters in the HDM-4 Model to reflect local conditions within a given timeframe, an alternative approach was adopted in this Survey as explained below:

Collection of Necessary Data

For the benefit estimation, the following data/ information were collected mainly from DPWH and from the results of the JBIC Pre-FS.

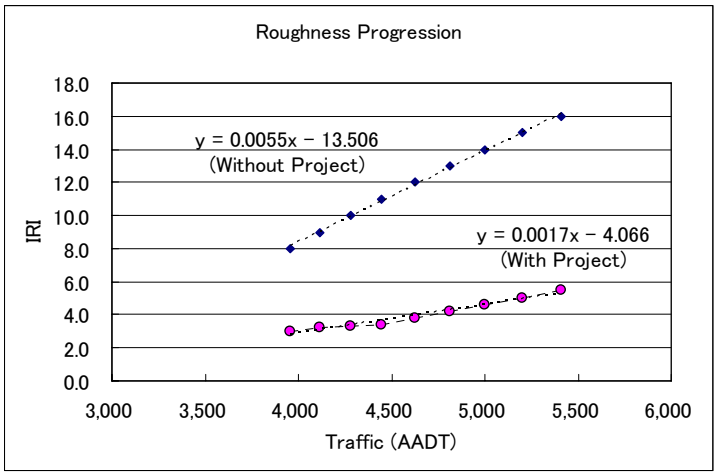
- Traffic volume (AADT) by vehicle type (12 types) and future growth rates
- Unit VOC (as Road User Cost (RUC) including passenger time cost: Php/km)
- Road surface type (asphalt, concrete, gravel) and condition (good, fair, poor, and bad)
- Roughness Progression calculated in the JBIC Pre-FS for both “With” and “Without” project situations.

Based on the above data, the economic benefits were estimated using the following steps:

Step 1: Analysis on Roughness Progression

The JBIC Pre-FS presented the results of IRI with AADT by each road section which were downloaded from the results of HDM-runs. These results were applied to the regression analyses to determine the relationship between the IRI with AADT. An example of the regression analysis

is shown below.



Step 2: Forecasting IRI considering future traffic volume

The future IRI was estimated by inputting the future traffic volume to the equations obtained in above regression analysis.

Step 3: Estimation of Relationship between IRI and Unit VOC (including time cost) by surface type (paved and gravel)

As the benefits by the implementation of the REAPMP projects will be generated mainly from the roughness improvement (from "Bad" to "Good" condition, for example), it is necessary to examine the relationship between IRI and VOC. The road condition and values of IRI relations are given by PMS below:

Roughness Category	Roughness (IRI) in PMS		
	Asphalt	Concrete	Gravel
Good	2.5	3.5	5.0
Fair	4.0	5.0	7.5
Poor	6.0	7.0	10.0
Bad	8.0	9.0	14.0

Meanwhile, values of VOC by road condition are presented as follows:

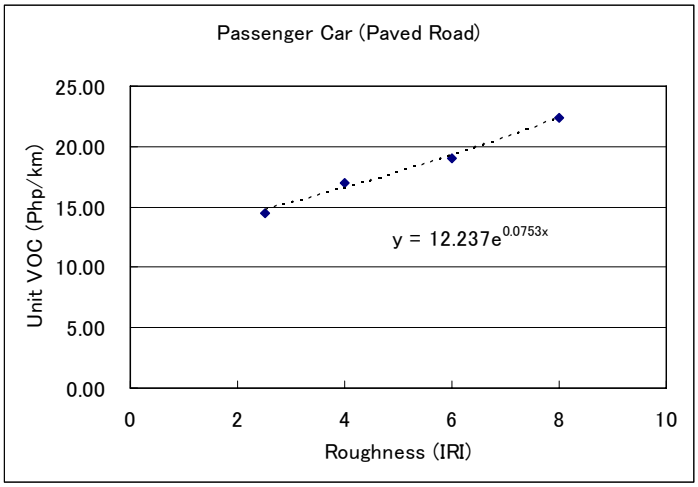
Pavement Type & Condition	Vehicle Operating Cost (VOC=R+F+T), 2005 Prices, Php/km									
	Car	Ratio	Jeepney	Ratio	Buses	Ratio	Trucks	Ratio	Motorcycle	Ratio
Paved Good	9.639	1.00	8.873	1.00	16.902	1.00	13.814	1.00	1.812	1.00
Paved Fair	11.294	1.17	10.419	1.17	19.868	1.18	16.189	1.17	2.143	1.18
Paved Poor	12.649	1.31	11.938	1.35	23.027	1.36	18.170	1.32	2.891	1.60
Paved Bad	14.811	1.54	15.034	1.69	30.008	1.78	21.426	1.55	3.816	2.11
Gravel Good	12.146	1.26	10.788	1.22	20.165	1.19	17.351	1.26	2.267	1.25
Gravel Fair	15.003	1.56	13.241	1.49	24.665	1.46	21.421	1.55	2.821	1.56
Gravel Poor	16.446	1.71	14.958	1.69	28.318	1.68	23.544	1.70	3.335	1.84
Gravel Bad	18.438	1.91	17.537	1.98	33.957	2.01	26.505	1.92	4.270	2.36

Original Source: DPWH. Ratios were calculated by JICA Survey Team.

The values of VOC in 2008/09 price by pavement type/condition were obtained applying the above ratios by vehicle type to the 2008 VOC values of paved roads rated with good condition.

(since values of VOC in 2008/09 price are available only for "Good Condition" paved roads).

Given the values of IRI by surface condition and corresponding VOC values, another regression analyses were carried out to estimate VOC values in both "Without" and "With" project situations. Below is an example of regression analysis for passenger car in the case of paved surface type.



Step 4: Estimation of Unit VOC in both "Without" and "With" project cases

As the future values of IRI were already estimated in the above Step 2, Unit VOCs (Php/km) in "Without" and "With" situations are obtained by inputting them to the equations in Step 3.

Step 5: Estimation of Total Benefit

The Road User Costs (VOC including the time cost) were calculated in the both "Without" and "With" project situations by multiplying the section length and traffic volume to the Unit VOC estimated in the Step 4. The difference of VOC between both situations is identified as the "Benefit".

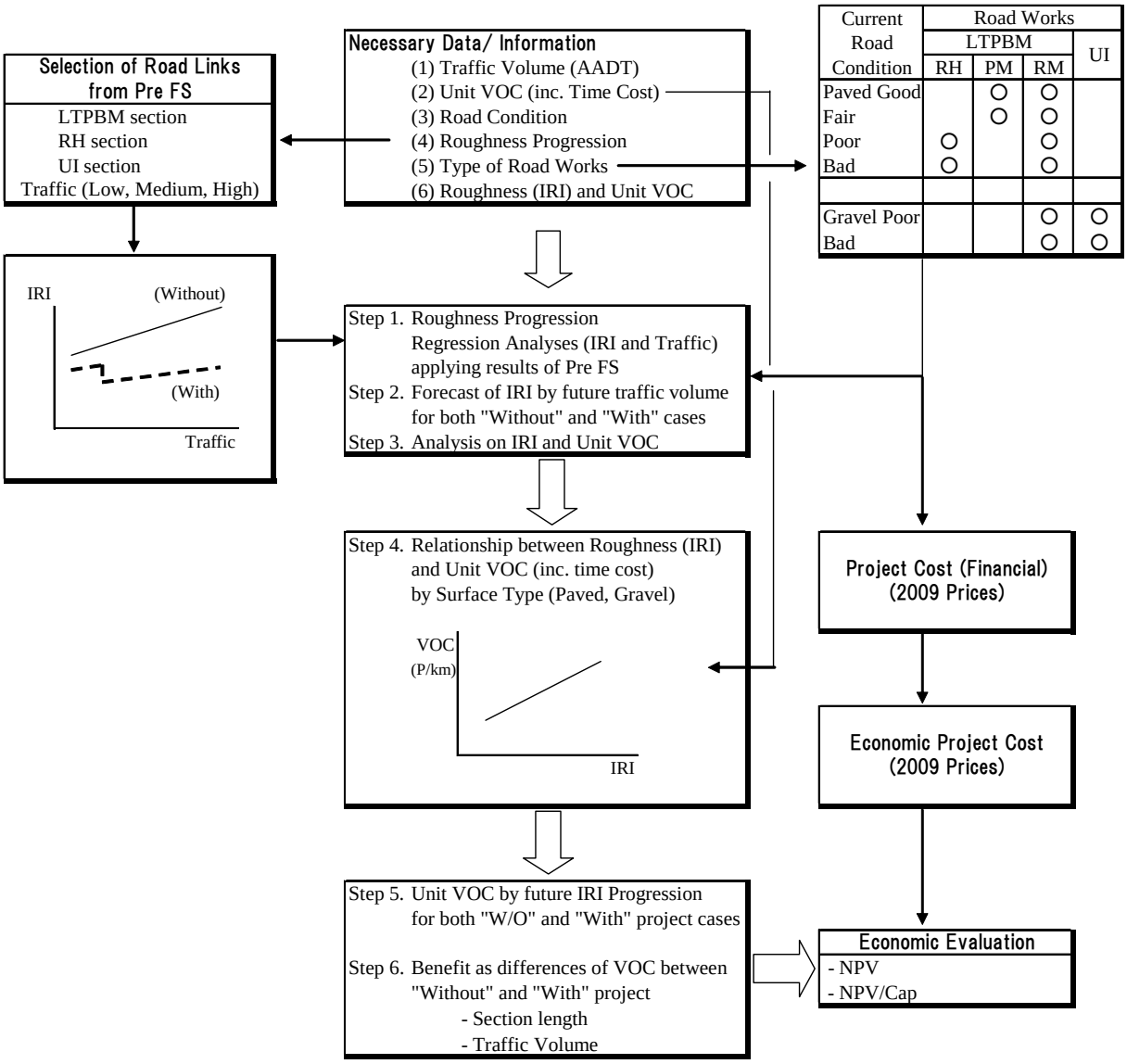


Figure 4.5.2 Flowchart Showing Procedure for Benefit Estimation

(4) Economic Costs

For the purpose of economic evaluation, the financial project costs (capital cost and routine maintenance cost) were converted to the economic costs. In this evaluation, SCF = 0.82 was applied based on the information provided by DPWH.

(5) Premises of Economic Evaluation

The following pre-conditions were established for the cost-benefit cash flow analysis:

1) Price Level: 2009 prices
2) Evaluation Period: 20 years after opening year
3) Residual Value: No residual values were counted
4) Opportunity Cost of Capital (Discount Rate): 15%

Cost-benefit stream by each project is shown in Table 4.5.6 to Table 4.5.8.

(6) Results of Economic Evaluation

The results of economic evaluation for the three PM projects are summarized in Table 4.5.5:

Table 4.5.5 Results of Economic Evaluation (PM projects)

Project ID	Road/ Section	Project Length (km)	NPV (Mil.Php)	NPV/C	B/C	EIRR (%)
PM-1	JCT.PPH-Rizal	25.6	512	2.7	3.7	52
PM-2	Alaminos-San Pablo-Tiaong	19.5	20,724	92.5	93.5	919
PM-3	Carmen-Davao City	48.0	44,687	41.1	42.1	480

All PM projects are economically feasible with positive values of NPV/Cap applying the 15% of discount rate.

Table 4.5.6 Cost Benefit Stream: PM-1: JCT.PPH-Rizal

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV Cost	PV Benefit
					Length (km)				25.6			
					2.3	14.6	8.7	0.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011	6.4		6.4	0.0	0.0	0.0	0.0	0.0	-6.4	4.9	0.0
0	2012	146.2		146.2	0.0	0.0	0.0	0.0	0.0	-146.2	96.1	0.0
1	2013		4.2	4.2	1.8	28.2	40.3	0.0	70.2	66.1	2.4	40.2
2	2014		4.2	4.2	2.0	30.9	44.5	0.0	77.4	73.2	2.1	38.5
3	2015		4.2	4.2	2.4	34.5	50.0	0.0	86.9	82.7	1.8	37.6
4	2016		4.2	4.2	2.8	38.5	56.3	0.0	97.6	93.4	1.6	36.7
5	2017		10.6	10.6	3.2	42.9	63.4	0.0	109.6	99.0	3.5	35.8
6	2018		146.2	146.2	3.8	47.9	71.5	0.0	123.2	-23.0	41.6	35.0
7	2019		4.2	4.2	6.3	64.9	89.5	0.0	160.7	156.5	1.0	39.7
8	2020		4.2	4.2	7.0	71.9	100.5	0.0	179.4	175.2	0.9	38.6
9	2021		4.2	4.2	7.9	79.6	113.1	0.0	200.6	196.4	0.8	37.5
10	2022		4.2	4.2	8.9	88.3	127.4	0.0	224.6	220.4	0.7	36.5
11	2023		10.6	10.6	10.0	98.0	143.8	0.0	251.8	241.2	1.5	35.6
12	2024		146.2	146.2	11.3	108.9	162.6	0.0	282.8	136.6	18.0	34.7
13	2025		4.2	4.2	15.3	135.8	192.2	0.0	343.3	339.1	0.4	36.7
14	2026		4.2	4.2	16.6	146.7	210.7	0.0	374.0	369.8	0.4	34.8
15	2027		4.2	4.2	18.0	158.6	231.3	0.0	408.0	403.8	0.3	33.0
16	2028		4.2	4.2	19.6	171.7	254.4	0.0	445.7	441.5	0.3	31.3
17	2029		10.6	10.6	21.4	186.0	280.1	0.0	487.5	476.9	0.6	29.8
18	2030		146.2	146.2	23.8	205.9	316.5	0.0	546.2	400.0	7.8	29.0
19	2031		4.2	4.2	30.3	250.9	370.3	0.0	651.5	647.3	0.2	30.1
20	2032		4.2	4.2	33.7	277.6	382.1	0.0	693.4	689.2	0.2	27.9
		152.6	529.0	681.7	246.1	2,267.6	3,300.6	0.0	5,814.2	5,132.6	187.0	698.9

NPV at 15%	511.9
NPV/Cap	2.74
B/C	3.74

Table 4.5.7 Cost Benefit Stream: PM-2: Alaminos-San Pablo-Tiaong

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV Cost	PV Benefit
					Length by Condition (km)				19.5			
					0	6.1	13.4	0.0	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011	7.9		7.9	0.0	0.0	0.0	0.0	0.0	-7.9	6.0	0.0
0	2012	179.0		179.0	0.0	0.0	0.0	0.0	0.0	-179.0	117.7	0.0
1	2013		3.8	3.8	0.0	531.6	1,781.0	0.0	2,312.6	2,308.8	2.2	1,322.2
2	2014		3.8	3.8	0.0	690.7	2,309.2	0.0	2,999.9	2,996.1	1.9	1,491.5
3	2015		3.8	3.8	0.0	846.0	2,826.0	0.0	3,672.0	3,668.2	1.6	1,587.5
4	2016		3.8	3.8	0.0	1,037.9	3,466.3	0.0	4,504.2	4,500.4	1.4	1,693.3
5	2017		11.7	11.7	0.0	1,276.0	3,646.3	0.0	4,922.2	4,910.6	3.8	1,609.1
6	2018		179.0	179.0	0.0	1,572.6	3,691.2	0.0	5,263.8	5,084.9	50.9	1,496.3
7	2019		3.8	3.8	0.0	2,309.7	4,391.9	0.0	6,701.6	6,697.8	0.9	1,656.5
8	2020		3.8	3.8	0.0	2,025.5	4,472.5	0.0	6,498.1	6,494.3	0.8	1,396.7
9	2021		3.8	3.8	0.0	2,042.9	4,531.8	0.0	6,574.7	6,570.9	0.7	1,228.9
10	2022		3.8	3.8	0.0	2,052.4	4,578.5	0.0	6,630.9	6,627.1	0.6	1,077.7
11	2023		11.7	11.7	0.0	2,052.3	4,610.0	0.0	6,662.2	6,650.6	1.6	941.6
12	2024		179.0	179.0	0.0	2,040.6	4,622.9	0.0	6,663.5	6,484.5	22.0	818.9
13	2025		3.8	3.8	0.0	2,516.5	5,532.3	0.0	8,048.8	8,045.1	0.4	860.1
14	2026		3.8	3.8	0.0	2,530.8	5,590.0	0.0	8,120.8	8,117.0	0.4	754.6
15	2027		3.8	3.8	0.0	2,538.7	5,631.7	0.0	8,170.5	8,166.7	0.3	660.2
16	2028		3.8	3.8	0.0	2,538.9	5,660.8	0.0	8,199.7	8,196.0	0.3	576.2
17	2029		11.7	11.7	0.0	2,529.9	5,675.1	0.0	8,205.0	8,193.4	0.7	501.3
18	2030		179.0	179.0	0.0	2,510.1	5,672.2	0.0	8,182.3	8,003.3	9.5	434.7
19	2031		3.8	3.8	0.0	3,033.9	6,669.7	0.0	9,703.6	9,699.8	0.2	448.3
20	2032		3.8	3.8	0.0	3,040.2	6,711.2	0.0	9,751.4	9,747.6	0.2	391.8
	Total	186.9	624.7	811.6	0.0	39,717.2	92,070.6	0.0	131,787.8	130,976.3	224.0	20,947.5

NPV at 15%	20,723.5
NPV/Cap	92.52
B/C	93.52

Table 4.5.8 Cost Benefit Stream: PM-3: Carmen-Davao City

Million Php/Year

No.	Year	Cost			RUC Benefit					B-C	Present Value (PV) at 15% (2009 base)	
		Capital	O&M	Total Cost	2009 Good	2009 Fair	2009 Poor	2009 Bad	Total Length		PV Cost	PV Benefit
					Length by Condition (km)				48.0			
					0	36.3	4.0	7.7	Total Benefit			
	2008											
	2009			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011	38.8		38.8	0.0	0.0	0.0	0.0	0.0	-38.8	29.3	0.0
0	2012	880.6		880.6	0.0	0.0	0.0	0.0	0.0	-880.6	579.0	0.0
1	2013		14.8	14.8	0.0	3,242.1	543.4	1,275.1	5,060.5	5,045.8	8.4	2,893.4
2	2014		14.8	14.8	0.0	4,131.9	683.4	1,551.8	6,367.0	6,352.3	7.3	3,165.5
3	2015		14.8	14.8	0.0	4,862.5	798.6	1,775.3	7,436.4	7,421.7	6.4	3,215.0
4	2016		14.8	14.8	0.0	5,719.9	934.0	2,034.1	8,688.0	8,673.3	5.5	3,266.1
5	2017		53.6	53.6	0.0	6,728.3	1,093.7	2,145.5	9,967.6	9,914.0	17.5	3,258.4
6	2018		880.6	880.6	0.0	7,917.5	1,104.5	2,170.1	11,192.1	10,311.5	250.3	3,181.5
7	2019		14.8	14.8	0.0	10,770.5	1,268.7	2,442.3	14,481.6	14,466.8	3.6	3,579.6
8	2020		14.8	14.8	0.0	11,636.0	1,282.2	2,476.7	15,394.9	15,380.1	3.2	3,309.0
9	2021		14.8	14.8	0.0	11,728.9	1,292.4	2,505.6	15,526.9	15,512.2	2.8	2,902.1
10	2022		14.8	14.8	0.0	11,800.8	1,300.4	2,531.6	15,632.8	15,618.0	2.4	2,540.8
11	2023		53.6	53.6	0.0	11,848.2	1,305.6	2,554.1	15,707.9	15,654.4	7.6	2,220.0
12	2024		880.6	880.6	0.0	11,867.1	1,307.7	2,572.6	15,747.3	14,866.7	108.2	1,935.3
13	2025		14.8	14.8	0.0	13,694.7	1,509.1	2,904.9	18,108.7	18,093.9	1.6	1,935.2
14	2026		14.8	14.8	0.0	13,783.2	1,518.8	2,935.0	18,237.0	18,222.3	1.4	1,694.7
15	2027		14.8	14.8	0.0	13,825.8	1,523.5	2,955.2	18,304.5	18,289.8	1.2	1,479.1
16	2028		14.8	14.8	0.0	13,842.7	1,525.4	2,971.6	18,339.8	18,325.0	1.0	1,288.6
17	2029		53.6	53.6	0.0	13,830.5	1,524.0	2,983.8	18,338.3	18,284.7	3.3	1,120.5
18	2030		880.6	880.6	0.0	13,785.1	1,519.0	2,991.1	18,295.2	17,414.6	46.8	972.0
19	2031		14.8	14.8	0.0	15,900.6	1,752.1	3,372.8	21,025.5	21,010.8	0.7	971.4
20	2032		14.8	14.8	0.0	15,932.9	1,755.7	3,392.5	21,081.1	21,066.3	0.6	846.9
	Total	919.4	3,009.3	3,928.7	0.0	216,849.2	25,542.3	50,541.8	292,933.3	289,004.6	1,088.2	45,775.2

NPV at 15%	44,686.9
NPV/Cap	41.06
B/C	42.06

(7) Multi-Criteria Analysis

In order to prioritize the PM projects, a MCA was carried out.

The criteria (indicators) and their weight (score points) were presented in the Highway Planning Manual of DPWH. Corresponding results are shown below:

Indicators for New Projects			Score Points	Max. Points	PM-1 Jct.PPH-Rizal	PM-2 Alaminos-Tiaong	PM-3 Carmen-Davao
1.	**Project Preparedness**			65			
1.1	Current Project Status			10			
	1.1.1	Approved by the ICC (within 18 months validity)	10		10	10	10
	1.1.2	Approved by the ICC (within 18 months validity) but deferred by lending institution	8				
	1.1.3	Approved by the ICC (after 18 months) but deferred by lending institution	4				
	1.1.4	Not approved by the ICC. New proposal needs to be submitted to the ICC	0				
1.2	Detailed Design carried out		5	5			
1.3	Economic Viability			30			
	1.3.1	NPV/C ? 2.0	30		30	30	30
	1.3.2	NPV/C < 2.0 but ? 1.0	25				
	1.3.3	NPV/C < 1.0 but ? 0.5	20				
	1.3.4	NPV/C < 0.5 but ? 0.3	15				
	1.3.5	NPV/C < 0.3 but > 0	10				
1.4	Environmental Assessment (project with IEE or EIS or EIA, otherwise 0)			10			
	1.4.1	Minor or negligible impact and any mitigation accounted for in project costs	10		10	10	10
	1.4.2	Moderate negative impact but mitigation accounted for in project costs	8				
	1.4.3	Considerable negative impact but mitigation accounted for in project costs	4				
1.5	Social Impact (projects with LAPRAP, if required, otherwise 0)			10			
	1.5.1	No resettlement	10		10	10	10
	1.5.2	Minor resettlement but mitigation accounted for in project costs	8				
	1.5.3	Major resettlement but mitigation accounted for in project costs	4				
2.	Road Network Importance			20			
2.1	Road Category						
	2.1.1	North-South Backbone, Arterial National Roads	15				15
	2.1.2	East-West Laterals, Arterial National Roads	12				
	2.1.3	Other Arterial Roads of Strategic Importance	8				
	2.1.4	Secondary National Roads	4		4	4	
2.2	Road Strategic Network						
	2.2.1	Identified under major DPWH studies	5			5	
	2.2.2	Not identified under 2.2.1	0				
3.	Economic and Social Development Policy			15			
	a) Provide access to basic services which currently are not available (basic human needs)						
	b) Develop economically and socially underdeveloped/ depressed areas provided a resource base is available						
	c) Improve law and order						
	d) Support agricultural modernization						
	e) Support traffic decongestion						
	f) Support industrial and tourism development						
	3.1.1	All points met	15				
	3.1.2	Point 3b) and another four out of the six points met	12				
	3.1.3	Point 3b) and another two out of the six points met	8				
	3.1.4	Only point 3b) met	4				
	3.1.5	None of the points met	0				
		Total Maximum Score		100	64	69	75

The total score of each PM project is summarized below:

- PM-1: JCT. PPH-Rizal: = 64
- PM-2: Alaminos-San Pablo-Tiaong: = 69
- PM-3: Carmen-Davao City: = 75

(8) Project Effects and Effect Indicator

For the purpose of evaluation of the effects by the implementation of the REAPMP projects, various effect indicators were prepared as listed below.

- Traffic Demand (AADT)

- Savings in Travel Time on project road sections
- Saving in Vehicle Operating Cost (VOC)
- Average Velocity Increase
- Decrease of Annual Traffic Impassability (No. of days impassable/ year) due to Disaster
- Degree of Poverty Reduction
- Economic Internal Rate of Return (EIRR)

Regarding the indicator of the Poverty Reduction, evaluations were made from the qualitative aspect due to the difficulty of quantification of contribution of projects to poverty reduction.

In addition, it is noted that the purpose of REAPMP projects is, in principle, to maintain, prevent, rehabilitate, and upgrade/improve the existing road assets to keep them in "paved good condition", and not for capacity augmentation (widening) nor construction of new roads (including expressways) to mitigate the traffic congestion. Traffic volume is basically the same in "Without project" and "With project" situations if newly generated traffic is not taken into account. Therefore, effects on velocity (speed) increase and resulting time savings are secondary effects of the projects. Furthermore, for road sections presently in good/fair condition, the preventive maintenance (PM) is planned to keep/maintain good/fair condition for long term. In this case, it will be difficult to estimate future velocity decrease when PM is not implemented.

The results of estimation of effect indicators for PM roads are summarized in the following table:

	1	2	3	4	5	6	7
Indicator / Project	AADT Including Motorcycles	Time Saving (minutes)	VOC Saving (Mil.Php/ year)	Average Velocity Increase (km/hr) (Estimate)	Decrease of impassable days/year	Poverty Reduction	EIRR (%)
PM-1: Rizal	(2008) 2,077 (2018) 2,814	10	(2015) 87 (2018) 123	50→65	-	moderate	52.3
PM-2: Alaminos	(2008) 14,010 (2018) 23,202	5	(2015) 3,670 (2018) 5,264	50→60	-	moderate	919.1
PM-3 Carmen	(2008) 19,212 (2018) 27,412	10	(2015) 7,440 (2018) 11,192	55→65	-	moderate	480.2

4.6 INSTITUTIONAL CAPACITY DEVELOPMENT (ICD) AND TECHNICAL ASSISTANCE (TA) COMPONENT

4.6.1 REVIEW OF ICD PROGRAMS

(1) Review of ICD Sub-components in the Pre-FS Report

Table 4.6.1 shows discussion points on the proposed ICD of DPWH during the joint SC/TWG meeting held on 16th June 2009.

Table 4.6.1 ICD in Pre-FS and Discussions at the SC/TWG Meeting (16th June 2009)

Sub-Component in Pre-FS Report	Contents	Discussion Points on TWG/SC
Institutional Capacity Building（ICB)		
1 Routine Maintenance Enhancement (1) Operation of Routine Maintenance Management System (RMMS) (2) Capacity Building for DPWH RO and DEO Staff	Staff Training (through Workshop and OJT)	Developed by ADB 6th Road Coordination with JICA TCP-2, Supply equipment for expanding to Remaining 13
2 Road Safety Enhancement (1) Enhancement of TARAS (2) Improvement of Road Safety Audit (RSA) System		Developed by ADB 6th Road and included RSIP
3 Overloaded Vehicle Control	New 10 weighbridges	**OK.** 8 New Weighbridge and 4 existing weighbridge refurbishing
4 Quality Control System（Construction, Rehabilitation and Preventive Maintenance）	Supply of Quality Control Equipment for 8 Level II	**OK**
	Quality Assurance System Enhancement on BRS and QAU	Coordination with JICA TCP-2
5 Enhancement of Contractors and Consultants on Road Maintenance	LTPBME Policy, Guideline, Capacity Development for Contractors and Consultants on	**OK**
6 Road Disaster Countermeasure Design and Construction	Capacity Building for Planning, Design and Construction	Duplication with JICA TCP-2
7 Supply of Emergency Disaster Recovery Equipment	Supply of 2 dump trucks and 1 wheel loader for 10 DEOs	**OK**
Technical Assistance (TA) (1) Formulation of PPP (2) Formulation of Future REAPMP-Phase II, including engineering design	 by Grant by Grant	 Propose JICA TA Facility Propose JICA TA Facility (Master Plan Study and FS)

The Survey Team agreed at the SC/TWG meeting that RMMS and Road Safety be deleted from the ICD program of REAPMP. It was further agreed that MIS/DPWH will submit ICD-matrix of NRIMP 1 and 2, and ADB 6th Road and RSIP, AusAID/PEGR and JICA REAPMP to avoid duplication among donor programs. A grant for the proposed technical assistance on PPP and REAPMP Phase 2 should be requested from GOP to GOJ.

(2) Review of Revised ICD Sub-programs of MIS/DPWH

The DPWH proposed the revised ICD programs on 6th July 2009. The JICA Survey Team requested clarification on contents and costs of the new ICD items. The JICA Survey Team discussed the revised ICD programs at the TWG meeting on 18th August 2009 and during the SC meeting on 27th August 2009.

Table 4.6.2 shows the matrix for ICD Programs proposed by MIS/DPWH to be adopted by the JICA Survey Team for REAPMP. The JICA Survey Team included JICA TCP Phase 2, though not yet committed, as this was requested by DPWH to the GOJ. It is noted that some ICD sub-programs of REAPMP are related to JICA TCP Phase 2.

ICD Component of REAPMP should be consistent with the thrust of the DPWH to integrate all ICD projects, and ensure that no duplication will occur.

The Survey Team recommends the following ICD components (programs) for REAPMP.

Description		Category	No.
ICD-1	Overload Vehicle Control Enhancement		
	1.1 New Weighbridges		8
	(1). Land Acquisition	DPWH	
	(2). Civil Works and Buildings	DPWH	
	(3). Purchase of Weighbridges and Installation	Goods	
	1.2 Refurbish of Existing Weighbridges		4
	(1). Buildings and Associated Facilities	DPWH	
	(2). Purchase of Spare Parts and Refurbish of	Goods	
	1.3 System Planning, Development & Operation	Consultancy	
ICD-2	Quality Assuarnce Enhancement		
	2.1 Sub-regional (Level II) Laboratory Establishment		8
	(1). Land Acquisition	DPWH	
	(2). Civil Works and Buildings for Laboratories	DPWH	
	(3). Purchase of Laboratory Equipment and Installation	Goods	
	2.2 Quality Control Enhancement (QAU)	Consultancy	
ICD-3	Emergency Road Disaster Recovery Equipment for DPWH DEOs	Goods	10
ICD-4	Communication Network and IT Equipment/Software	DPWH	30
	4.1 IT Equipment		
	(1). Purchase of Computer, Software and IT Connection	Goods	
	(2). DEO Staff Training (Workshop & OJT)	MIS/DPWH	30
	4.2 Information Management Planning	Consultancy	
ICD-5	Capacity Development Support for Remaining 13 Regions		13
	(1). Non-destructive equipment	Goods	
	(2). Workshop and OJT Costs	DPWH	
ICD-6	Consultancy Services for ICD		
(1)	Institutional Capacity Development for the ICD-1, ICD-2 and ICD-4	Consultancy	
(2)	Reform Monitoring Assistance	Consultancy	
(3)	Enhancement of Contractors and Consultants (Workshops)	Consultancy	

System development for e-binding was not recommended as it would be difficult to adopt in the current internet environment.

The Survey Team did not finally recommend Geo-hazard management (slope and scouring protection, bridge seismic design and retrofitting and model projects) proposed by BOD for REAPMP, because of:

- The slope and river protection works were included in the on-going JICA TCP-1 and proposed JICA TCP-2.
- Bridge seismic design and retrofitting should be covered by JICA TCP-2 as the bridge training programs and expert are there.
- As NRIMP-2 included 43 sites of Landslide Risk and Mitigation, part of the slope assessment and management ICD should be covered under NRIMP-2.
- Considering nature of proposed study and man-months/cost, these should be appropriate for grant but not loan under the GOJ ODA category.

Table 4.6.2 Matrix of Institutional and Capacity Development Programs (1/2)

NRIMP-1	ADB 6TH Road	AusAid/PEGR	NRIMP-2	ADB-RSIP	JICA TCP Phase II (under proposal)**	JICA-REAPMP Proposal by DPWH	JICA-REAPMP Adoption
· Network Planning and Multi-Year Programming (Includes Multi-Year Programming and Scheduling (MYPS) Application and Road Traffic Information Application (RTIA)	· Routine Maintenance Management System (RMMS)	· Financial Management	· Institutionalization of the New Planning Processes	· RMMS	· Quality Management and Enhancement for Road Construction / Maintenance	· e-Bidding	No
· Road and Bridge Information Application (RBIA)	· Pavement Management System (PMS)/Bridge Management System (BMS)	· Independent Procurement Evaluator	· Engineering Design Processes	· TARAS	· Quality Management and Enhancement for Bridge Construction / Maintenance	· Overloaded Vehicle Control	Yes, with overloaded vehicle improvement systems
· Road Infrastructure Surveys	· Road Infrastructure Safety/TARAS	· Support to Road Watch (Bantay Lansangan)	· Environmental and Social Safeguards	· Road Safety Audit	· Expansion of Capacity Enhancement of ROs and DEOs to all remaining regions	· Communication Network	Yes, Equipment supply
· Procurement of Automatic Traffic Classifiers		· Strengthening Internal Control and Audit System	· Advisory Services and Road Management	· Project Management Information System (PMIS) Includes Project Cost Evaluation	· Slope and scouring protection works	· IT Equipment and Software	Yes, Equipment supply
· Procurement of Portable Weight Scales		· Corporate Modernization/ support to implement the ISAP	· Sector Reform and Road Board Strengthening	· Environmental and Social Safeguard & ROW	· Information Management Planning	· Road Disaster Countermeasure Design and Construction	Yes, Consultancy Services
· Cost Estimation, Procurement Management		· Independent Technical Auditor	· Procurement and Estimation Services	· Communication Network			No, Design Enhancement under JICA TCP Phase 2

Table 4.6.2 Matrix of Institutional and Capacity Development Programs (2/2)

NRIMP-1	ADB 6TH Road	AusAid/PEGR	NRIMP-2	ADB-RSIP	JICA TCP Phase II (under proposal)**	JICA-REAPMP Proposal by DPWH	JICA-REAPMP Adoption
· Strengthening of Environmental. Socio-Economic, and Land Acquisition Processes Includes IROW Application		· Human Resource and Leadership Development	· Special Road Surveys	· IT Facilities		· Enhancement of Contractors and Consultants	Yes, Consultancy Services (Workshops)
· Communication Network			· Bridge Inspection Units and Service Maintenance	· Road Partnership		· Supply of Quality Control Equipment	Yes, Equipment supply
· IT Framework and Workstation			· Traffic Classifiers and Service Maintenance	· Comprehensive Human Resource Development		· Quality Control Enhancement	Yes, Consultancy Services
· Geographic Information System (GIS)			· Survey Equipment and Service Maintenance	· Gender Mainstreaming		· Supply of Emergency Disaster Recovery Equipment	Yes, Equipment supply
· Database Management System (DBMS)			· Materials Testing Equipment	· Quality Assurance System		· Supply of non-destructive testing equipment, etc. for 13 ROs	Yes, Equipment supply**
· eNGAS			· IT Equipment and Software	· Infrastructure Development and Quality Assurance Equipment		· Finance for Workshop / OJT costs for RO/DEO Capacity Development (remaining 13 ROs)	Yes, Required Workshop/OJT costs**
			· Communication Network				Reform Monitoring Assistance*
			· Database Management System (DBMS)			· **Technical Assistance (Grant)**	
			· Geographic Information System (GIS)			TA-1: Preparation of REAPMP Phase 2 Project	Recommend JICA Road Mater Plan Study and Pre-FS for priority projects
			· Confirm Software Maintenance			TA-2: Preparation of PPP Projects	

Notes: * Recommended by the JICA Survey Team
** JICA TCP Phase 1 has been implemented for 3 regions (CAR, Region VII and Region XI). Phase II will expand ICD to the remaining 13 regions, either with JICA assistance or own DPWH has proposed assistance of GOJ for TCP Phase 2 implementation. However, GOJ/JICA has not made any commitment on it.
Source: MIS/ DPWH and JICA Survey Team

4.6.2 ICD-1: OVERLOAD VEHICLE CONTROL ENHANCEMENT

As a part of Partnership for Economic Governance Reforms (PEGR), AusAID conducted a study on truck overloading. The study reports concluded firstly that the majority of the existing weighbridge stations are in poor condition. Said stations have inoperative machines and are mostly located at sites which have insufficient signage, inadequate lighting and damaged carriageways. Out of the current total network of some 23 DPWH weighbridges it was found that virtually none of the sites are currently operating satisfactorily due to various technical issues. It concluded that 15 of the existing weighbridge stations need to be retained but refurbished. It is also recommended that twenty new sites be added to the existing weighbridge network. Moreover, a number of mobile enforcement squads, utilizing portable axle weighing machines, should be established.

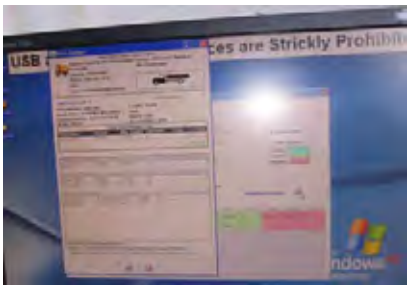
To addressing these issues, REAPMP will include the measures that will improve the function of overloaded vehicle control, as follows:

- Improve transparency in axle and gross weight control methods and operations.
- Establish eight new weighing stations at strategic points on arterial road network to avoid overloaded trucks from skipping control station through alternative routes.
- Refurbish four existing weighbridge stations.
- Educate vehicle owners and drivers.
- Introduce a computerized system for overload control efficiency improvement.

The JICA Survey Team recommends the introduction of a computer-assisted system at weighing stations similar to that installed for SCTEX project. Consequently, when a heavy vehicle passes on a weigh-in-motion bridge, its axle loads and gross vehicle weight are transmitted to a computer wherein the magnitude of overloading are automatically determined and indicated on screen (photographs below). As the driver's name and truck's owners are recorded, it can identify how often they breach overloading laws. More strict warning and penalties can been given to the repeated drivers and owners including public opening.

Weigh-in-motion Weigh Bridge

Record of Driver and Vehicle Owners



Automatic Recording and Overload Record

The Survey Team recommends refurbish of four existing weighbridge stations and installation of eight new weighbridges (Figure 4.6.1 and Table 4.6.3) which are selected based on the following conditions:

- Consistency with the recommended future weighbridge station network proposed in the above-mentioned PEGR Study (RA009-01) and accepted by DPWH.
- Traffic Volume of the road AADT more than 2500
- Give Priority to the UI and LTPBM road sections of REAPMP.
- Exclude the Pilot Study Area (Manila surrounding) by AusAID/PEGR

- Cebu as a center of Central Philippine Economic zone

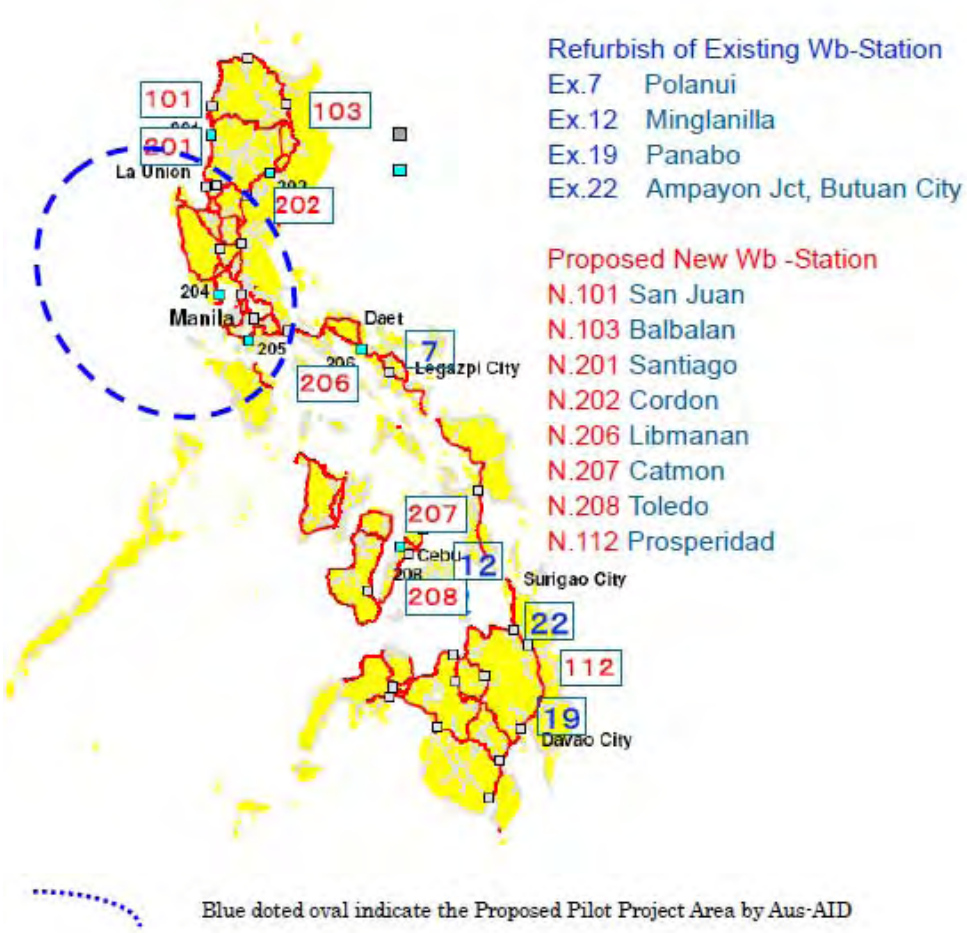


Figure 4.6.1 Location Map of Proposed Weighbridge Stations

Table 4.6.3 Location of Proposed Weighbridge Stations

Station No	Road Category	Road Name Location	Town / City	Province	Region
Refurbish of Existing WB-Staion					
Ex.7	North-South Backbone	Daang Maharlika (LZ)	Polangui	Albay	R-V
Ex.12	North-South Backbone	Natalio Bacalso Avenue	Minglanilla	Cebu	R-VII
Ex.19	North-South Backbone	Daang Maharlika (MN)	Panabo	Davao del Norte	R-XI
Ex.22	North-South Backbone	Butuan- Cagayan de Oro-Iligan City Rd	Ampayon Jct, Butuan City	Butuan	R-XIII
Newly construction of WB-Station					
New.101	North-South Backbone	Manila North Rd	San Juan (Lapog)	Ilocos Sur	R-I
New.103	East-West Lateral	Kalinga-Abra Rd	Balbalan	Kalinga	CAR
New.201	North-South Backbone	Manila North Road	Santiago	Illocos Sur	R-I
New.202	North-South Backbone	Daang Maharklika	Cordon	Isabela	R-II
New.206	North-South Backbone	Daang Maharlika (LZ)	Libmanan	Camarines Sur	R-V
New.207	Other Road	Cebu North Hagnaya Wharf Rd	Catmon	Cebu	R-VII
New.208	North-South Backbone	Cebu - Toledo Wharf Road	Toledo City	Cebu	R-VII
New.112	North-South Backbone	Daang Maharlika (Agusan-Davao Sect)	Prosperidad	Agusan del Sur	R-XIII

The Survey Team has recently received unofficial information from DPWH that the

weighbridges at the original locations – Panabo, Libmanan and Toledo – are being financed from 2008 MVUC funds recently approved by the Road Board. The Survey Team recommends clarification on this issue at the time of loan appraisal and decides whether to accept alternative locations proposed by DPWH.

4.6.3 ICD-2: QUALITY ASSURANCE ENHANCEMENT

Quality assurance (QA) is an all-encompassing term that includes quality control (QC) by the contractor, the conduct of assessment/inspection by an independent inspectorate team such as the DPWH establishment of quality assurance units (QAUs), the employment of competent laboratory and technical personnel by both parties (the contractor and the DPWH) and the acceptance of the project by the implementing agency (DPWH). QA is a total system attained as a result of the combined efforts and resources of the entities involved in the construction of projects (DPWH, contractors and consultants).

The objective of ICD for QA system component is to strengthen the DPWH's QA capacity for ensuring acceptable quality of construction and maintenance. As a sub-component of the ICD on QA System, the following three issues are to be addressed:

- Improvement of Materials Testing Capability and Capacity
- QA System for Maintenance and Construction
- Assessments of QAUs.

(1) Improvement of Materials Testing Capability and Capacity

The testing equipment and capacity of RO laboratories is sufficient to conduct most of the quality tests required for road works. However, that of DEOs remain limited as they do not have cement, asphalt and steel bar testing facilities. Most of the small to medium contractors as well do not have testing equipment and designated staff.

To overcome these problems, the DPWH, through the Bureau of Research and Standards (BRS), proposed to supply materials testing and QA equipment for the new eight Level II or sub-regional (satellite) laboratories at the following locations:

Region	Location	Region	Location
II	Cabarroguis, Quirino	IX	Pagadian City
V	Naga City	X	Oroquieta City
VII	Dumaguete City	XII	General Santos City
VIII	Catbalogan, Samar	XIII	Surigao City

Note: Level I – subdistrict or district, Level II – subregion, Level III – region, and Level IV – central office (BRS)

The proposed sub-regional laboratories are strategically located in order to serve the DEOs which are far from the existing laboratory sites. Each laboratory will be capable of testing materials for the following purposes:

The Level II laboratory will be capable of carrying out the following activities as a minimum:

(i) Calibration of basic equipment.

(ii) Basic testing of soils and aggregates.

(iii) Sample preparation and strength testing of cement mortar, concrete and asphalt.

(iv) CBR, Los Angeles abrasion, soundness and organic impurities tests for aggregates.

(v) Steel Bar strength testing.

(vi) Penetration testing of bitumen.

(vii) Marshal stability tests for asphalt concrete mix design.

(viii) Consultancy Services for ICD.

(ix) Bitumen extraction and grading of compacted bituminous mixtures.

(x) Concrete pipe testing.

The minimum complement of materials testing equipment for each Level II laboratory is listed in Annex 6.

(2) QA System for Maintenance and Construction

The DPWH, through the BRS, requires technical assistance for the implementation of the QA System. The BRS intends to employ a technical expert who will provide the following services for one year:

(i) Advise the BRS and DPWH generally on all aspects of the QA management systems;

(ii) Develop and introduce modern computer-based methods of testing to upgrade the department's laboratory capability and capacity;

(ii) Review and recommend improvements on the service provided to the clients of the department by improving the quality of management practices;

(iv) Prepare standard technical notes and operating procedures, and a system for updating the practices and systems;

(v) Design and develop on how to enhance the relationship between the department and its contractors/suppliers, by adopting the AASHTO or equivalent QA program, and introduce the necessary changes in the contract documents;

(vi) Improve the established system of accreditation for private testing laboratories and batching plants and for staff from the department and contractors/consultants;

(vii) Introduce QA more widely in the department;

(viii) Recommend further actions for increased awareness on QA best practices;

(ix) Train the department's staff in order to qualify as certified QA practitioners;

(x) Assist BRS in the preparation of periodic and completion reports required by the DPWH management and JICA.

The technical expert will be required to fully transfer the skills to BRS staff, so that the QA implementation will continue to be executed smoothly upon completion of the project.

(3) Assessments of QAUs

By virtue of Department Order No. 26, series of 1990, the DPWH created the QAUs which are tasked with assessing the quality of on-going and completed projects. Since 1990, the QAUs have been involved in the assessment of both construction and maintenance projects of the department. The ICD assistance under REAPMP aims (a) to support the DPWH program of institutional strengthening of quality management, and (b) to reduce the frequency of defects and deficiencies found in DPWH projects.

4.6.4 ICD-3: EMERGENCY ROAD DISASTER RECOVERY EQUIPMENT FOR DPWH DEOS

As a sub-component of ICD, emergency road disaster recovery in mountainous areas is an essential response to natural disaster and calamity (typhoons, heavy and prolonged rains which tend to trigger landslides and road slips leading to the damage and closure of roads).

REAPMP support the provision of two dump trucks and one pay loader for each of the DEOs situated in the following areas that are most prone to slope failures and landslides:

Region	Province	Region	Province
CAR	Benguet	Region V	Catanduanes
Region II	Nueva Vizcaya	Region VIII	Eastern Samar
Region III	Aurora	Region VIII	Southern Leyte
Region IV-A	Quezon	Region XIII	Surigao del Sur
Region V	Albay	Region XIII	Agusan del Sur

4.6.5 ICD-4: COMMUNICATION NETWORK AND IT EQUIPMENT/SOFTWARE

The DPWH has developed many computer assisted road management systems, including RTIA, RBIA, PMS, BMS, RMMS, eNGAS, etc. It has also a web-basis public information system. The DPWH intends to connect all ROs and DEOs to its WAN as part of the modern business system. The WB NRIMP-2 and ADB RSIP will assist to renovate and introduce IT equipment/soft ware and communication network of the DEOs.

The DPWH submitted a revised ICD matrix for REAPMP which included the following Communication Network, IT Equipment/Software and Information Management Planning for as a collaboration program of the World Bank and ADB.

(1) e-bidding

The objectives of introduction of the e-bidding are as follows:

- To strengthen the integrity of the bidding process in the DPWH
- To promote transparency in the bidding procedure
- To level the playing field or equal opportunity is given to all contractors
- To streamline the bidding process.

The scope of works is consultancy services to study and establish procedures and procurement of facility to implement online bidding.

However, the Survey Team does not recommend e-bidding for REAPMP as it is still premature when considering current IT and communications capacity in the Philippines, especially outside of Manila and Cebu.

(2) Procurement of DPWH Communication Network Equipment (Voice and Data) for 30 remaining District Engineering Offices

The objective of program is to connect 30 remaining District Offices to the Wide Area Network (WAN) of the Department. The scope of works includes the following:

- Construction of network room or data center.

- Construction of powerhouse and concrete pedestal.
- Delivery and installation of network cables including nodes for voice and data.
- Delivery and installation of generator set.
- Delivery and installation of PABX and telephone sets.
- Delivery and installation of Wide Area Network equipment and data switches.
- Activation of the equipment including connection to the Department Wide Area Network.

The MIS/DPWH will conduct training of DEO staff through workshops and OJT programs. REAPMP will include such training costs by DPWH to ensure a workable new equipment and system.

(3) Procurement of DPWH IT Computer and Software for 30 District Engineering offices

The general objective is that DPWH is looking to expand its enterprise-wide platform of database servers, application servers, administrative servers, and client workstations, to implement a three-tier client-server architecture running a number of enterprise applications in all Department Offices. The objective of program is to provide IT computers and Software for 30 remaining District Offices. The equipment included in this procurement includes Domain Servers, Business Workstations, Uninterruptible Power Supplies (UPS) and peripherals including printers, and associated software for the additional 30 District Offices.

The scopes of works include:

- Delivery and installation of 30 Servers with UPS, related peripherals and software, including mail server and active directory configuration.
- Delivery and installation of 450 Business Workstations with UPS, related peripherals and software
- Delivery and installation of 90 printers, related peripherals and software
- Provide the required training and orientation required to implement the WAN/LAN connectivity in the most effective, efficient, and optimized manner to obtain the greatest benefit. This environment includes servers and workstations with UPS, printers and software.

(4) Information Management Planning

To support the service delivery of the DPWH, the MIS is committed to effectively and efficiently manage the Information Management (IM) operations and protect the value of its investment. Because of this commitment, the MIS needs the IM Planning Methodology which will assist in ensuring that the right projects are to be implemented, and identifying new opportunities to respond to the IT needs of the Department.

The scope of works is advisory services on:

- Selection of hardware and/or software for inclusion in DPWH Architecture and Standards
- Purchase of hardware and/or software for evaluation, testing or implementation
- Development and implementation of application system
- Enhancement/maintenance of existing application system

- Customization, integration, and implementation of package software
- Implementation of new releases or upgrades to hardware or system software
- Any purchase of consultancy or supplies contract or other IT support services.

4.6.6 ICD-5: CAPASITY DEVELOPMENT SUPPORT FOR REMAINING 13 REGIONS

JICA has implemented the technical cooperation for "the project for improvement of quality management for highway and bridge construction and maintenance" as a joint effort of the GOP and GOJ, aiming at the capacity enhancement of the DPWH CAR, Region VII and Region XI engineers. The JICA TCP focused on the ROs and DEOs where approximately 85% of the DPWH employees belong. They are the designated implementing agencies for both development and maintenance projects for locally funded projects. The JICA assigned a TCP Team comprised of two long-term experts and 5 - 6 short-term experts. The phase 1 project is from February 2007 to February 2010. The DPWH has proposed to the GOJ for the implementation of TCP Phase 2[4]. The JICA TCP adopted workshops and on-the-job training methodologies. Phase 1 is mostly for training of OJT trainers.

The DPWH will expand the quality enhancement and management for highway and bridge construction and maintenance to all remaining 13 regions and DEOs under JICA TCP Phase 2 if approved by GOJ or by own resources if not approved by GOJ. REAPMP will provide equipment, mostly non-destructive testing devices (refer to Annex A for a testing equipment list) and facilities necessary for workshops and OJTs.

Note: The DPWH has proposed the GOJ to grant non-destructive testing devices for the remaining 13 regions. If the GOJ approved it, the supply of equipment by REAPMP (Yen loan) will be deleted.

4.6.7 ICD-6 : CONSULTANCY SERVICES FOR ICD

The consultancy services planned for REAPMP ICD include the following:

- Procurement assistance for goods (weighbridges, laboratory equipment, disaster recovery equipment, IT equipment, non-destructive equipment) by ICD, including preparation of bidding documents and specification, bid evaluation and contract procedures
- System planning, development and operation guidance for weighbridges
- QAU
- Information management planning
- Enhancement of capacity of contractors and consultants (Workshops)
- Reform monitoring assistance services

4.6.8 COST ESTIMATE

(1) General

ICD is composed of the following components:

- ICD-1: Rehabilitation and installation of new weighbridge including operation system improvement

[4] JICA has not yet made any commitment to TCP Phase 2. JICA will consider implementation of TCP-Phase 2 based on a joint project appraisal by JICA and DPWH scheduled by the end of 2009.

- ICD-2: Strengthening of quality assurance system for construction and maintenance
- ICD-3: Procurement of Heavy equipment for emergency road disaster
- ICD-4: IT equipment and its software for information management system
- ICD-5: Capacity Development Support for Remaining 13 Regions
- ICD-6: Consultancy services for associate consultancy for ICD-1, ICD-2 and ICD-4, enhancement of contractors and consultants and reform monitoring assistance.

Cost estimates for the above ICD components were prepared based on quotations requested from suppliers or contract prices in similar projects. The type, system and number of equipment, apparatus and facilities are based on discussion with DPWH. The buildings and civil works were approximately estimated based on the plans provided by the facilities engineer.

(2) ICD-1: Rehabilitation and New Installation of Weighbridges and Improvement of Operation System

Eight new weighbridges shall be installed as proposed under this project. Type of system recommended is the weigh-in-motion scale. Unit cost and quantities for said type of bridge were derived from the following information:

- Subic-Clark Extension Project, Feb 2008
- Proposed weighbridge station at Magdugo, Toledo City, Feb 2009

Four existing weighbridges meanwhile were identified for improvement and repairs. Items for related works were obtained by the JICA Survey Team through visual inspection and interviews with operators at site and concerned DEOs.

Based on detailed estimate presented in Annex 8 of this report, the following presents a summary of budgetary cost for the weighbridges:

Installation of new weighbridges at eight locations:

Estimated Cost						
Category		Equipment Supply (Mill Php)	Civil Works and Building (Mill Php)	ROW (Mill Php)	Administration (Mill Php)	Total (Mill Php)
Direct Cost		3,160,000	9,152,000.00	4,689,000	407,000	17,408,000
Make-up	18%	3,728,800	10,799,360	4,689,000	407,000	19,624,160
With VAT	12%	4,176,256	12,095,283	4,689,000	407,000	21,367,539
Quanity (No)	8	33,410,000	96,762,000	37,512,000	3,256,000	170,940,000

Refurbishment of existing weighbridges at 4 locations:

Estimated Cost						
Category		Equipment Supply (Mill Php)	Civil Works and Building (Mill Php)	ROW (Mill Php)	Administration (Mill Php)	Total (Mill Php)
Direct Cost		23,293,400	30,916,000.00	-	1,355,235	55,564,635
With VAT	12%	26,089,000	34,626,000	0	1,355,000	62,070,000

(3) ICD-2: Strengthening of DPWH Quality Assurance Systems

In order to strengthen the QA systems of DPWH, eight sub-regional laboratories shall be constructed and equipped with all essential testing apparatus and facilities.

List of apparatus were based on the "Road Operation and Maintenance Sector Study Final Report" by JBIC, dated 31 July 2007. Marshall Stability testing equipment for AC mix design is proposed to be added in the required apparatus. Corresponding unit prices were also derived from said report and from the following available information:

- Engineer's estimate, Pinatubo Project, 2009
- Quotations from suppliers

The structure for the laboratory facility was also estimated based on approximate measurements of an existing building in Region IV-B compound. Unit price per square meter was approximated based on current market prices, to determine the budgetary cost of said structure.

Detailed estimates for the laboratory facility are included in Annex 8. The following shows the summary costing.

Estimated Cost						
Category		Equipment Supply (Mill Php)	Civil Works and Building (Mill Php)	ROW (Mill Php)	Administration (Mill Php)	Total (Mill Php)
Direct Cost		13,628,698	13,010,000	2,800,000	735,967	30,174,665
With VAT	12%	15,264,000	14,571,000	2,800,000	736,000	33,371,000
Quanitity	8	122,112,000	116,568,000	22,400,000	5,888,000	266,968,000

(4) ICD-3: Provision of Equipment for Emergency Road Disaster Response

For efficient response to emergency road disasters, ten new dump trucks and wheel loaders shall be procured. Unit costs for said equipment were obtained from supplier's quotations.

Estimated costs are as follows:

Estimated Cost						
Category		Equipment Supply (Mill Php)	Civil Works and Building (Mill Php)	ROW (Mill Php)	Administration (Mill Php)	Total (Mill Php)
Direct Cost	10 sets	265,964,286	-	0	6,649,107	272,613,393
With VAT	12%	297,880,000	0	0	6,649,000	304,529,000

(5) ICD-4: IT Equipment, Software, Information Management System and ICD-5: JICA TCP Phase 2 support equipment and facility for remaining 13 Regions

The estimated costs for the related equipment in this ICD component are as follows:

No.	Description	Estimated Cost				Number of RO, DEO or Location
		Equipment Supply (Php)	Workshops/ OJT (Php)	Administration (Php)	Total (Php)	
ICD-4	Communication Network and IT (1) IT Equipment and software for 30 DEOs	208,000,000	3,000,000	5,275,000	216,275,000	30 DEOs
ICD-5	JICA TCP Phase II Support for Remaining 13 Regions (1) Non-destructive equipment (2) Workshop and OJT Costs	156,610,000	 39,000,000	3,915,250 975,000	160,525,250 39,975,000	 13 ROs 13 ROs

Note: Including VAT 12%

(6) ICD-5: Capacity Development Support for Remaining 13 Regions

The equipment and training facilities required for this ICD program were estimated at Php 201 million.

(7) ICD-6: Consultancy Services

The estimated costs for this ICD component are as follows:

Base Cost

Item / Description	FC (1000 Yen)	LC (1000 Php)	Total (1000 Php)
F1 Remuneration of Consultants (66 Man-Month)	¥172,200		86,663
F2 Out-of-Pocket Expenses			
1. Airfare	¥8,820		4,439
2. Per Diem Allowance	¥11,880		5,979
3. International Communications	¥900		453
Total (Mill Yen)	**¥193,800**		**97,534**
L1 Remuneration of Consultants (74 Man-Month)		20,840	20,840
L2 Out-of-Pocket Expenses			
1. Domestic Travels		1,230	1,230
2. Office Rental & Running Cost		6,840	6,840
3. Office Equipment & Furniture		1,500	1,500
4. Car Rental and Others		5,460	5,460
5. System Development and Workshops for Training		5,000	5,000
Sub-Total		**40,870**	**40,870**
L3 VAT (12%)		4,904	4,904
Total		**45,774**	**45,774**
Grand Total			**143,308**

Note: Currency Exchange Rates

US$ 1.00 = Php.	47.80	=	95.00 J.Yen
Peso 1.00 = US$	0.0209	=	1.987 J.Yen

(8) Comparison of Estimated ICD Costs with that of Pre-FS

The following Table 4.6.4 shows a comparison of the estimated ICD costs with that estimated in the Pre-FS report. Weighbridges and laboratories have significant differences as these include

associated facility construction. The emergency disaster response equipment has considerable differences since the Pre-FS cost seems less conservative.

Table 4.6.4 Comparison of Estimated ICD Costs with Pre-FS

No.	Description	Estimated Cost in Pre-FS		REAPMP				Difference to Pre-FS	Difference to Pre-FS
				Category			Estimate Cost		
		Quanitity	Estimated Cost (Mill Php)	Equipment Supply	Consultancy Services	Activity of DPWH	(Mill Php)	(Mill Php)	(%)
ICD-1	Overload Vehicle Control Enhancement								
	(1) Installation of New Weigh Bridge Stations at 8 locations:	10	87	X			171	84	197%
	(2) Refurbishment of Existing Weighbridges at 4 locations:			X			62	62	
	(3) Operation System Improvement (program development, installation and training)				X				
ICD-2	Quality Control Enhancement								
	(1) New satellite laboratories at 8 locations	8	107	X			267	160	250%
	(2) Quality Control Enhancement				X				
ICD-3	Emergency Road Disaster Recovery Equipment for 10 DPWH DEOs	10	42	X			305	263	725%
ICD-4	Communication Network and IT Equipment								
	(1) IT Equipment and software			X			216	216	
	(2) Information Management Planning				X				
ICD-5	Capacity Development Support for Remaining 13 Regions								
	(1) Non-destructive equipment			X			161	161	
	(2) Workshop and OJT Costs					X	40	40	
	Sub-Total:		236				1,221	986	518%
ICD-6	Consultancy Services for ICD		121		X		143	22	118%
	(1) Institutional Capacity Development for the above ICD-1(3), ICD-2(2) and ICD-4(2)								
	(2) Reform Monitoring Assistance		0						
	(3) Enhancement of Contractors and Consultants		18						
	- Others (Slope, Safety, RMMS)		103						
	Total:		357				1,365	1,008	383%

Note: Including VAT 12%

4.6.9 EVALUATION

The ICD Components consists of various items as outline in the foregoing sections.

Since the quantitative evaluation of the outcomes of these components is not simple, the following evaluation methodologies are proposed:

(1) Installation/ refurbishment of new weighbridges: Record the daily/monthly/ yearly data of overloading with computers connected to the weighbridges. Evaluate the degree of achievement compared to a targeted level of reducing the overloading. This process will be supported by the consultants monitoring service.

(2) QC Enhancement: The follow-up survey of utilization of the satellite laboratories and checking the results of inspection by the QAU through the consultants monitoring services.

(3) Emergency Road Disaster Recovery Equipment: Check the rate of operation/ number of working times per month of equipment, and many hours/days required to utilize the designated equipment, until the closed roads are opened.

(4) Communication Network and IT Equipment: Prepare questionnaire surveys before, intermediate, and after introducing the system/equipment to RO and DEO engineers querying the outcome and issues, if any.

(5) ICD for RO, DEO, Contractors, and Consultants: Determine number of participants in the workshops, and compare examination scores before and after the workshop.

Subsequently evaluate the degree of accomplishment of each engineer considering a specific aim through a project design matrix.

CHAPTER 5 PROGRAM IMPLEMENTION COST AND FUNDING PLAN

5.1 PROGRAM IMPLEMENTATION COST

5.1.1 SUMMARY OF PROGRAM IMPLEMENTATION COST

(1) Base Cost

The base cost by program component was estimated in Chapter 4. The total base cost, excluding price and physical contingencies, was estimated at Php 20,787 million as summarized in the following table.

Table 5.1.1 Summary of Base Cost of REAPMP

Unit: Php Million

Component and Category		Civil Works	Consultancy Service	Equipment Supply	Training (DPWH)	ROW	Administ-ration	Total	
I	Road Upgrading / Improvement (UI)	4,440	552			58	126	5,177	24.9%
II	Road Asset Preservation Programs								
II.1	Long Term Performance Based Maintenance (LTPBM)	8,392	821			0	230	9,443	45.4%
II.2	Preventive Maintenance (PM)*								
A	Pre-Fixed PM	1,482				0	54	1,535	7.4%
B	HDM-4 based PM	3,153				0	114	3,268	15.7%
	Sub-Total	13,026	821	0	0	0	398	14,246	68.5%
III	Institutional Capacity Development (ICD)								
ICD-1	Overload Vehicle Control Enhancement	131		59		38	5	233	1.1%
ICD-2	Quality Control Enhancement	117		122		22	6	267	1.3%
ICD-3	Emergency Road Disaster Recovery Equipment for 10 DPWH DEOs			298			7	305	1.5%
ICD-4	Communication Network and IT Equipment			208	3		5	216	1.0%
ICD-5	Capacity Development Support for Remaining 13 Regions			157	39		5	201	1.0%
ICD-6	Consultancy Services for ICD		143					143	0.7%
	Sub-Total	248	143	844	42	60	27	1,365	6.6%
	Total	17,715	1,517	844	42	118	552	20,787	100.0%
	Share (%)	85.2%	7.3%	4.1%	0.2%	0.6%	2.7%	100.0%	

Note: * Inclusive of DD and CS (consultancy service) cost by local consultants.

(2) Physical and Price Contingencies

The physical and price contingencies were estimated considering the following:

Category	Currency	Civil Works	Consultancy Services	Land Acquisition /Compensation
Price Contingency	FC	3.1% / annum	3.1% / annum	-
	LC	9.7% / annum	9.7% / annum	9.7% / annum
Physical Contingency	FC/LC	10%	5%	-

(3) Value Added Tax (VAT)

Value Added Tax (VAT) of 12 % was applied for civil works and consultancy service cost estimate.

(4) Administration Cost

Administration cost was estimated at 2.5% for UI and LTPBM projects while 3.5 % was applied to PM programs as given in HDM-4 program. Administration cost was estimated at 2.0% on the average for ICD programs.

(5) Foreign and Local Currency Component Estimate

The following foreign and local currency components were applied by project component and category. These components were determined from the past project implementation in the case of civil works. Actual cost estimation was the carried out for the consultancy services (refer to Annex -8 as to details).

Currency Component	UI Projects		LTPBM Projects		PM Programs		ICB Programs	
	Civil Works	Consultancy	Civil Works	Consultancy	Civil Works	Consultancy	Civil Works/	Consultancy
FC	40%	38%	50%	38%	45%	0%	70%	68%
LC	60%	62%	50%	62%	55%	100%	30%	32%

(6) Interest Rates during the Construction and Commitment Charge

The interest rates during the construction were estimated at 1.4% for civil works and 0.01% for consultancy services on the loan portion. The commitment charge was estimated at 0.1 of the loan amount. These are covered by the loan of REAPMP.

5.1.2 COST COMPARISON WITH PRE-FS AND ICC-NEDA APPROVAL

The estimated project cost of REAPMP was Php 28,194 million in the Pre-FS/ICC NEDA Approval. Two proposed LTPBME projects (JLM 5 and JLM 9 in Samar and Leyte) amounting to Php 3,306 million was deleted as these were financed by GOP.

The estimated project cost of REAPMP prepared by the Survey Team is Php 29,066 million, which is Php 872 million (3.1%) more than the Pre-FS/NEDA ICC cost as shown in Table 5.1.2. The total road works (UI, LTPBM, PM and safety) cost will decrease from Php 27,770 million to Php 27,331 million by 1.6%. The ICD cost will increase from Php 401 million to Php 1,735 million (333%).

Though the total project cost increase was Php 872 million (3.1%), it will be quite higher than Pre-FS/NEDA approval when considering delete of two LTPBM projects and reduction of UI and LTPBM lengths as summarized in Table 5.1.2 and detailed in Table 5.1.3. The Pre-FS used average road costs of the on-going and past DPWH projects while the Survey Team estimated the construction cost based on preliminary designs and quantity estimates reflecting the project characteristics and current road conditions.

Table 5.1.2 Comparison with Pre-FS/NEDA ICC Approval

Unit: Mill Php

Component and Category		Pre-FS & NEDA Approval	JICA Survey	Difference	
				Amount	%
I	Road Upgrading / Improvement (UI)	8,327	7,360	-967	-11.6%
II	Road Asset Preservation Programs				
II.1	Long Term Performance Based Maintenance (LTPBM)	14,256	13,460	-796	-5.6%
II.2	Preventive Maintenance (PM)	5,009	6,510	1,501	30.0%
	Sub-Total	19,265	19,971	705	3.7%
-	Road Safety*	177	0	-177	-100.0%
	Total	27,770	27,331	-439	-1.6%
III	Institutional Capacity Development (ICD)	401	1,735	1,334	333.0%
IV	Technical Assistance	24	0	-24	-100.0%
Grand Total		**28,194**	**29,066**	**872**	**3.1%**

Note: Included in UI and LTPBM components in the case of JICA Survey.

Table 5.1.3 Details of Cost Comparison with Pre-FS/NEDA ICC Approval

Component	Project Code No. New	Project Code No. Old	Project Name	Pre-FS / ICC-NEDA GAA (Mill Php)	Pre-FS / ICC-NEDA MVUC (Road) (Mill Php)	Pre-FS / ICC-NEDA Foreign (Yen Loan) (Mill Php)	Pre-FS / ICC-NEDA Total (Mill Php)	JICA Survey GAA (Mill Php)	JICA Survey MVUC (Road) (Mill Php)	JICA Survey Foreign (Yen Loan) (Mill Php)	JICA Survey Total (Mill Php)	Difference to Pre-FS (%)	Remarks (and change of cost)
I. Road Upgrading / Improvement (UI)													
	UI-1	(JLM 6)	Bongabon - Rizal/ Pantabangan - Baler	1,157.4	161.3	1,583.6	2,902.3	342.1	0.0	409.5	751.7	25.9%	UI-1 and UI-2 were changed from
	UI-2	(JLM 10)	Lipa - Alaminos	264.9	53.5	368.8	687.2	177.6	0.0	185.2	362.8	52.8%	LTPBM to UI.
	UI-3	(JLM 8)	Mindoro West Coast	1,373.4	0.0	1,808.9	3,182.3	1,726.5	0.0	2,005.4	3,731.8	117.3%	
	UI-4	(JLM 11)	Catanduanes Circumferential Road	672.7	0.0	882.8	1,555.5	1,171.1	0.0	1,342.8	2,513.9	161.6%	Slope protection and drainage works
Sub-Total				**3,468.4**	**214.8**	**4,644.1**	**8,327.3**	**3,417.3**	**0.0**	**3,942.8**	**7,360.1**	**88.4%**	
				41.65%	2.58%	55.77%	100.00%	46.43%	0.00%	53.57%	100.00%		
II. Asset Preservation Programs													
II.1 Long Term Performance Based Maintenance (LTPBM)													
	PBM-1	(JLM 3)	Aringay - Laoag	1,738.9	459.1	2,329.8	4,527.8	1,432.6	781.9	3,212.3	5,426.8	119.9%	
	PBM-2	(JLM 1)	Sta.Rita-Bdr.N.Ecija	1,027.9	355.7	1,348.5	2,732.1	792.7	431.2	1,796.3	3,020.3	110.5%	
	PBM-3	(JLM 2)	Sipocot - Baao	406.1	214.4	508.1	1,128.6	607.6	330.0	1,384.2	2,321.7	205.7%	2- layer AC overlay
	PBM-4	(JLM 4)	Surigao (Lipata) - Bdr.Agusan D.N.	964.0	332.0	1,266.1	2,562.1	703.4	381.7	1,606.4	2,691.5	105.1%	
Sub-Total				**4,136.9**	**1,361.2**	**5,452.5**	**10,950.6**	**3,536.3**	**1,924.8**	**7,999.2**	**13,460.3**	**122.9%**	
				37.78%	12.43%	49.79%	100.00%	26.27%	14.30%	59.43%	100.00%		
- Other LTPBM excluded by GOP													
	JLM 5		Calbiga - Tacloban	583.6	264.9	737.0	1,585.5			0.0	0.0	0.0%	Implemented by
	JLM 9		Calbayog - Allen Road	706.2	31.3	982.8	1,720.3			0.0	0.0	0.0%	GOP finance
Sub-Total				**1,289.8**	**296.2**	**1,719.8**	**3,305.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0%**	
				39.02%	8.96%	52.02%	100.00%						
II.2 Preventive Maintenance (PM)													
			Pre-Fixed Road Links (moved from LTPBM)				0.0	553.2	280.3	1,231.2	2,064.8		Moved from LTPBM
			HDM-4 selected Road Links	1,900.5	806.7	2,301.7	5,008.9	1,192.1	604.0	2,649.4	4,445.5	88.8%	
Sub-Total				**1,900.5**	**806.7**	**2,301.7**	**5,008.9**	**1,745.3**	**884.3**	**3,880.7**	**6,510.3**	**130.0%**	
				37.94%	16.11%	45.95%	100.00%	26.81%	13.58%	59.61%	100.00%		
Total of Road Works				**10,795.6**	**2,678.9**	**14,118.1**	**27,592.6**	**8,698.9**	**2,809.2**	**15,822.7**	**27,330.8**	**99.1%**	
				39.12%	9.71%	51.17%	100.00%	31.83%	10.28%	57.89%	100.00%		
- Road Safety				66.0	28.0	83.1	177.1	0.0	0.0	0.0	0.0	0.0%	
								(included in UI and LTPBM)					
III. Institutional Capacity Development (ICD)				169.3	0.0	231.4	400.7	267.6	0.0	1,467.5	1,735.1	433.0%	
				42.3%	0.0%	57.7%	100.0%	15.4%	0.0%	84.6%	100.0%		
IV. Technical Assistance				23.5			23.5	0.0	0.0	0.0	0.0	0.0%	To be proposed for JICA TA (Grant)
Grand Total				**11,054.4**	**2,706.9**	**14,432.6**	**28,193.9**	**8,966.5**	**2,809.2**	**17,290.2**	**29,065.8**	**103.1%**	
% Share				**39.2%**	**9.6%**	**51.2%**	**100.0%**	**30.8%**	**9.7%**	**59.5%**	**100.0%**		
Japanese Yen Equivalent:				**¥21,965.1**	**¥5,378.6**	**¥28,677.6**	**¥56,021.3**	**¥17,816.4**	**¥5,581.8**	**¥34,355.6**	**¥57,753.8**		

Notes: Currency Exchange Rates
US$ 1.00= Php. 47.80 = 95.00 J.Yen
Php 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

5.2 FUNDING PLAN

5.2.1 FUNDING METHOD AND SHARE

The REAPMP shall be financed by GOP (General Application Act or GAA, and Motor vehicles User's Charges of MVUC Road Fund) and GOJ (Yen Loan). Eligibility of funding is classified as shown in the following table. Funding from MVUC is applicable only for the maintenance project/program (LTPBM and PM) contracts.

Table 5.2.1 Eligibility of Funding by Program Component and Source

Component	Category	GOP		GOJ (Yen Loan)	
		GAA	MVUC (Road Fund)	L.C. Portion	F.C. Portion
Road Upgrading / Improvement (UI)	Civil Works, Consultancy Services	O		O	O
	ROW, Administration and VAT	O		X	X
Long Term Performance Based Maintenance (LTPBM)	Civil Works, Consultancy Services	O	O	O	O
	ROW, Administration and VAT	O	O	X	X
Preventive Maintenance (PM)	Civil Works, Consultancy Services	O	O	O	O
	ROW, Administration and VAT	O	O	X	X
Institutional Capacity Development (ICD)	Civil Works, Consultancy Services	O		O	O
	ROW, Administration and VAT	O		X	X

Note: O ; Eligible, X ; Not eligible

Referring to the ICC NEDA approval, the JICA Survey Team recommends the following funding share of GAA, MVUC and GOJ.

The GOJ (Yen Loan) will finance:

- 100% of foreign currency portion irrespective of program component and category, including physical and price contingencies
- 100% of local currency portion of consultancy services, including physical and price contingencies, except the PM program
- 1/3 of local currency portion of civil works, including physical and price contingencies, except for the ICD programs.
- 100% of local currency portion of civil works, equipment and training including physical and price contingencies, for the ICD programs.

The GOP will finance:

- 100% of ROW acquisition and compensation, administration cost and VAT
- 2/3 of local currency portion of civil works for UI projects including physical and price contingencies
- 1/3 of local currency portion of civil works for LTPBM projects and PM programs,

including physical and price contingencies

The MVUC will finance:

- 1/3 of local currency portion of civil works for LTPBM projects and PM programs

Table 5.2.2 Funding Share by Program Component and Source

Component and Category	GOP		GOJ (Yen Loan)		Remarks (Eligibility of Loan)
	GAA	MVUC (Road	L.C. Portion	F.C. Portion	
I Road Upgrading / Improvement (UI)					
- Civil Works	2/3		1/3	100%	100%
- Consultancy Service Cost			100%	100%	100%
- ROW	100%				0%
- Administration Cost	100%				0%
- Value Added Tax (VAT)	100%				0%
II Road Asset Preservation Programs					
II.1 Long Term Performance Based Maintenance (LTPBM)					
- Civil Works	1/3	1/3	1/3	100%	100%
- Consultancy Service Cost			100%	100%	100%
- ROW	-	-	-		0%
- Administration Cost	100%				0%
- Value Added Tax (VAT)	100%				0%
II.2 Preventive Maintenance (PM)					
- Civil Works	1/3	1/3	1/3	100%	100%
- Consultancy Service Cost	2/3	1/3	-	-	100%
- ROW	-	-	-		0%
- Administration Cost	100%				0%
- Value Added Tax (VAT)	100%				0%
III Institutional Capacity Development (ICD)					
- Equipment Supply			100%	100%	100%
- Civil Works			100%		100%
- Consultancy Service Cost			100%	100%	100%
- ROW	100%				0%
- Administration Cost	100%				0%
- Value Added Tax (VAT)	100%				0%

5.2.2 PROJECT COST AND FUNDING

The total cost of REAPMP was estimated at Php 29,066 million. The largest portion amounting to Php 17,290 million (59.5%) will be financed from the loan proceeds. As for the local component, Php 8,967 million (30.8%) of the GOP counterpart fund is from the GAA and Php 2,809 (9.7%) will come from the MVUC special funds (road fund) allocated primarily for road maintenance.

The estimated loan amount is Yen 34,356 million at the following exchange rate as of the end of June 2009 (refer to Table 5.2.3).

Table 5.2.3 Summary of Project Cost and Funding by Program Component and Source

Component and Category		Forein Currency Portion					Local Currency Portion					Total	Total				
		GOJ	GOP			Total	GOJ	GOP			Total		GOJ	GOP			Total
		Yen Loan	GAA	Road Fund	Total		Yen Loan	GAA	Road Fund	Total			Yen Loan	GAA	Road Fund	Total	
		Mill JPY	Mill JPY	Mill JPY	Mill JPY	Mill JPY	Mill Php	Mill Php	Mill Php	Mill Php	Mill Php	Mill Php	Mill JPY	Mill Php	Mill Php	Mill Php	Mill JPY
Civil Works																	
I	Road Upgrading / Improvement (UI)	3,151.0			0.0	3,151.0	792.9	1,585.8			1,585.8	2,378.7	4,726.5	1,585.8	0.0	1,585.8	7,877.5
II	Road Asset Preservation Programs																
II.1	Long Term Performance Based Maintenance (LTPBM)	7,443.9			0.0	7,443.9	1,248.8	1,248.8	1,248.8		2,497.5	3,746.3	9,925.2	1,248.8	1,248.8	2,497.5	14,887.8
II.2	Preventive Maintenance (PM)	3,600.1			0.0	3,600.1	603.9	603.9	603.9		1,207.9	1,811.8	4,800.1	603.9	603.9	1,207.9	7,200.1
III	Institutional Capacity Development (ICD)	1,408.4			0.0	1,408.4	303.8	0.0			0.0	303.8	2,011.9	0.0	0.0	0.0	2,011.9
	Sub-Total	15,603.3	0.0	0.0	0.0	15,603.3	2,949.4	3,438.5	1,852.7		5,291.2	8,240.6	21,463.7	3,438.5	1,852.7	5,291.2	31,977.3
Price Escalation		1,708.3			0.0	1,708.3	1,103.2	1,346.2	701.1		2,047.3	3,150.4	3,900.3	1,346.2	701.1	2,047.3	7,968.2
Physical Contingency		1,731.2			0.0	1,731.2	405.3	478.5	255.4		733.8	1,139.1	2,536.4	478.5	255.4	733.8	3,994.6
Consulting Services		1,278.0			0.0	1,278.0	1,874.5				0.0	1,874.5	5,002.7	0.0	0.0	0.0	5,002.7
Land Acquisition					0.0	0.0		157.0			157.0	157.0	0.0	157.0	0.0	157.0	311.9
Administration Cost					0.0	0.0		667.8			667.8	667.8	0.0	667.8	0.0	667.8	1,326.9
VAT					0.0	0.0		2,878.6			2,878.6	2,878.6	0.0	2,878.6	0.0	2,878.6	5,719.8
Import Tax					0.0	0.0					0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest during construction		1,271.2			0.0	1,271.2					0.0	0.0	1,271.2	0.0	0.0	0.0	1,271.2
Commitment Charge		181.2			0.0	181.2					0.0	0.0	181.2	0.0	0.0	0.0	181.2
Total		21,773.2	0.0	0.0	0.0	21,773.2	6,332.3	8,966.5	2,809.2		11,775.7	18,108.0	34,355.6	8,966.5	2,809.2	11,775.7	57,753.8
(Share)		37.7%	0.0%	0.0%	0.0%	37.7%	21.8%	30.8%	9.7%		40.5%	62.3%	59.5%	30.8%	9.7%	40.5%	100.0%

Notes: Currency Exchange Rates

US$ 1.00= Php. 47.80 = 95.00 J.Yen
Php 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

5.3 ANNUAL FUNDING REQUIREMENTS

The following Table 5.3.1 shows the annual investment requirement for the implementation of REAPMP. Approximately half of the investment cost is concentrated in 2012 as the main improvement, rehabilitation and overlay works of LTPBM and UI projects are concentrated this year.

Table 5.3.1 Annual Funding Requirements

I. Road Upgrading / Improvement (UI)

Year	Local		Foreign	Total
	GAA (Mill	MVUC (Road Fund) (Mill Php)	Yen Loan (Mill Php)	(Mill Php)
2010	8.4	0.0	87.2	95.6
2011	81.6	0.0	93.3	174.9
2012	1,365.2	0.0	1,572.3	2,937.5
2013	1,589.1	0.0	1,747.4	3,336.5
2014	373.0	0.0	442.6	815.6
2015	0.0	0.0	0.0	0.0
2016				0.0
Total	3,417.3	0.0	3,942.8	7,360.1

II. Asset Preservation Programs

II.1 Long Term Performance Based Maintenance (LTPBM)

Year	Local		Foreign	Total
	GAA (Mill	MVUC (Road Fund) (Mill Php)	Yen Loan (Mill Php)	(Mill
2010	8.3	0.0	90.4	98.8
2011	9.1	0.0	96.5	105.6
2012	2,184.2	1,199.5	4,538.3	7,922.0
2013	554.5	301.8	1,268.4	2,124.7
2014	524.4	287.2	1,206.6	2,018.1
2015	168.3	89.6	493.6	751.5
2016	87.5	46.9	305.4	439.8
Total	3,536.3	1,924.8	7,999.2	13,460.3

II.2 Preventive Maintenance (PM)

Year	Local		Foreign	Total
	GAA (Mill	MVUC (Road Fund) (Mill Php)	Yen Loan (Mill Php)	(Mill Php)
2010	0.0	0.0	0.0	0.0
2011	337.3	163.2	809.1	1,309.5
2012	896.5	459.3	1,936.5	3,292.3
2013	511.5	261.8	1,135.1	1,908.4
2014	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0
2016				0.0
Total	1,745.3	884.3	3,880.7	6,510.3

III. Institutional Capacity Development (ICD)

Year	Local		Foreign	Total
	GAA (Mill	MVUC (Road Fund) (Mill Php)	Yen Loan (Mill Php)	(Mill
2010	0.0	0.0	0.0	0.0
2011	170.7	0.0	685.1	855.8
2012	94.7	0.0	729.8	824.5
2013	2.2	0.0	52.6	54.8
2014	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0
2016				0.0
Total	267.6	0.0	1,467.5	1,735.1

Total (I + II + III)

Year	GOP		GOJ	Total	
	GAA (Mill	Road Fund (Mill Php)	Yen Loan (Mill Php)	(Mill Php)	(%)
2010	16.8	0.0	177.6	194.4	0.7%
2011	598.7	163.2	1,683.9	2,445.8	8.4%
2012	4,540.5	1,658.8	8,777.0	14,976.3	51.5%
2013	2,657.3	563.6	4,203.5	7,424.4	25.5%
2014	897.4	287.2	1,649.2	2,833.7	9.7%
2015	168.3	89.6	493.6	751.5	2.6%
2016	87.5	46.9	305.4	439.8	1.5%
Total	8,966.5	2,809.2	17,290.2	29,065.8	100%
(Share)	30.8%	9.7%	59.5%	100.0%	

Table 5.3.2 shows total annual finding plan with breakdown. Table 5.3.3, 5.3.4, 5.3.5, 5.3.6 and 5.2.7 show the summary of annual fund requirements for UI project, LTPBM project, PM program and ICD programs, respectively.

Table 5.3.2 Annual Funding Plan (Total) and Breakdown for REAPMP

Total of REAPMP (UI+LTPBM+MP+ICD)

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6	7
Construction Cost:	100.0%		0.00%	7.74%	56.41%	24.69%	8.59%	1.74%	0.83%
Consultancy Services:	100.0%		7.88%	19.15%	35.22%	23.19%	8.68%	3.92%	1.96%
Land Acquisition and Resettlement:	100.0%		0.00%	95.91%	4.09%	0.00%	0.00%	0.00%	0.00%
Administration Cost:	100.0%		0.62%	9.08%	52.20%	26.04%	8.82%	2.14%	1.11%
Total:	100.0%		0.67%	8.41%	51.53%	25.54%	9.75%	2.59%	1.51%

2. Project Cost

Civil Works (Exclud. VAT): 16,093.27 Mill Php — Land Acquisition and Resettlement: 118.11 Mill Php
Consultancy Services (Exclud. VAT): 1,868.64 Mill Php — Administration Cost: 552.00 Mill Php
Construction Cost: FC: 48.79% LC: 51.21% — Consultancy Services: FC: 29.59% LC: 70.41%

3. Annual Funding Plan

Category		Total	2009 Base	2010 1st	2011 2nd	2012 3rd	2013 4th	2014 5th	2015 6th	2016 7th
(I) Foreign Currency Portion (Mill Php)										
Civil Works (Base Cost)		7,852.69	0.00	0.00	724.18	4,468.33	1,801.34	651.81	140.19	66.85
Price Escalation (%/ann.)	3.1%	859.73	0.00	0.00	45.60	428.57	233.97	107.49	28.18	15.93
Physical Contingency	10.0%	871.24	0.00	0.00	76.98	489.69	203.53	75.93	16.84	8.28
Sub-Total		9,583.67	0.00	0.00	846.76	5,386.59	2,238.84	835.23	185.20	91.05
Consulting Services (Base Cost)		552.92	0.00	55.96	90.77	183.63	119.14	61.66	27.85	13.92
Price Escalation (%/ann.)	3.1%	59.62	0.00	1.73	5.71	17.61	15.47	10.17	5.60	3.32
Physical Contingency	5.0%	30.63	0.00	2.88	4.82	10.06	6.73	3.59	1.67	0.86
Sub-Total		643.17	0.00	60.58	101.31	211.30	141.34	75.42	35.12	18.10
Total		10,226.84	0.00	60.58	948.06	5,597.89	2,380.18	910.65	220.32	109.15
(II) Local Currency Portion (Mill Php)										
Civil Works (Base Cost)		8,240.57	0.00	0.00	521.67	4,609.32	2,171.31	731.23	140.19	66.85
Price Escalation (%/ann.)	9.7%	3,150.44	0.00	0.00	106.11	1,475.63	973.17	430.45	104.13	60.95
Physical Contingency	10.0%	1,139.10	0.00	0.00	62.78	608.49	314.45	116.17	24.43	12.78
Sub-Total		12,530.11	0.00	0.00	690.57	6,693.44	3,458.93	1,277.85	268.74	140.58
Consulting Services (Base Cost)		1,315.72	0.00	91.31	267.00	474.44	314.22	100.60	45.43	22.72
Price Escalation (%/ann.)	9.7%	469.57	0.00	8.86	54.31	151.89	140.83	59.22	33.75	20.71
Physical Contingency	5.0%	89.26	0.00	5.01	16.07	31.32	22.75	7.99	3.96	2.17
Sub-Total		1,874.55	0.00	105.17	337.38	657.64	477.80	167.82	83.14	45.60
Land Acquisition and Resettlement		118.11	0.00	0.00	113.28	4.83	0.00	0.00	0.00	0.00
Price Escalation (%/ann.)	9.7%	24.59	0.00	0.00	23.04	1.55	0.00	0.00	0.00	0.00
Physical Contingency	10.0%	14.27	0.00	0.00	13.63	0.64	0.00	0.00	0.00	0.00
Sub-Total		156.97	0.00	0.00	149.96	7.01	0.00	0.00	0.00	0.00
Administration Cost		667.77	0.00	4.14	60.61	348.55	173.87	58.91	14.31	7.38
Total		15,229.41	0.00	109.32	1,238.51	7,706.65	4,110.60	1,504.58	366.19	193.56
(III) VAT Tax Portion (Mill Php)										
Civil Works (Base Cost)	12.0%	1,931.19	0.00	0.00	149.50	1,089.32	476.72	165.97	33.64	16.04
Price Escalation	12.0%	481.22	0.00	0.00	18.21	228.50	144.86	64.55	15.88	9.23
Physical Contingency	12.0%	241.24	0.00	0.00	16.77	131.78	62.16	23.05	4.95	2.53
Sub-Total		2,653.65	0.00	0.00	184.48	1,449.60	683.73	253.57	54.47	27.80
Consulting Services (Base Cost)	12.0%	157.89	0.00	10.96	32.04	56.93	37.71	12.07	5.45	2.73
Price Escalation	12.0%	56.35	0.00	1.06	6.52	18.23	16.90	7.11	4.05	2.49
Physical Contingency	12.0%	10.71	0.00	0.60	1.93	3.76	2.73	0.96	0.48	0.26
Sub-Total		224.95	0.00	12.62	40.49	78.92	57.34	20.14	9.98	5.47
Total		2,878.60	0.00	12.62	224.96	1,528.52	741.07	273.71	64.45	33.27
II + III (Local Cost Total)		18,108.01	0.00	121.94	1,463.47	9,235.17	4,851.67	1,778.28	430.64	226.83
(IV) Total Project Cost (Mill Php)		28,334.84	0.00	182.52	2,411.54	14,833.06	7,231.84	2,688.94	650.96	335.98
(V) Eligible Portion (Loan Amount) in Mill Php:										
Civil Works FC	100.00%	9,583.67	0.00	0.00	846.76	5,386.59	2,238.84	835.23	185.20	91.05
Civil Works LC	35.58%	4,457.78	0.00	0.00	364.23	2,378.19	1,152.98	425.95	89.58	46.86
Consultancy Services (FC&LC)	100.00%	2,517.72	0.00	165.76	438.68	868.94	619.14	243.24	118.26	63.71
Interest during construction (Civil)	100.00%	639.01	0.00	0.00	16.95	125.90	175.15	132.76	92.51	95.74
Interest during construction (Consu	100.00%	0.78	0.00	0.02	0.06	0.15	0.21	0.15	0.09	0.10
Commitment Charge	100.00%	91.22	0.00	11.87	17.20	17.20	17.20	11.87	7.94	7.94
Total		17,290.17	0.00	177.64	1,683.88	8,776.96	4,203.50	1,649.19	493.59	305.40

Note: Financing Share for C.Works (FC+LC) 63.4964%

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2010	2011	2012	2013	2014	2015	2016
Foreign Currency (Mill Php)[a]	JICA (Loan)	10,957.8	37.7%	72.47	982.28	5,741.13	2,572.73	1,055.43	320.87	212.94
Local Currency (Mill Php)[b]	JICA (Loan)	6,332.3	21.8%	105.17	701.60	3,035.83	1,630.77	593.77	172.72	92.46
Local Currency (Mill Php)[c]	GOP(GAA)	8,966.5	30.8%	16.76	598.70	4,540.54	2,657.29	897.36	168.34	87.51
Local Currency (Mill Php)[d]	SRSuF	2,809.2	9.7%	0.00	163.17	1,658.81	563.60	287.16	89.58	46.86
FC + LC Total (Mill Php)	Total	29,065.8	100.0%	194.4	2,445.8	14,976.3	7,424.4	2,833.7	751.5	439.8

Note: [a] 100% of F.C , [b] 100% of Consultant, 1/3 of Civil L. C. Cost, Interest & C. Charge [c] VAT, RROW Cost, Admin. Cost and 1/3 of L. C. Cost, [d] 1/3 of L.C.C

5. Loan Amount of Japanese Government (Yen-Loan)

Foreign Currency	**(Mill Yen)**	**21,773.2**	**100.0%**	143.99	1,951.79	11,407.63	5,112.01	2,097.13	637.57	423.10
Local Currency	**(Mill Yen)**	**12,582.3**	**35.0%**	208.98	1,394.08	6,032.19	3,240.35	1,179.82	343.20	183.72
Total	**(Mill Yen)**	**34,355.6**	**59.5%**	**353.0**	**3,345.9**	**17,439.8**	**8,352.4**	**3,276.9**	**980.8**	**606.8**

Note: Currency Exchange Rates US$ 1.00= Php. 47.80 = 95.00 J.Yen
Peso 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

Table 5.3.3 Annual Funding Plan (Total) and Breakdown for UI Projects

Road Improvement (UI) Project Summary

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6
Construction Cost:	100.0%				43.3%	46.7%	10.0%	
Consultancy Services:	100.0%		15.0%	15.0%	34.8%	28.3%	6.9%	
Land Acquisition and Resettlement:	100.0%			91.7%	8.3%			
Administration Cost:	100.0%		1.3%	2.5%	40.2%	45.4%	10.6%	

2. Project Cost

Civil Works (Exclud. VAT): 3,964.51 Mill Php — Land Acquisition and Resettlement: 58.20 Mill Php
Consultancy Services (Exclud. VAT): 493.28 Mill Php — Administration Cost: 126.27 Mill Php at 2.50%
Construction Cost: FC: 40% LC: 60% — Consultancy Services: FC: 38% LC: 62%

3. Annual Funding Plan

Category		Total	2009 Base	2010 DD/P1	2011 DD/P2	2012 C1	2013 C2	2014 O&M1	2015 O&M2
(I) Foreign Currency Portion (Mill Php)									
Civil Works (Base Cost)		1,585.81	0.00	0.00	0.00	687.01	739.96	158.84	0.00
Price Escalation (%/ann.)	3.1%	188.20	0.00	0.00	0.00	65.89	96.11	26.19	0.00
Physical Contingency	10.0%	177.40	0.00	0.00	0.00	75.29	83.61	18.50	0.00
Sub-Total		1,951.40	0.00	0.00	0.00	828.19	919.67	203.54	0.00
Consulting Services (Base Cost)		187.45	0.00	28.12	28.12	65.28	53.00	12.93	0.00
Price Escalation (%/ann.)	3.1%	17.92	0.00	0.87	1.77	6.26	6.88	2.13	0.00
Physical Contingency	5.0%	10.27	0.00	1.45	1.49	3.58	2.99	0.75	0.00
Sub-Total		215.63	0.00	30.44	31.38	75.12	62.88	15.81	0.00
Total		2,167.04	0.00	30.44	31.38	903.31	982.55	219.35	0.00
(II) Local Currency Portion (Mill Php)									
Civil Works (Base Cost)		2,378.71	0.00	0.00	0.00	1,030.51	1,109.93	238.26	0.00
Price Escalation (%/ann.)	9.7%	967.63	0.00	0.00	0.00	329.91	497.47	140.26	0.00
Physical Contingency	10.0%	334.63	0.00	0.00	0.00	136.04	160.74	37.85	0.00
Sub-Total		3,680.97	0.00	0.00	0.00	1,496.47	1,768.14	416.37	0.00
Consulting Services (Base Cost)		305.83	0.00	45.88	45.88	106.51	86.48	21.09	0.00
Price Escalation (%/ann.)	9.7%	99.06	0.00	4.45	9.33	34.10	38.76	12.42	0.00
Physical Contingency	5.0%	20.24	0.00	2.52	2.76	7.03	6.26	1.68	0.00
Sub-Total		425.13	0.00	52.84	57.97	147.64	131.50	35.19	0.00
Land Acquisition and Resettlement		58.20	0.00	0.00	53.37	4.83	0.00	0.00	0.00
Price Escalation (%/ann.)	9.7%	12.40	0.00	0.00	10.86	1.55	0.00	0.00	0.00
Physical Contingency	10.0%	7.06	0.00	0.00	6.42	0.64	0.00	0.00	0.00
Sub-Total		77.66	0.00	0.00	70.65	7.01	0.00	0.00	0.00
Administration Cost		158.77	0.00	2.08	4.00	63.86	72.05	16.77	0.00
Total		4,342.54	0.00	54.92	132.62	1,714.98	1,971.69	468.33	0.00
(III) VAT Tax Portion (Mill Php)									
Civil Works (Base Cost)	12.0%	475.74	0.00	0.00	0.00	206.10	221.99	47.65	0.00
Price Escalation	12.0%	138.70	0.00	0.00	0.00	47.50	71.23	19.97	0.00
Physical Contingency	12.0%	61.44	0.00	0.00	0.00	25.36	29.32	6.76	0.00
Sub-Total		675.89	0.00	0.00	0.00	278.96	322.54	74.39	0.00
Consulting Services (Base Cost)	12.0%	36.70	0.00	5.51	5.51	12.78	10.38	2.53	0.00
Price Escalation	12.0%	11.89	0.00	0.53	1.12	4.09	4.65	1.49	0.00
Physical Contingency	12.0%	2.43	0.00	0.30	0.33	0.84	0.75	0.20	0.00
Sub-Total		51.02	0.00	6.34	6.96	17.72	15.78	4.22	0.00
Total		726.90	0.00	6.34	6.96	296.68	338.32	78.61	0.00
II + III (Local Cost Total)		5,069.44	0.00	61.26	139.57	2,011.66	2,310.01	546.94	0.00
(IV) Total Project Cost (Mill Php)		7,236.48	0.00	91.70	170.95	2,914.97	3,292.56	766.29	0.00
(V) Eligible Portion (Loan Amount) in Mill Php:									
Civil Works FC	100%	1,951.40	0.00	0.00	0.00	828.19	919.67	203.54	
Civil Works LC * 1/3	33.33%	1,226.99	0.00	0.00	0.00	498.82	589.38	138.79	
Consultancy Services (FC&LC)	100.0%	640.77	0.00	83.28	89.35	222.76	194.38	51.00	
FC Interest during construction (Civil)	1.4%	103.86	0.00	0.00	0.00	18.58	39.97	45.32	
FC Interest during construction (Consul	0.01%	0.19	0.00	0.01	0.02	0.04	0.06	0.06	
FC Commitment Charge	0.1%	19.62	0.00	3.92	3.92	3.92	3.92	3.92	
Total		3,942.83	0.00	87.21	93.29	1,572.32	1,747.38	442.63	0.00

Note: Financing Share for C.Works (FC+LC) 56.4308%

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2010	2011	2012	2013	2014	2015
Foreign Currency (Mill Php)[a]	JICA (Loan)	2,290.7	31.1%	34.4	35.3	925.9	1,026.5	268.7	0.0
Local Currency (Mill Php)[b]	JICA (Loan)	1,652.1	22.4%	52.8	58.0	646.5	720.9	174.0	0.0
Local Currency (Mill Php)[c]	GOP(GAA)	3,417.3	46.4%	8.4	81.6	1,365.2	1,589.1	373.0	0.0
Local Currency (Mill Php)[d]	SRSuF	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0
FC + LC Total (Mill Php)	Total	**7,360.1**	100.0%	**95.6**	**174.9**	**2,937.5**	**3,336.5**	**815.6**	**0.0**

Note: [a] 100% of F.C , [b] 100% of Consultant, 1/3 of Civil L. C. Cost, Interest & C. Charge [c] VAT, RROW Cost, Admin. Cost and 2/3 of L. C. Cost, [d] N

5. Loan Amount of Japanese Government (Yen-Loan)

Foreign Currency	**(Mill Yen)**	**4,551.6**	**100.0%**	**68.3**	**70.2**	**1,839.7**	**2,039.7**	**533.8**	**0.0**
Local Currency	**(Mill Yen)**	**3,282.8**	**32.6%**	**105.0**	**115.2**	**1,284.5**	**1,432.4**	**345.7**	**0.0**
Total	**(Mill Yen)**	**7,834.4**	**53.6%**	**173.3**	**185.4**	**3,124.2**	**3,472.0**	**879.5**	**0.0**

Note: Currency Exchange Rates US$ 1.00= Php. 47.80 = 95.00 J.Yen
Peso 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

Table 5.3.4 Annual Funding Plan (Total) and Breakdown for LTPBM Projects

Long Term Performance Based Maintenance (LTPBME) Projects: Summary

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6	7
Construction Cost:	100.0%				66.14%	15.17%	13.16%	3.74%	1.78%
Consultancy Services:	100.0%		10.00%	10.00%	30.00%	17.50%	17.50%	10.00%	5.00%
Land Acquisition and Resettlement:									
Administration Cost:	100.0%		0.72%	0.78%	60.35%	15.73%	14.80%	5.03%	2.59%

2. Project Cost

Civil Works (Exclud. VAT): 7,492.59 Mill Php — Land Acquisition and Resettlement: 0.00 Mill Php

Consultancy Services (Exclud. VAT): 732.81 Mill Php — Administration Cost: 230.31 Mill Php at 2.50%

Construction Cost: FC: 50% LC: 50% — Consultancy Services: FC: 38% LC: 62%

3. Annual Funding Plan

Category		Total	2009 Base	2010	2011 DD/P2	2012 PBMC1	2013 PBMC2	2014 PBMC3	2015 PBMC4	2016 PBMC5
(I) Foreign Currency Portion (Mill Php)										
Civil Works (Base Cost)		3,746.29	0.00	0.00	0.00	2,477.97	568.32	492.97	140.19	66.85
Price Escalation (%/ann.)	3.1%	436.89	0.00	0.00	0.00	237.67	73.82	81.30	28.18	15.93
Physical Contingency	10.0%	418.32	0.00	0.00	0.00	271.56	64.21	57.43	16.84	8.28
Sub-Total		4,601.50	0.00	0.00	0.00	2,987.20	706.36	631.70	185.20	91.05
Consulting Services (Base Cost)		278.47	0.00	27.85	27.85	83.54	48.73	48.73	27.85	13.92
Price Escalation (%/ann.)	3.1%	33.91	0.00	0.86	1.75	8.01	6.33	8.04	5.60	3.32
Physical Contingency	5.0%	15.62	0.00	1.44	1.48	4.58	2.75	2.84	1.67	0.86
Sub-Total		328.00	0.00	30.15	31.08	96.13	57.81	59.61	35.12	18.10
Total		4,929.50	0.00	30.15	31.08	3,083.33	764.17	691.30	220.32	109.15
(II) Local Currency Portion (Mill Php)										
Civil Works (Base Cost)		3,746.29	0.00	0.00	0.00	2,477.97	568.32	492.97	140.19	66.85
Price Escalation (%/ann.)	9.7%	1,503.29	0.00	0.00	0.00	793.30	254.72	290.20	104.13	60.95
Physical Contingency	10.0%	524.96	0.00	0.00	0.00	327.13	82.30	78.32	24.43	12.78
Sub-Total		5,774.54	0.00	0.00	0.00	3,598.39	905.35	861.48	268.74	140.58
Consulting Services (Base Cost)		454.34	0.00	45.43	45.43	136.30	79.51	79.51	45.43	22.72
Price Escalation (%/ann.)	9.7%	194.19	0.00	4.41	9.24	43.64	35.64	46.81	33.75	20.71
Physical Contingency	5.0%	32.43	0.00	2.49	2.73	9.00	5.76	6.32	3.96	2.17
Sub-Total		680.96	0.00	52.33	57.41	188.94	120.90	132.63	83.14	45.60
Land Acquisition and Resettlement		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Price Escalation (%/ann.)	9.7%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Physical Contingency	10.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Administration Cost		284.63	0.00	2.06	2.21	171.77	44.76	42.14	14.31	7.38
Total		6,740.12	0.00	54.40	59.62	3,959.09	1,071.01	1,036.25	366.19	193.56
(III) VAT Tax Portion (Mill Php)										
Civil Works (Base Cost)	12.0%	899.11	0.00	0.00	0.00	594.71	136.40	118.31	33.64	16.04
Price Escalation	12.0%	232.82	0.00	0.00	0.00	123.72	39.42	44.58	15.88	9.23
Physical Contingency	12.0%	113.19	0.00	0.00	0.00	71.84	17.58	16.29	4.95	2.53
Sub-Total		1,245.13	0.00	0.00	0.00	790.27	193.40	179.18	54.47	27.80
Consulting Services (Base Cost)	12.0%	54.52	0.00	5.45	5.45	16.36	9.54	9.54	5.45	2.73
Price Escalation	12.0%	23.30	0.00	0.53	1.11	5.24	4.28	5.62	4.05	2.49
Physical Contingency	12.0%	3.89	0.00	0.30	0.33	1.08	0.69	0.76	0.48	0.26
Sub-Total		81.71	0.00	6.28	6.89	22.67	14.51	15.92	9.98	5.47
Total		1,326.84	0.00	6.28	6.89	812.94	207.91	195.10	64.45	33.27
II + III (Local Cost Total)		8,066.96	0.00	60.68	66.51	4,772.03	1,278.92	1,231.35	430.64	226.83
(IV) Total Project Cost (Mill Php)		12,996.47	0.00	90.82	97.59	7,855.36	2,043.10	1,922.65	650.96	335.98
(V) Eligible Portion (Loan Amount) in Mill Php:										
Civil Works FC	100.0%	4,601.50	0.00	0.00	0.00	2,987.20	706.36	631.70	185.20	91.05
Civil Works LC * 1/3	33.33%	1,924.85	0.00	0.00	0.00	1,199.46	301.78	287.16	89.58	46.86
Consultancy Services (FC&LC)	100.0%	1,008.96	0.00	82.48	88.49	285.07	178.72	192.24	118.26	63.71
Interest during construction (Civil)	1.4%	407.85	0.00	0.00	0.00	58.61	73.55	87.44	92.51	95.74
Interest during construction (Consu	0.01%	0.41	0.00	0.01	0.02	0.05	0.06	0.08	0.09	0.10
Commitment Charge	0.1%	55.61	0.00	7.94	7.94	7.94	7.94	7.94	7.94	7.94
Total		7,999.18	0.00	90.43	96.45	4,538.33	1,268.41	1,206.56	493.59	305.40

Note: Financing Share for C.Works (FC+LC) 62.8983%

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2010	2011	2012	2013	2014	2015	2016
Foreign Currency (Mill Php)[a]	JICA (Loan)	5,393.4	40.1%	38.1	39.0	3,149.9	845.7	786.8	320.9	212.9
Local Currency (Mill Php)[b]	JICA (Loan)	2,605.8	19.4%	52.3	57.4	1,388.4	422.7	419.8	172.7	92.5
Local Currency (Mill Php)[c]	GOP(GAA)	3,536.3	26.3%	8.3	9.1	2,184.2	554.5	524.4	168.3	87.5
Local Currency (Mill Php)[d]	SRSuF	1,924.8	14.3%	0.0	0.0	1,199.5	301.8	287.2	89.6	46.9
FC + LC Total (Mill Php)	Total	13,460.3	100.0%	98.8	105.6	7,922.0	2,124.7	2,018.1	751.5	439.8

Note: [a] 100% of F.C , [b] 100% of Consultant, 1/3 of Civil L. C. Cost, Interest & C. Charge [c] VAT, RROW Cost, Admin. Cost and 1/3 of L. C. Cost, [d] 1/3 of L.C.C

5. Loan Amount of Japanese Government (Yen-Loan)

Foreign Currency	**(Mill Yen)**	**10,716.6**	**100.0%**	**75.7**	**77.6**	**6,258.9**	**1,680.5**	**1,563.3**	**637.6**	**423.1**
Local Currency	**(Mill Yen)**	**5,177.7**	**32.3%**	**104.0**	**114.1**	**2,758.7**	**839.9**	**834.1**	**343.2**	**183.7**
Total	**(Mill Yen)**	**15,894.4**	**59.4%**	**179.7**	**191.6**	**9,017.7**	**2,520.3**	**2,397.4**	**980.8**	**606.8**

Note: Currency Exchange Rates US$ 1.00= Php. 47.80 = 95.00 J.Yen

Peso 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

Table 5.3.5 Annual Funding Plan (Total) and Breakdown for PM Program

PM-A: Summary of Pre-Fixed PM + PM-B: HDM-3

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6
Construction Cost:	100.0%			20.41%	52.38%	27.21%		
Consultancy Services:	100.0%			31.0%	41.8%	27.2%		
Land Acquisition and Resettlement:								
Administration Cost:	100.0%			20.2%	50.8%	29.0%		

2. Project Cost

Civil Works (Exclud. VAT): 3,623.61 Mill Php — Land Acquisition and Resettlement: 0.00 Mill Php
Consultancy Services (Exclud. VAT): 514.60 Mill Php — Administration Cost: 168.10 Mill Php at 3.50%
Construction Cost: FC: 50% LC: 50% — Consultancy Services: FC: 0% LC: 100%

3. Annual Funding Plan

Category		Total	2009 Base	2010	2011 DD	2012 P/C	2013 O&M1	2014 O&M2	2015 O&M3
(I) Foreign Currency Portion (Mill Php)									
Civil Works (Base Cost)		1,811.81	0.00	0.00	369.79	948.96	493.06	0.00	0.00
Price Escalation (%/ann.)	3.1%	178.34	0.00	0.00	23.28	91.02	64.04	0.00	0.00
Physical Contingency	10.0%	199.01	0.00	0.00	39.31	104.00	55.71	0.00	0.00
Sub-Total		2,189.16	0.00	0.00	432.38	1,143.97	612.81	0.00	0.00
Consulting Services (Base Cost)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Price Escalation (%/ann.)	3.1%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Physical Contingency	5.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2,189.16	0.00	0.00	432.38	1,143.97	612.81	0.00	0.00
(II) Local Currency Portion (Mill Php)									
Civil Works (Base Cost)		1,811.81	0.00	0.00	369.79	948.96	493.06	0.00	0.00
Price Escalation (%/ann.)	9.7%	600.00	0.00	0.00	75.22	303.80	220.98	0.00	0.00
Physical Contingency	10.0%	241.18	0.00	0.00	44.50	125.28	71.40	0.00	0.00
Sub-Total		2,652.99	0.00	0.00	489.51	1,378.03	785.44	0.00	0.00
Consulting Services (Base Cost)		514.60	0.00	0.00	159.31	215.24	140.04	0.00	0.00
Price Escalation (%/ann.)	9.7%	164.08	0.00	0.00	32.41	68.91	62.76	0.00	0.00
Physical Contingency	5.0%	33.93	0.00	0.00	9.59	14.21	10.14	0.00	0.00
Sub-Total		712.61	0.00	0.00	201.31	298.36	212.94	0.00	0.00
Land Acquisition and Resettlement		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Price Escalation (%/ann.)	9.7%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Physical Contingency	10.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Administration Cost		194.42	0.00	0.00	39.31	98.71	56.39	0.00	0.00
Total		3,560.01	0.00	0.00	730.13	1,775.11	1,054.78	0.00	0.00
(III) VAT Tax Portion (Mill Php)									
Civil Works (Base Cost)	12.0%	434.83	0.00	0.00	88.75	227.75	118.33	0.00	0.00
Price Escalation	12.0%	93.40	0.00	0.00	11.82	47.38	34.20	0.00	0.00
Physical Contingency	12.0%	52.82	0.00	0.00	10.06	27.51	15.25	0.00	0.00
Sub-Total		581.06	0.00	0.00	110.63	302.64	167.79	0.00	0.00
Consulting Services (Base Cost)	12.0%	61.75	0.00	0.00	19.12	25.83	16.80	0.00	0.00
Price Escalation	12.0%	19.69	0.00	0.00	3.89	8.27	7.53	0.00	0.00
Physical Contingency	12.0%	4.07	0.00	0.00	1.15	1.70	1.22	0.00	0.00
Sub-Total		85.51	0.00	0.00	24.16	35.80	25.55	0.00	0.00
Total		666.57	0.00	0.00	134.78	338.44	193.34	0.00	0.00
II + III (Local Cost Total)		4,226.59	0.00	0.00	864.91	2,113.55	1,248.12	0.00	0.00
(IV) Total Project Cost (Mill Php)		6,415.75	0.00	0.00	1,297.30	3,257.52	1,860.93	0.00	0.00
(V) Eligible Portion (Loan Amount) in Mill Php:									
Civil Works FC	100%	2,189.16	0.00	0.00	432.38	1,143.97	612.81		
Civil Works LC * 1/3	33.33%	884.33	0.00	0.00	163.17	459.34	261.81		
Consultancy Services (FC&LC)	100%	712.61	0.00	0.00	201.31	298.36	212.94		
Interest during construction (Civil)	1.4%	82.82	0.00	0.00	8.34	30.90	43.58		
Interest during construction (Consu	0.01%	0.14	0.00	0.00	0.02	0.05	0.07		
Commitment Charge	0.1%	11.61	0.00	0.00	3.87	3.87	3.87		
Total		3,880.67	0.00	0.00	809.08	1,936.50	1,135.08	0.00	0.00

Note: Financing Share for C.Works (FC+LC) 63.4737%

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2010	2011	2012	2013	2014	2015
Foreign Currency (Mill Php)[a]	JICA (Loan)	2,283.7	35.1%	0.0	444.6	1,178.8	660.3	0.0	0.0
Local Currency (Mill Php)[b]	JICA (Loan)	1,596.9	24.5%	0.0	364.5	757.7	474.8	0.0	0.0
Local Currency (Mill Php)[c]	GOP(GAA)	1,745.3	26.8%	0.0	337.3	896.5	511.5	0.0	0.0
Local Currency (Mill Php)[d]	SRSuF	884.3	13.6%	0.0	163.2	459.3	261.8	0.0	0.0
FC + LC Total (Mill Php)	Total	6,510.3	100.0%	0.0	1,309.5	3,292.3	1,908.4	0.0	0.0

Note: [a] 100% of F.C , [b] 100% of Consultant, 1/3 of Civil L. C. Cost, Interest & C. Charge [c] VAT, RROW Cost, Admin. Cost and 1/3 of L. C. Cost, [d] 1/

5. Loan Amount of Japanese Government (Yen-Loan)

Foreign Currency	**(Mill Yen)**	**4,537.8**	**100.0%**	**0.0**	**883.4**	**2,342.3**	**1,312.1**	**0.0**	**0.0**
Local Currency	**(Mill Yen)**	**3,173.1**	**37.8%**	**0.0**	**724.2**	**1,505.6**	**943.3**	**0.0**	**0.0**
Total	**(Mill Yen)**	**7,710.9**	**59.6%**	**0.0**	**1,607.7**	**3,847.8**	**2,255.4**	**0.0**	**0.0**

Note: Currency Exchange Rates US$ 1.00= Php. 47.80 = 95.00 J.Yen
Peso 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

Table 5.3.6 Annual Funding Plan (Total) and Breakdown for ICD Programs

Institutional Capacity Development (ICD) Component

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6
Equipment & Construction Cost:	100.0%			50.0%	50.0%	0.0%		
Consultancy Services:	100.0%			40.0%	40.0%	20.0%		
Land Acquisition and Resettlement:	100.0%			100.0%	0.0%	0.0%		
Administration Cost:	100.0%			51.0%	46.0%	3.0%		

2. Project Cost

Equipment & Civil Works (Exclud. VAT): 1,012.55 Mill Php — Land Acquisition and Resettlement: 59.91 Mill Php
Consultancy Services (Exclud. VAT): 127.95 Mill Php — Administration Cost: 27.31 Mill Php at 2.00%
Total Cost: FC: 70% LC: 30% — Consultancy Services: FC: 68% LC: 32%

3. Annual Funding Plan

	Category		Total	2009	2010	2011	2012	2013	2014	2015
(I)	**Foreign Currency Portion (Mill Php)**									
	Equipment & Civil Works (Base Cost)		708.79	0.00	0.00	354.39	354.39	0.00	0.00	0.00
	Price Escalation (%/ann.)	3.1%	56.30	0.00	0.00	22.31	33.99	0.00	0.00	0.00
	Physical Contingency	10.0%	76.51	0.00	0.00	37.67	38.84	0.00	0.00	0.00
	Sub-Total		841.60	0.00	0.00	414.38	427.22	0.00	0.00	0.00
	Consulting Services (Base Cost)		87.01	0.00	0.00	34.80	34.80	17.40	0.00	0.00
	Price Escalation (%/ann.)	3.1%	7.79	0.00	0.00	2.19	3.34	2.26	0.00	0.00
	Physical Contingency	5.0%	4.74	0.00	0.00	1.85	1.91	0.98	0.00	0.00
	Sub-Total		99.54	0.00	0.00	38.84	40.05	20.65	0.00	0.00
	Total		941.14	0.00	0.00	453.22	467.27	20.65	0.00	0.00
(II)	**Local Currency Portion (Mill Php)**									
	Equipment & Civil Works (Base Cost)		303.77	0.00	0.00	151.88	151.88	0.00	0.00	0.00
	Price Escalation (%/ann.)	9.7%	79.52	0.00	0.00	30.89	48.62	0.00	0.00	0.00
	Physical Contingency	10.0%	38.33	0.00	0.00	18.28	20.05	0.00	0.00	0.00
	Sub-Total		421.61	0.00	0.00	201.05	220.56	0.00	0.00	0.00
	Consulting Services (Base Cost)		40.95	0.00	0.00	16.38	16.38	8.19	0.00	0.00
	Price Escalation (%/ann.)	9.7%	12.25	0.00	0.00	3.33	5.24	3.67	0.00	0.00
	Physical Contingency	5.0%	2.66	0.00	0.00	0.99	1.08	0.59	0.00	0.00
	Sub-Total		55.85	0.00	0.00	20.70	22.70	12.45	0.00	0.00
	Land Acquisition and Resettlement		59.91	0.00	0.00	59.91	0.00	0.00	0.00	0.00
	Price Escalation (%/ann.)	9.7%	12.19	0.00	0.00	12.19	0.00	0.00	0.00	0.00
	Physical Contingency	10.0%	7.21	0.00	0.00	7.21	0.00	0.00	0.00	0.00
	Sub-Total		79.31	0.00	0.00	79.31	0.00	0.00	0.00	0.00
	Administration Cost		29.96	0.00	0.00	15.09	14.21	0.66	0.00	0.00
	Total		586.73	0.00	0.00	316.14	257.47	13.11	0.00	0.00
(III)	**VAT Tax Portion (Mill Php)**									
	Civil Works (Base Cost)	12.0%	121.51	0.00	0.00	60.75	60.75	0.00	0.00	0.00
	Price Escalation	12.0%	16.30	0.00	0.00	6.38	9.91	0.00	0.00	0.00
	Physical Contingency	12.0%	13.78	0.00	0.00	6.71	7.07	0.00	0.00	0.00
	Sub-Total		151.59	0.00	0.00	73.85	77.73	0.00	0.00	0.00
	Consulting Services (Base Cost)	12.0%	4.91	0.00	0.00	1.97	1.97	0.98	0.00	0.00
	Price Escalation	12.0%	1.47	0.00	0.00	0.40	0.63	0.44	0.00	0.00
	Physical Contingency	12.0%	0.32	0.00	0.00	0.12	0.13	0.07	0.00	0.00
	Sub-Total		6.70	0.00	0.00	2.48	2.72	1.49	0.00	0.00
	Total		158.29	0.00	0.00	76.34	80.46	1.49	0.00	0.00
	II + III (Local Cost Total)		745.02	0.00	0.00	392.48	337.93	14.61	0.00	0.00
(IV)	**Total Project Cost (Mill Php)**		1,686.15	0.00	0.00	845.70	805.20	35.25	0.00	0.00
(V)	**Eligible Portion (Loan Amount) in Mill Php:**									
	Civil Works & Equipment FC	100%	841.60	0.00	0.00	414.38	427.22	0.00		
	Civil Works & Equipment LC	100%	421.61	0.00	0.00	201.05	220.56	0.00		
	Consultancy Services (FC&LC)	100%	155.39	0.00	0.00	59.54	62.75	33.10		
	Interest during construction (Civil)	1.4%	44.48	0.00	0.00	8.62	17.81	18.05		
	Interest during construction (Consu	0.01%	0.03	0.00	0.00	0.01	0.01	0.02		
	Commitment Charge	0.1%	4.39	0.00	0.00	1.46	1.46	1.46		
	Total		1,467.50	0.00	0.00	685.06	729.81	52.63	0.00	0.00

Note: Financing Share for C.Works (FC+LC) 100.0000%

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2010	2011	2012	2013	2014	2015
Foreign Currency (Mill Php)[a]	JICA (Loan)	990.0	57.1%	0.0	463.3	486.6	40.2	0.0	0.0
Local Currency (Mill Php)[b]	JICA (Loan)	477.5	27.5%	0.0	221.7	243.3	12.5	0.0	0.0
Local Currency (Mill Php)[c]	GOP(GAA)	267.6	15.4%	0.0	170.7	94.7	2.2	0.0	0.0
Local Currency (Mill Php)[d]	SRSuF	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0
FC + LC Total (Mill Php)	Total	1,735.1	100.0%	0.0	855.8	824.5	54.8	0.0	0.0

Note: [a] 100% of F.C, [b] 100% of Consultant & 100% of Civi/Equipment LC, [c] VAT, RROW, Admin, [d] None

5. Loan Amount of Japanese Government (Yen-Loan)

Foreign Currency	**(Mill Yen)**	**1,967.2**	**100.0%**	**0.0**	**920.6**	**966.8**	**79.8**	**0.0**	**0.0**
Local Currency	**(Mill Yen)**	**948.7**	**64.1%**	**0.0**	**440.6**	**483.4**	**24.7**	**0.0**	**0.0**
Total	**(Mill Yen)**	**2,915.9**	**84.6%**	**0.0**	**1,361.2**	**1,450.1**	**104.6**	**0.0**	**0.0**

Note: Currency Exchange Rates US$ 1.00= Php. 47.80 = 95.00 J.Yen
Peso 1.00= US$ 0.0209 = 1.987 J.Yen J.Y 1.00= 0.5033 Peso

CHAPTER 6 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

6.1 EXISTING DATA RELATED TO THE PROJECT

6.1.1 COLLECTION OF EXISTING DATA

Existing data related to the project are listed in Table 6.1.1. These include the EIA documents of DPWH submitted to DENR-EMB for approval and the Environmental Compliance Certificates (ECC) or Certificate of Non-Coverage (CNC) issued by Environmental Management Bureau (EMB).

Table 6.1.1 Existing Data related to the Project

Project Name / No.	Name of Documents
1. MNR, Aringay-La Union-Laoag City (PBM-1*/JLM3)	- Certificate of Non-Coverage (CNC), 5th September 2007, EMB, DENR Region I
2. Jct. PPH - Bongabon - Pantabangan - Baler Rd - Aurora – N.E. (UI-1*/JLM6)	- Environmental Impact Statement for the Proposed Arterial Road Link Development Project Phase III JBIC Loan No.PH-P188 (Bongabon – Baler Road Improvement Project) January 2001, DPWH - Updated Economic Re-Evaluation Report, Bongabon – Baler Road via Pantabangan, Phase II, PMO-DPWH, October 2006 - Environmental Compliance Certificate (ECC), 16th September 2002, EMB, DENR
3.CVR, Sta.Rita Nueva Ecija (PBM-2/JLM1)	- Certificate of Non-Coverage (CNC), 24th July 2008, EMB, DENR
4. Lipa-Alaminos Road (UI-2/JLM10)	- Initial Environmental Examination for the Rehabilitation/ Improvement of Lipa City-Alaminos/ San Pablo Road, August 2007, ESSO - Feasibility Study Report, Lipa City- Alaminos/ San Pablo City Road, PMO-DPWH, December 2002 - Environmental Compliance Certificate (ECC), 28th January 2008, EMB, DENR, Calabarzon Region IV
5. Sipocot-Baao (PBM-3/JLM2)	- Project Description, Daang Maharlika Road Sipocot-Baao Section, REAPMP, ESSO-DPWH, October 2007 - Certificate of Non-Coverage (CNC), 15th February 2008, EMB, DENR, Region V
6. Catanduanes Circumferential Road (UI-4/JLM11)	- Economic Re-Evaluation, Catanduanes Circumferential Road, Phase II, Viga- Codon (San Andres) Section, PMO-DPWH, August 2006 - Environmental Impact assessment, Catanduanes Circumferential Road Improvement Project, DPWH, April 2002 - Environmental Compliance Certificate (ECC), 15th October 1995, EMPES, DENR, Region V
7. Mindoro West Coast Road (UI-3/JLM8)	- Feasibility Study Report, Mindoro West Coast Road Phase II, PMO-DPWH, March 2006 - Mindoro West Coast Road Improvement Project, DPWH, January 2001 - Environmental Compliance Certificate (ECC), 27th September 2001, DENR, Region IV
8. Surigao(Lipata) –Davao City (PBM-4/JLM-4)	- Project Description, Surigao (Lipata)- Davao Road, REAPMP, ESSO-DPWH, October 2007 - Certificate of Non-Coverage (CNC), 21st February 2008, EMB, DENR, Caraga Regional Office

Note: * UI; Road Improvement Project, PBM; Performance Based Maintenance Project

The manuals for environmental and social considerations issued by DPWH and DENR-EMB are as follows:

- Social and Environmental Management Systems (SEMS) Operations Manual, DPWH, April 2003
- Road Development and the EIA Process, By Ms. Criste Zuñiga-Navida, PhD Project Manager IV Head ESSO, DPWH
- Right-of-Way (IROW) Procedural Manual, DPWH, April 2003
- Revised Procedural Manual of DAO 2003-30, EMB, August 2007

6.1.2 PROJECT OUTLINE AND ENVIRONMENTAL BASELINE

(1) Outline of REAPMP

REAPMP consists of four program components; Road Improvement (UI), Long-term Performance Based Maintenance (LTPBM), Preventive Maintenance (PM) and Institutional Capacity Development (ICD) as summarized in Table 6.1.2 (refer to Annexes 4.3- 4.4 as to details).

Under REAPMP, the sub-projects being subjected to environmental and social considerations survey are 4 UI projects and 4 LTPBM projects. The UI roads will involve widening of existing roads and partial road alignment change and, therefore, land acquisition, resettlement and deforestation would become necessary apart form the dust emission control during construction. LTPBM does not cause any resettlement because of no road widening but it will require dust control during the repair works. No negative environmental impacts are foreseen for the PM programs as these are AC overlay works on the existing roads.

Table 6.1.2 Component and Scope of REAPMP

Component	Project Code No.		Project Name	Road Works					Bridge Works	
	New	Old		Project Length (km)	UI (km)	RH (km)	PM (km)	RM (km)	Replacement or Widening (No)	(m)
I. Road Upgrading / Improvement (UI)										
	UI-1	(JLM 6)	Bongabon - Rizal/ Pantabangan - Baler	51.3	2.6				6	194
	UI-2	(JLM 10)	Lipa - Alaminos	16.7	7.5				0	0
	UI-3	(JLM 8)	Mindoro West Coast Road	153.4	71.0				13	365
	UI-4	(JLM 11)	Catanduanes Circumferential Road	64.2	47.4				3	250
Total				**285.7**	**128.4**	**0.0**	**0.0**	**0.0**	**22**	**809**
II. Long Term Performance Based Maintenance (LTPBM)										
	PBM-1	(JLM 3)	Aringay - Laoag	242.1		93.0	149.1	1,210.5		
	PBM-2	(JLM 1)	Sta.Rita-Bdr.N.Ecija	169.3		62.6	106.7	846.5	1	45
	PBM-3	(JLM 2)	Sipocot - Baao	109.5		41.6	67.9	547.5		
	PBM-4	(JLM 4)	Surigao (Lipata) - Bdr.Agusan D.N.	123.5		44.5	79.0	617.5	1	84
Total				**644.4**	**0.0**	**241.7**	**402.7**	**3,222.0**	**2**	**129**
III. Preventive Maintenance (PM)										
	Pre-Fixed Road Links (moved from LTPBM			93.0			93.0			
	HDM-4 selected Road links			500.0			500.0			
Total				**593.0**	**0.0**	**0.0**	**593.0**	**0.0**	**0**	**0**

Note: UI; Upgrading / Improvement, RH; Rehabilitation, PM; Preventive Maintenance, RM; Routine Maintenance

(2) Social Environmental Baseline Survey

Results of social environmental baseline survey for UI-3, Mindoro West Coast Road Project, are described in Table 6.1.3. These data are used for making scoping matrix.

Table 6.1.3 Summary of Social Environmental Baseline Survey for UI-3, Mindoro West Coast Road Project

Item		Findings
Social Environment	Affected people/ Related people/ Group: (Livelihood/ People/ Gender/ Residents / Squatters/ NGOs/ Poor people/ Indigenous people, Ethnic minority and Socially vulnerable groups/ People's awareness to the project, etc.)	The province of Occidental Mindoro had a total population of 421,952 in 2007. Of these, 70,506 populations live in Sablayan municipality, 26,779 in Calintaan and 32,065 Rizal. *1 The main source of employment in the province is agricultural sector. Sixty-six percent of the workers are engaged in agriculture, fishing and forestry. The remaining 34% are engaged in non-agricultural sectors. In terms of education, the province of Occidental Mindoro has a high literacy rate with 94% of the total population. Persons ten years old and above are able to read and write. The Mangyans are the original natives of Occidental Mindoro. They are the people of distinct ethnic origin. These inhabitants dwell in the island's interior, which are hardly accessible by car. Anthropologist classified the Mangyans into at least seven ethnic groups. Most of the Mangyan families still live according to their traditional way of life and culture. However, they are in losing their cultural autonomy- a culture that is unique in the Philippines.
	Land use and local resource utilization: (Urban area/ Rural area/ Industrial and commercial area/ Historical area/ Scenic spot/ Fishing ground/ Seaside industrial zone/ Historical legacy, etc.)	The total land area of the province is 587,985 ha of which 156,004 ha (26.5%) is classified as certified alienable and disposable land. Forestland covers an area of 431,981 ha (73.5%); 49,531 ha of the unclassified and 382,450 ha of classified forestland. Classified forestland consists of established forest reservation of 91,270 ha; established timberland of 78,783 ha; national parks of 192,811 ha; military and naval reservation of 147 ha; civil reservation of 16,190 ha and fishpond of 3,249 ha.
	Local infrastructure/ Social organization: (Decision-making organization of the area /Education /Transportation network /Drinking water / Well, Reservoir, Water supply /Electricity / Sewage system/ Wastes, Bus and ferry terminal, etc.)	Formal education in Occidental Mindoro is classified into elementary, secondary and college levels. The province has a total of 261 schools consisting of 223 elementary schools, 28 high schools and 10 colleges. Non-formal education (NFE) classes are composed of function and literacy for preschoolers and cultural communities providing vocational and technical courses for out-of-school youths and adults; leadership training courses and parent education classes. Travel to any point of the province is possible through public utility buses and jeepneys. There are five bus lines regularly operating between San Jose and Mamburao. These are various public utility jeepneys servicing in each municipality. People mostly from the urban barangays are served by the piped water. Majority of the population, especially those in the rural areas, depends on springs, wells and pumped water posing greater incidence of water borne diseases. The usual garbage disposal methods in Occidental Mindoro are as follows: (a) garbage truck collection (b) dumping in individual pits (not burned), (c) burning, (d) composting, (e) burying recyclable materials, (f) feeding to animals and (g) others. There is no existing sanitary sewerage system in the province. Majority of the drainage facilities consist of open canals or ditches. The rivers and streams function as the drainage system. The rivers receive the domestic wastewater. Storm water are collected through the segmented drainage facilities in urban centers.
	Economy: (Agriculture / Fishing / Industry / Commerce/ Tourism, etc.)	Occidental Mindoro is rich in marine and mineral resources. Its fertile valleys are among the country's top rice producers. Occidental Mindoro's fishing grounds include its shorelines, the Mindoro Strait situated between Mindoro and Palawan, and the small islands within its political boundaries. One of the best fishing areas is the Apo Reef within Sablayan that is noted for rich fish species and coral formation. Puerto Galera's beaches, Apo Reef Natural Park, Mt. Iglit-Baco National Park, endemic plants and animals make the province tourists' spot.
	Nation's health and hygiene: (Infectious disease such as disease/ HIV/ AIDS, Hospital, Sanitary custom, etc.)	The leading causes of morbidity are diarrhea, acute respiratory infection, bronchitis, pneumonia, malaria, influenza, chicken pox, measles, tuberculosis and heart disease. Public and private hospitals and clinics and rural health units (RHUS) service the health needs of the people of Occidental Mindoro. It has eight public hospitals and four private hospitals.

Source: Mindoro West Coast Road Improvement Project, DPWH, January 2001
*1:2007 CENSUS of Population

(3) Natural Environmental Baseline Survey

Results of natural environmental baseline survey for UI-3, Mindoro West Coast Road Project, are described in Table 6.1.4.

Table 6.1.4 Summary of Natural Environmental Baseline Survey–UI-3 Mindoro West Coast Road Project

Item		Features /Findings
Natural Environment	Geographical feature and Geology: (Steep slope/ Soft ground/ Wetland/ Fault, etc.)	San Jose -Rizal Section: This road that traverses is generally flat, starting from north of San Jose town proper, then will pass through some barangays up to the next town of Rizal, right after the wide river banks of Busuanga Bridges including the single-lane Cambaog Bridge . Sablayan -Sta. Cruz Section: The start of the road is generally flat. It traverses along hilly to mountainous terrains while going east. The terrain is rolling to flat upon approaching the area of Sta. Cruz town in the north to west direction of the road. Mamburao -Abra De Ilog Section: The road generally traverses flat to rolling terrain on some portions when crossing the hilly areas of barangays towards the river of Abra de IIog town. From this section, the terrain is mostly flat up to the terminal of the road section while passing some areas that are aligned near the foot of the mountain towards the terminal section.
	Fauna, Flora and Habitat: (Protected area/ National park/ Rare species/ Mangrove/ Coral reef/ Aquatic life, etc.)	The proposed Mangyan Heritage Natural Park (MHNP) is located between 12035'N and 13030'N, and 1210E. It covers 274,914 hectares or 27% of the total land area of Mindoro Island. Presently, the province of Occidental Mindoro has an aggregate forest area of 81,468 hectares, of which 40,361 ha is a protected forest while 41,107 ha is utilized as source for production of goods. The rich environment is now endangered due to uncontrolled resource extraction and exploitation activities of the people, i.e. hunting of wild pigs, deer and birds; illegal cutting of trees, i.e. acacia and agoho stands which serve as river banks' protective barriers; cultivation of flood plain for various agricultural crops; gathering of minor forest products (e.g. rattan, vines, firewood); cattle ranching/grazing, upland farming and human settlements. These destructive activities have greatly caused rapid deforestation and consequently soil erosion, landslides, flooding of rice fields and settlements, etc. The total area of mangrove forest in Occidental Mindoro province is 2,243 ha based on latest-estimate of NAMRIA in 1990.
	Coast and sea: (Erosion/ Sedimentation/ Flow / Tide / Water depth/ Ocean current, etc.)	
	Lake, River system, Seashore/ Climate: (Water quality, Flow, Precipitation, etc.)	The drainage systems of Occidental Mindoro generally flow westward and finally into South China Sea. It has four principal river basins, namely: the Caguray River of 136 sq.km., the Busuanga River of 434 sq.km., the Mamburao River of 189 sq.km. and the Pagbahan River of 263 sq.km. It has also six secondary rivers, which include Patrick, Tuay, Anuwis, Labangan, Ibod and Lumintao. The province belongs to Type I climate characterized by two pronounced seasons: dry season from November to April and wet during the rest of the years. The province is affected by the southeast monsoon from June to October. Annual volume of rainfall in 1992 was 2,263 mm with monthly average of 189 mm. The average maximum temperature is 30.1C while the minimum is 22.8C.

Item		Features /Findings
Pollution	Present pollution: (Atmosphere, Water, Sewer, Noise, Vibration, etc.)	Samplings for ambient air quality (in comparison with DENR standards) TSP, CO, N02 will be conducted on the first environmental monitoring by the MMT. Samplings for ambient noise levels at the project site and at the locations near human settlements, boundary of property lines will be conducted on the first environmental monitoring by the MMT. Water quality analysis, particularly the physical characteristics of water samples from rivers and creeks in the project areas will be submitted during the Environmental Monitoring by the MMT.
	Complaints which people regard as the major concern:	
	Countermeasures against pollution: (Measure on systems such as rules/compensations)	• Ambient water quality criteria (DAO 34 series of 1990) • Ambient air quality guidelines (DAO 2000-81 or the IRR of RA 8749) • Ambient noise pollution criteria (IRR of PD 984) • Effluent standards as basis for re-dissolution of sediment materials (DAO 35 series of 1990) • Solid Waste Management Act (RA 9003) *1

Source: Mindoro West Coast Road Improvement Project, DPWH, January 2001, *1: By Survey Team

6.1.3 SCOPING AND MITIGATION MEASURES

(1) Scoping Matrix

Scoping Matrix for UI-3 Mindoro West Coast Road Project is shown in Table 6.1.5 in consultation with counterpart personnel of DPWH.

Table 6.1.5 Scoping Matrix for UI-3 Mindoro West Coast Road Project

Name of Cooperation Project			UI-3 Mindoro West Coast Road (71 km UI Length)	
Item			Rating	Reasons
Social Environment: *Impacts on "Gender" and "Children's Right" may be related to all social environment criteria.	1	Involuntary Resettlement	B	Resettlement (13 households) is required for the ROW.
	2	Local Economy such as Employment and Livelihood, etc		Preferably employment, livelihood, etc. help activate the local economy.
	3	Land Use and Utilization of Local Resources	B	Land acquisition (54 ha) is required for the ROW. During construction, local resources such as water, sand, stone, etc are utilized.
	4	Social Institutions such as Social Infrastructure and Local Decision - making Institutions		Preferably traffic conditions are improved and access to the social institutions becomes easy.
	5	Existing Social Infrastructures and Services		Impacts on water and electricity demand in the area are not expected.
	6	The Poor, Indigenous and Ethnic people		No squatters around the site. Ethnic minority and indigenous people reside inside the island and along the seashore respectively. They do not reside along the route.
	7	Misdistribution of Benefit and Damage		Consensus building on road improvement was made by stakeholder meetings.
	8	Cultural heritage		A precious inheritance and historic relics do not exist in the proposed route.
	9	Local Conflicts of Interest		Implementation of this project activates the local economy.
	10	Water Usage or Water Rights and Communal Rights		Water and common rights are not set up in the ROW.
	11	Sanitation	B	Is considered aggravation of health environment by increase in garbage or noxious insect during construction.

Name of Cooperation Project			UI-3 Mindoro West Coast Road (71 km UI Length)	
Item			Rating	Reasons
	12	Hazards (risk) Infectious Diseases such as HIV/AIDS	B	There is fear of infection, such as HIV/AIDS, by employment of construction workers.
Natural Environment	13	Topography and Geographical Features		Geomorphic characteristics are not changed by a road project.
	14	Soil Erosion	B	Soil erosion may occur by civil engineering works.
	15	Groundwater		Since excessive pumping of groundwater is not carried out, there is no possibility of groundwater level fall.
	16	Hydrological Situation	B	Inflow of sediment from a quarry may change hydrographic and sediment conditions of lakes and rivers.
	17	Coastal zone		There are no civil works which may cause seashore erosion.
	18	Flora, Fauna and Biodiversity		Under the present circumstances, no serious impacts on ecosystem are expected.
	19	Meteorology		Road construction may not cause change of climate conditions (temperature, rain, wind, etc.).
	20	Landscape		There is no scenery to be considered in particular in the proposed route. Preferably roadside planting causes positive impact on scenery.
	21	Global Warming		There is no emission of carbon dioxide to the extent that a global warming issue is caused.
Pollution	22	Air Pollution	B	Dust is caused by passing of construction machinery and vehicles during construction.
	23	Water Pollution	B	There is a possibility of pollution of surface water due to unexpected oil spill from construction machinery and soil runoff from topsoil exposure part.
	24	Soil Contamination		There is no possibility of soil contamination during construction.
	25	Waste	B	Construction and solid wastes are generated during construction.
	26	Noise and Vibration	B	Noise and vibration are generated by operation of construction machinery and vehicles during and after construction.
	27	Ground Subsidence		There is no excessive pumping of groundwater which causes land subsidence during and after construction.
	28	Offensive Odor		There is no possibility that a bad smell will occur.
	29	Bottom Sediment		There is no possibility of sediment contamination.
	30	Accidents	B	There is danger to the life and environment by traffic accident, blasting work and natural disasters (falling stones, mudslide, etc.) during and after construction.
Overall rating			**B**	Some impacts are expected.

Rating;
A: Serious impact is expected,
B: Some impact is expected,
C: Extent of impact is unknown,
D (or No Mark): No impact is expected. IEE/EIA is not necessary.

(2) Avoidance and Mitigation Measures and Monitoring Plan

Regarding the items in the scoping matrix identified to be subject to some expected impacts, environmental management plan (avoidance and mitigation measures) and monitoring plan were made in consultation with the DPWH counterparts based on the EIS reports, the ECC and site reconnaissance survey. The project activities are divided into three periods, namely, before, during and after construction. Corresponding avoidance and mitigation measures and monitoring requirements for UI-3 Mindoro West Coast Road Project are shown in Table 6.1.6.

Table 6.1.6 Avoidance and Mitigation Measures and Monitoring Plan for UI-3 Mindoro West Coast Road Project

Impact	Avoidance and Mitigation measures	Monitoring requirement	Responsibility
Ⅰ. Project activity - before construction			
Involuntary Resettlement	- Quick payment of proper compensation expense for land acquisition and removal of houses.	- Recording and reporting by DPWH, responsible organization (4 times per year) -Attitude (degree of satisfaction) survey to Project Affected Families (PAFs), 4 times per year	DPWH, LGUs
Ⅱ. Project activity - during construction			
Sanitation	- Health education to construction companies and medical examination to employees - Proper disposal of wastes	- Reporting (2 times per year) - Surveillance report on proper disposal of wastes (4 times per year)	LGUs, Construction company
Hazards (risk) Infectious Diseases such as HIV/AIDS	- Health education and medical examination to construction workers	- Reporting (2 times per year)	LGUs, Construction company
Soil Erosion	- Minimization of earthwork during rainy season as much as possible. - Implementation of planting and afforestation. (Felling permission from DENR, complying with DPWH D.O.#131,1995)	- Reporting of compliance of design and construction process (4 times per year) - Investigation of growth state (4 times per year)	DPWH, Consultant and Construction company
Hydrological Situation	- No permit of quarry site which has fine sediments. - To limit extraction depth from river bottom. - To set apart of quarry site from drinking water.	- Observance report related to compliance to ECC conditions by the construction company and quarry operator (4 times per year) - Surveillance report on river turbidity (4 times per year)	Construction company, DPWH, Consultant and LGU
Air Pollution	- Maintenance of heavy equipment for construction - Establishment of materials storage site apart from private residence. - Watering work in passing of the vehicles for construction - To cover the bed of the sand truck for construction. - To moisturize the piled up sand in the open air.	- Air quality survey (TSP, 4 times per year) - Surveillance report on dust (4 times per year)	Construction company
Water Pollution	- Minimization of earthwork activities during rainy season as much as possible.	- Monitoring report on water quality of rivers and lakes (4 times per year) - Observance report on design and construction methodologies (4 times per year)	Consultant and Construction company
Waste	・Proper abandonment of the excavated material to the appointed place ・Establishment of garbage collection and processing system from work camp. ・To install work camp in the area apart from the residential section.	- Monitoring report (4 times per year) - Water quality test on groundwater and drinking water (4 times per year) - Collection and report of complaints from residents (4 times per year)	Construction company, DPWH

Impact	Avoidance and Mitigation measures	Monitoring requirement	Responsibility
Noise and Vibration	- Introduction of low noise type construction machinery - To lessen construction workers in the vicinity of settlements	- Observance report on design and construction methodologies (4 times per year) - Measurement of noise level (4 times per year)	Consultant, Construction company
Accidents	- Small blasting work and thoroughness of prior arrangement	- Observance report on work standards (4 times per year)	Construction company, DPWH
Ⅲ. Project activity - after construction			
Land Use and Utilization of Local Resources	- Restoration of work sites	- Surveillance report after planting/afforestation (2 times per year)	DENR, LGU
Air Pollution	- Traffic control	- Air quality survey (TSP, 4 times per year)	Police, Province, LGU
Waste	- Waste disposal plan	- Water quality test of groundwater and drinking water (4 times per year)	Province, LGU
Noise and Vibration	- Traffic control	- Measurement of noise level (4 times per year)	Police, Province, LGU
Accidents	- Installation of speed limit, road sign, pedestrian crossing, and barrier in urban area - Arrangement of traffic policemen in high populated area	- Report on traffic accidents (2 times per year)	Police, Province, LGU

6.1.4 SCOPING MATRIX FOR OTHER UI AND LTPBM PROJECTS

The scoping matrix for other UI and LTPBM projects are summarized in the following Table 6.1.7 (refer to Annex 7 as to details).

Table 6.1.7 Scoping Matrix of Other UI and LTPBM Roads (except Mindro West Coast)

Name of Sub-Project			UI-1. Bongabon - Pantabangan - Baler Road		UI-2. Lipa -Alaminos Road		UI-4. Catanduanes Circumferential Road	
Item			Rating	Reasons	Rating	Reasons	Rating	Reasons
Social Environment: *Impacts on "Gender" and "Children's Right" may be related to all social environment criteria.	1	Involuntary Resettlement		No resettlement required	B	Resettlement (3 households) is required for the ROW.	B	Resettlement (16 households) is required for the ROW.
	2	Local Economy such as Employment and Livelihood, etc		Local Economy such as Employment and Livelihood would be activated.		Local Economy such as Employment and Livelihood would be activated.		Local Economy such as Employment and Livelihood would be activated.
	3	Land Use and Utilization of Local Resources	B	Land acquisition (4 ha) is required for the ROW. Local resources such as water, sand, stone and etc. are utilized during construction.	B	Land acquisition (8 ha) is required for the ROW. Local resources such as water, sand, stone and etc. are utilized during construction.	B	Land acquisition (65 ha) is required for the ROW. Local resources such as water, sand, stone and etc. are utilized during construction.
	4	Social Institutions such as Social Infrastructure and Local Decision - making Institutions		Traffic condition would be improved and access to the social institution would be easy.		Traffic condition would be improved and access to the social institution would be easy.		Traffic condition would be improved and access to the social institution would be easy.
	5	Existing Social Infrastructures and Services		No influence on the local water and electricity demand is expected.		No influence on the local water and electricity demand is expected.		No influence on the local water and electricity demand is expected.
	6	The Poor, Indigenous and Ethnic people		No squatter around the site. No ethnic minority and indigenous people reside around the area.		No squatter around the site. No ethnic minority and indigenous people reside around the area.		No squatter around the site. No ethnic minority and indigenous people reside around the area.
	7	Misdistribution of Benefit and Damage		Consensus building of construction was made by stakeholder meetings.		Consensus building of construction was made by stakeholder meetings on June and Sept. of 2006.		Consensus building of construction was made by stakeholder meetings.
	8	Cultural heritage		No precious heritage and historic relics located along the proposed route.		No precious heritage and historic relics located along the proposed route.		No precious heritage and historic relics located along the proposed route.
	9	Local Conflicts of Interest		Implementation of the project activates the local economy.		Implementation of the project activates the local economy.		Implementation of the project activates the local economy.
	10	Water Usage or Water Rights and Communal Rights		Water and common rights are not set in the ROW.		Water and common rights are not set in the ROW.		Water and common rights are not set in the ROW.
	11	Sanitation	B	Sanitation environment would be suffered from the increased garbage or noxious insect during construction.	B	Sanitation environment would be suffered from the increased garbage or noxious insect during construction.	B	Sanitation environment would be suffered from the increased garbage or noxious insect during construction.
	12	Hazards (risk) Infectious Diseases such as HIV/AIDS	B	There is fear of infection diseases such as HIV/AIDS through employed construction workers.	B	There is fear of infection diseases such as HIV/AIDS through employed construction workers.	B	There is fear of infection diseases such as HIV/AIDS through employed construction workers.
Natural Environment	13	Topography and Geographical Features		Geographical Features would not be changed.		Geographical Features would not be changed.		Geographical Features would not be changed.
	14	Soil Erosion	B	Soil Erosion may be occure by civil engineering works.	B	Soil Erosion may be occure by civil engineering works.	B	Soil Erosion may be occure by civil engineering works.
	15	Groundwater		No possibility of dropping the		No possibility of dropping the groundwater		No possibility of dropping the groundwater level

Name of Sub-Project			UI-1. Bongabon - Pantabangan - Baler Road		UI-2. Lipa -Alaminos Road		UI-4. Catanduanes Circumferential Road	
Item			Rating	Reasons	Rating	Reasons	Rating	Reasons
				groundwater level because excessive pomping wouldn't be carried out.		level because excessive pomping wouldn't be carried out.		because excessive pomping wouldn't be carried out.
	16	Hydrological Situation	B	Hydrological situation may be influenced by the inflow of sediments from quarry.	B	Hydrological situation may be influenced by the inflow of sediments from quarry.	B	Hydrological situation may be influenced by the inflow of sediments from quarry.
	17	Coastal zone		No civil engineering works to cause seashore erosion.		The site is not in coastal zone.		No civil engineering works to cause seashore erosion.
	18	Flora, Fauna and Biodiversity	B	Flora and Fauna would be affected by felling trees for road widening, curve form change and construction of working and drainage facilities.	B	Flora and Fauna would be affected by felling trees for road widening, curve form change and construction of working and drainage facilities.	B	Flora and Fauna would be affected by felling trees for road widening, curve form change and construction of working and drainage facilities.
	19	Meteorology		Meteorology wouldn't be affected by road project.		Meteorology wouldn't be affected by road project.		Meteorology wouldn't be affected by road project.
	20	Landscape		No scenery to be considered along the proposed route.		No scenery to be considered along the proposed route.		No scenery to be considered along the proposed route.
	21	Global Warming		Not so much CO2 emission.		Not so much CO2 emission.		Not so much CO2 emission.
Pollution	22	Air Pollution	B	Dust would be discharged by construction machinery and vehicles during and after construction.	B	Dust would be discharged by construction machinery and vehicles during and after construction.	B	Dust would be discharged by construction machinery and vehicles during and after construction.
	23	Water Pollution	B	There is possibility that the surface water would be polluted by unexpected oil spill from construction machinery and soil runoff from exposed topsoil.	B	There is possibility that the surface water would be polluted by unexpected oil spill from construction machinery and soil runoff from exposed topsoil.	B	There is possibility that the surface water would be polluted by unexpected oil spill from construction machinery and soil runoff from exposed topsoil.
	24	Soil Contamination		No possibility of soil contamination during construction.		No possibility of soil contamination during construction.		No possibility of soil contamination during construction.
	25	Waste	B	Construction and solid wastes would be generated during construction.	B	Construction and solid wastes would be generated during construction.	B	Construction and solid wastes would be generated during construction.
	26	Noise and Vibration	B	Noise and Vibration would be generated by construction machinery and vehicles during and after construction.	B	Noise and Vibration would be generated by construction machinery and vehicles during and after construction.	B	Noise and Vibration would be generated by construction machinery and vehicles during and after construction.
	27	Ground Subsidence		Excessive pomping to occur ground subsidence wouldn't be carried out during and after construction..		Excessive pomping to occur ground subsidence wouldn't be carried out during and after construction..		Excessive pomping to occur ground subsidence wouldn't be carried out during and after construction..
	28	Offensive Odor		No possibility to generate offensive odor.		No possibility to generate offensive odor.		No possibility to generate offensive odor.
	29	Bottom Sediment		No possibility to generate bottom sediment.		No possibility to generate bottom sediment.		No possibility to generate bottom sediment.

Name of Sub-Project			UI-1. Bongabon - Pantabangan - Baler Road		UI-2. Lipa -Alaminos Road		UI-4. Catanduanes Circumferential Road	
Item			Rating	Reasons	Rating	Reasons	Rating	Reasons
	30	Accidents	B	There is danger to the life and environment by traffic accident, blasting work and natural disaster (falling stones, mudslide, etc.) during and after construction.	B	There is danger to the life and environment by traffic accident, blasting work and natural disaster (falling stones, mudslide, etc.) during and after construction.	B	There is danger to the life and environment by traffic accident, blasting work and natural disaster (falling stones, mudslide, etc.) during and after construction.
Overall rating			B	Some impacts are expected.	B	Some impacts are expected.	B	Some impacts are expected.

Name of Sub-Project			PBM-1. Aringay -Laoag City		PBM-2. Sta.Rita (Bulacan)-Nueva Ecija		PBM-3. Sipocot -Baao Road		PBM-4. Surigao(Lipata)-Davao City*	
Item			Rating	Reasons	Rating	Reasons	Rating	Reasons	Rating	Reasons
Social Environment: *Impacts on "Gender" and "Children's Right" may be related to all social environment criteria.	1	Involuntary Resettlement		No resettlement required		No resettlement required		No resettlement required		No resettlement required
	2	Local Economy such as Employment and Livelihood, etc		Local Economy such as Employment and Livelihood would be activated.		Local Economy such as Employment and Livelihood would be activated.		Local Economy such as Employment and Livelihood would be activated.		Local Economy such as Employment and Livelihood would be activated.
	3	Land Use and Utilization of Local Resources		No change in land use and no use of local resources.		No change in land use and no use of local resources.		No change in land use and no use of local resources.		No change in land use and no use of local resources.
	4	Social Institutions such as Social Infrastructure and Local Decision - making Institutions		Traffic condition would be improved and access to the social institution would be easy.		Traffic condition would be improved and access to the social institution would be easy.		Traffic condition would be improved and access to the social institution would be easy.		Traffic condition would be improved and access to the social institution would be easy.
	5	Existing Social Infrastructures and Services		No influence on the local water and electricity demand is expected.		No influence on the local water and electricity demand is expected.		No influence on the local water and electricity demand is expected.		No influence on the local water and electricity demand is expected.
	6	The Poor, Indigenous and Ethnic people		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	7	Misdistribution of Benefit and Damage		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	8	Cultural heritage		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	9	Local Conflicts of Interest		Implementation of the project activates the local economy.		Implementation of the project activates the local economy.		Implementation of the project activates the local economy.		Implementation of the project activates the local economy.
	10	Water Usage or Water Rights and Communal Rights		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	11	Sanitation		Sanitation environment is not expected to be suffered		Sanitation environment is not expected to be suffered		Sanitation environment is not expected to be suffered		Sanitation environment is not expected to be suffered
	12	Hazards (risk) Infectious Diseases such as HIV/AIDS		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.

Name of Sub-Project			PBM-1. Aringay -Laoag City		PBM-2. Sta.Rita (Bulacan)-Nueva Ecija		PBM-3. Sipocot -Baao Road		PBM-4. Surigao(Lipata)-Davao City*	
Item			Rating	Reasons	Rating	Reasons	Rating	Reasons	Rating	Reasons
Natural Environment	13	Topography and Geographical Features		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	14	Soil Erosion		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	15	Groundwater		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	16	Hydrological Situation		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	17	Coastal zone		No impact is expected.		Proposed route doesn't pass along coastal zone.		Proposed route doesn't pass along coastal zone.		Proposed route doesn't pass along coastal zone.
	18	Flora, Fauna and Biodiversity		Proposed route doesn't pass through forest preservation area. No impact on Flora and Fauna is expected.		Proposed route doesn't pass through forest preservation area. No impact on Flora and Fauna is expected.		Proposed route doesn't pass through forest preservation area. No impact on Flora and Fauna is expected.		Proposed route doesn't pass through forest preservation area. No impact on Flora and Fauna is expected.
	19	Meteorology		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	20	Landscape		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	21	Global Warming		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
Pollution	22	Air Pollution	B	Dust would be generated by construction machinery and vehicles during and after construction.	B	Dust would be generated by construction machinery and vehicles during and after construction.	B	Dust would be generated by construction machinery and vehicles during and after construction.	B	Dust would be generated by construction machinery and vehicles during and after construction.
	23	Water Pollution		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	24	Soil Contamination		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	25	Waste		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	26	Noise and Vibration	B	Construction and solid wastes would be generated during construction.	B	Construction and solid wastes would be generated during construction.	B	Construction and solid wastes would be generated during construction.	B	Construction and solid wastes would be generated during construction.
	27	Ground Subsidence		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	28	Offensive Odor		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	29	Bottom Sediment		No impact is expected.		No impact is expected.		No impact is expected.		No impact is expected.
	30	Accidents	B	There is danger to the life by traffic accident during construction.	B	There is danger to the life by traffic accident during construction.	B	There is danger to the life by traffic accident during construction.	B	There is danger to the life by traffic accident during construction.
Overall rating			B	Some impacts are expected.	B	Some impacts are expected.	B	Some impacts are expected.	B	Some impacts are expected.

6.1.5 ALTERNATIVE STANDARD CROSS SECTION PLANS FOR UI PROJECTS AND INFLUENCE ON ENVIRONMENT

Four alternative standard cross sections (ROW: 14.1m, 12.0 m, 10.1m, 9.1m) were studied and compared in the project planning stage of UI project for the road sections located in town areas. The Survey Team has finally adopted the 12.0m standard section based on site reconnaissance survey and discussion with DPWH. No alternative cross section study was conducted for LTPBM project as this is maintenance of the existing road sections without widening.

The major results of considerations on the environmental aspects are outlined below.

(1) Bongabon-Rizal/Pantabangan-Baler Road

The road improvement from existing gravel road to concrete pavement is only 2.6 km in total length and the major works for remaining sections are slope protection and drainage works. No alternative cross section study was conducted as the new pavement works in town areas were already completed.

(2) UI-2 Lipa-Alaminos Road

The environmental items evaluated as rating "B" are studied for four alternatives cross section plans. The results indicate that the smaller the ROW width, the lesser the impact, as follows:

- Soil Erosion: Soil erosion may occur by civil engineering works. ➔ The larger the ROW width, the higher the scale of civil engineering works becomes.
- Hydrological Situation: Inflow of sediment from a quarry may change hydrographic and sediment conditions of lakes and rivers. ➔ The larger the ROW width, the more amount of quarry is required, hence, the inflow of earth and sand increases.
- Flora, Fauna and Biodiversity: Tree cutting for road widening, change of route, working and drainage facilities causes impacts on fauna and flora. ➔ The larger the ROW width, the more amount of tree cutting is required.
- Air Pollution: Air pollutants are emitted from construction machinery and vehicles during and after construction. ➔ The larger the ROW width, the larger quantity of work is required, hence, the more pollutants are emitted.
- Water Pollution: There is a possibility of pollution of surface water due to unexpected oil spill from construction machinery and soil runoff from topsoil exposure part. ➔ The larger the ROW width becomes, the larger the area of topsoil exposure, hence, the inflow of soil increases.
- Waste: Construction and solid wastes are generated during construction. ➔ The larger the ROW width, the larger quantity of work is required, hence, more construction and solid wastes are generated.
- Noise and Vibration: Noise and vibration are generated by operation of construction machinery and vehicles during and after construction. ➔ The larger the ROW width, the larger quantity of work is required, hence, the number/working hours of construction machinery and vehicles increases.
- Accidents: There is danger to the life and environment by traffic accident, blasting work and natural disasters (falling stones, mudslide, etc.) during and after construction. ➔ The larger the ROW width, the larger quantity of work is required, hence the accident risks increase.

- Involuntary Resettlement: Resettlement is required for the ROW. ➔ The larger the ROW width, the more land is required, hence, the number of relocated houses increases.
- Land Use and Utilization of Local Resources: Land acquisition is required for the ROW. During construction, local resources such as water, sand, stone, etc are utilized. ➔ The larger the ROW width, the larger area for land acquisition is required, hence, utilization of local resources increases during construction.
- Sanitation: Is considered aggravation of health environment by increase in garbage or noxious insect during construction. ➔ The larger the ROW width, the more workers are required, hence, garbage or noxious insect increases.
- Hazards (risk) Infectious Diseases such as HIV/AIDS: There is fear of infection, such as HIV/AIDS, by employment of construction workers. ➔ The larger the ROW width, the more workers are required, hence, the worse risk of infection, such as HIV/AIDS is anticipated.

(3) Project No.7 Mindoro West Coast Road

Most of the Mindoro West Coast Road routes pass on the flat land compared with other UI projects passing through mountainous terrains. The principle scoping results are same as UI-2, except on Flora, Fauna and Biodiversity and air pollution.

According to the scoping result in Table 6.1.5, no impacts are seen on Flora, Fauna and Biodiversity. As to air pollution, dust is caused by passing of construction machinery and vehicles during construction.

(4) UI-4 Catanduanes Circumferential Road

The principle scoping results are same as UI-2 but its dignity is higher than UI-2 as the project size is larger and located in more steep mountainous terrain.

6.2 ACQUISITION OF ENVIRONMENTAL CLEARANCE

6.2.1 EIA SYSTEM IN THE PHILIPPINES

(1) EIA Procedures

The Philippine Environmental Impact Statement System (PEISS) was established through Presidential Decree (PD) No. 1151 in 1977, known as the Philippine Environmental Policy. In order to avoid confusion in the following, terminologies were standardized such as "EIS," which describe the environmental impact assessment note, and "EIA" for all the systems and procedures. PD No. 1151 stipulates the necessity of the preparation of EIS for the proposed project and/or undertakings which might cause significant environmental impacts. In 1978, PD No. 1586, known as the Philippine Environmental Law, was issued. In addition, the National Environment Protection Council (NEPC) stipulated the implementation rules to define specific procedures for EIA. In the Article 1 of said rule, it is declared that the nation should maintain and accomplish social and economic development and harmonization of environmental protection. The EIA procedures cover Environmentally Critical Projects (ECPs) presumed to have significant negative impacts on environment or projects proposed in Environmentally Critical Areas (ECAs). This could give significant influences on the quality of environment. The ECPs and ECAs are stipulated in the Presidential Proclamation (PP) No. 2148 in 1981 and PP No. 803 issued in 1996.

PD No. 1586 was amended in 1992 according to the Department of Environment and Natural Resources (DENR) Administrative Order (DAO) No. 12. Each official announcement of the policy, objective, procedures, ECC, and monitoring is stipulated in the amended PD No. 1586. This decree was further revised in 1996 by the DAO No. 37. It was enhanced on the issues including 1) immediate environmental consideration; 2) further streamlining of the EIA procedures as a project management method; and 3) the maximized public participation to ensure the social approval of the projects.

Furthermore, the related DAO No. 42 in 2002 and No. 30 in 2003 were revised to partly simplify the procedures. The revision includes a rule that the ECC and/or Certificate of Non-CNC can be assumed issued, if no decision is made by the EMB within a predetermined period.

Figure 6.2.1 shows the flowchart of EIA procedure.

According to the Revised Procedural Manual of the DAO No. 30, once a project is implemented, the ECC remains valid and active for the entire duration of the project. However, the ECC automatically expires if the project has not been implemented within five years from date of ECC issuance, or if the ECC is not requested for extension within three months from the expiration of its validity.

The CNC certifies that, the project is not covered by the EIS System and is not required to secure an ECC. Further, the CNC advises the Proponent on coverage to other requirements by the DENR offices, LGUs or other government agencies. A CNC cannot be issued for projects with Project Description Report (PDR) thresholds component but which is also has sub-components with EIS/IEE threshold. In this case, the decision document will recommend the appropriate grouping and corresponding EIA Report requirement.

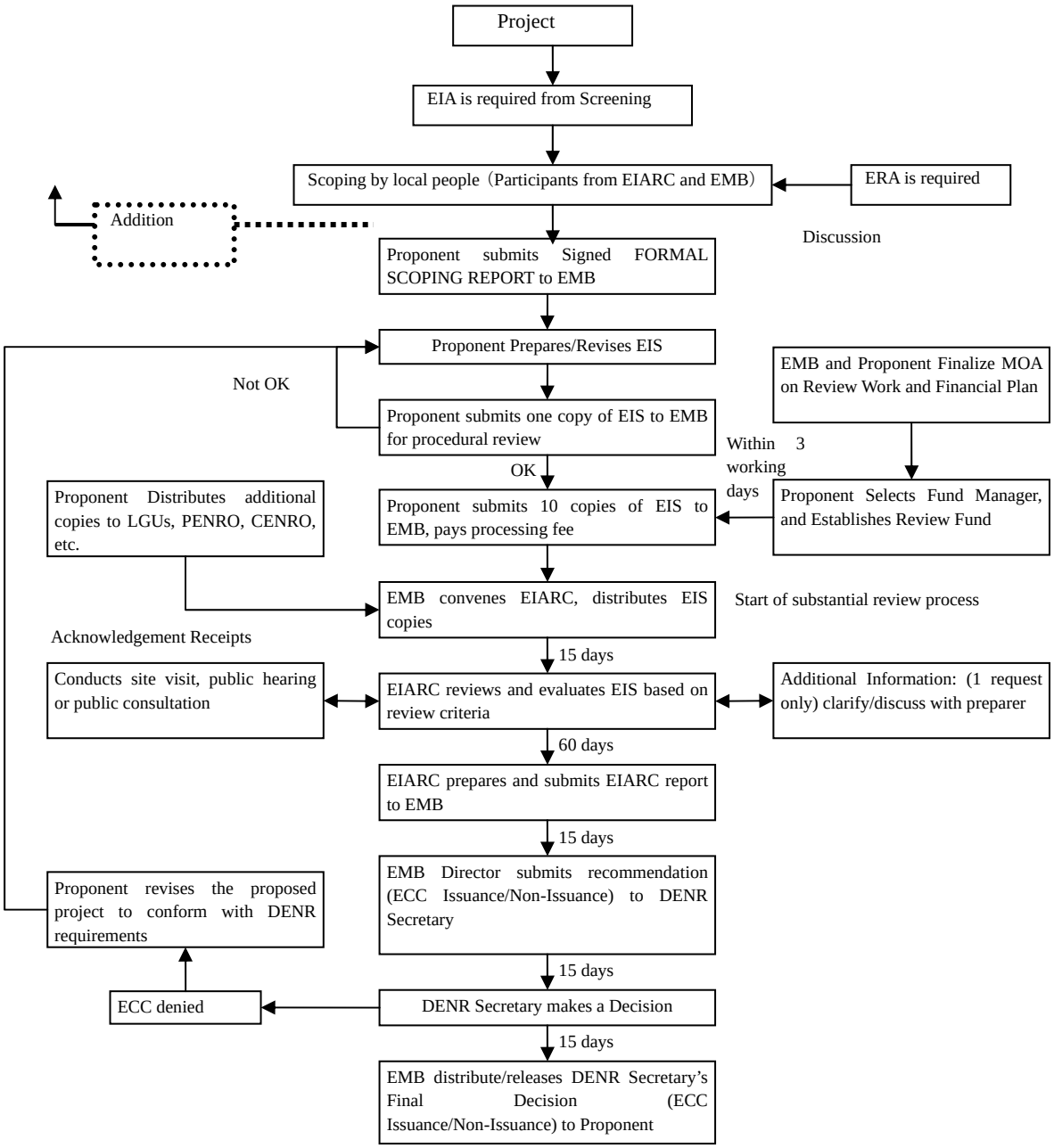


Figure 6.2.1 Flowchart of EIA Procedures

(2) System of Approval and License

Under the Philippine EIA system, ECC shall be secured prior to commencement of the project/undertakings, if significant environmental impacts are anticipated. The ECC is issued by the EMB after the EIARC's review of the submitted EIS.

In the Philippines, a new category classification is adopted by the revised system in 2003. This classification is almost similar to that adopted by the World Bank and Asian Development Bank (ADB). According to the classification, a project is classified as category A, B, C, or D on the basis of the degree of impacts of the project, and the procedures corresponding to the category are applied. Projects classified as category A or B are required to obtain ECCs. Projects classified as category C are required to submit the outline of the project. Projects in category D are required to obtain the CNC.

The important factors that will classify the project under category A or B are the ECPs (Environmental Critical Projects) indicating that large impacts are expected and the ECAs （Environmental Critical Areas） which define the area likely to be affected. The category is decided based on the consolidated information. Table 6.2.1 shows the category classification of a project and/or undertakings in the EIA system.

Table 6.2.1 Categories of Projects/Undertakings under the EIS System

Category	Reason
Category A	ECPs with significant potential to cause negative environmental impact
Category B	Projects that are not categorized as ECPs, but which may cause negative environmental impacts because they are located in ECAs.
Category C	Projects intended to directly enhance environmental quality or address existing environmental problems not falling under Category A or B.
Category D	Projects unlikely to cause adverse environmental impacts.

Source: Art. II, Sec. 4.3, DENR Administrative Order No. 2003-30

The road and/or bridge project is included in the subject project of the ECPs. Table 6.2.2 shows requirements of the factors.

The requirements include, depending on the scale of the subject project, the EIS in the capital region, EIS in the rural area, and IEE investigation and checklist. Table 6.2.2 also shows that the EIS shall be submitted to the EMB capital region office or the EMB local office. ECC will only be acquired after the examination of the EIS. IEE investigation checklists are submitted to the EMB office in charge so as to obtain the ECC. In case the remark "Nothing" is indicated, project description is submitted to the EMB office in charge to obtain a CNC.

Table 6.2.2 ECPs Screening Criteria and Requirements

Specifications	Requirement
3. Roads and Bridges	
3.1 Bridges and Viaduct	
a. New Construction	
a.1 =< 50.00 meters	Not covered
a.2 > 50.00 meters, =< 80.00 meters	IEE checklist
a.3 > 80.00 meters, =< 150.00 meters	IEE study
a.4 > 150.00 meters, < 500.00 meters	EIS (region)
a.5 500.00 meters and above	EIS (central)
b. Rehabilitation/ Improvement	
b.1 Width increase of =< 50%, acquisition of right of way	Not covered
b.2 Width increase of > 50%, acquisition of right of way	IEE checklist
b.3 Width right of way acquisition	Not covered
3.2 Roads	
a. New Construction	
a.1 Outside critical slope, =< 10.00 km.	IEE checklist
a.2 Outside critical slope, > 10.00 km., =< 15.00 km.	IEE study
a.3 Outside critical slope, > 15.00 km., =< 20.00 km.	EIS (region)
a.4 Outside critical slope, > 20.00 km.	EIS (central)
a.5 Within critical slope, =< 3.00 km.	IEE checklist
a.6 Within critical slope, > 3.00 km., =< 5.00 km.	IEE study
a.7 Within critical slope, > 5.00 km., =< 10.00 km.	EIS (region)
a.8 Within critical slope, > 10.00 km.	EIS (central)
b. Rehabilitation and Improvement	
b.1 Without right of way acquisition	Not covered
b.2 =< 50% of right of way acquisition	Not covered
b.3 > 50% of right of way acquisition	IEE checklist
c. Elevated Roads	
c.1 Fly-over	IEE checklist
c.2 Cloverleaf and other interchanges	IEE study
d. Tunnels and sub-grade reads	
d.1 =<200 meters	IEE study
d.2 >200 meters	EIS (central)
e. Pedestrian passages	
e.1 Overpass	Not covered
e.2 Underpass	IEE checklist

Note: -If the road has a bridge component, the total length of the road and the bridge will be considered
Critical slope - is equal to 50% slope or 26.57^{o} angle
Source: Social and Environmental Management Systems (SEMS) Operations Manual, DPWH, April 2003

Detailed data on the ECAs are disclosed on the EMB's website (http://www.emb.gov.ph/index.html). However, the actual category classification is not automatically decided according to these standards, but flexibly determined in consideration of characteristics of the project and the area concerned.

The search range in the Philippine EIA system is determined by two factors, i.e., i) characteristics of the project and the degree of the negative impacts on environment, and ii) possibility of large effects or vulnerability of the environmental resources in the project area.

The specific standards for category classification of projects/undertakings covered by the EIA

system (DENR AO No. 2003-30 Article II, subchapter 4.3) are as follows:

a. Characteristics of the project or undertaking
   - Size of the project
   - Cumulative nature of impacts vis-à-vis other projects
   - Use of natural resources
   - Generation of waste and environment-related nuisance
   - Environment-related hazards and risk of accidents

b. Location of the Project
   - Vulnerability of the project area to disturbances due to its ecological importance, endangered or protected status
   - Conformity of the proposed project to existing land use, based on approved zoning or on national laws and regulations
   - Relative abundance, quality and regenerative capacity of natural resources in the area, including the impact absorptive capacity of the environment

c. Nature of the potential impact
   - Geographic extent of the impact and size of affected population
   - Magnitude and complexity of the impact
   - Likelihood, duration, frequency, and reversibility of the impact

6.2.2 ACQUISITION AND VALIDITY OF ENVIRONMENTAL LICENSE

Table 6.2.3 shows the acquisition status of project license. Four projects belong to UI component while another four to LTPBM. The four UI projects are the subject matter of the EIA Study. Said study has already been implemented and ECC has been issued for these projects. The remaining four LTPBM projects were not included in the EIA since its works are limited to rehabilitation and maintenance of the existing roads. Hence, CNC for this has been issued.

Table 6.2.3 Acquisition and Validity of Project Environmental License

No. / Project Name	Classification / (Project No)	Document reviewed by EMB	ECC/ CNC	Issuer	Project Owner	Validity
1. MNR, Aringay-La Union-Laoag City	LTPBM (PBM-1)	Project Description	CNC 5th Sept. 2007	EMB, DENR Region I	DPWH	N/A
2. Jct. PPH – Bongabon - Pantabangan - Baler Rd-Aurora –N.E.	**UI** (UI-1) (Note: Jct.PPH – Rizal section was changed to PM)	EIS	ECC 16th Sept. 2002	EMB, DENR	DPWH, Nueva Ecija, Nueva Vizcaya and Aurora	Requested for progress on procedures of "Application for re-issuance"
3.CVR, Sta.Rita (Bulacan)-Nueva Ecja	LTPBM (PBM-2)	Project Description	CNC 24th July. 2008	EMB, DENR	DPWH	N/A
4. Lipa-Alaminos Road	**UI** (UI-2)	IEE Study	ECC 28th January 2008	EMB, DENR, Calabarzon Region IV	DPWH	Valid
5. Sipocot-Baao	LTPBM (PBM-3)	Project Description	CNC 15th Feb. 2008	EMB, DENR, Region V	DPWH	N/A
6. Catanduanes Circumferential Road	**UI** (UI-4)	EIS	ECC 15th Oct. 1995	EMPES, DENR,	PMO-Dept . of	Valid**

No. / Project Name	Classification / (Project No)	Document reviewed by EMB	ECC/ CNC	Issuer	Project Owner	Validity
				Region V	DPWH, Catanduanes	
7. Mindoro West Coast Road	**UI** (UI-3)	EIS	ECC 27th Sept. 2001	DENR, Region IV	DPWH	Valid**
8. Surigao(Lipata) -Davao City*	LTPBM (PBM-4)	Project Description	CNC 21st Feb. 2008	EMB, DENR, Caraga Regional Office	DPWH	N/A

Notes:* LTPBM; Surigao (Lipata) - Agusan D.N. (124 km), Preventive Maintenance; Carmen – Davao City (48 km)
**; Once a project is implemented, the ECC remains valid and active for the lifetime of the project. However, the ECC automatically expires if a project has not been implemented within five (5) years from ECC issuance.（DAO No.03-30)

ECC remains valid during the duration of the project, according to DAO No. 30 issued in 2003. However, the ECC automatically expires if the project has not been implemented within five years from its issuance. The Environmental and Social Services Office (ESSO) of DPWH has confirmed that ECCs for all UI projects remain valid since partial implementation has been executed, except UI-1 Bongabon-Baler Road Project with conditions.

As to UI-1, DPWH requested an extension of validity in November 2008. However, in January 2009, DENR requested DPWH to 1) update the EIS, and 2) prepare and 3) submit monitoring reports. As of August 2009, DPWH has not taken any action. Environmental and Social Services Office (ESSO) under supervision of DPWH scheduled these activities to complete as soon as possible.

Collateral conditions are attached to the ECC and CNC (Table 6.2.4). In the ECC, suspension/revocation of the license, and/or payment of a fine Php 50,000 or less are stipulated in case of violation of the collateral conditions (PD No. 1586, subchapter 9).

For projects under Category A, a Multi-partite Monitoring Team (MMT) shall be formed immediately after the issuance of ECC. Proponents required to establish an MMT shall put up an Environmental Monitoring Fund (EMF) not later than the initial construction phase of the project.

Table 6.2.4 Contents of the ECCs

Project No. / Name	Issued date	Issued by	Issued to
UI-1. Bongabon-Baler Road Improvement	16th Sept. 2002	EMB ,DENR	DPWH, Nueva Ecija, Nueva Vizcaya and Aurora
(Environmentally collateral conditions) - Adequate and acceptable compensation/relocation package including that for the indigenous people (if portion of their land will be used) shall be finalized prior to construction. - Tree cutting shall be reduced to the barest minimum to prevent undue destruction to vegetation. At least one hundred (100) saplings of appropriate tree species at an optimum height (for sustainability) shall be planted or donated per tree for reforestation of all areas damaged due to project activities. - All mitigating measures and monitoring requirements, especially those contained in the EIS, particularly in the Environmental Management and Monitoring Plans, including all its modifications and additional information as approved by the EMB, must be instituted throughout the project implementation. - The proponent shall set up a Multiple Monitoring Team (MMT) and a relenishable Environmental Monitoring Fund (EMF).			
UI-2. Rehabilitation/Improvement of Lipa City- Alaminos/ San Pablo City Road	28th January 2008	EMB, DENR, Calabarzon Region IV	DPWH
(Environmentally collateral conditions) - The proponent shall strictly implement the mitigating, enhancement, and rehabilitation measures. - Administrative conditions for the grant of this Certificate shall be strictly complied.			
UI-4. Improvement and rehabilitation of Catanduanes Circumferential Road	15th Oct. in 1995	EMPES,DENR, Region V	PMO-Dept. of DPWH, Catanduanes
(Environmentally collateral conditions) - That appropriate mitigating measures shall be adopted to minimize dust emissions that may cause nuisance during site development works. - That no cutting of trees and removal of vegetation in the project area and its immediate environment shall be undertaken unless appropriate permit/license is secured from concerned government agencies. - That all solid waste materials excavated or generated during the development phase shall be disposed properly in such a manner that public nuisance is avoided.			
7. Mindoro West Coast Road	17th of September in 2001	DENR, Region IV	DPWH
(Environmentally collateral conditions) - That the operation shall not cause generation of fugitive dust and noise pollution that would result to exceedance of ambient air and noise standard set forth under DENR Administrative Order No.14 (Revised Air Quality Standards of 1992) and P.D. 984 (Pollution Control Law). - That the Proponent (DPWH) in coordination with DENR shall initiate the establishment and/or setting up of an Environmental Monitoring Fund and formalize the creation of the MMT to be composed of representatives from DPWH, LGU's, local community, NGO's, EMB and DENR-Region 4 within 15 days after the approval of the monitoring mechanisms. - That the landowner who will be affected by the Road Right of Way requirements of the project shall be properly compensated and provided with relocation sites if necessary in accordance with R.A. 8974 Road Right of Way Acquisition. - That a monitoring mechanism shall be prepared by DPWH for the use of the Multi-partite Monitoring Team and to be submitted within thirty (30) days upon the issuance of Notice To Proceed to the contractor. - That the proponent shall properly rehabilitate all areas including open spaces along the road project by planting trees adoptable in the area for environmental protection and promote aesthetics.			

Source: ECCs issued by DENR-EMB

For UI-1, DENR issued ECC on 16 Sept. 2002. According to collateral condition Section 9 of the ECC, the ECC shall be considered automatically revoked if the project has not commenced within a period of three years from the issuance thereof, or suspension/stopped of operation extends to three years such that significant changes in land and resource uses have occurred in the project area or its vicinities.

Out of 100 km section, approximately 80 km of new pavement and two bridges were completed. DPWH intends to request DENR-ENB for extension of validity of the ECC for the project.

For UI-2, DENR issued ECC on 28 January 2008. Hence, the ECC is still valid.

For UI-4, DENR issued ECC on 15th Oct. in 1995. As related projects are still on-going at the area, the ECC remains valid.

For UI-3, DENR issued ECC on 17 September 2001. Although validity period of ECC is limited to five years, the ECC is still considered valid as the proponent DPWH, already started construction works for the project.

6.2.3 CONFORMITY WITH JICA ENVIRONMENTAL GUIDELINES

Since JICA and JBIC guidelines are in a transition period at present, both can be used for confirmation of environmental and social considerations for the project. This involves preparation of the scoping matrix based on a project description and the environmental baseline survey, formulation of an environmental management plan, and filling up of an environmental check list. The results indicate that the environmental and social considerations for the project undertaken based on the Philippines EIA system, conformed closely to the JICA (and JBIC) guidelines.

(1) Secure of Transparency and Accountability

The social acceptability of a project is a result of meaningful public participation, which shall be assessed as part of the ECC application, based on concerns related to the project's environmental impacts（DAO 2003-30）. EIA for the project was conducted based on DAO 2003-30 (or the previous DENR Order), with the public participating during the meeting, as required by the order.

(2) Considerations to Socially Vulnerable Groups

The EIA for the project includes considerations to socially vulnerable groups in terms of gender, children, elders, the poor, ethnic minority and indigenous people. The EIA process for Project No.7 (Mindoro West Coast Road) includes the following;

- The ethnic minority who resides in the interior of the island was also considered as among the stakeholders.
- The road project is far from major upland indigenous people communities therefore, has minimal effects to their present lifestyle.

(3) Monitoring Plan

The ECCs for the projects of UI-4, UI-3, UI-1 and UI-2 were issued 14, 8, 7 and 2 years ago, respectively. As these monitoring plans were made according to DAO 2003-30, they are still satisfactory in general. However, reimplementation of EIA might be required during the detailed design stage, as it has already been around 10 years since the commencement of works, particularly for UI-3 and UI-4 projects. New EIA is required if there have been significant changes in current land use, though such change was not identified by the Survey Team during its site reconnaissance survey.

(4) HIV/AIDS

The HIV/AIDS problems specified in JICA/JBIC guidelines are not taken up in the Philippines

EIA system. A lot of workers[1] other than local residents will flow in from the outside especially during construction period. As infectious diseases such as HIV/AIDS might occur, a concrete plan should be prepared with due considerations to public health.

6.3 LAND ACQUISITION AND RESETTLEMENT

6.3.1 LAND ACQUISITION AND RESETTLEMENT POLICY IN THE PHILIPPINES

The first Land Acquisition, Resettlement and Rehabilitation (LARR) Policy was formulated in 1999 specifically for the National Road Improvement and Management Program (NRIMP) Phase 1, a World Bank assisted project. Thereafter, said policy was adopted, with some modifications in pursuance to prevailing laws and policies, to projects supported by other financing institutions such as the Asian Development Bank (ADB), JBIC.

A second edition of the LARR Policy was formulated in 2004 for the Sixth Road Project. To some extent, the ADB LARR Policy was applied to JBIC funded projects.

To ensure uniformity of standards in resettlement planning, a revised LARR Policy, 3rd edition, was formulated. This now contains the DPWH's indigenous peoples policy, based on the Indigenous Peoples' Right Act (IPRA) and National Commission on Indigenous Peoples (NCIP) Administrative Order No. 1, series of 2006, or the Free and Prior Informed Consent Guidelines of 2006.

This latest edition, now called the Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy (LARRIPP) shall provide guidance to those preparing resettlement action plans (RAP) and safeguard instrument for indigenous peoples, affected by infrastructure projects of the DPWH, whether foreign or locally funded.

This policy includes the principles and objectives of the involuntary resettlement policy, the legal framework, eligibility, compensation and entitlements, the indigenous peoples' policy framework, implementation procedures that ensure complaints are processed, public support and participation, and the provision of internal and external monitoring of the implementation of the RAP and safeguard instrument for IPs.

(1) Land Acquisition and Expropriation

1) Basic National Policy

The related provisions based on basic national policy are as follows:

a. Article III, Section 9: "Private property shall not be taken for public use without just compensation"

b. Article XII, Section 5 "The State shall protect the rights of indigenous cultural communities to their ancestral lands to ensure their economic, social, and cultural well-being "By act of Congress, customary laws governing property rights or relations can be applied in determining the ownership and extent of ancestral domains.

2) RA 8974

a. An act to facilitate the acquisition of right –of-way (ROW), site or location for national government infrastructure projects was assigned and took effect in November

[1] 50 % hiring of unskilled labor & 30 % of skilled labor from the local residents (RA 6685 and DPWH Department Order 51 series of 1990).

2000.

- Implementing rules and regulations of Republic Act (RA) 8974 provides the different bases for land valuation for the modes of acquisition, namely, negotiated sale and expropriation.
- The Implementing rules and regulations of this law state that the implementing agency shall negotiate with the owner for the purchase of the property by offering first the current zonal value issued by the Bureau of Internal Revenue for the area where the private property is located.
- The law also states that valuation of the improvements and/or structures on the land to be acquired shall be based on the replacement cost which is defined as the amount necessary to replace the structure or improvement based on the current market prices for materials, equipment, labor, contractor's profit and overhead. This also includes all other costs associated with the acquisition and installation in place of the affected improvements/installation.
- Methods of Negotiation. Under the law, there are different modes of acquiring title and ownership of private properties particularly real estate. It also implies the modes of acquiring right to use private property for another purpose. RA 8974 specifies the following methods: donation, quit claim, exchange or barter, negotiated sale or purchase, expropriation and any other modes of acquisition authorized by law.
- Zonal value as the first offer. In case the mode of acquisition is through a negotiated sale, the first offer shall be the zonal value of the particular land where the property is located, issued by the Bureau of Internal Revenue. In case the owner rejects the first offer, DPWH shall renegotiate using the values recommended by the appraisal committee or independent land appraiser as a guide for negotiation.
- Standards to determine market value. Negotiated sale between DPWH and the PAF shall be based on the following standards to determine the market value:

b. The classification and use for which the property is suited;

c. The development costs for improving the land;

d. The value declared by the owners;

e. The current selling price of similar lands in the vicinity;

f. The reasonable disturbance compensation for the removal and/or demolition of certain improvements on the land and for the value for improvements thereon;

g. The size, shape and location, tax declaration and zonal valuation of the land;

h. The price of the land as manifested in the ocular findings, oral as well as documentary evidence presented; and

i. Such facts and events as to enable the affected property owners to have sufficient funds to acquire similarly situated lands of approximate areas as those required from them by the government, and thereby rehabilitate themselves as early as possible.

- Quit Claim. A quit claim instrument is required to be executed by owners of lands acquired under the public land act because of the reservation made in the issuance of patents or titles thereto. If the government should exercise its right to use the area reserved for public use, the owner shall be required to execute a quit claim. This mode can be availed not only in cases where the lot acquired under the public land act still covered by free patents, but even after the issuance of certificate of title or transfer certificates. This is considering that a series of transactions has taken place involving transfer of ownership from one person to another. No payment shall be made for land acquired under the quit claim mode except for damages to

improvements, and, if eligible, assistance with income restoration.

- PAPs/PAFs may qualify for compensation even if they have arrears on land tax. To facilitate the processing of payment on land acquired from the PAPs with tax arrears the DPWH will pay the arrears and deduct the amount to the total compensation cost.
- In case the PAPs/PAFs are qualified but are already dead and their heirs have not undergone extra-judicial partition, the PAPs/PAFs will be given a grace period to meet the requirement within the allotted validity period of two years. Beyond this period, PAPs have to settle the case in court.
- In case of expropriation.

j. For Structures: In the event that the PAF rejects the compensation for structures at replacement cost offered by DPWH, the latter or the PAF may take the matter to court. When court cases are resorted to either by DPWH through expropriation or by the PAFs through legal complaints, the DPWH will deposit with the court in escrow the whole amount of the replacement cost (100%) it is offering the owner for compensation of assets, to allow the works to proceed. The PAF will receive the replacement cost of the assets within one month following the receipt of the decision of the court.

k. For Land: If the owner contests the DPWH's second offered value for compensation, the PAF or the DPWH may take the matter to court. DPWH's offer shall include paying the owner: a) 100% of the value of the property based on the BIR zonal valuation, and b) the value of improvements and structures. However, if the owner rejects the full payment, the DPWH will deposit 100% of the BIR zonal value in an escrow account. The court shall determine the just compensation within sixty 60 days, taking into account the standards for the assessment of the value of the land (Sec. 5, RA 8974).

The settlement of claims for compensation for lost assets of PAFs is summarized in the entitlement matrix. The determination of compensation and entitlements is based on the legal framework and principles of the LARR policy.

(2) Involuntary Resettlement

1) Basic Principles of Resettlement Policy

a. Involuntary resettlement should be avoided where feasible.

b. Where population displacement is unavoidable, it should be minimized by exploring all viable project options.

c. People unavoidably displaced should be compensated and assisted, so that their economic and social future would be generally as favorable as it would have been in the absence of the project.

d. People affected should be fully informed and consulted on resettlement and compensation options.

e. Involuntary resettlement should be conceived and executed as part of the project

2) Operational Policies for Resettlement

a. The absence of a formal legal title to land by some affected groups should not be a bar to compensation, especially if the title can be perfected. Particular attention should be paid to households headed by women and other vulnerable groups, such as indigenous

peoples and ethnic minorities, and appropriate assistance to help them improve their living.

b. In case of severe impacts on agricultural land use, rehabilitation measures shall be given to PAFs actively cultivating affected plots, this shall be in the form of a combination of training, money to be invested to improve productivity, agricultural extension and income restoration allowances.

c. If possible, income restoration entitlements may also be given to informal settlers affected by non-severe loss of agricultural land, although the rehabilitation may have lesser effect than for severely affected PAFs.

d. Existing social and cultural institutions of re-settlers and their hosts should be supported and used to the greatest extent possible and they should be integrated economically and socially into the host communities.

e. The full costs of resettlement and compensation should be included in the presentation of project costs and benefits

f. The costs of resettlement are not eligible for Yen-loan, it must be provided by the GOP. Costs that are covered by the GOJ include all cost associated with land acquisition, land improvement, construction of new housing and community infrastructure, and income generating measures.

3) Resettlement Action Plan

The RAP refers to the planning document that describes what will be done to address the direct social and economic impacts associated with involuntary taking of land or its acquisition. The Abbreviated Resettlement Action Plan (ARAP) is acceptable if fewer than 200 people are affected. It is also acceptable if more than 200 people are affected so long as all land acquisition is minor (10 percent or less of all holdings is taken) and no physical relocation is required.

RAP includes the following information;

a. Number and names of barangays to be traversed /affected

b. Types of land use (agricultural, residential, commercial, etc.)

c. Number and type (concrete, wood, light materials) of Structures to be affected

d. Type of plantations (mango, coconut, banana, etc.), if any

e. Compensation and Entitlements (actual payments for land and improvements such as structures, crops and trees, and other entitlements.

f. Implementation schedule and budget (actual)

4) Infrastructure Right-of-Way (IROW) Procedural Manual, DPWH, April 2003

This IROW procedural manual was developed to guide various offices of the DPWH in the proper implementation of the improved IROW process. The preparation of this manual is in line with Department Order No. 5, Series of 2003, which aims to “implement a streamlined IROW process designed to identify, acquire, and manage ROW efficiently and in a timely manner for the implementation of infrastructure projects.” This manual is for the use of all offices involved in IROW acquisition within DPWH jurisdiction. Table 6.3.1 shows contents of the IROW procedural manual.

Table 6.3.1 Contents of IROW Procedural Manual

1. INTRODUCTION
1.1 Purpose of the Manual
1.2 The Improved DPWH IROW Process
2. PROCEDURES FOR THE IROW PROCESS
2.1 Project Identification, Feasibility Study, and Preparation of IROW Action Plan
2.2 Environmental Impact Assessment
2.3 Update IROW Action Plan Based on Result of Detailed Design
2.4 Conduct of Parcellary Survey
2.5 Relocation of Public Utilities
2.6 Preparation of the Land Acquisition Plan and Resettlement Action Plan (LAPRAP)
2.7 Turnover of IROW Through Donation
2.8 IROW Acquisition Through Purchase
2.9 Preparation of Deed of Absolute Sale
2.10 Transfer of Title/Tax Declaration
2.11 Acquisition Procedures for Mortgaged Properties
2.12 Expropriation Proceedings
2.13 Turnover of IROW Through Deed of Exchange
2.14 Clearing of Structures Along the IROW
2.15 Clearing of Other Improvements Along the IROW
2.16 Clearing of Perennial Trees Along the IROW
2.17 Preparation of the IROW Completion Report
2.18 Processing of Title Documents
2.19 Management of IROW
3. PROCEDURES FOR SPECIAL CASES
3.1 IROW Acquisition by Execution of Quit Claim
3.2 IROW Acquisition by Easement of Right-of-Way
3.3 Turnover of IROW by Conversion
3.4 IROW Acquisition of Untitled Lands
3.5 IROW Acquisition of Lands Wherein Owner is Deceased
3.6 IROW Acquisition of Lands Wherein Landowner is a Corporation
3.7 IROW Acquisition of Lands Wherein Property is Under Guardianship or Administratorship
3.8 IROW Acquisition of Lands Wherein the Vendor is represented by an Attorney-in-Fact
3.9 IROW Acquisition of Lands When There are No Claimants

Source: Infrastructure Right-of-Way (IROW) Procedural Manual, DPWH, April 2003

6.3.2 RESETTLEMENT FOR PROJECTS

Affected house survey was conducted for the town areas in UI-2, UI-3 and UI-4 projects by alternative ROW width. The basic assumption is same for counting the number of affected houses that are the sum of "physically relocated house" plus "houses expected to be set back".

(1) UI-2 Lipa-Alaminos Road

Since the road section from Lipa City to Malarayat golf course, 2.5 km in length, is located in an urban area, resettlement is expected. Based on the distance between centerline of the road to the walls of the existing houses, number of residents to be affected is listed for four alternatives in Table 6.3.2.

Table 6.3.2 Affected Residential Houses (Building)

Alternatives	ROW	LIPA City- MALARAYAT Golf Course	Remarks
1	14.1m	8	
2	12.0m	3	Adopted standards in highway planning (Sec.4.3.3)
3	10.1m	0	
4	9.1m	0	

Source: JICA Survey Team

Distribution of houses and other buildings (store, school, warehouse, etc.) are shown in Figure 6.3.1. Horizontal axis represents the plot number, and the vertical axis represents the distance (m) from the road center.

The situation of a street is shown in Photo 6.3.1. Structures of buildings that consist of timber, concrete, galvanized roof, etc., belong to middle-class categories in the Philippines.

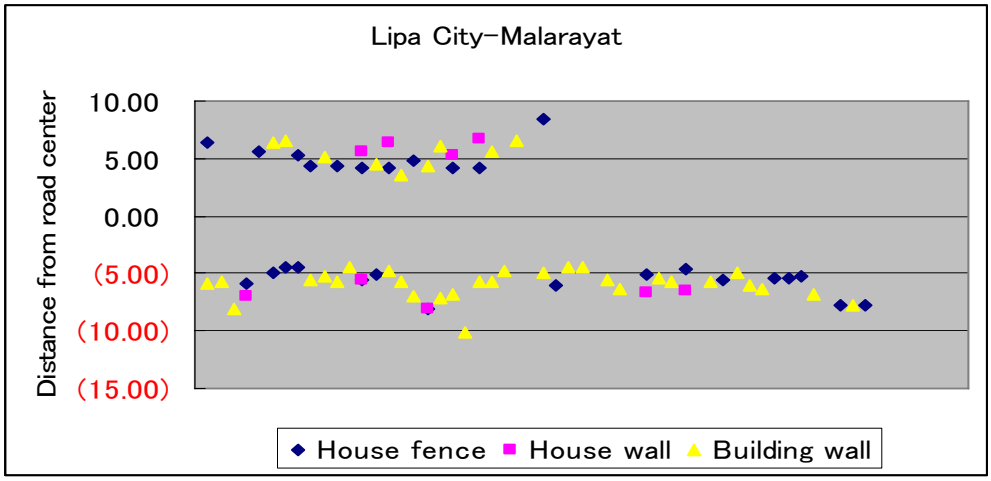


Figure 6.3.1 Distribution of Houses and Buildings

(2) UI-4 Catanduanes Circumferential Road

Affected house survey was conducted. Since the major cities like Viga and Pandan are located in an urban area, resettlement is expected. Based on the distance between the centerline of the road and the wall of the existing house shown on the alignment drawings, number of houses to be affected is listed for four alternatives in Table 6.3.3.

Table 6.3.3 Affected Residential Houses (Building)

(Packages II and III)

Alternatives	ROW	Viga	Panganiban	Bagamanoc	Pandan	Total
1	14.1m	1	12	5	20	38
2	12.0m*	1	3	4	8	16
3	10.1m	1	1	1	2	5
4	9.1m	1	1	0	2	4

Note: Adopted standard width in highway planning (Sec.4.3.3)
Source: JICA Survey Team

Distribution of houses measured from road drawings are shown in Figure 6.3.3. The horizontal axis represents the plot number, while the vertical axis represents the distance (m) from the road center.

The situation of a street is shown in Photo 6.3.2. Structures of buildings consisting timber, concrete, galvanized roof, etc., belong to middle-class categories in the Philippines.

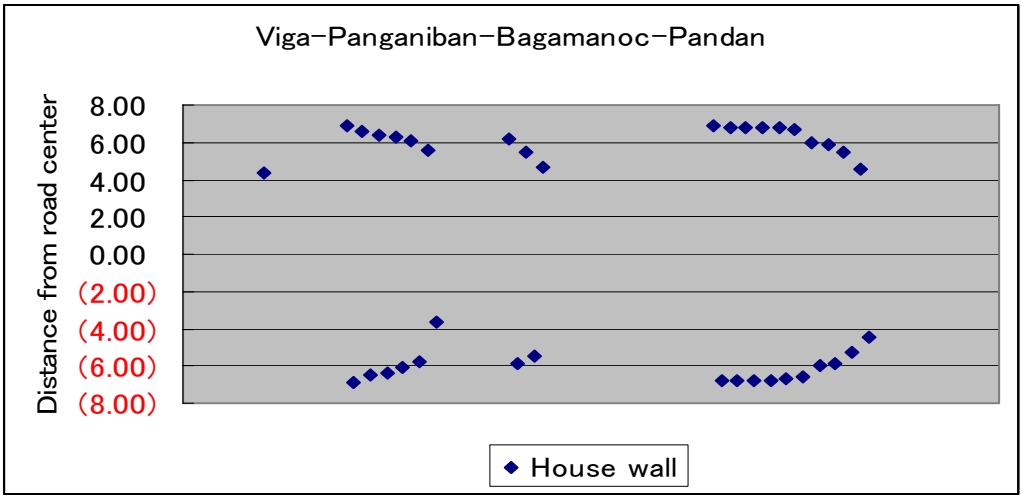


Figure 6.3.2 Distribution of houses

(3) UI-3 Mindoro West Coast Road

Affected house survey was conducted. Since two cities, Sablayan and Calintaan are located in an urban area, resettlement is expected. Based on the distance between centerline of the road and the wall of the existing houses, number of affected residents is listed for four alternatives in Table 6.3.4.

Table 6.3.4 Affected Residential Houses (Building)

Alternatives	ROW	Sablayan Town	Calintaan Town	Total
1	14.1m	22	19	41
2	12.0m*	6	7	13
3	10.1m	1	3	4
4	9.1m	0	0	0

Note: * Adopted standard width in highway planning (Sec.4.3.3)
Source: JICA Survey Team

Distribution of houses and other buildings (store, school, warehouse, etc.) are shown in Figure 6.3.3. Horizontal axis represents the plot number, and the vertical axis represents the distance (m) from a road center.

The condition of the street is shown in Photo 6.3.1. Structures of buildings made of timber, concrete, galvanized roof, etc., belong to middle-class categories in the Philippines.

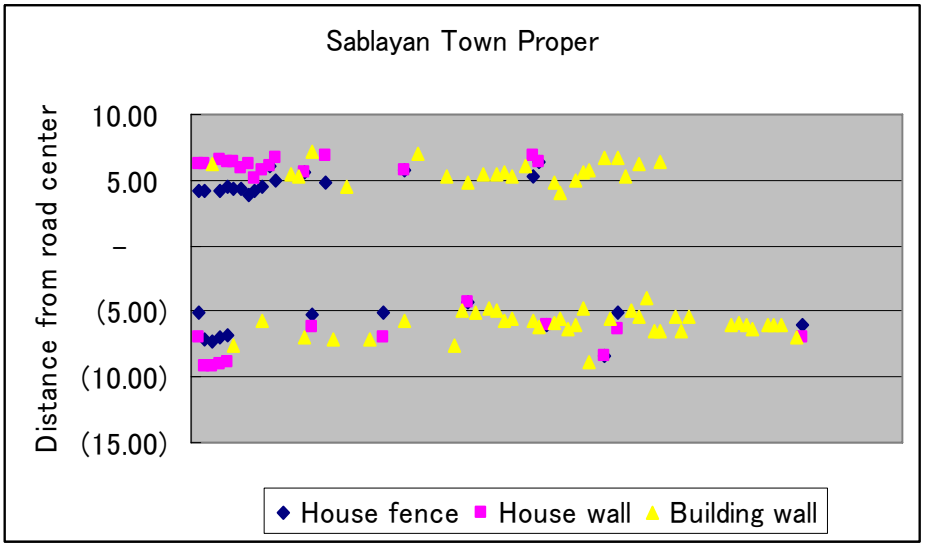


Figure 6.3.3 Distribution of Houses (1)

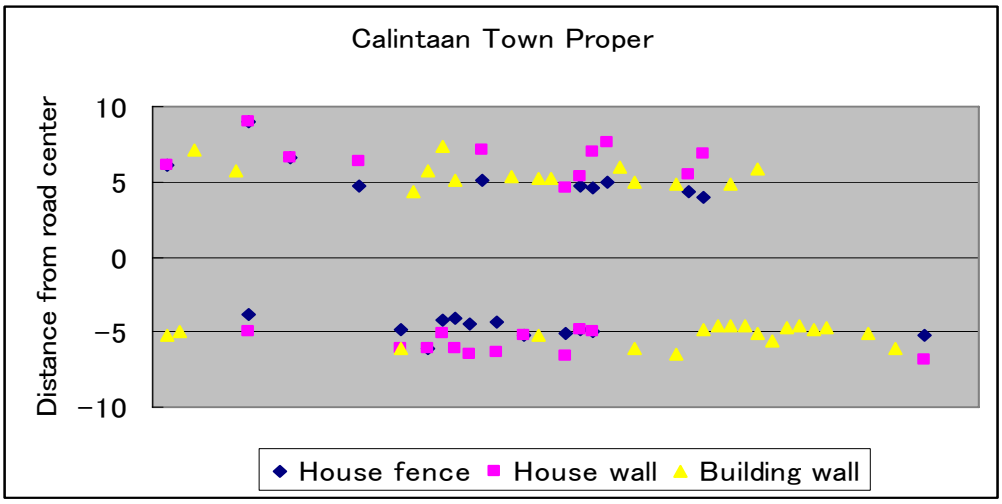


Figure 6.3.3 Distribution of Houses (2)


UI-2: Lipa City to Golf Course Road


Ui-4: Catanduanes Circumferential Road


UI-3: Mindoro West Coast Road

Photo 6.3.1

6.3.3 AVOIDANCE AND MITIGATION MEASURES FOR PAPS

The number of houses required to be resettled are as summarized in Table 6.3.5.

Table 6.3.5 Affected Residential Houses (Building)

ROW	Mindoro West Coast Road		Catanduanes Circumferential Road				Rizal-M. Aurora Road	Lipa-Malarayat Golf Course
	Sabalayan Town Proper	Calintaan Town Proper	Viga	Panganiban	Bagamanoc	Pandan		
14.1m	22	19	1	12	5	20	0	8
12.0m*	6	7	1	3	4	8	0	3
10.1m	1	3	1	1	1	2	0	0
9.1m	0	0	1	1	0	2	0	0

Notes; Among UI bridges for reconstruction, widening and construction no squatters near the bridges are found as the result of field survey.
* Adopted standard with by highway planning (Sec.4.3.3)
Source: JICA Survey Team

The number of buildings excluding residential houses is summarized in Table 6.3.6.

Table 6.3.6 Affected Buildings except Residential Houses

ROW	Lipa- Malarayat Golf Course	Mindoro West Coast Road	
		Sabalayan Town Proper	Calintaan Town Proper
14.1m	34	53	31
12.0m*	24	34	28
10.1m	10	12	15
9.1m	6	4	2

Note: * Adopted standard with by highway planning (Sec.4.3.3)
Source: JICA Survey Team

For the calculation of the land acquisition costs, the necessary acquisition widths are estimated in the Survey as shown in Table 6.3.7.

Table 6.3.7 Necessary Acquisition Widths

	Town Area	Flat Area	Rolling Area	Mountainous Area
Width at both sides	4.0 m	8.0 m	12.0 m	15.0 m

The following mitigation measures are required for these PAFs:

- DPWH should comply with LARRIPP (Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy)
- A compulsive resettlement should be avoided as much as possible. When unavoidable, resettlement should be minimized after examining all the project alternatives. Sufficient compensation and support to PAFs should be provided. Choice of resettlement and compensation should be given based on sufficient information service presented to PAFs, etc.

It was confirmed by the site survey that there are no squatters near the UI bridges subjected for reconstruction and widening.

The detailed design should include defining ROW acquisition limits by Parcellary survey,

identifying land ownership for PAFs, public consultations, socio economic and property survey for PAFs, etc.

6.4 CONCLUSIONS AND RECOMMENDATIONS ON THE ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

6.4.1 EIA PROCEDURES

UI-4 Catanduanes Circumferential Road and Mindoro West Coast Road projects have been passed 14 and 8 years since the issuance of their ECCs. Reimplementation of EIA would be required for these projects at the detailed design stage since substantial changes might be occurred in land use though no substantial changes were seen during the field reconnaissance survey.

It is noted that DENR-EMB has requested DPWH regarding UI-1 Bongabon – Baler Road Project 1) to update the environmental conditions, 2) to update environmental management/ monitoring plan, and 3) to submit a monitoring report. DPWH should response to these DENR-EMB requests without delay.

6.4.2 NATURAL ENVIRONMENTAL AND POLLUTION

Because the UI road projects except UI-3 Mindoro West Coast Road pass through mountainous terrains, there is a concern that sediment discharge may occur due to earth works. It is necessary to take the measures against sediment discharge and to prepare a monitoring plan. For all projects, since dust pollution during construction becomes a problem, it is necessary to take measures to control its emission.

For UI projects, since alignment change and widening are planned in part, deforestation is required. The quantity of deforestations is estimated as in Table 6.4.1.

Table 6.4.1 Estimation of Quantity of Deforestations

Unit: Number of trees to be cut

Project No.	Individual Removal of Trees (Small)	Individual Removal of Trees (Large)
UI-1. Bongabon - Pantabangan - Baler Road	300	34
UI-2. Lipa-Alaminos Road	140	7
UI-4. Catanduanes Circumferential Road	900	50
UI-3. Mindoro West Coast Road	1510	82
Total	2850	173

Note: The above estimation might be changed by the detailed design.

One of the ECC conditions for UI-1 Bongabon-Baler Road Project stated that “Tree cutting shall be reduced to the barest minimum to prevent undue destruction to vegetation. At least 100 saplings of appropriate tree species at an optimum height (for sustainability) shall be planted or donated per tree for reforestation of all areas damaged due to project activities”. One of the ECC conditions for UI-4 Catanduanes Circumferential Road Project stated that “no cutting of trees and removal of vegetation in the project area and its immediate environment shall be undertaken unless appropriate permit/license is secured from concerned government agencies.”

The project owner should secure a logging license from DENR, and should comply with DPWH D.O.#131,1995. As suggested in the environmental management plan, surveillance should be done twice per year after planting /afforestation.

6.4.3 SOCIAL ENVIRONMENT (RESETTLEMENT)

(1) Resettlement

At the detailed design stage, basic data should be collected for preparation of the Resettlement Action Plan (RAP). The data should include the following information:

a. Number and names of barangays and families to be traversed/ affected
b. Types of land use (agricultural, residential, commercial, etc.)
c. Number and type (concrete, wood, light materials) of structures to be affected
d. Type of plantations (mango, coconut, banana, etc.), if any
e. Compensation and entitlements (actual payments for land and improvements such as structures, crops and trees, and other entitlements)
f. Implementation schedule and budget.

The survey should comply with IROW Procedural Manual (DPWH, April 2003).

(2) Considerations to Socially Vulnerable Groups

The EIA for the project includes considerations to socially vulnerable groups in terms of gender, children, senior people, the poor, Ethnic minority and indigenous people. The EIA process for project No.7 includes the following;

- The ethnic minority who resides in the interior of the island was also considered as among the stakeholders.
- The road project is far from major upland indigenous people communities therefore, has minimum affect to their present lifestyle.

The RAP should be comply with LARRIPP

(3) HIV/AIDS

The HIV/AIDS problems described in JICA/JBIC guidelines are not taken up in the Philippines EIA system. In the present situation that a lot of workers other than local residents flow in from outside the province, especially during construction period, infectious diseases such as HIV/AIDS is more likely to develop. Therefore, a concrete plan should be established for considerations of public health.

6.4.4 ENVIRONMENTAL CHECKLIST

The environmental checklist for roads and railways provided in the JBIC Environmental guidelines was used to confirm environmental considerations for the UI project. Table 6.4.2 shows confirmation of environmental considerations for UI-3 Mindoro West Coast Road Project. Refer to Annex 7 as to other UI and LTPBM projects.

Table 6.4.2 Confirmation of Environmental Considerations

UI-3 Mindoro West Coast Road (71 km UI)

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	1) Have EIA reports been officially completed? 2) Have EIA reports been approved by authorities of the host country's government? 3 Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? 4) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	1) The EIA report was completed in January 2001. 2) The EIA reports had been approved by DENR and ECC was issued on September 17, 2001. 3) The conditions imposed on ECC will be implemented. 4) It is scheduled to obtain licenses for logging and quarrying from the local government agency.
	(2) Explanation to the Public	1) Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? 2) Are proper responses made to comments from the public and regulatory authorities?	1) The public consultation between stakeholders were held on November 29, 2000 and December 18, 2000, respectively. The consensus concerning construction was established between them. 2) Comments from the public and authorities will be properly responded.
2 Mitigation Measures	(1) Air Quality	1) Is there a possibility that air pollutants emitted from various sources, such as vehicle traffic will affect ambient air quality? Does ambient air quality comply with the country's ambient air quality standards? 2) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	1) The predicted environment concentrations of SO2 and PM10 emitted from a vehicle after construction meet environmental standards of the Philippines. 2) There is no industrial area where air pollutant is brought down near the route.
	(2) Water Quality	1) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? 2) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? 3) Do effluents from various facilities, such as stations and parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas that do not comply with the country's ambient water quality standards?	1) Due to potential declining quality of water in downstream water areas, monitoring of water quality in the areas, as well as greening of the exposed surface soil, will be conducted. 2) Monitoring of water quality of groundwater and drinking water will be conducted during construction. 3) Effluents from facilities such as drive-ins comply with the effluent standards of the Philippines.
	(3) Noise and Vibration	1) Do noise and vibrations from vehicle and train traffic comply with the country's standards?	1) After a review of noise and vibration levels of vehicles after construction, it is resulted that these levels comply with the environment standards of the Philippines.

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
3 Natural Environment	(1) Protected Areas	1) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	1) The project site is not located in the protected area designated by laws of the Philippines or international treaties. Without a plan of bridgework, there will be no effect on the mangrove protection area.
3 Natural Environment	(2) Ecosystem	1) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? 2) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? 3) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? 4) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? 5) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? 6) In cases where the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	1) No, it does not. 2) According to field investigations, no precious species are found on the project sites. 3) No significant impacts on ecosystem are anticipated at present. If there is concern about any impacts, measures will be taken, in accordance with the specialist's advice and instructions, so as to reduce the impacts on ecosystem. 4) No impacts as mentioned are anticipated at present. Measures will be taken when the traffic increases in the future. 5) No impacts as mentioned are anticipated because the project is related to repair or improvement of exiting roads. 6) The existing road passes through a developed area such as dry field or rice field, thus there will be no significant impacts on ecosystem.
	(3) Hydrology	1) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	1) There are no large alteration of topographic features and new construction of tunnels because the project is related to repair or improvement of exiting roads.
	(4) Topography and Geology	1) Is there a soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? 2) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? 3) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	1) The route is located on the flat. No route is found in a soft-ground area where slope failures or landslides may be caused. 2) Appropriate drainage structure and ditching will be constructed. Places where soils are cut or filled will be greened by plants that grow rapidly. 3) To prevent soil runoff from the sites, civil works during a rainy season will be stopped and trees will be planted. Places where there is little possibility of soil runoff will be chosen as a soil disposal site or soil pit.

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	1) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? 2) Is adequate explanation on relocation and compensation given to affected persons prior to resettlement? 3) Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? 4) Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? 5) Are agreements with the affected persons obtained prior to resettlement? 6) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? 7) Is a plan developed to monitor the impacts of resettlement?	1) Resettlement is caused because of land acquisition for road construction. The effects caused by resettlement should be minimized. 2) People affected should receive an appropriate explanation. 3) At the detailed design stage, investigation should be conducted and then resettlement should be planned. 4) Due diligence and proper attention should be given to the socially vulnerable. 5) An agreement should be obtained. 6) The organizational framework will be established. Measures for capacity and budget should be taken. 7) Monitoring program should be planned. As to resettlement, policies of RA8974 and LARR should be observed.
	(2) Living and Livelihood	1) Where roads or railways are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts? 2) Is there a possibility that the project will adversely affect the living conditions of inhabitants other than the affected inhabitants? Are adequate measures considered to reduce the impacts, if necessary? 3) Is there a possibility that diseases, including communicable diseases, such as HIV will be introduced due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? 4) Is there a possibility that the project will adversely affect road traffic in the surrounding areas (e.g., by causing increases in traffic congestion and traffic accidents)? 5) Is there a possibility that roads and railways will cause impede the movement of inhabitants? 6) Is there a possibility that structures	1) In the project, roads will be improved so that traffic conditions will become better. It is required that local people should account for 30% of skilled workers and 50% of unskilled labors, i.e., those who should be resettled have priority. 2) There is no bad influence. Measures to ease the impacts will be taken, if necessary. 3) Appropriate considerations will be given to public health. Health education and periodical health checkup will be provided to building contractors and construction workers. 4) Plans will be made on speed limitations in the urban areas, traffic signs, crosswalks, arrangement of barriers and traffic police in the densely-populated areas. 5) No impediments will be caused. 6) No structures causing a sun shading and radio interference will be

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
		associated with roads (such as bridges) will cause a sun shading and radio interference?	planned.
	(3) Heritage	1) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?	1) No important heritage and historical sites have been found in the project sites.
4 Social Environment	(4) Landscape	1) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	1) No landscape to be protected has been found in the project sites.
	(5) Ethnic Minorities and Indigenous Peoples	1) Where ethnic minorities and indigenous peoples are living in the rights-of-way, are considerations given to reduce the impacts on culture and lifestyle of ethnic minorities and indigenous peoples? 2) Does the project comply with the country's laws for rights of ethnic minorities and indigenous peoples?	1) Minorities are domiciled in the island's interior and indigenous people in coastal areas. They don't live on or near the routes, though measures will be taken in order to minimize effects against them. 2) Yes, the projects comply with the laws for their rights.
5 Others	(1) Impacts during Construction	1) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? 2) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? 3) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? 4) If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?	1) Measures to reduce impacts will be prepared such as adoption of the low-noise machines, halt of works on earthworks working during the rainy seasons, planting of trees in the exposed surface soil, prevention of discharging dust, and adequate waste disposal. 2) No bad influences on ecosystem will be considered at present. If there is any possibility of adverse affect, measures will be taken, in accordance with the specialist's advice and instructions, so as to reduce the impacts on ecosystem. 3) Construction plans to pay attention to people living in the vicinity will be made in order to minimize impacts on them. 4) Safety training about traffic safety and public health will be given to those who are involved in the projects.
	(2) Monitoring	1) Does the proponent develops and implement monitoring program for the environmental items that are considered to have potential impacts? 2) Are the items, methods and frequencies included in the monitoring program judged to be appropriate? 3) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? 4) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	1) Monitoring program will be planned and implemented. 2) The items, methods and frequencies of the monitoring program, which are defined by MMT, are considered appropriate. 3) MMT will establish it. 4) Reporting methods and frequencies from DPWH to DENR are defined.

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
6 Notes	Reference to Checklist for Other Sectors	1) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). 2) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	1) No deforestation in large areas will be implemented. 2) No power transmission and distribution lines will not be constructed and installed.
	Note on Using Environmental Checklist	1) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	1) No elements cannot be confirmed in connection with cross-boundary or global issues.
1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are made, if necessary. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan' experience).			
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.			

CHAPTER 7 IMPLEMENTATION PLAN

7.1 INSTITUTIONAL SETUP FOR PROGRAM IMPLEMENTATION

7.1.1 EXECUTING AGENCY

The Department of Public Works and Highways (DPWH) will be the executing agency responsible for the implementation of Road Enhancement and Asset Preservation Management Program (REAPMP or the Program).

7.1.2 PROJECT IMPLEMENTATION AND MANAGEMENT ORGANIZATION

(1) Program Steering Committee (PSC)

To achieve the goals and targets of REAPMP efficiently and effectively, the DPWH will initiate the implementation arrangements as shown in Figure 7.1.1, through a department order similar to NRIMP-2[1].

Overall direction and leadership for implementing REAPMP will be exercised by the Secretary of the DPWH supported by its Executive Committee (EXCOM). Directly assisting the Secretary in his overall direction of the program shall be the Undersecretary designated as Overall-in-Charge for the implementation. The EXCOM will serve as the Program Steering Committee (PSC) for REAPMP. The PSC will be periodically called, or as required, to discuss policies and institutional reforms that require management attention and decision. The PSC formulates recommendations on such issues for the Secretary's consideration and other outside agencies.

The REAPMP (Yen Loan) should coordinate and collaborate with the related JICA Grant and Technical Assistance, including its Technical Cooperation Project (Phase 2) under proposal and Road Sector Long Term Master Plan Study to be proposed.

(2) Program Management Office (PMO)

A new unified REAPMP Program Management Office (REAPMP-PMO) shall be created to administer the Program. REAPMP-PMO is responsible and accountable for the management of program inputs and delivery of outputs. It shall ensure the timely implementation and completion of the approved program implementation plan. REAPMP-PMO will also act as the secretariat of the PSC.

[1] Refer to DPWH Department Order No.63, Series of 2008, Implementation Arrangements and Creation of a Program Management Office for the IBRD-assisted National Road Improvement and Management Program (NRIMP), Phase 2.

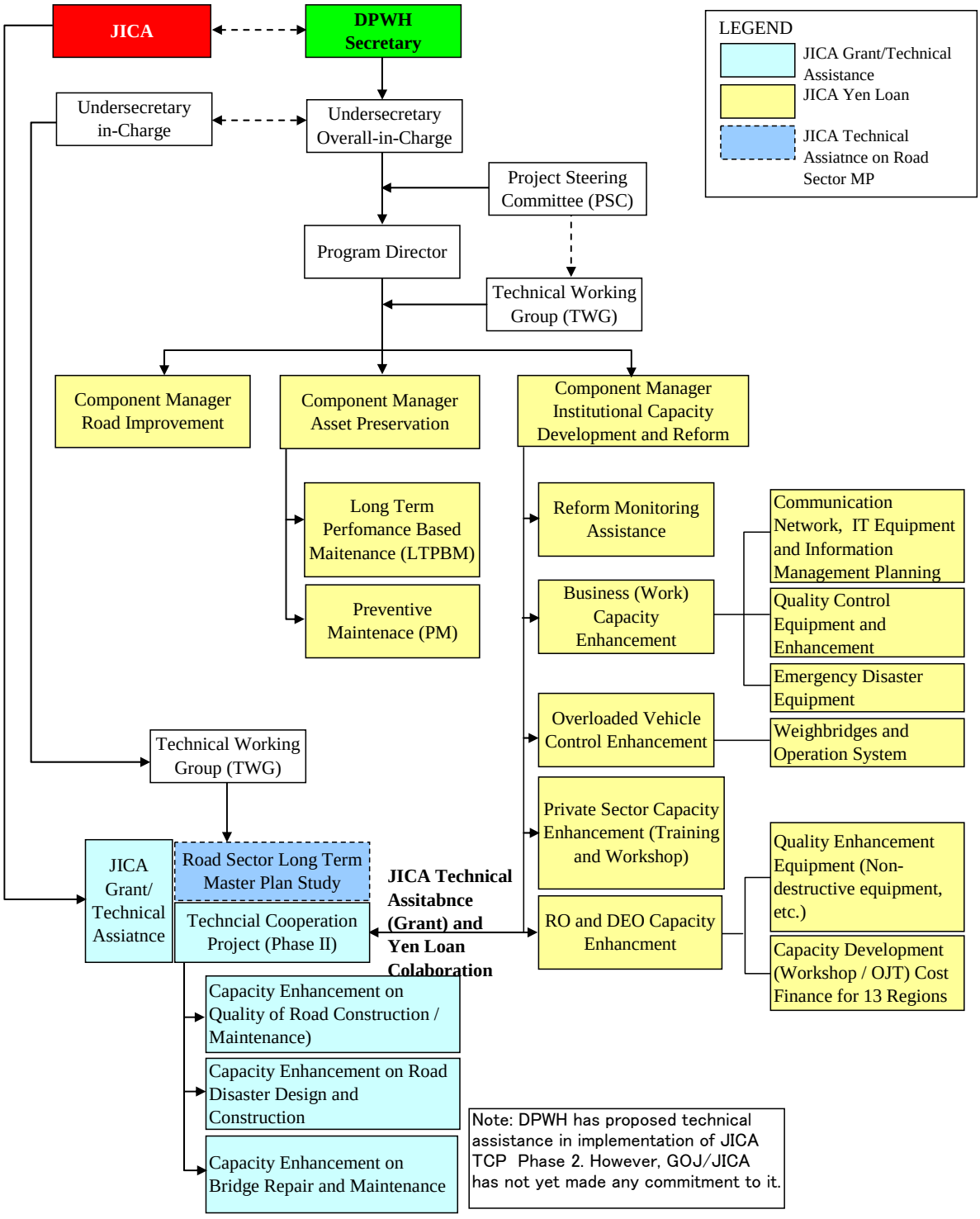


Figure 7.1.1 Implementation and Management Organization of REAPMP

The REAPMP-PMO shall be headed by a Program Director who will report directly to the designated Undersecretary for the implementation of REAPMP. Three component managers will be appointed for each of the three components, namely road upgrading and improvement (UI), road asset preservation (LTPBM and PM) and institutional capacity development (ICD).

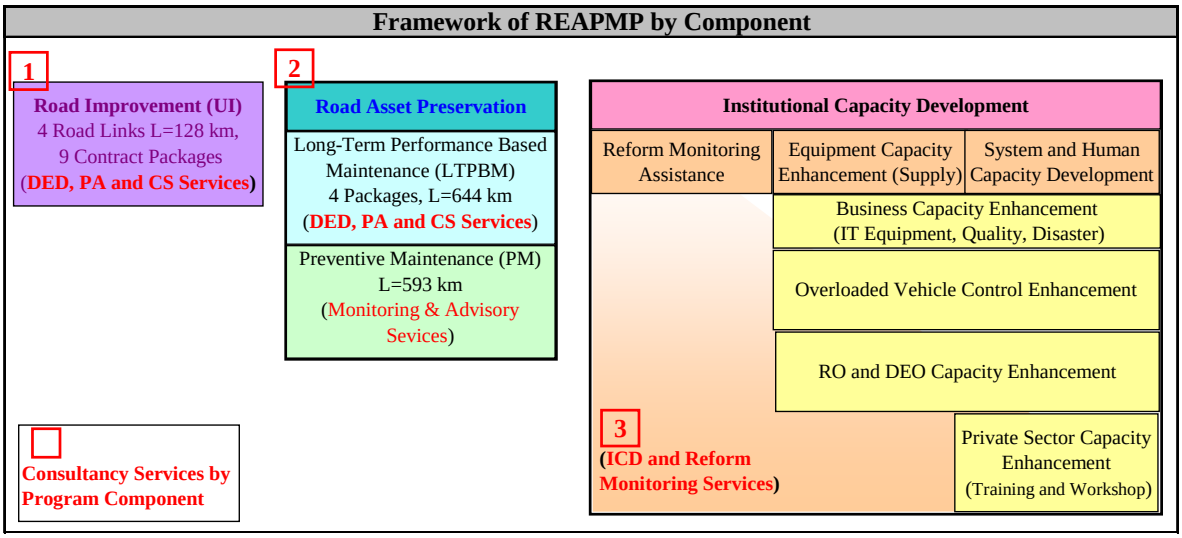


Figure 7.1.2 Framework (Component) of REAPMP

(3) Roles and Responsibilities of REAPMP-PMO

The roles and responsibilities of the REAPMP-PMO will be as follows:

1) Coordinate all tasks of respective implementing units of DPWH including Road Program Office (RPO), Bureau of Maintenance (BOM), Bureau of Design (BOD), Regional Office (RO), etc.

2) Direct, manage and implement sub-projects and services both for civil works and consultancy services.

3) Exercise overall responsibility for the successful implementation and completion of the projects, services and activities of the Program.

(4) Management of Program Component

The UI Component comprising of civil works and consultancy services will be managed by the UI Component Manager.

LTPBM and PM, and associated consultancy services will be implemented by the BOM and the RPO. The Component Manager for LTPBM and PM reports to the Program Director on all activities under said component. The detailed design will be implemented at the DPWH Central Office in coordination with BOM and BOD while the implementation (maintenance contract) will be implemented by the responsible RO. The PM Program will be prepared annually by the RPO, with the support of the Planning Service (HDM-4) and BOM. Projects will be designed, procured and managed by ROs.

ICD Component will be coordinated by its designated Component Manager in close coordination with MIS and other relevant units, including BRS, BOE, PSC, etc.

(5) Financial Management

The Program financial management shall be undertaken by both the Controller and Financial Management Services (CFMS) and REAPMP-PMO. The main financial management system will be conducted by the CFMS to maintain the account books, monitor the designated account and prepare the related financial reports required by JICA. For UI, LTPBM and associated consultancy services, the REAPMP-PMO shall follow-up the preparation of disbursement

vouchers, state of expenditures and withdrawal application in accordance with the loan agreement between GOP and GOJ.

For the PM program component, a JICA special account method will be adapted. The progress billings including state of work accomplished shall be prepared by site supervision teams and submitted to RO for approval. These billings will be processed at the central office for withdrawals and payments to the contractors.

The DPWH Secretary shall appoint a financial management head and staff to be responsible for the financial operation and management of the Program.

7.2 IMPLEMENTATION SCHEDULE

7.2.1 OVERALL PROGRAM IMPLEMENTATION SCHEDULE

Figure 7.2.1 shows the overall Program implementation schedule. The Program implementation period will be from 2010 to 2017.The draft final report of JICA preparatory survey for REAPMP is submitted in September 2009. JICA will conduct project appraisal in November 2009 and loan agreement is expected to be signed by the Japanese fiscal year of 2009 (March 2010).

The procurement of consultancy services, which will take six months, will start soonest after the signing loan agreement. The detailed engineering design and preparation of procurement documents for road improvements projects will take for about six months and nine months for procurement assistance. The construction period is two years to three years depending on contract size and work volume.

The detailed engineering design (and concept design for a pilot design-build contract) for LTPBM projects will take for about six months, including the existing pavement investigation using Fallen Weight Deflectometer (FWD) and International Roughness Index (IRI) equipment for supplying the correct information to bidders. The consultancy services will include training of contractors/ consultants for LTPBM contracts and project implementation. Procurement of LTPBM contracts is expected to take nine months.

Item	Length (km)	Start	End	Period (Month)	2009 (1)	2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)	2017 (9)
JICA Loan Preparation													
- JICA Preparatory survey		Mar.2009	Oct.2009	7									
- Project Appraisal		Nov.2009		1									
- L/A & E/N		Feb.2010	Mar.2010										
Project Implementation													
1. Road Improvement (UI)	128												
- Procurement of Consultants		Apr.2010	Sep.2010	6									
- Detailed Engineering Design & Bidding Documents Preparation		Oct.2010	Mar.2011	6									
- Parcellary Survey and Land Acquisition		Jan.2011	Dec.2011	12									
- Procurement of Civil Works Contractors		Apr.2011	Dec.2011	9									
- Civil Works and Construction Supervision		Jan.2012	Dec.2014	24 - 36									
- Maintenance Period		Jan.2015	Dec.2015	12									
2. Asset Preservation													
2.1 Long Term Performance-Based Maintenance (LTPBM)	644												
- Procurement of Consultants		Apr.2010	Sep.2010	6									
- Detailed Engineering Design & Bidding Documents Preparation (including conception design for a pilot design-build contract)*		Oct.2010	Mar.2011	6									
- Training of Contractors/ Consultants for LTPBM		Jan.2011	Mar.2011	3									
- Procurement of Civil Works Contractors		Apr.2011	Dec.2011	9									
- Implementation of LTPBMC		Jan.2012	Dec.2016	60									
- Monitoring & Evaluation		Jan.2017	Dec.2017	12									
2.2 Preventive Maintenance (PM)	593												
- Preparation (DPWH)		Apr.2010	Dec.2010	9									
- Implementation of Pre-Fixed Road Links (moved from LTPBM)	93	Jan.2012	Dec.2012	12									
- Implementation of Annual Program 1 (AWP-1)	150	Jan.2011	Dec.2011	12									
Implementation of Annual Program 2 (AWP-2)	150	Jan.2012	Dec.2012	12									
- Implementation of Annual Program 3 (AWP-3)	200	Jan.2013	Dec.2013	12									
- Monitoring and Engineering Advice		Jan.2011	Dec.2013	36									
3. Institutional Capacity Development (ICD) and Reform Monitoring													
Procurement of Consultants		Jun.2010	Dec.2010	9									
- ICD-1 Overload Vehicle Control Enhancement		Apr.2011	Dec.2013	33									
- ICD-2 Quality Control Enhancement		Apr.2011	Dec.2012	21									
- ICD-3 Emergency Road Disaster Recovery Equipment for 10 DPWH DEOs		Apr.2011	Sep.2011	6									
- ICD-4 Communication Network and IT Equipment/Software		Apr.2011	Dec.2012	21									
- ICD-5 Capacity Development Support for Remaining 13 Regions		Jan.2011	Dec.2013	36									
- ICD-6 Consultancy Services for ICD													
(1) Institutional Capacity Development for the ICD-1,		Apr.2011	Dec.2012	21									
(2) Reform Monitoring Assistance		Jan.2011	Dec.2013	36									
(3) Enhancement of Contractors and Consultants		Apr.2011	Dec.2012	21									

Note: * Detailed Engineering Design includes the existing pavement investigation by **FWD** and **IRI** Equipment to supply the correct information for bidders.

Figure 7.2.1 Overall Implementation Schedule of REAPMP

7.2.2 ROAD IMPROVEMENT (UI)

Figure 7.2.2 shows project implementation schedule for the UI sub-projects. The procurement of consultant will start soonest after the loan agreement. It will take about six months for the detailed engineering design and nine months for the procurement of civil works contractor. The estimated construction period is 24 months, except for the contract packages of Catanduanes Circumferential road which would take 36 months. The maintenance (warranty) period is 12

months.

Description		No. of C. Packages	Period	2010 (1)	2011 (2)	2012 (3)	2013 (4)	2014 (5)	2015 (6)
Procurement of Consultants		1	6						
Detailed Design & Procurement Assistance			6						
Construction Supervision									
Construction and Maintenance									
UI-1	Bongabon - Rizal/ Pantabangan - Baler	2	24						
UI-2	Lipa - Alaminos	1	24						
UI-3	Mindoro West Coast Road*	4	24						
UI-4	Catanduanes Circumferential Road*	2	36						

Note: Contract Packages will be adjusted to similar sizes at the detailed engineering design stage.

Figure 7.2.2 Implementation Schedule of UI Sub-projects

7.2.3 LTPBM

Figure 7.2.3 shows project implementation schedule for the LTPBM sub-projects. The procurement of consultant will start soonest after the loan agreement, scheduled in April 2010. It will take about six months for the detailed engineering design for PBM-1, PBM-2 and PBM-4 and for the concept design for PBM-3. Both the detailed engineering design and concept design include measurement of cracks and other pavement distresses using IRI, to provide information for bidders. The design also includes FWD investigation for the existing pavement structure and its foundation evaluation. Training of contractors and consultants under LTPBM should be undertaken during this design period. The procurement of LTPBM contractors needs about nine months and the contract period will be for five years.

Description		No. of C. Packages	Period	2010 (1)	2011 (2)	2012 (3)	2013 (4)	2014 (5)	2015 (6)	2016 (7)
Procurement of Consultants		1	6							
Detailed Engineering Design & Bidding Documents Preparation for PBM-1, PBM-2 and PBM-4*			6							
Conception Design for a pilot design-build contract (PBM-3)*			6							
Procurement Assistance			9							
Training of Contractors/ Consultants for LTPBM			3							
LTPBM Contracts										
PBM-1	Aringay - Santa - Laoag	1	5 years							
PBM-2	Sta.Rita-Bdr.N.Ecija	1	5 years							
PBM-3	Sipocot - Baao	1	5 years							
PBM-4	Surigao (Lipata) - Bdr.Agusan D.N.	1	5 years							

Note: * Designs include the existing pavement investigation and analysis by **FWD** and **IRI Equipment**

Figure 7.2.3 Implementation Schedule of LTPBM Projects

The rehabilitation of pavement is scheduled for poor and bad road sections in the first year. PM (AC overlay) will be required for fair conditioned roads during the first three years. Even for the currently good conditioned road, PM will be required for a few years. The following figure

shows the implementation schedule for LTPBM PBM-1 sub-project (Aingay - Laoag Road).

Item		Length (km)	2009 (1)	2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)
JICA Loan Preparation										
JICA Preparatory survey										
Project Appraisal										
L/A & E/N										
Project Implementation										
Procurement of Consultants										
Detailed Engineering Design & Bidding Documents Preparation*										
Training of Contractors/ Consultants for Procurement of Civil Works Contractors										
LTPBM Contract		**242.1**				**1**	**2**	**3**	**4**	**5**
Rehabilitation (RH)	Length of Poor&Bad Condition x 100%	95.0								
Backlog Maintenance	Backlog Length of Backlog Maintenance	70.0								
Preventive Maintenance (PM)	**(PM Total)**	**147.1**					6km	7km	8km	
	Length in Good Condition	21.0								
						50km	44km	32.1km		
	Length in Fair Condition	126.1								
Routine Maintenance	All length (RM), 242.12 km x 5 years	**1,210.6**								

Note: * Detailed Engineering Design includes the existing pavement investigation by **FWD** and **IRI** Equipment

Figure 7.2.4 Implementation Schedule for LTPBM PBM-1 Sub-project

7.2.4 PREVENTIVE MAINTENANCE (PM)

Figure 7.2.5 shows implementation schedule of the PM programs. PM is an annual work program to be completed within a fiscal year (January - December). The DPWH selects the road links based on HDM-4, except for pre-fixed road links, which were move from the original LTPBM links, and conduct the detailed design prior to bidding. The design will be conducted by administration (in-house) and/or by local consultants employed by DPWH.

It will take about nine months for selection of the subjected road links and detailed engineering design. The construction period will be six to nine months and the warranty period shall be one year.

Description		No. of C. Packages*	Length (km)	2010 (1)	2011 (2)	2012 (3)	2013 (4)	2014 (5)
A. Pre-Fixed Road Links								
PM-A1	PPH/Talavera-Rizal	1-2	25.5					
PM-A2	Alaminos - San Pablo - Tiaong (PPH)	1-2	19.5					
PM-A3	Carmen - Davao City (2-7 lane road), (PPH)	3-4	48.0					
B. HDM-4 selected Road Links								
Annual Work Program 1 (AWP-1)		10	150.0					
Annual Work Program 2 (AWP-2)		10	150.0					
Annual Work Program 3 (AWP-3)		15	200.0					
Monitoring and Engineering Advice								

Note: * Approximate number of contracts.

● ● ● Preparation by DPWH ▬ Construction Period ■ ■ ■ Warranty Period

Figure 7.2.5 Implementation Schedule of Preventive Maintenance Programs

7.2.5 INSTITUTIONAL CAPACITY DEVELOPMENT (ICD)

Figure 7.2.6 shows implementation schedule of the ICD programs. The ICD programs are categorized to land acquisition, civil/building works, procurement of goods, workshops/training and various consultancy services.

The procurement of goods shall be subject to international completive bidding (ICB) while local competitive bidding (LCB) for civil/building works

Description	Category	No.	2010 (2)	2011 (3)	2012 (4)	2013 (5)
Procurement of Consultants		1				
Implementation of ICD						
ICD-1 Overload Vehicle Control Enhancement						
1.1 New Weighbridges		8				
(1). Land Acquisition	DPWH					
(2). Civil Works and Buildings	DPWH					
(3). Purchase of Weighbridges and Installation	Goods					
1.2 Refurbish of Existing Weighbridges		4				
(1). Buildings and Associated Facilities	DPWH					
(2). Purchase of Spare Parts and Refurbish of Weighbridges	Goods					
1.3 System Planning, Development & Operation Guidance	Consultancy					
ICD-2 Quality Control Enhancement						
2.1 Sub-regional Laboratory Establishment		8				
(1). Land Acquisition	DPWH					
(2). Civil Works and Buildings for Laboratories	DPWH					
(3). Purchase of Laboratory Equipment and Installation	Goods					
2.2 Quality Control Enhancement (QAU)	Consultancy					
ICD-3 Emergency Road Disaster Recovery Equipment for DPWH DEOs	Goods	10				
ICD-4 Communication Network and IT Equipment/Software	DPWH	30				
4.1 IT Equipment						
(1). Purchase of Computer, Software and IT Connection	Goods					
(2). DEO Staff Training (Workshop & OJT)	MIS/DPWH	30				
4.2 Information Management Planning	Consultancy					
ICD-5 Capacity Development Support for Remaining 13 Regions		13				
(1). Non-destructive equipment	Goods					
(2). Workshop and OJT Costs	DPWH					
ICD-6 Consultancy Services for ICD						
(1) Institutional Capacity Development for the ICD-1, ICD-2 and ICD-4	Consultancy					
(2) Reform Monitoring Assistance	Consultancy					
(3) Enhancement of Contractors and Consultants (Workshops)	DPWH / Consultancy					

Figure 7.2.6 Implementation Schedule of ICD Programs

7.3 CONSULTANCY SERVICES

7.3.1 GENERAL

(1) Framework of Consultancy Services for REAPMP

The consultancy services for the REAPMP implementation will be provided by program component as indicated in Figure 7.1.1. As there are three different components under REAPMP, and the sub-projects of UI and LTPBM are located in Luzon Island, area and component combination like WB NRINP-2 will not be applicable. The proposed consultancy services should match the program implementation framework illustrated in Figure 7.3.1. Team A and Team B will provide the consultancy services for the UI, and the LTPBM/PM programs, respectively. Team C provides the services for ICD and reform monitoring assistance, including monitoring on loan covenants and action plans.

The NRIMP-2 planned procuring different consultants for the detailed engineering and construction supervision, which is a popular method in EU countries. If this method is applied, responsibility between the design consultants and the construction supervision consultant would be unclear. Consultants under Japanese yen-loan projects have been the sole responsible for both the detailed engineering design and the construction supervision, not only in the Philippines but also in other countries. This will be a more appropriate method for REAPMP to avoid disputes on responsibilities and technical handover, from the detailed engineering design stage to the construction supervision stage.

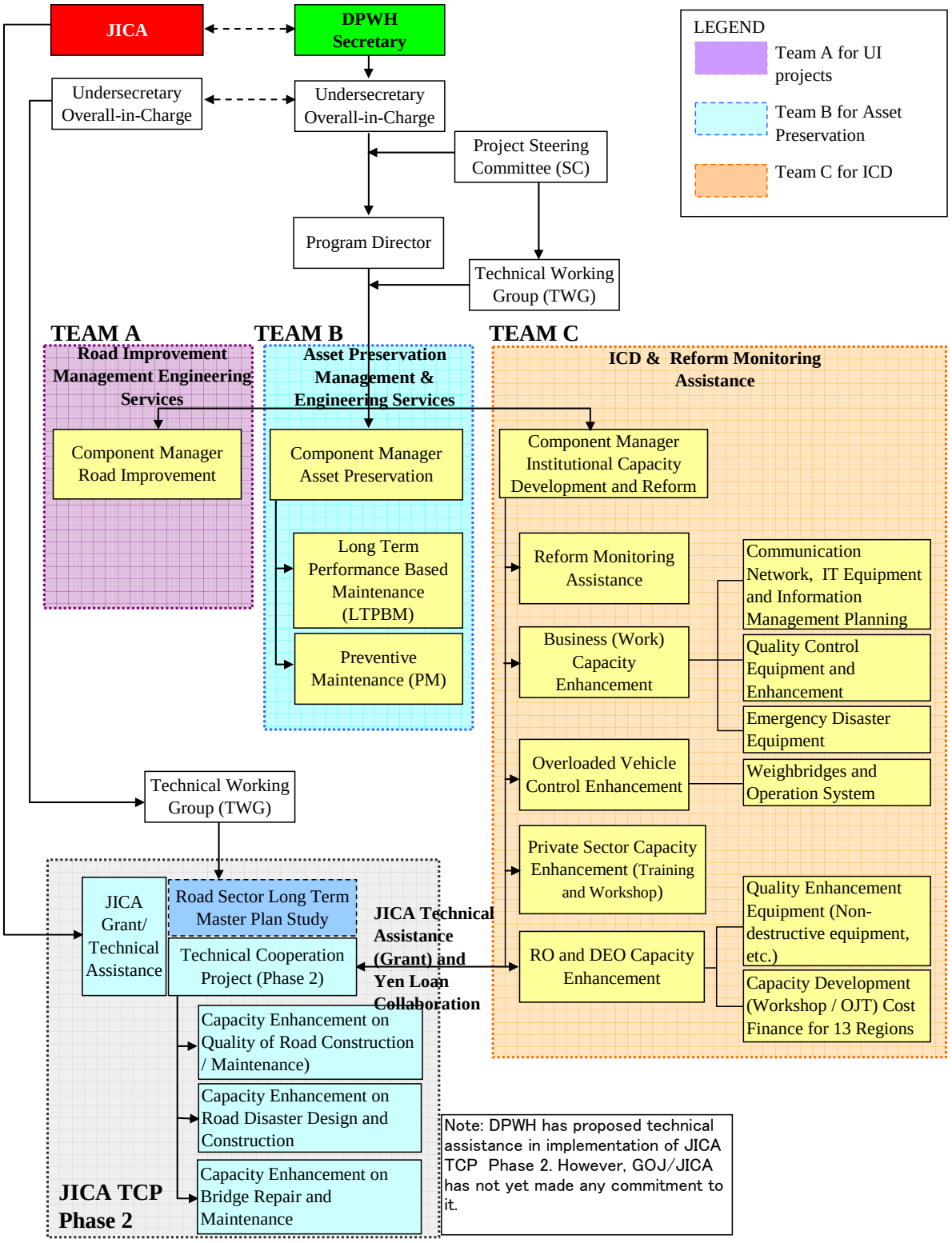
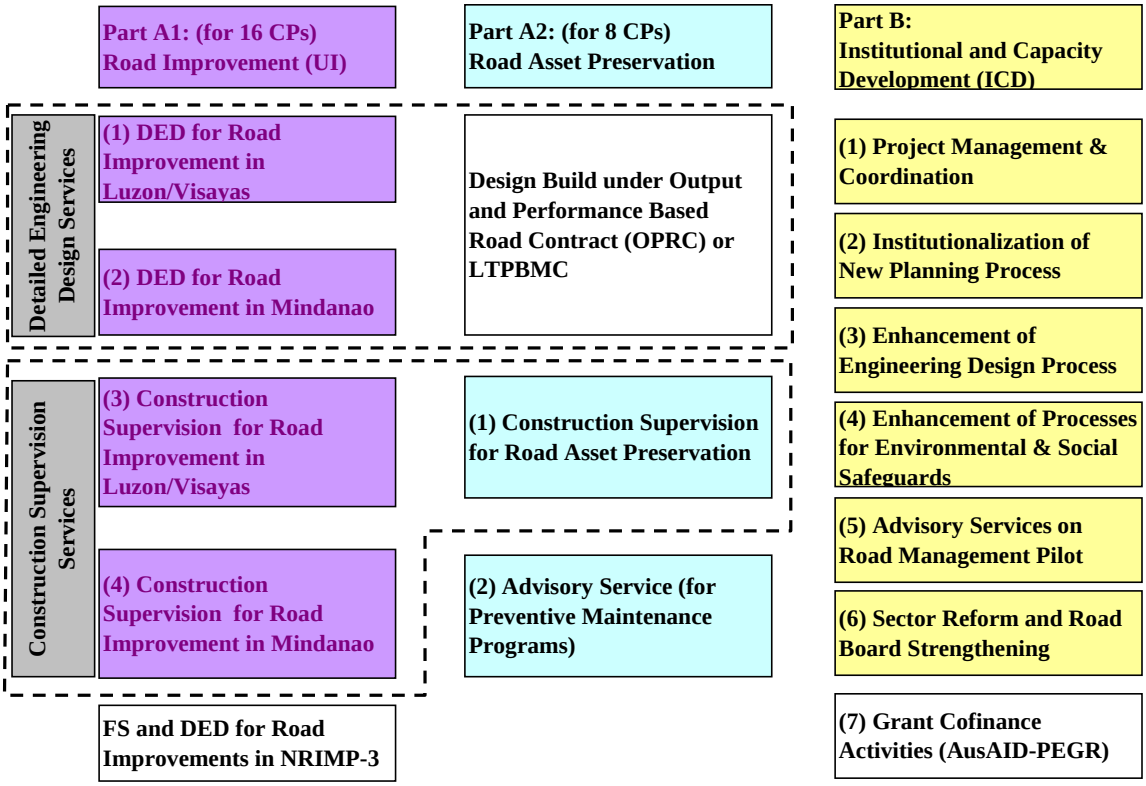


Figure 7.3.1 Consultancy Services based on REAPMP Implementation Framework

(2) Framework of Consultancy Services for NRIMP-2 (WB)

Figure 7.3.2 shows the framework of consultancy services for NRIMP-2. There are three components to be provided with consultancy services, namely, for UI, LTPBM/PM and ICD. It is noted that there are various consultancy services contracts under each component. The consultancy services for the UI are divided to detailed engineering design and construction supervision. These are further sub-divided to Luzon, Visayas and Mindanao.

No consultancy services for detailed engineering designs are scheduled for asset preservation OPRC as design-build contract has been planned to be implemented. Construction supervision is also very minimal since full responsibility shall be given to the contractor. Lump-sum payments are also applied in this scheme. However, concept design should be provided by the consultant to provide bidders with sufficient information.



Source: Prepared by JICA survey Team based on Procurement Plan of DPWH/WB

Figure 7.3.2 Framework of Consultancy Services for NRIMP-2 (WB)

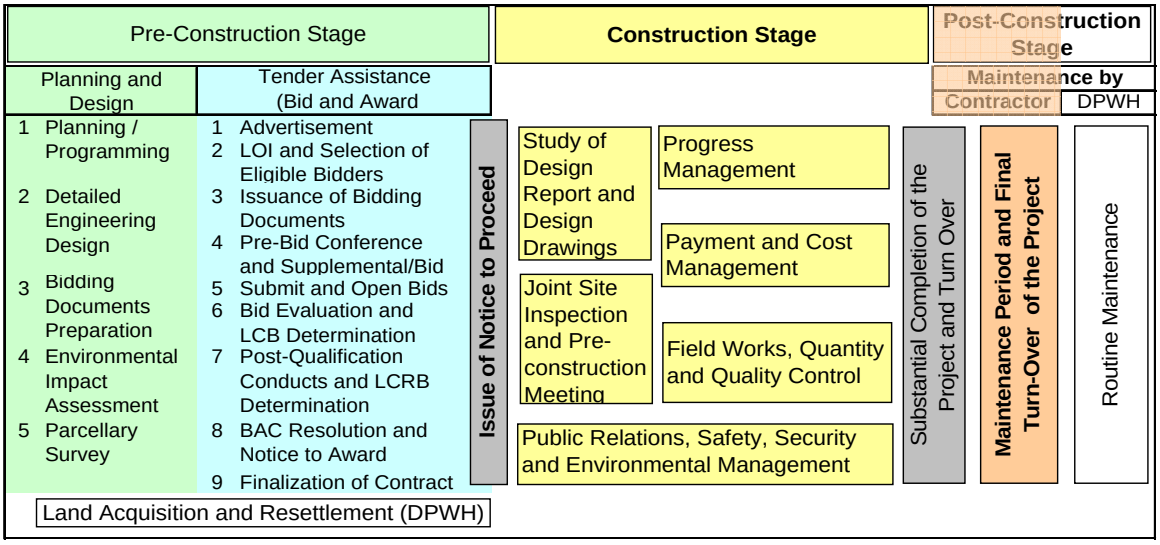
7.3.2 PROJECT IMPLEMENTATION AND MANAGEMENT SERVICES FOR UI PROJECTS

The consultancy services for the UI project implementation include:

- Detailed engineering design (design review for UI-1 and UI-4) and tender documents preparation. UI-4 should be reviewed to meet the project budget, minimizing realignments.
- Procurement assistance to civil works contractor
- Construction supervision and project management.

Figure 7.3.3 shows the scope of the consultancy services to be provided for pre-construction,

construction and post-construction stages.

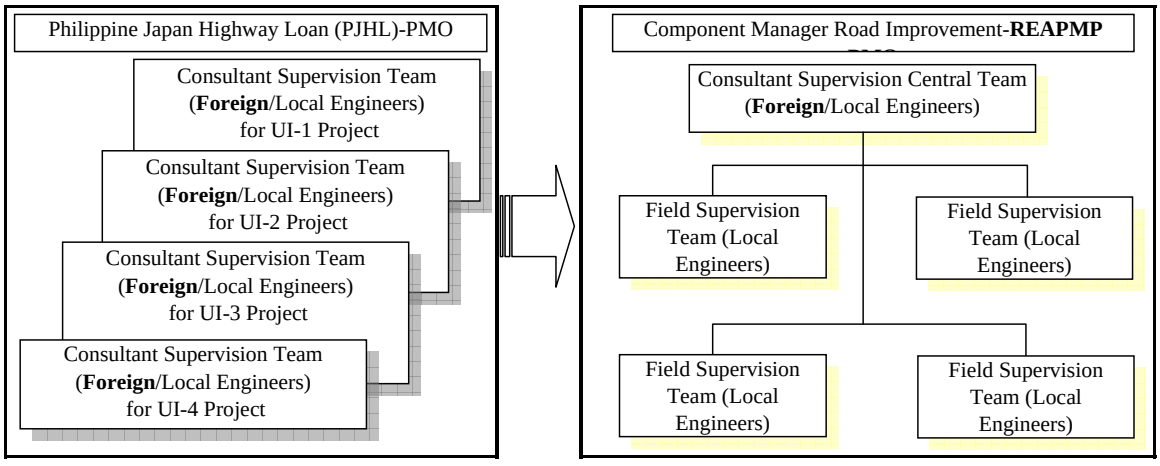


Source: JICA Survey Team (based on Road Project Management and Construction Supervision Manual of JICA TCP)

Figure 7.3.3 Scope of Consultancy Services for UI Project Implementation

Figures 7.3.4, 7.3.5 and 7.3.6 show recommended organizational structures of the consultancy services at each stage (refer to Annex 8 for planned assignment schedule of consultancy service staff).

The expatriate engineers will be assigned to the central team and provide guidance on field survey and check the detailed engineering deigns by the local consultants. The same methodology will be applied for the construction supervision stage. The central team will provide project implementation management services and guidance for the field supervision teams. The modification of approach undertaken by PJHL-PMO for the UI projects is shown in figures below. This is intended to save the foreign costs while enhancing the local consultants' capacity.



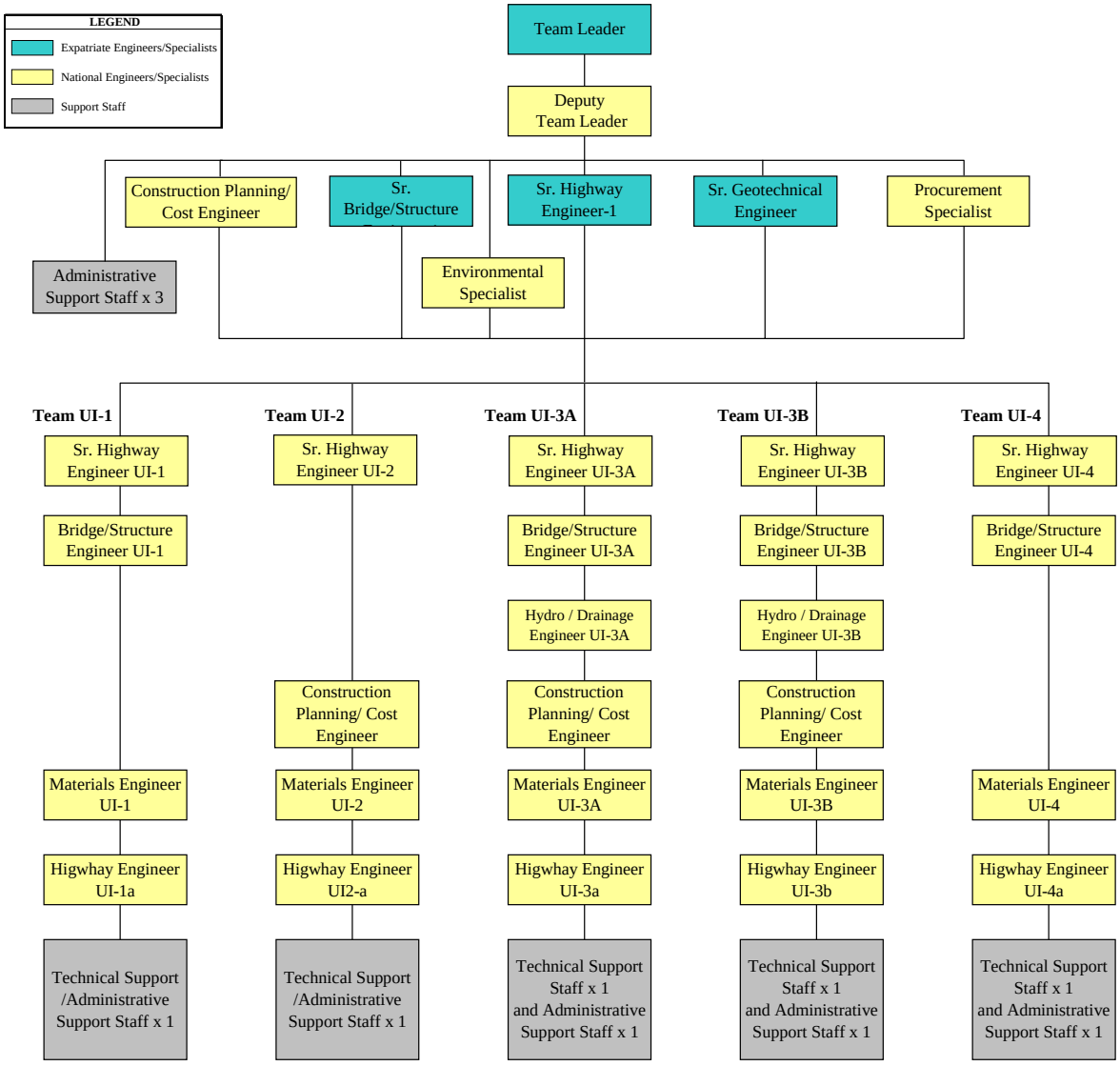


Figure 7.3.4 Organizational Chart of Consultancy Services at Detailed Engineering Design and Tender Documents Preparation Stage (UI)

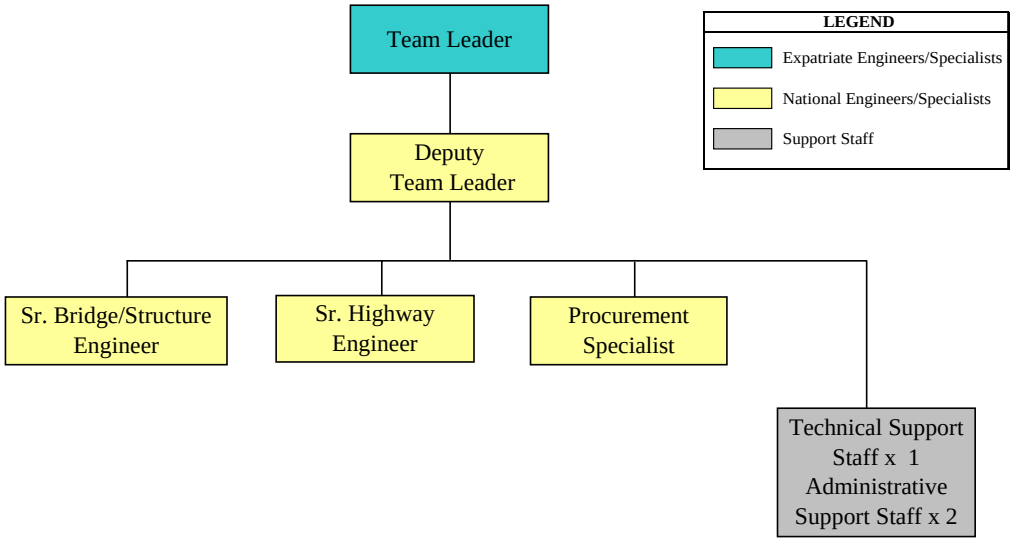


Figure 7.3.5 Organizational Chart of Consultancy Services at the Stage of Procurement Assistance to Civil Works Contractor (UI)

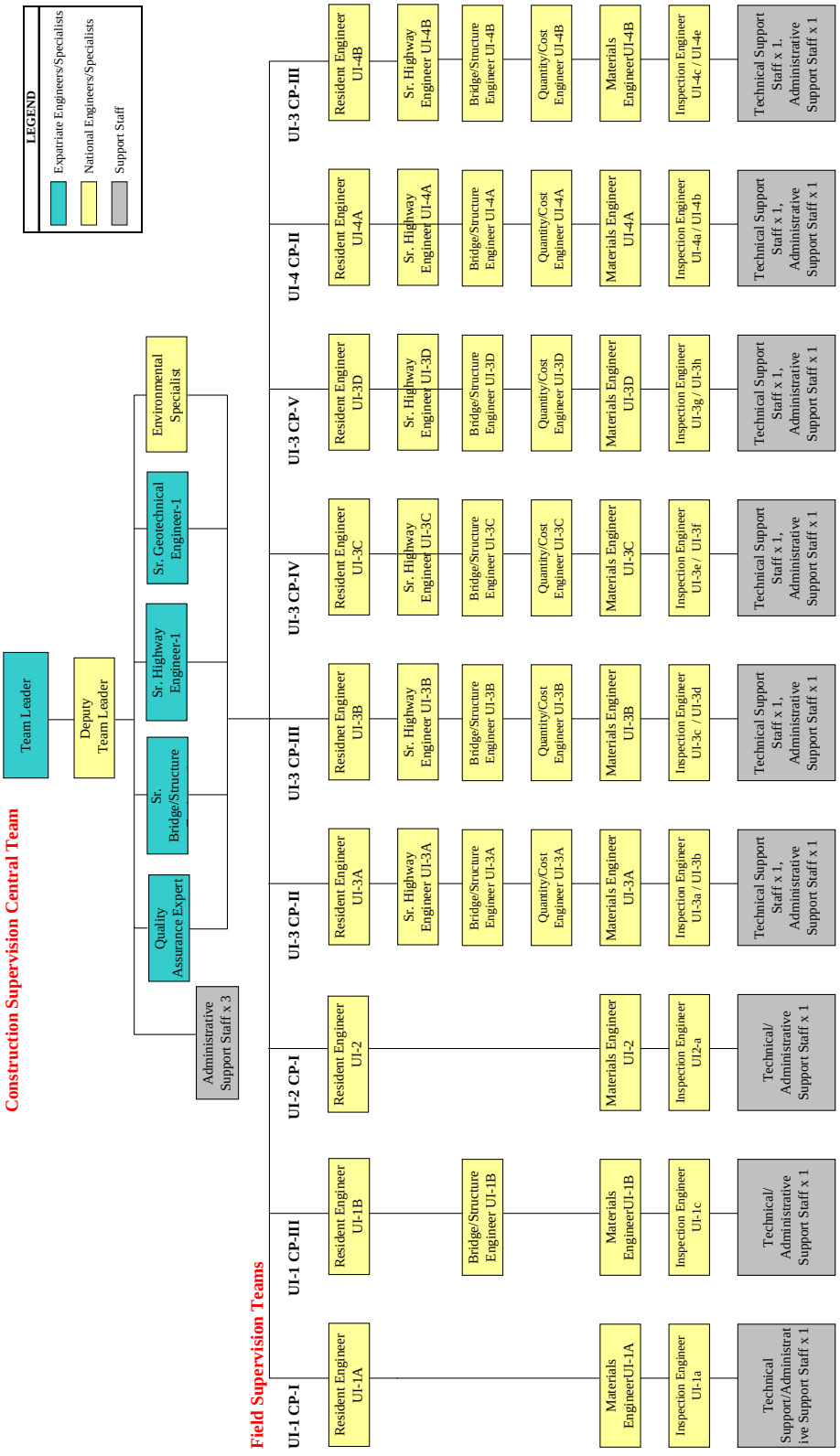


Figure 7.3.6 Organizational Chart of Consultancy Services at Construction Supervision and Project Management Stage (UI)

7.3.3 PROJECT IMPLEMENTATION AND MANAGEMENT SERVICES FOR LTPBM AND PM

The consultancy services for the LTPBM and PM are comprised of:

- LTPBM implementation, including detailed engineering design and tender documents preparation, procurement assistance, construction supervision and project management.
- Providing monitoring and engineering advice on the PM programs.

The detailed engineering design includes:

- Existing road condition survey using IRI measurement and FWD devices
- Establishment of pavement deterioration model for both PCC pavement and composite pavement (asphalt concrete overlay on PCC pavement)
- Rehabilitation and AC overlay design
- Backlog maintenance design (drainage and shoulders)
- Road safety study and facility design
- Minor slope protection works.
- Estimate of quantities
- Bidding documents preparation.

A concept design will be also conducted for a pilot design build contract for PBM-3, including existing road condition survey using IRI measurement and FWD devices to provide correct and sufficient information to bidders.

The consultant will also conduct training of contractors, consultant and DPWH staff on LTPBM contracts, including work concept, responsibility, interventions measurement and payment methods.

Figures 7.3.7, 7.3.8 and 7.3.9 show recommended organizational structures of the consultancy services at each stage (refer to Annex 8 for planned assignment schedule of consultancy service staff).

The PM under REAPMP involves execution of annual AC overlay works on the existing pavement to be implemented as a joint financial scheme of GOP (GAA and Road fund) and GOJ (Yen loan). Special account method shall be applied for payment. The consultancy services include monitoring of PM program implementation and engineering advisory services.

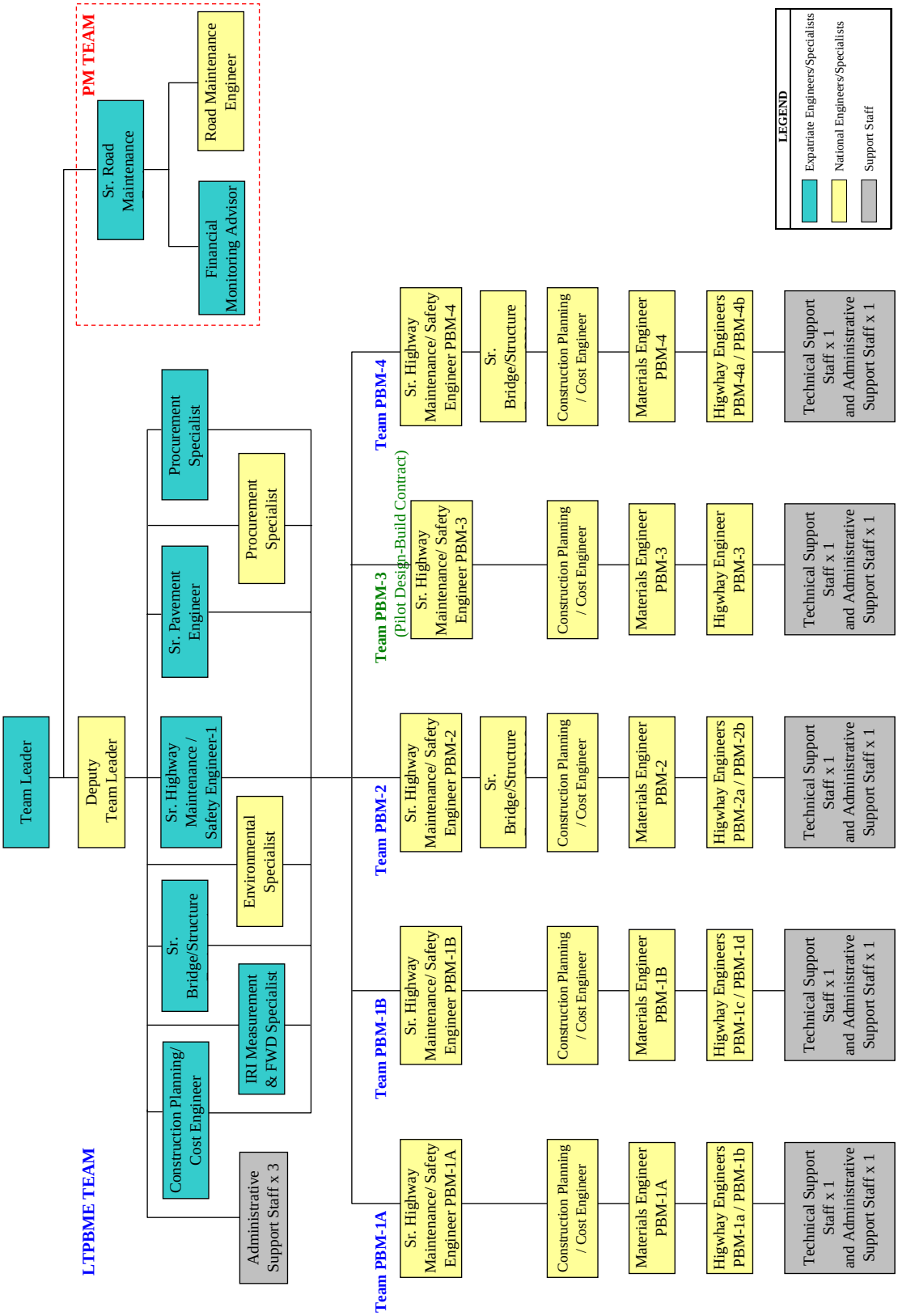


Figure 7.3.7 Organizational Chart of Consultancy Services at Detailed Engineering Design and Tender Documents Preparation Stage (LTPBM)

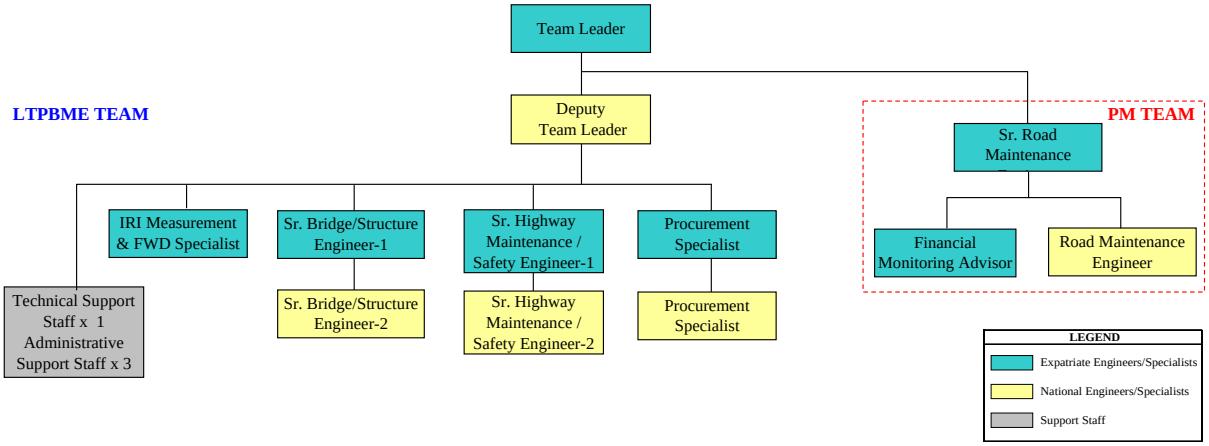


Figure 7.3.8 Organizational Chart of Consultancy Services at Stage of Procurement Assistance to Contractor (LTPBM)

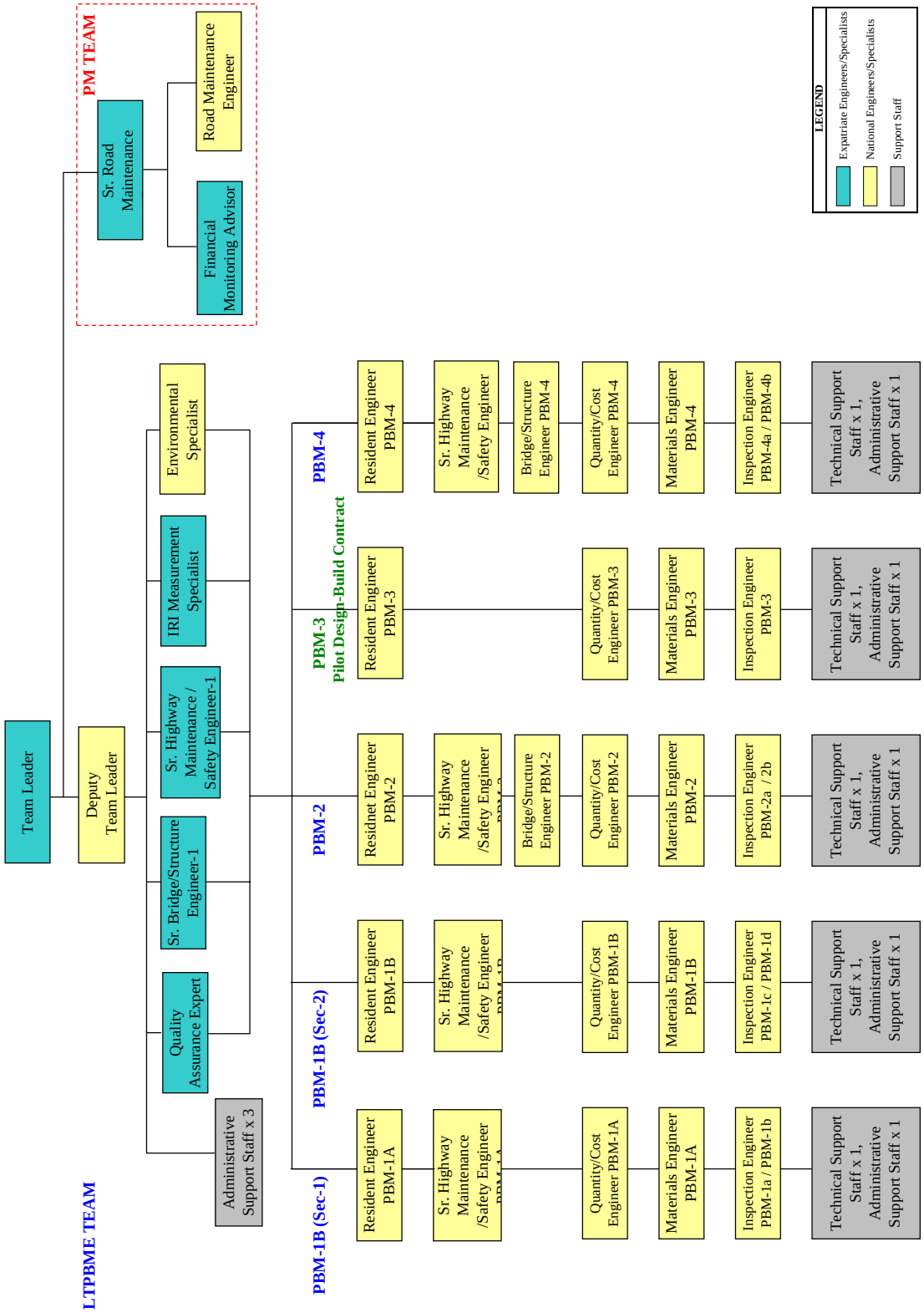


Figure 7.3.9 Organizational Chart of Consultancy Services at Construction Supervision and Project Management Stages (LTPBM)

7.3.4 INSTITUTIONAL CAPACITY DEVELOPMENT (ICD)

The consultancy services for the ICD include the following:

- Procurement assistance for equipment (weighbridges, laboratory equipment, disaster recovery equipment, IT equipment, non-destructive equipment) through ICB, including bidding documents and specification preparations, bid evaluation and contract procedures
- System planning, development and operation guidance for weighbridges
- Quality Control Enhancement (QAU)
- Information Management Planning
- Enhancement of Contractors and Consultants (Workshops)
- Reform Monitoring Assistance Services, including agreed action plans.

Figure 7.3.10 shows recommended organizational structures of the consultancy services for ICD (refer to Annex 8 for planned assignment schedule of consultancy service staff).

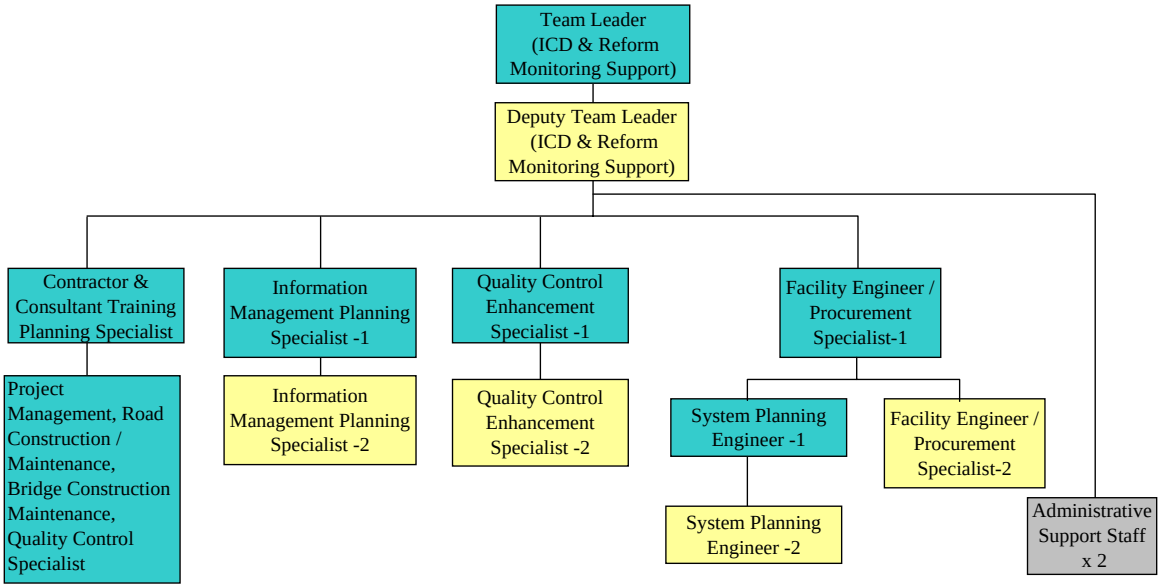


Figure 7.3.10 Organizational Chart of Consultancy Services for ICD

7.4 TECHNICAL ASSISTANCE

7.4.1 PROPOSAL OF DPWH FOR JICA TECHNICAL COOPERATION PROJECT PHASE II[2]

The DPWH has proposed to the GOJ the implementation of Technical Cooperation Project Phase 2 (TCP-Phase 2) on "Quality Management and Enhancement for Road and Bridge Construction / Maintenance". Its objective is to further enhance the capacity of ROs and DEOs at all remaining 13 regions. If both governments agreed on TCP-Phase 2 after a joint project appraisal on TCP-Phase 1, JICA will continue its capacity development project for 3 regions (CAR, Region VII and Region XI). The REAPMP will finance the cost of nondestructive equipment required for the remaining 13 regions and training costs (workshop and OJT costs) as collaboration

[2] DPWH has proposed GOJ for technical assistance in implementation of JICA TCP Phase 2. However, GOP/JICA has not made any commitment on acceptance of TCP Phase 2.

program.

In the case of that GOP/JICA does not agree on TCP-Phase 2, the Survey Team recommends that DPWH should expand institutional capacity development project to the remaining 13 regions by using equipment and training facilities available under REAPMP.

7.4.2 JICA TECHNICAL ASSISTANCE PROJECT ON REAPMP PHASE II AND PPP

In the Pre-FS report, DPWH has proposed to conduct the detailed engineering and parcellary surveys, through consulting services, for projects that, while meritorious, are not technically prepared for implementation under Phase I of the REAMP. Thus, this will be considered for implementation under REAPMP Phase II, under a grant aid scheme. The DPWH has also requested technical assistance in preparing the four projects for implementation through the PPP scheme, under a grant scheme.

However, as Yen Loan does not have grant portion unlike an IBRD loan, the JICA Survey Team recommends that the study and engineering design should be subject to the technical assistance scheme of GOP. The Study Team will also recommend that the DPWH establish clear and stable future policies, strategy involving LTPBM, targets and investment plan for road asset valuation and management, not only for the medium-term but also for long-term. As JICA has technical assistance facilities for preparation of the nationwide highway planning and road asset management, the DPWH should utilize such facilities. The results of the highway master plan should be the basis for REAPMP Phase II and Phase III in the future.

The following Figure 7.3.13 shows an expected schedule of JICA Highway Asset Planning Management Master Plan Study and expected REAPMP Phases II and III. If LTPBM in REAPMP 1 and NRIMP-2 is successful, this scheme should be extended to all north-south backbone and east-west lateral roads.

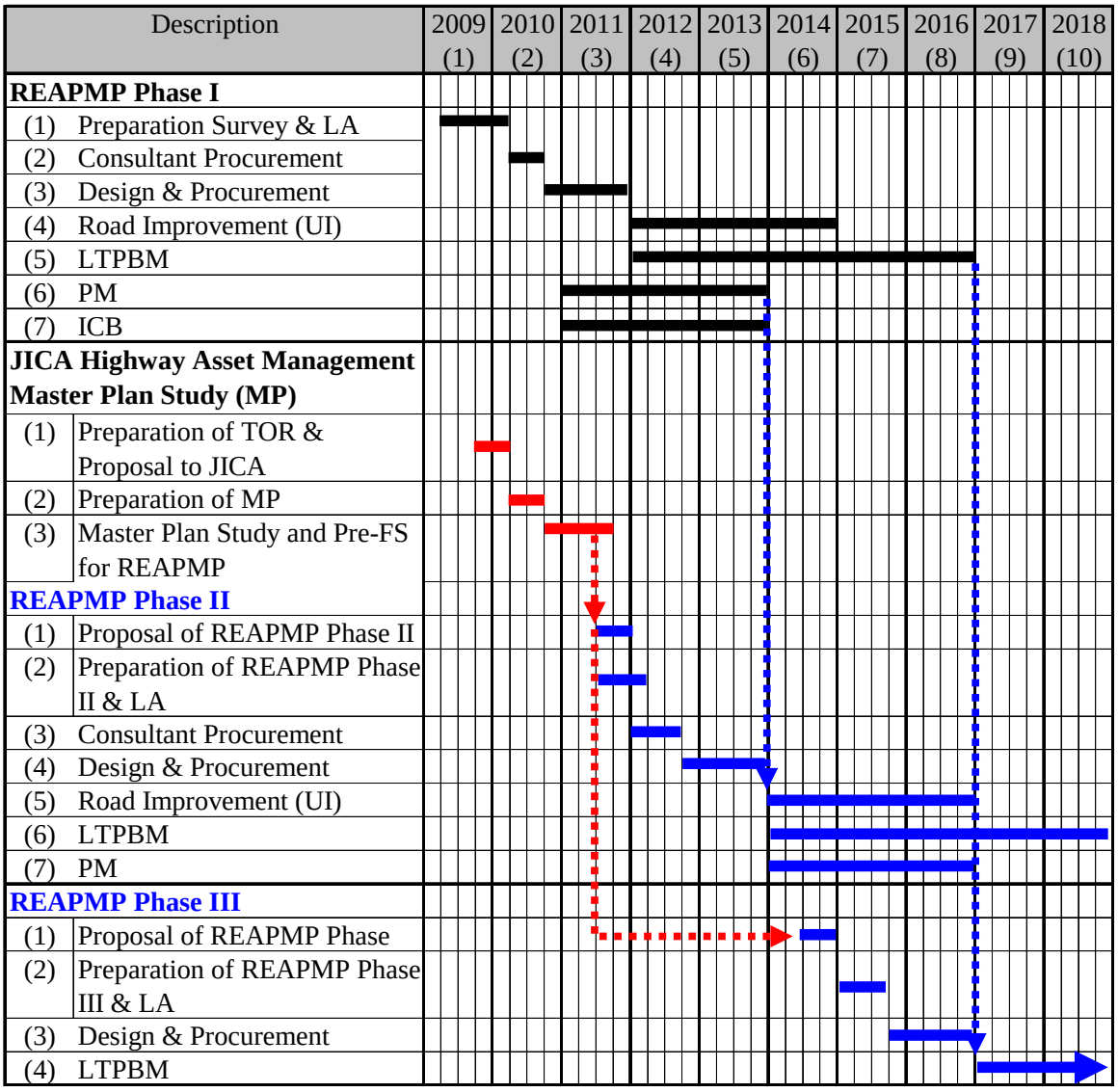


Figure 7.4.1 Expected JICA Master Plan Study and REAPMP Phase II and III Formulation and Implementation

7.5 PROCUREMENT PLAN

7.5.1 CONTRACT PACKAGING AND PROCUREMENT PLAN FOR UI PROJECT CONTRACTS

UI project should be implemented with appropriate contract packages to be determined taking into consideration the size of contracts (amount and quantity), characteristics of the section, technical difficulty, construction period, funding source, and type bidding competition.

The Survey Team recommends implementing the UI project in nine packages as given in the following table. Adjustment of contract sizes should be made appropriate for UI-3 and UI-4, during the detailed design stage.

Table 7.5.1 Outline of Contract Packages for UI Project

No.	Project Name	Package No.	Contract Name	Road Length (km)	UI Length* (km)	Bridge Length				Construction Period (Month)	Estimated Contract (Mill Php)	Remarks (Contract size adjustment)
						Replacement		Widening 1 lane to 2 lanes				
						(No.)	(m)	(No.)	(m)			
UI-1	Bongabon - Rizal/ Pantabangan - Baler	UI-1. CP-I	Bongabon-Rizal -Pantabanagn	27.26	0.74					24	167	
		UI-2. CP-III	Canili - Maria Aurola	24.08	1.90	2	129	4	106	24	293	
UI-2	Lipa - Alaminos	CP-1	Lipa - Alaminos	16.73	7.46					24	211	
UI-3	Mindoro West Coast Road	UI-3. CP-II	Rizal - Calintaan	17.51	5.63	1	8			24	164	Adjust Contract package at the DE stage to make similar sizes
		UI-3. CP-III	Calintaan - Sablayan	49.34	35.38	4	92	2	63	24	1,110	
		UI-3. CP-IV	Sablayan - Sta Cruz	62.08	21.76	2	66	1	10	24	709	
		UI-3. CP-V	Sta Cruz - Mamburao	24.48	8.23	2	64	1	62	24	304	
UI-4	Catanduanes Circumferential	UI-4. CP-II	Vega - Bagamanoc	9.97	3.32	2	230			36	148	Adjust Contract package at the DE stage to make similar sizes
		UI-4. CP-III	Bagamanoc-Pandan	54.24	44.04	2	110			36	1,334	
Total				285.67	128.46	15.00	698.60	8.00	240.70		4,440	

Note: * Pavement length improved from gravel road to PCC paved road.

The procurement method to be adopted shall be the ICB in accordance with the JICA/JBIC procurement guideline. The Revised Implementing Role and Regulations (IRR) of R.A.9184 (refer to the following figure) shall be applied as far as these have no conflict with the JICA/JBIC procurement guidelines.

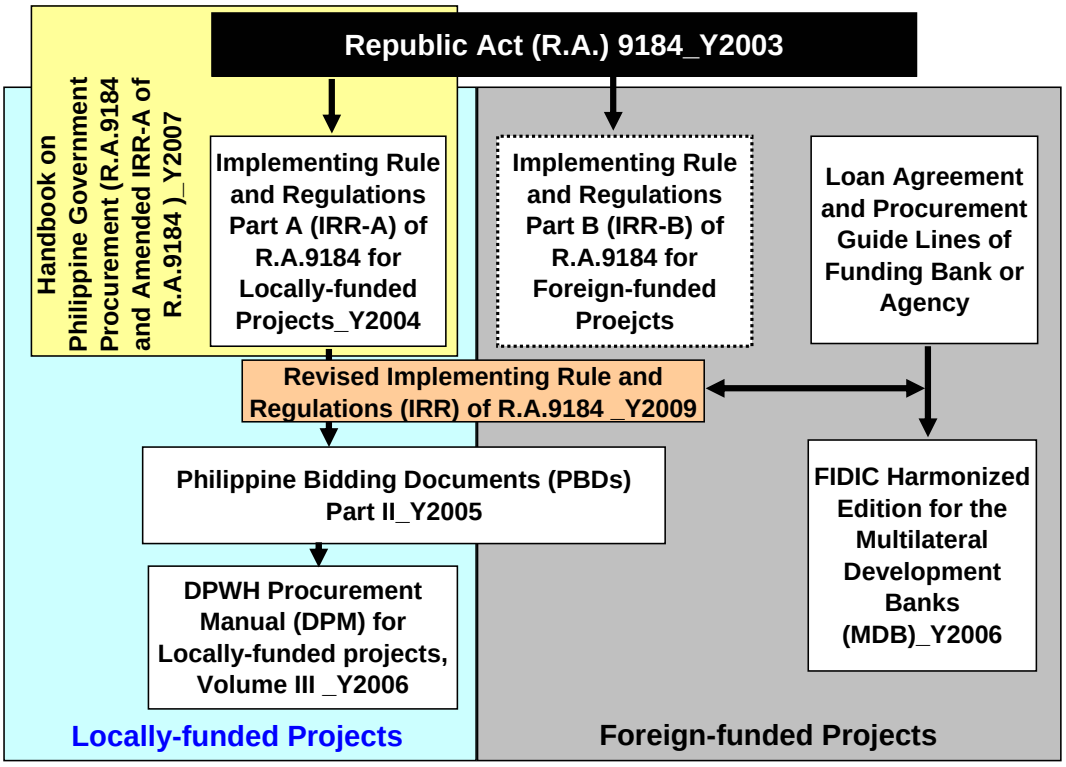


Figure 7.5.1 Procurement Rules and Guidelines applied for REAPMP Implementation

7.5.2 CONTRACT PACKAGING AND PROCUREMENT PLAN FOR LTPBM CONTRACTS

LTPBM contract packages consist of four sub-projects as outlined in the following table. The contractor is responsible for managing the road (and bridges) rated to be in good to fair condition, (IRI<4.0) for 5-year contract period. The scope of work includes rehabilitation, PM, routine maintenance and backlog maintenance for shoulders, drainage and slopes. PBM-2 and PBM-4 includes bridge replacement. The works also include road safety facilities.

Table 7.5.2 Outline of Contract Packages of LTPBM Project

No.	Contract Name	Road Length (km)	Major Scope of Works			Bridge Length		Contract Period (Year)	Estimated Contract Amount (Mill Php)	Remarks
			RH (km)	PM (km)	RM (km)	Replacement (m)	Repair & Maintenance (m)			
PBM-1	Aringay-Laoag	242.12	93.00	149.10	1,210.60		2,813	5	3,413	
PBM-2	Sta. Rita- Bdr. Nueva Ecija	169.27	62.60	106.70	846.35	45	2,502	5	1,873	
PBM-3	Sipocot- Baao	109.48	41.60	67.90	547.40		911	5	1,441	Pilot Design Build Contract
PBM-4	Surigao (Lipata) - Bdr.Agusan D.N.	123.50	44.50	79.00	617.50	84	1,954	5	1,665	
Total		644.37	241.70	402.70	3,221.85	129	8,180		8,392	

Note: The LTPBM contract includes backlog maintenance for shoulders, drainage and slopes. It also includes road safety facilities.

The procurement method to be adopted shall be ICB in accordance with the JICA/JBIC procurement guideline and Revised IRR of R.A.9184.

7.5.3 CONTRACT PACKAGING AND PROCUREMENT PLAN FOR PM CONTRACTS

The PM under REAPMP is programmed into three annual work programs to be completed within each fiscal year (January – December). The minimum contract length should be 10 km and its contract amount will be about Php 70-80 million, except PM-A1, A2 and A3, as outlined in Table 7.5.3.

Table 7.5.3 Outline of Contract Packages of PM Program

No.	Contact Name / AMP	No. of C. Packages*	Length (km)	Estimated Total Cost (Mill.Php)	Average Contract Amount (Mill.Php)
A. Pre-Fixed Road Links					
PM-A1	PPH/Talavera-Rizal	1-2	25.5	157	157
PM-A2	Alaminos - San Pablo - Tiaong (PPH)	1-2	19.5	193	193
PM-A3	Carmen - Davao City (2-7 lane road), (PPH)	3-4	48.0	947	237
B. HDM-4 selected Road Links					
Annual Work Program 1 (AWP-1)		10	150.0	828	83
Annual Work Program 2 (AWP-2)		10	150.0	828	83
Annual Work Program 3 (AWP-3)		15	200.0	1,104	74
Total		39 to 41	593.0	4,058	

Note: * Approximate numbers of contracts.

The procurement method to be adopted shall be the LCB in accordance with Revised IRR, R.A.9184.

7.5.4 PROCUREMENT OF EQUIPMENT

The procurement method to be adopted shall be International Competitive Bidding (ICB) in accordance with JICA/JBIC procurement guidelines.

Table 7.5.4 Outline of Contract Packages for Procurement of Equipment

No.	Description	No.	Estimated Cost (Mill Php)	Remarks
ICD-1	(1). Purchase of Weighbridges and Installation	8 sets	33.4	
	(2). Purchase of Spare Parts and Refurbish of Weighbridges	4 sets	26.1	
ICD-2	(3). Purchase of Laboratory Testing Equipment	8 sets	122.1	2 packages (separate package for universal testing machines)
ICD-3	(4). Emergency Road Disaster Recovery Equipment for DPWH DEOs (1 wheel loader and 2 dump trucks each)	10 sets	297.9	2 packages (one for dump trucks and other for wheel loaders)
ICD-4	(5). Purchase of Computer, Software and IT Communication Equipment	30 sets	208.0	
ICD-5	(6). Non-destructive equipment, etc. for Capacity Development of 13 Regions	13 sets	156.6	
Total			844.1	

7.5.5 CONSULTANCY SERVICES

Three consultancy services will be procured by the REAPMP component. Team A provides the consultancy services for the road improvement project, Team B for the LTPBM and PM programs, and Team C for the ICD and reform monitoring assistance, including monitoring on agreed action plans.

Table 7.5.5 Outline of Contract Packages for Consultancy Services

Contract Package	Description	Stage	Man-Month			Estimated Amount (Mill Php)
			Foreign Experts	Local Experts	Support Staff	
Team A	Consultancy Services for Road Improvement (UI) Project Implementation	DD / PA	26	149	84	122
		CS	90	1,358	516	431
		Total	116	1,507	600	552
Team B	Consultancy Services for Road Asset Preservation Programs (LTPBM & PM)	DD / PA	63	157	96	209
		CS	130	1,124	684	612
		Total	193	1,281	780	821
Team C	Consultancy Services for Institutional Capacity Development (ICD) and Reform Monitoring Assistance		66	74	72	143
Total			375	2,862	1,452	1,517

The procurement method to be adopted for seeking consultancy services shall be the ICB in accordance with JICA/JBIC procurement guidelines. Short listing and two-envelop methods shall be applied. The procurement procedures can start after signing the loan agreement of REAPMP, which is scheduled in March 2010.

7.6 MAINTENANCE AT POST-CONSTRUCTION STAGE

7.6.1 ROUTINE MAINTENANCE FOR UI PROJECT AND PM PROGRAM

The "Defects Liability Period" shall mean a warranty period of one year (365 days) as per the DPWH standard contracts. The contractor shall be responsible for carrying out routine maintenance at his own cost up to the final acceptance.

The DPWH shall be responsible for carrying out maintenance after the issuance of the Certificate of Acceptance. The BOM is responsible for overall maintenance management while the ROs/DEOs will be responsible for the maintenance works implementation.

Road maintenance consists of the routine maintenance, preventive (periodic) maintenance and emergency works. Routine maintenance is an activity that should be undertaken every year. It is mostly a labor intensive work as compared with the PM which is equipment based. The design period for new or upgrading projects is ten years for AC pavement and 20 years for PCC pavement. The first preventive maintenance is required within 10 years after the opening of the road. In principle, since the design life for PM components is 5-10 years, maintenance should be repeated every 4-9 years depending on the level of traffic and road condition.

The required maintenance activities are classified in Table 7.6.1.

Table 7.6.1 Maintenance Activities for Road Facilities

Category	Classification	Routine	Preventive (periodic)	Emergency
Roadway	Road surface (AC pavement)	Crack sealing Patching	Overlay, partial reconstruction	Damage or road cut-off by slope failures, scouring, etc.
	Road surface (PCCP)	Crack sealing	Overlay, partial reconstruction	Damage or road cut-off by slope failures, scouring, etc.
	Shoulders and approaches	Vegetation control		
		Spot failure repair	Material addition and/or sealing	
Drainage	Culverts	Cleaning	Capacity increase	Cleaning debris
	Roadside Drains	Cleaning	Repair, addition	Cleaning debris
Roadside	Embankments	Vegetation control	Slope stabilization	Slope failure, settlement
	Cut slopes	Removal of fallen rock/boulders	Slope stabilization	Slope failure repair (grouted riprap, rock net)
Bridges	Superstructure	Drainage	Repainting (steel)	Joint repair
	Foundation		Scouring protection work	Scouring protection / repair
	Others	Approach road settlement	Approach slab construction	
Traffic control device	Information and regulation signs, markings, etc.	Repair	Repainting of markings, addition	Replacement of crushed signs, etc.
Safety devise	Guard rails, barriers, etc.	Repair	Repair and addition	Replacement of crushed guard rails, signs, barriers, etc.

7.6.2 ROUTINE MAINTENANCE FOR LTPBMC

The contractor is fully responsible for rehabilitation, PM and routine maintenance during the 5-year contract period in the case of LTPBM contract. The contractor should be also required to control overloaded vehicles on the contracted LTPBM road links as it will cause highly negative effects on pavements.

The DPWH shall be responsible for maintenance after the issuance of the Certificate of

Acceptance of LTPBM contract. The BOM is responsible for the overall maintenance management while the ROs/DEOs are responsible for the maintenance works implementation.

7.7 EXTERNAL RISKS

Some potential risks caused by uncontrollable external factors are anticipated through the implementation of the Project. Those risks and their proposed mitigation measures to be taken if possible are cited in the table below.

Table 7.7.1 Anticipated External Factors with Adverse Effects to Project

Potential Risks	Mitigation Measures to be taken possibly
Expansion of the funds needed for road maintenance not realized in current economical and political environment	Increase current MVUC rates through executive action, overcoming pressures
Revision of inadequate provisions of RA 8794 on overloading by legislation and provision of stiffer penalties not realized	Enhance public opinions against overloading
Not many contractors are interested in participating in LTPBM contracts	Conduct capacity development of contractors and consultants in this new business scheme though public information and training (workshops/ seminars)
Difficulty in sector reform involving attraction of more contractors to road maintenance	Right size the package and improve contract conditions, as well as undertake capacity development programs
Allocation of funds and selection of projects based on objective techno-economic criteria through PMS/HDM-4 distorted by external interference	Monitor overall funding mechanism to public works and road maintenance
Prospect for insufficient expansion of asphalt pavement due to current cost disadvantage and low technical capability of contractors	Strengthened capacity development for both DPWH and contractors
Natural disasters caused by heavy tropical-type rainfall, typhoons and earthquakes	Establish systematic emergency recovery measures against unavoidable disasters having a certain probability

Especially, it should be noted that sufficient counterpart fund of GOP (GAA and Road Fund) should be secured for the first year of LTPBM contracts since approximately 60% of the contract amount will be disbursed in this single year.

CHAPTER 8 PERFORMANCE INDICATORS

The project appraisal document for NRIMP-2 by WB provides arrangements for the project results monitoring to be made for both the project outcome indicators and intermediate outcome indicators. It specifies the baseline data 2008 and the data to be collected and reported in the years 2009-2012, frequency and reports, data collection instruments, and responsible agencies. It is suggested that primary indicators will be measured and managed through DPWH procedures for road surveys and information. Additional results covering a wide spectrum of agency performance and user opinions will be collected by the citizen's group, Road Watch, and published periodically.

The project outcome indicators to assess the overall project impact include:

(a) Administrative efficiency - reduced project delivery time,

(b) Sustainability of financing for national roads asset management – Increased cost recovery from road users,

(c) Value of investment - Reduced medium-term average cost of preserving paved national roads, and

(d) Road users' satisfaction with the quality of the national roads.

The intermediate outcome indicators meanwhile are composed of

(1) National roads as per standards for paving,

(2) Arterial national roads restored to good condition each year,

(3) Improved road asset management by DPWH,

(4) DEOs utilization of the maintenance by contract system,

(5) Improved corporate relations,

(6) Higher corporate integrity,

(7) Streamlined corporate structure.

On the other hand, the pre-FS report on REAPMP by JBIC/DPWH provides a set of performance indicators to be adopted and used by DPWH, as well as their targets at the ends of 2010 and 2014, in order to assess the progress and effectiveness of REAPMP. Data collection and reporting of these indicators are reviewed and rearranged in a way similar to NRIMP-2, as shown in Table 8.1. However, DPWH should take appropriate measures as some of the indicators like International Roughness Index (IRI) require a special measurement equipment which DPWH currently does not have and make RMMS workable.

Table 8.1 Tentative Arrangements for Project Performance Monitoring

Performance Indicators	Baseline 2009 or 2010	Targets				Data Collection & Reporting		Responsibility
		2011	2012	2013	After 2013	Frequency	Data Collection Instrument	
1. Greater Efficiency in Planning and Funding								
1.1 % of PM Projects Funded based on Needs using PMS/HDM-4	tbc	80%	85%	90%	90%	Annual	PMS, BOM & RPO databases	BOM, RPO, RB
1.2 % of RM Projects Funded based on RMMS	tbc	80%	85%	90%	90%	Annual	RMMS database	BOM, RPO
2. Improvement of Road Conditions or Service Level								
2.1 Average Road Roughness Measured by IRI	tbc	5.5	5.0	4.5	4.0	Annual	RBIA	PS, BOM
2.1 % of Paved Roads Rated Good or Fair Using IRI/ROCOND	39% (2008)	50%	60%	70%	80%	Annual	RBIA	PS, BOM
2.3 Pavement Road v.s. Total National Road Length	73% (2008)	76%	78%	80%	90%	Annual	RBIA	PS, BOM
2.4 Budget Allocation for Road Maintenance (billion peso)	12	14	15	16	20	Annual	RBIA	PS, BOM
3. Reduction in Road User Costs								
3.1 Reduction in Vehicle Operating Cost, vs. 2009	tbm	-10%	-15%	-20%	-25%	Annual	HDM-4	PS
3.2 Increase in Travel Speed based on Spot Surveys, vs 2009	tbm	10%	13%	16%	20%	Annual	BOM Survey	PS, BOM
3.3 Reduction in % Incidence of Overloading, vs. 2009	tbc	-2%	-3%	-4%	-5%	Annual	BOM records, LTO records	RO, LTO
3.4 Reduction in Incidence of Road Accidents, vs. 2009	tbc	-10%	-15%	-20%	-30%	Annual	PNP records, TARAS	PS, RO
4. Improved Project Implementation								
4.1 % of Maintenance Projects Completed on Schedule	tbc	80%	85%	90%	95%	Annual	BOM records	BOM, RO
4.2 % of cases where Maintenance Defects were Remedied within the Prescribed Time	tbc	85%	90%	95%	95%	Annual	BOM records	BOM, RO
4.3 % of Maintenance Project Completed within Budget	tbc	85%	90%	95%	95%	Annual	BOM records	BOM, RO
4.4 % of Maintenance Projects Complying with the Technical Audit	tbc	85%	90%	95%	95%	Annual	BOM records	BOM, RO
5. Others								
5.1 % Reduction in COA Disallowance and Reported Irregularities on Maintenance Activities	tbc	-20%	-25%	-30%	-40%	Annual	COA records	DPWH, COA
5.2 % Reduction in Adverse Internal Audit Findings on Maintenance Activities	tbc	-20%	-25%	-30%	-40%	Annual	IAS records	DPWH
5.3 Report Card Rating by Bantay Lansangan Partnership	tbc	85%	90%	95%	95%	Quarterly	BL Reports	BL, DPWH
5.4 Staff Number v.s. Current Staff Number	100%	95%	93%	90%	70%	Annual	DPWH records	PS

Note: tbc: to be calculated, tbm: to be measured

CHAPTER 9 AGREED ACTION PLANS

To efficient and effective implementation of the entire road enhancement and asset preservation/management program, the Pre-FS for REAPMP conducted by JBIC/DPWH produced a set of conditionalities to be adopted and carried out by the Government of the Philippines (GOP). The conditionality matrix given in this Pre-FS report provides for each of the three major areas covering 1) planning and financial aspects, 2) technical aspects, and 3) governance and accountability aspects. Said matrix includes specific issues, current situation, root causes, reform measures, responsible agencies and target period.

Keeping the basic framework unchanged, the review and rearrangements of the original matrix have been undertaken and are still in progress. The formation of the revised matrix will be composed of the objectives, action measures, and intensity of recommendation, together with the actions to be taken by GOP in the initial phase of the REAPMP implementation. It will also include the evaluated intensity of the features of the action measures, and the intensity of GOP's relationship with JICA concerning the latter's involvement in REAPMP and JICA Technical Cooperation Programs.

The reform measures which were all components of the conditionality in the original Pre-FS matrix are finally renamed the "agreed action plans" and ranked into A, B or C according to the intensity of recommendation. Their definitions are tentatively determined by JICA as follows;

Agreed Action Plan A: Action measure which is most strongly recommended so that JICA may not ensure the continuation of the succeeding phase of the program if GOP fails to achieve it during the current phase.

Agreed Action Plan B: Action measure of which the progress toward achievement is monitored during the program implementation, and

Agreed Action Plan C: Action measure to be achieved by GOP on a longer-term basis.

The action measures for the intensity to be evaluated include features such as importance, urgency, and difficulty. According to the relative intensity, action measures are ranked as A, B, or C for each of the three features. Thus, the necessity of the action measure is evaluated.

The proposed set of the agreed action plans has not been finalized yet. After the finalization, negotiations between JICA and GOP on this matter will take place prior to JICA's appraisal.

The updated draft for the agreed action plans matrix, produced jointly by the JICA Survey Team and JICA's designated team of consultants, is contained in Annex 9. Its summary is shown in Tables 9.1(Agreed Action Plan A and B) and Table 9.2 (Agreed Action Plan C) below.

Table 9.1 Summary of Agreed Action Plans (Agreed Action Plan A and B)

Objectives	Action Measures	Type of Recommendations	JICA Related	Donor Assistance
I. PLANNING AND FINANCING ASPECTS				
I.1 Improve National Road Network Based on Definitive Long-Term Asset Preservation Framework	**I.1.1** Establish long-term asset preservation/maintenance strategy	B	C	-
	I.1.2 Enhance Multi-Year (Medium-Term) Rolling Program (Network/Program Analysis) based on the long-term strategy	**A**	A	REAPMP, NRIMP, RSIP
I.2 Optimize Project Selection and Budget Allocation for Asset Preservation	**I.2.2** Make Routine Maintenance Management System (RMMS) workable	B	B	RSIP
I.3 Raise Road Maintenance Fund Levels to Cover Needs.	**I.3.1.e** Provide timely matching counterpart fund for Preventive Maintenance Component of REAPMP	**A**	A	REAPMP
I.4 Improve ICT System for Road Planning and Management	**I.4.1** Install communication facilities to connect 30 DEOs to DPWH WAN **I.4.2** Supply IT hardware and software to remaining 30 DEOs	B	A	REAPMP-ICD
	I.4.3 Provide expert advisory and training services to MIS for evaluation and prioritization of IT projects	B	B	REAPMP
II. TECHNICAL ASPECTS				
II.1 Improve/Upgrade Maintenance Practices	**II.1.1.a** Sustain MBC (from current 70% to 90%)	B	C	-
	II.1.1.b Continue PM works by contract using sizable packages to attract contractors	**A**	A	REAPMP- PM
	II.1.2 Introduce Design-Build (DB) scheme as pilot case in REAPMP	B	A	REAPMP- LTPBM
	II.1.3.a.1 Enhance and institutionalize LTPBMC (including pilot projects under REAPMP)	**A**	A	REAPMP- LTPBM
	II.1.3.b Orient/educate contractors on LTPBMC	B	A	REAPMP- LTPBM
	II.1.4.a Undertake road condition rating using IRI measurements	B	A	JICA-TCP/REAPMP
	II.1.4.b Conduct training of project engineers, maintenance inspectors, et al	B	A	JICA-TCP/REAPMP
	II.1.7.b Supply emergency disaster recovery equipment	B	A	REAPMP-ICD
	II.1.8.a Implement programs of JICA Technical Cooperation for improvement of Quality Management for Highway and Bridge Maintenance	B	A	REAPMP, JICA-TCP
	II.1.8.b Conduct master plan study on road and bridge asset valuation and management	B	A	JICA-TCP
II.2 Enhance Design Systems	**II.2.1.a** Undertake revision/updating of DPWH design guides (1982) and standard drawings	B	A	NRIMP-II
	II.2.3 Improve design preparation and review process/QA/check-engineer capacity of BOD/ROs/DEOs	B	A	REAPMP-ICD
II.4 Provide for More Effective Procurement Practices	**II.4.1** Fully implement DPWH procurement manual including timelines and downloadable SBDs down to District Level	B	C	-
	II.4.1.a1 Install and implement Agency Performance Indicators for procurement	B	C	-
	II.4.1.a2 Apply stiff sanctions for breaches on procurement rules	B	C	-
	II.4.1.b Improve and decentralize computerized eligibility screening and post qualification of bidders down to District level	B	B	RSIP-I
	II.4.1.d Provide for procurement evaluation (audit) system by third parties	B	B	NRIMP-II
	II.4.2 Undertake capacity building program for DPWH, local contractors and consultants for road maintenance works	**A**	A	REAPMP-ICD
	II.4.3.a Adopt new IRR for RA 9184 for locally-funded and foreign-assisted projects under national competitive bidding	B	C	-
	II.4.3.b Review and improve contract conditions to address one-sided conditions	B	C	-
II.5 Strengthen Project Management	**II.5.1.b1** Train engineers and foreman of contractors, introduce qualification requirements based on examination	B	A	REAPMP-ICD
	II.5.1.b2 Use Constructor's Performance Evaluation System (CPES) and develop Consultant's Performance Evaluation System for eligibility screening and monitoring of performance	B	C	-
	II.5.2.a1 Train, equip, fund and field more QAUs for maintenance works	B	A	REAPMP-ICD
	II.5.2.a2 Strengthen/install additional field laboratories to handle materials testing and QA	B	A	
	II.5.2.a3 Strengthen validation teams composed of senior officials	B	A	
	II.5.3.a Establish a performance management system for DPWH planning, design, construction and maintenance engineers with incentives and sanctions	B	C	-
II.6 Reduce the Incidence of Overloaded Vehicles	**II.6.2.a1** Refurbish/upgrade inoperable weighbridges (at least 15 weighbridges)	B	A	REAPMP-ICD
	II.6.2.a4 Install additional weighbridges	B	A	
	II.6.2.a5 Provide dedicated MVUC Special Road Safety Fund for O&M of weighbridges	B	A	REAPMP-ICD
III. GOVERNANCE AND ACCOUNTABILITY ASPECTS				
III.1 Strengthen Internal Control System	**III.1.1** Establish Program Office (REAPMPO) and Steering Committee for REAPMP	**A**	A	REAPMP
	III.1.2-a Refine and roll out eNGAS to Regional and District offices	B	B	PEGR
	III.1.2-b Strengthen Internal Audit Service to do system and risk based audits	B	B	PEGR, NRIMP-II
	III.1.3 Develop and implement a performance monitoring and evaluation system linked to OPIF	B	B	PEGR, RSIP
III.2 Promote Greater Accountability and Transparency	**III.2.2** Support Bantay Lansangan to monitor and analyze the use of road funds (GAA & MVUC) and performance of road agencies (DPWH & RB)	B	B	NRIMP-II, PEGR
III.3 Rationalize Staffing and Improve Productivity	**III.3.2** Enhance capability of DPWH staff under the streamlined organization	B	A	REAPMP-ICD
	III.3.3.a Support capacity development of DPWH, contractors and consultants to increase outsourcing of road services	**A**	A	REAPMP-ICD

Note: JICA: (Relation with JICA) : **A** - JICA related programs; **B** -On-going/planned by NRIMP, ADB-RSIP, AusAID-PEGR; **C** - Not by JICA but other donors
Type of Recommendations: A: Strong, B: Medium, C: Long-term

Table 9.2 Summary of Agreed Action Plans (Agreed Action Plan C)

Objectives	Action Measures		Type of Recommendations	JICA Related	Donor Assistance
	Long-Term Action Measures	More Immediate Action Measures			
I. PLANNING AND FINANCING ASPECTS					
I.2 **Optimize Project Selection and Budget Allocation for Asset Preservation**		**I.2.3.a** Post on the DPWH and DBM websites all fund programs and expenditures	C	C	-
		I.2.3.b Reduce employment oriented roadside activities from above 50% to 30% of routine maintenance (RM)	C	C	-
		I.2.3.c Limit labor cost component of 40% of RM (Part of I.2.2 RMMS)	C	C	-
I.3 **Raise Road Maintenance Fund Levels to Cover Needs.**		**I.3.1.a** Mobilize additional funds for road maintenance through ODA with MVUC and GAA as counterpart funds	C	C	-
		I.3.1.b Increase current MVUC rates through executive action in accordance with the provision of RA 8794, including increase in overloading penalties.	C	B	PEGR
	I.3.1.c Establish additional sources of road maintenance fund, including fuel levy/surcharge		C	B	NRIMP-II
		I.3.1.d Include Road Fund as a priority area for monitoring.	C	B	NRIMP-II, PEGR
II. TECHNICAL ASPECTS					
II.1 **Improve/Upgrade Maintenance Practices**		**II.1.3.c.** Adopt large-sized contract packages to attract local contractors	C	B	NRIMP-II
		II1.7.a Introduce new products and techniques for pothole repair including: 1) pre-mixed asphalt concrete, 2) cold-mixed asphaltic concrete, 3) hot-mixed design	C	C	-
		II.2.1.b Institutionalize value engineering for projects costing at least Php 50 M	C	C	NRIMP-II
		II.2.2 Make operational computer-assisted Cost Estimation System (CES)	C	B	NRIMP-II
II.3 **Enhance Road Safety Considerations**		**II.3.1.a** Provide implementation guidance and training on TARAS data review, encoding and analysis down to DEOs	C	B	RSIP-I
		II.3.1.b Undertake renewal/installation of computers and IT for TARAS at ROs and DEOs	C	B	NRIMP-II; RSIP-I
		II3.1.c Review and establish better coordination between PNP and DPWH	C	B	RSIP-I
		II.3.2 Review/update/improve geometric design guide (1982) to enhance safety aspects	C	C	-
II.4 **Provide for More Effective Procurement Practices**	**II.4.1.c** Establish online bidding procedure and facilities		C	C	REAPMP
		II4.3.c Propose JICA to become a member of the MDB and allowed to use the harmonized edition of FIDIC conditions of contract	C	A	
II.5 **Strengthen Project Management**		**II.5.1.a1** Engage private consultants and technical auditors to assist DPWH in maintenance project supervision	C	B	
		II.5.1.a2 Utilize Project Management and Construction Supervision Manuals prepared by JICA TCP-Phase I	C	A	REAPMP
	II.5.1.a3 Train project engineers, inspectors and material engineers		C	A	REAPMP
		II.5.2.b Apply method for implementation of pavement works in dry season, including advanced design and bidding	C	C	-
		II.5.4 Strictly enforce policy to limit variation orders to not more than 10% of original contract based on IRR of RA9184	C	C	-
II.6 **Reduce the Incidence of Overloaded Vehicles**	**II.6.1** Introduce legislation (as part of overall amendment of RA 8794)				
	II.6.1.a Clarify contradictions between GVW limit and axle load limit and amend allowable GVW and axle load		C	B	PEGR
	II.6.1.b1 Provide stiffer penalties for repeated overloading offenses		C	B	PEGR
	II.6.1.b2 Provide incentives and assistance to trucking industry to be more efficient		C	B	PEGR
		II.6.2.a2 Provide impounding areas for overloaded vehicles	C	C	-
		II.6.2.a3 Install computer system for recording and giving warning for overloading	C	C	PEGR
	II.6.2.b1 Transfer from PS to BOM the responsibility for overseeing the weighbridge operations		C	B	PEGR
	II.6.2.b2 Sustain full 24 hour staffing and operation of weighbridges either in-house or through private operator		C	B	PEGR
	II.6.2.b3 Train staff and enforce load limit strictly. Impose sanctions on erring staff		C	B	PEGR
	II.6.3 PNP and LTO to deputize DPWH to enforce load limits		C	B	PEGR
III. GOVERNANCE AND ACCOUTABILITY ASPECTS					
III.3 **Rationalize Staffing and Improve Productivity**		**III.3.1** Implement rationalization plan or alternative plan (if RP is not approved) to right-size DPWH	C	C	-
	III.3.3.b. Establish qualification system of contractors and consultants to increase outsourcing of road services		C	C	-
III.4 **Improve Road Service Facilities**	**III.4.1** Include in design guide and implement the provision of service facilities, amenities like roadside rest areas and shops, and informative and directional signs, etc.		C	A	JICA-TCP RSIP-I
	III.4.2 Promote work ethics with emphasis on public service and accountability.		C	B	NRIMP-II

Note: JICA: (Relation with JICA): **A** - JICA related programs; **B** -On-going/planned by NRIMP, ADB-RSIP, AusAID-PEGR; **C** - Not by JICA but other donors;
Type of Recommendations: *A*: Strong, *B*: Medium, *C*: Long-term

Incidentally, it should be noted that in NRIMP funded by WB, the terminologies such as conditionalities, covenants, and triggers are used. Such definitions are as follows:

- Conditionalities or loan/credit effectiveness conditions in NRIMP are the conditions which must be fulfilled to make the funded project effective,
- Triggers are the conditions to be cleared to continue the subsequent phase of the multiple-phase project, while
- Covenants are the targets to be achieved incrementally during the project period and monitored/reported periodically or regularly, but not related to the fund disbursement.

In NRIMP-2 most of the covenants are related to the ICD components (such as business process improvements, organizational effectiveness, road partnership, road management service delivery, integrity support, strategic sector reform, and training and workshop) rather than the national road improvement and asset preservation part. GOP is therefore requested to implement the project, clearing each of the covenants.

Moreover, in order to monitor the project achievements, NRIMP-2 sets up the framework and targets for monitoring the project results. It provides four project outcome indicators, namely, reduced project delivery time, increased cost recovery from road users, reduced medium-term average cost of preserving national paved roads, and road users' satisfaction with national road system. There are also several intermediate outcome indicators provided, e.g. at least 130 km is added by the project to the paved national roads by December 2012, etc.

Similarly, the above agreed Action Plans provide the actions to be taken in each of the first three years of REAPMP implementation and thereafter for each of the action measures.

CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

The conclusions of the survey are as summarized below:

(1) The key issues in the road sector of the Philippines are:

1) Limited quality of roads compared to the importance of the national road network, due to insufficient budget allocation to and utilization by DPWH to cover the needs, and external influences to the expenditure of the Road Fund (Motor Vehicle User Charge).

2) Inadequacy in road planning and management system, comprising the lack of long-term road development and asset management plan, inappropriate application and integration of the various advanced road development and management systems developed so far with the assistance of WB and ADB and insufficient capacity of ROs and DEOs for project implementation and management.

3) Overloading are adversely affecting road pavements and bridges due to unsuitable legal limits for the maximum allowable gross vehicle weight and axle load, insufficient enforcement of regulations, and deteriorated/outdated overloaded vehicle control equipment (weighbridges).

4) Insufficient capacity in design, construction and maintenance on work items such as PCC pavement and AC overlays, quality assurance and maintenance technology.

5) Increase in construction costs mainly due to the significant world price hikes of raw materials for oil, asphalt, cement and steel during the period 2005-2008.

(2) The key issues in national road maintenance are:

1) EMK to be replaced by RMMS, which has been developed but still non-operational, for planning and managing routine maintenance.

2) Wide funding gap between the allocated budget and actual needs, for which recommended measures include a) increasing the allocation from GAA temporarily, which should be subsequently covered with the fund from road users, b) introducing the beneficiaries-pay principle such as fuel surcharge and increased rates of MVUC, and c) introduction of the toll collection system over some portion of the national road network in combination with LTPBMC (private sector participation).

3) Large maintenance backlog should be solved within the short- to medium-term period to avoid further investment increase.

(3) The rationalization plan for DPWH is still in slow progress with important policy changes in its proposed structure, including the deferment of the creation of the Road Maintenance Authority, commercialization, etc. The rationalization plan includes the targeted MBC and MBA ratio of 90%:10%, the privatization of BOE, downsized manpower, etc. Consequently, all DPWH organization including ROs and DEOs should have standardized slim organizational structures.

(4) The scope and components of REAPMP comprising UI, asset preservation programs (LTPBM and PM), and ICD have been reviewed and subsequently revised/rearranged, as follows:

1) The total road length covered by the proposed REAPMP is 1,523 km, compared to 1,655 km previously approved in NEDA-ICC, which has expired as of the end of

August 2009.

Component	Project Code No.	Project Name	Road Works					Bridge Works	
			Project Length (km)	UI (km)	RH (km)	PM (km)	RM (km)	Replacement or Widening (No)	(m)
I. Road Upgrading / Improvement (UI)									
	UI-1	Bongabon - Rizal/ Pantabangan - Baler	51	3				6	194
	UI-2	Lipa - Alaminos	17	7				0	0
	UI-3	Mindoro West Coast Road	153	71				13	365
	UI-4	Catanduanes Circumferential Road	64	47				3	250
Total			**286**	**128**	**0**	**0**	**0**	**22**	**809**
II. Long Term Performance Based Maintenance (LTPBM)									
	PBM-1	Aringay - Laoag	242		93	149	1,211		
	PBM-2	Sta.Rita-Bdr.N.Ecija	169		63	107	847	1	45
	PBM-3	Sipocot - Baao	110		42	68	548		
	PBM-4	Surigao (Lipata) - Bdr.Agusan D.N.	124		45	79	618	1	84
Total			**644**	**0**	**242**	**403**	**3,222**	**2**	**129**
III. Preventive Maintenance (PM)									
	Pre-Fixed Road Links (moved fro		93			93			
	HDM-4 selected Road links		500			500			
Total			**593**	**0**	**0**	**593**	**0**	**0**	**0**
Grand Total			**1,523**	**128**	**242**	**996**	**3,222**	**24**	**938**

Note: UI; Upgrading / Improvement, RH; Rehabilitation, PM; Preventive Maintenance, RM; Routine Maintenance

2) UI covers four road links with a total project length of 286 km and 54 bridges, with total length of 3,394 m. The length of improvement from gravel roads to concrete pavement is 128 km in total. Reconstruction and widening are proposed for 22 bridges, with 809 m in total length.

3) LTPBM meanwhile consists of four road links with 644 km total length, including bridge maintenance (approximately 8,000 m in total) and reconstruction of 2 bridges (129 m in total). Preventive Maintenance (PM) includes 593 km of total road length.

4) ICD has subcomponents consisting of equipment supply, including new weighbridges, laboratories, emergency disaster response equipment and IT and software, capacity development in program/project implementation and management, human resources development, and project/program implementation assistance.

(5) The estimated costs and economic validity of REAPMP are as follows:

1) The total base cost (2009 Price) is estimated at Php 20.8 billion, comprising Php 5.2 billion (24.9%) for UI, Php 14.2 billion (68.5%) for LTPBM and PM, and Php 1.4 billion (6.6%) for ICD. Out of the total amount, civil works cost is Php 17.7 billion (85.2%), consultancy services is Php 1.5 billion (7.3%), and others at Php 1.6 Billion (7.5%).

2) Adding the physical and price contingencies, VAT, and administration cost to the base cost, the total program cost is estimated at Php 29.1 billion, as compared to Php 28.2 billion previously approved in the NEDA-ICC.

3) Economic analysis undertaken resulted in a favorable economic feasibility (positive NPV or B/C>1.0 or EIRR>15%) for all 13 cases (4 for UI, 6 for LTPBM, and 3 for PM). The PM programs, with 500 km in total length as selected by PMS/HDM-4, also indicated NPV/CAP in positive values (IRR>15%).

4) After segregating the project cost into foreign and local currencies, the project funding

plan by project component and funding source was developed. As a result, the amounts from GAA and MVUC of GOP, and the Japanese ODA Loan are estimated at Php 9.0 billion (30.8%), Php 2.8 billion (9.7%), and Php 17.3 billion (59.5%), respectively. The Japanese loan amount is estimated at 34.4 billion yen.

(6) The Program implementation schedule will be as follows:

1) JICA will conduct the project appraisal in November 2009 and the Loan Agreement will be signed by the end of March 2010.

2) Procurement of consultants starts in April 2010 and will be completed within six months.

3) Implementation of UI projects: six months for detailed engineering design and bidding documents preparation, and nine months for the procurement of the civil works contractor. The construction period is for two – three years.

4) Implementation of LTPBM projects: six months for detailed engineering design/ conceptual design for a pilot design-build contract and bidding documents preparation, and nine months for civil works contractor procurement. The contract period is for five years.

5) Implementation of PM programs: three annual work programs from 2011 to 2013.

6) Implementation of ICD programs from 2011 to 2013.

(7) Based on the Philippines EIA system, it is ascertained that the environmental and social considerations for the Project conform well to the JICA (and JBIC) guidelines. Among the projects under REAPMP, four UI projects require acquisition of ECC. The EIA study was conducted and ECC was already issued for these projects. The ECCs for the UI projects are judged to be still valid, except for the Bongabon-Baler project for which DENR requires DPWH to submit supplemental EIS and monitoring reports. DPWH is advised to take actions on this matter.

10.2 RECOMMENDATIONS

The recommendations for the REAPMP implementation are summarized as follows:

(1) Recommendations on addressing the key issues in the road sector and road maintenance include:

1) Establishment of a medium-/long-term national road and bridge improvement and maintenance plan and strategy, which is essentially required for the definite and steadily kept national investment target for both asset management and infrastructure development.

2) Promotion of LTPBM aiming for the reduction of the life-cycle costs and increase of maintenance efficiency towards the future.

3) Enhancement of cooperation and coordination among donors assisting GOP for national road network development and maintenance.

4) Action on planning and financing, technical, and governance and accountability aspects listed up in Chapter 9 of this report.

(2) Recommendations on the project implementation plan, schedule and some specific engineering aspects are as follows:

1) A new unified REAPMP Program Management Office (REAPMP-PMO) should be

established for the administration and management of REAPMP.

2) Consultancy services should be procured reflecting the three project components: UI project, Asset Preservation Programs (LTPBM and PM monitoring services), and ICD. DPWH should commence the procurement process soon after the signing of the JICA loan agreement, since this will take about six months.

3) With assistance from the consultants, DPWH should conduct sufficient training for the anticipated bidders (contractors) on the project information and LTPBM contract, including scope of works, maintenance obligations, technology, payment methods, management methods and risks.

4) The detailed engineering design for LTPBM should include existing pavement investigation using FWD and IRI equipment in order to provide bidders with adequate and rational information. The intervention level for AC overlay should be determined by the existing pavement roughness measured by IRI equipment to ensure transparency, accountability and equality.

5) A pilot design-build scheme of LTPBM should be applied for the Sipocot – Baao Road (109 km in length) in Region V.

6) The Lipa – Alaminos road under UI project, which is currently classified as city and local road, should be converted to national road status by the time of the JICA project appraisal.

7) Existing detailed designs of the Bongabon–Baler Road and the Catanduanes Circumferential Road should be fully reviewed to reduce the cost to the estimated cost level in this survey.

(3) The following ICD and enhancements are recommended for REAPMP:

- Overload Vehicle Control Enhancement (8 new locations and 4 refurbishing)
- Quality Control Enhancement (8 new sub-regional laboratories)
- Emergency Road Disaster Recovery Equipment for 10 DEOs
- Communication Network and IT Equipment/Software for 30 DEOs
- Capacity Development Support Equipment for the remaining 13 Regional Offices of DPWH
- Consultancy Services for ICD, including information management planning, reform monitoring assistance and capacity enhancement for contractors, consultants and DPWH officers.

The Technical Assistance on the REAPMP Phase II and PPP requested by DPWH through a grant should be proposed to JICA for application of development study facility (technical assistance grant). The appropriate technical assistance will be a national road master plan study, including establishment of a long-/medium-term national road and bridge improvement and maintenance plan, road asset management strategy (LTPBM strategy), a road map for the proposed Road Maintenance Authority, and efficient integration with other transport modes.

(4) Capacity development of ROs and DEOs should be continued either with technical assistance of GOJ if JICA TCP-2 is accepted or by own resources of DPWH, if not accepted by GOJ, as it is one of the essential parts of the ICD on road maintenance.

(5) REAPMP shall be financed by GOP (GAA and Road Fund) and through an ODA loan from GOJ, taking the following recommendations into considerations.

1) Appropriate financing share should be discussed and agreed during the JICA project appraisal scheduled in November 2009.

2) GOP should provide sufficient counterpart fund at appropriate timing for the project implementation. It should be noted that approximately 50% of the project cost needs to be invested in 2012.

3) The civil works required for the installation of eight new weighbridges and establishment of eight new sub-regional laboratories should be included in the ODA loan component.

(6) Approval of REAPMP by the NEDA-ICC has expired as of the end of August 2009. DPWH should prepare a new (or revised) NEDA-ICC proposal based on this Final Report and resubmit to NEDA for approval just after the project appraisal of JICA scheduled in November 2009. This would enable the signing of the Loan Agreement by the end of March 2010.