

**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  
SUMMARY**

OCTOBER 2009

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

**NIPPON KOEI CO., LTD.**

EID
CR(2)
09-120

## 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**

**Legend :**

- 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
- Region XIII (CARAGA)
- ARMM
- LTPBM Road
- UI Road

PBM-No	Road Link Name for LTPBM Length (Km)
UI-No	Road Link Name for Upgrading / Improvement Length (Km)

**Preventive Maintenance (PM)**

**Pre-fixed Road Links (L=93.01 Km)**

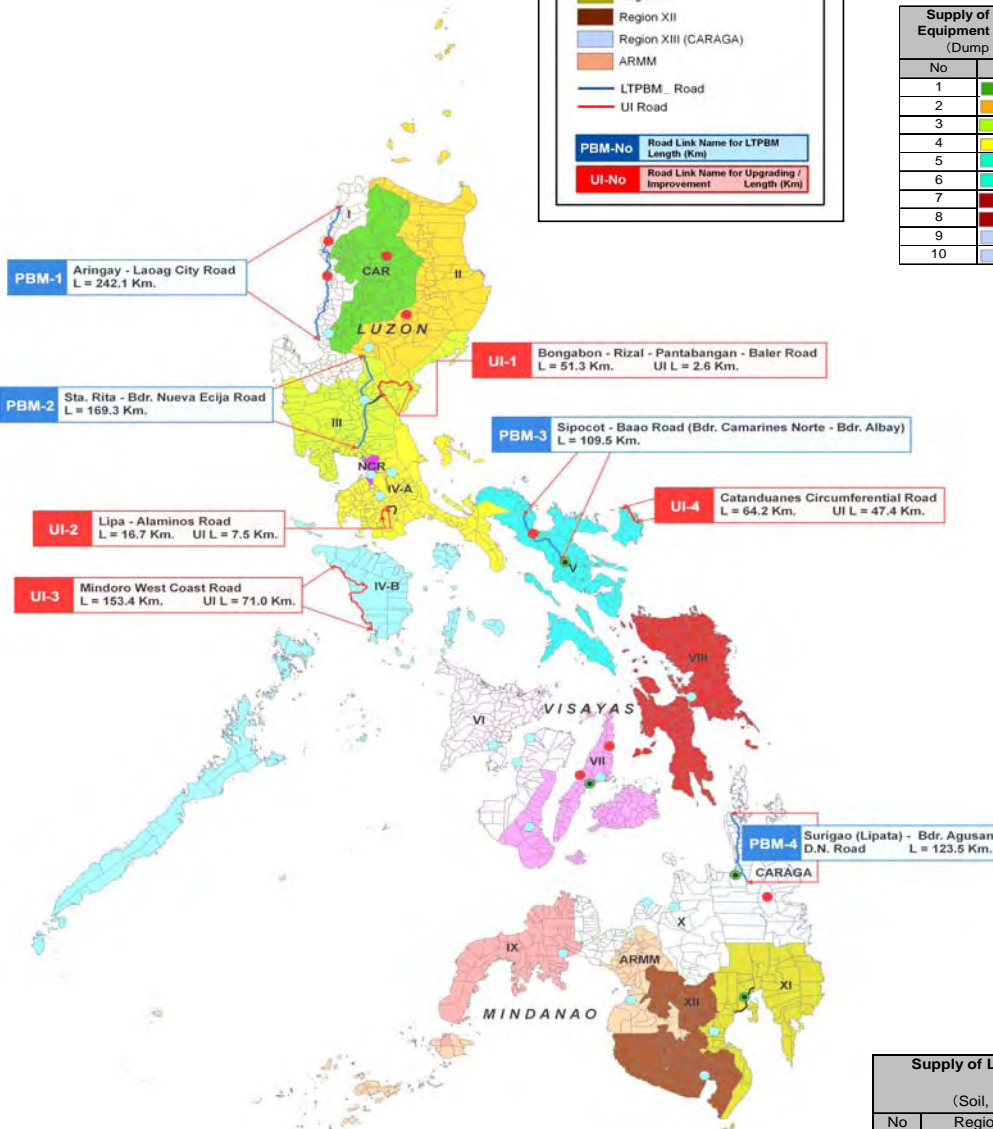
- Region III
- Region IV-A CALABARZON
- Region XI

**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

## SUMMARY

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### 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
<b>I</b>	
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
<b>J</b>	
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
<b>K</b>	
km	kilometer
<b>L</b>	
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
<b>M</b>	
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
<b>N</b>	
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
<b>O</b>	
ODA	Official Development Assistance
OJT	On-the-Job Training
OPRC	Output and Performance-based Road contract
<b>P</b>	
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
<b>Q</b>	
QA	Quality Assurance
QAU	Quality Assurance Unit
QC	Quality Control
<b>R</b>	
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
<b>S</b>	
SONA	State of the Nation Address of the President
SRNH	Strong Republic Nautical Highway
SRSF	Special Road Safety Fund
<b>T</b>	
TA	Technical Assistance
TARAS	Traffic Accident Recording and Analysis System
TCP	Technical Cooperation Project
TOR	Terms of Reference
TWG	Technical Working Group
<b>U</b>	
UI	Upgrading or Improvement
USEC	Under Secretary
US\$	United States Dollar
<b>V</b>	
VAT	Value Added Tax
VCI	Visual Condition Index
VOC	Vehicle Operation Cost
<b>W</b>	
WB	World Bank

## SYNOPSIS

<b>1. Country</b>	Republic of the Philippines
<b>2. Name of Study</b>	Preparatory Survey for Road Enhancement and Asset Preservation Management Program (REAPMP)
<b>3. Counterpart Agency</b>	Department of Public Works and Highways
<b>4. Objectives of Study</b>	<ol style="list-style-type: none"> <li>1. Enhancement of the Road O&amp;M System</li> <li>2. Selection of national road links for a Japanese ODA Loan for implementation of REAPMP and confirmation of the scope of the program</li> </ol>
<b>5. Study Area</b>	All over the country
<b>6. Scope of Study</b>	
<ol style="list-style-type: none"> <li>1) To collect the basic data on roads and bridges, including the current condition, relevant institutions, and the extent of assistance by major donors,</li> <li>2) To collect and analyze the present O&amp;M system for roads and bridges, and recommend improvement measures,</li> <li>3) To confirm and propose the projects/programs to be funded by a Japanese ODA Loan for asset management, and</li> <li>4) To confirm the conditions concerning the social and environmental considerations for the Japanese ODA Loan projects.</li> </ol>	
<b>7. Major Findings</b>	
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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%).</p>	

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.

## **1. INTRODUCTION**

### **1.1 BACKGROUND**

In order to assist accomplishing the development visions and goals, DPWH formulated the Medium-Term Public Investment Program of DPWH (2005-2010) which tackles the following three major challenges of the road sector, i.e. Low level of national road development; Low level of investment to road development and O&M, insufficient budgets, and inefficient budget execution; and DPWH's insufficient capacity for planning, implementation and management

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.

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 PPP application for existing national roads.

### **1.2 SURVEY OBJECTIVES**

The objectives of this Survey are as follows:

- i) Enhancement of the Road O&M System
- ii) Selection of national roads to be included in the Japanese ODA Loan for implementation of REAPMP (Road Enhancement and Asset Preservation Management Program) from the projects requested by GOP for Japanese ODA

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 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) for each of the above survey components 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:

- |   |          |
|---|----------|
| a) JLM3, Aringay – Laoag                                  | L=242 km |
| b) JLM6, Talavera – Rita – Bongabon – Pantabangan – Baler | L=119 km |
| c) JLM1, Sta. Rita – Nueva Ecija                          | L=160 km |
| d) JLM10, Lipa – Alaminos – San Pablo – Tiaong            | L=43 km  |
| e) JLM2, Sipocot – Baao                                   | L=100 km |
| f) JLM11, Catanduanes Circumferential Road                | L=58 km  |
| g) JLM8, Mindoro West Coast Road                          | L=119 km |
| h) 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	
<b>Institutional Capacity Building (ICB)</b>	
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
<b>Technical Assistance (TA)</b>	
	(1) Formulation of PPP
	(2) Formulation of Future REAPMP-Phase II, including engineering design

Source: Pre-FS Report, July 2007

## 1.4 SURVEY PROGRESS

The survey work in the Philippines commenced on March 16, 2009, on which the Inception Report was submitted. Since then the work on assembling of basic data on national roads and bridges, site reconnaissance survey, analysis of the present O&M systems, and confirmation of REAPMP projects to be assisted by Japanese ODA Loan as well as the relevant environmental and social considerations had been undertaken by the Survey Team. Compiling those contents, the Progress Report was submitted on July 10, 2009.

After that, the work of Survey was continued on the confirmation and proposal on the ODA Loan project and 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 4<sup>th</sup>, 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 plans for the Project and DPWH reform
- Conclusion and recommendations

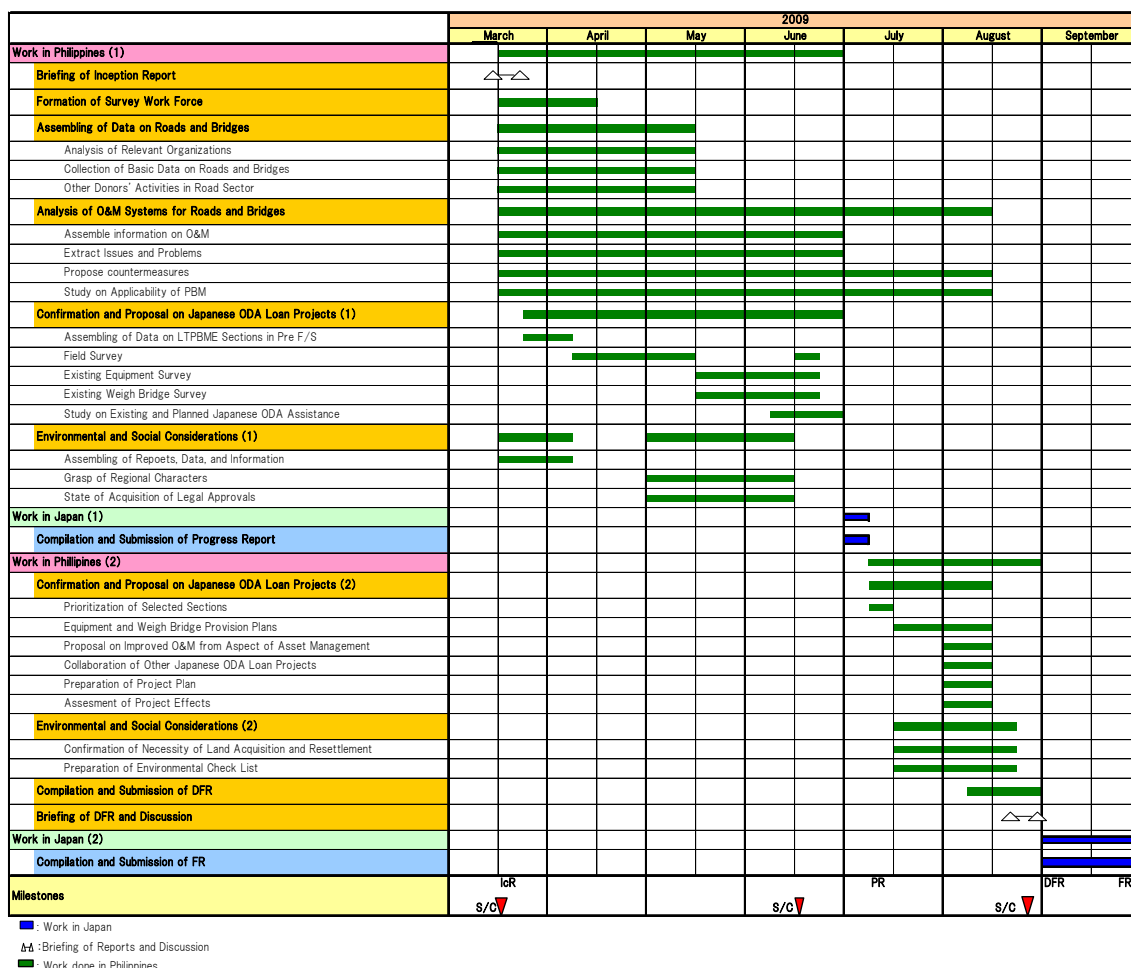


Figure 1.4.1 Progress of Work

## 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.

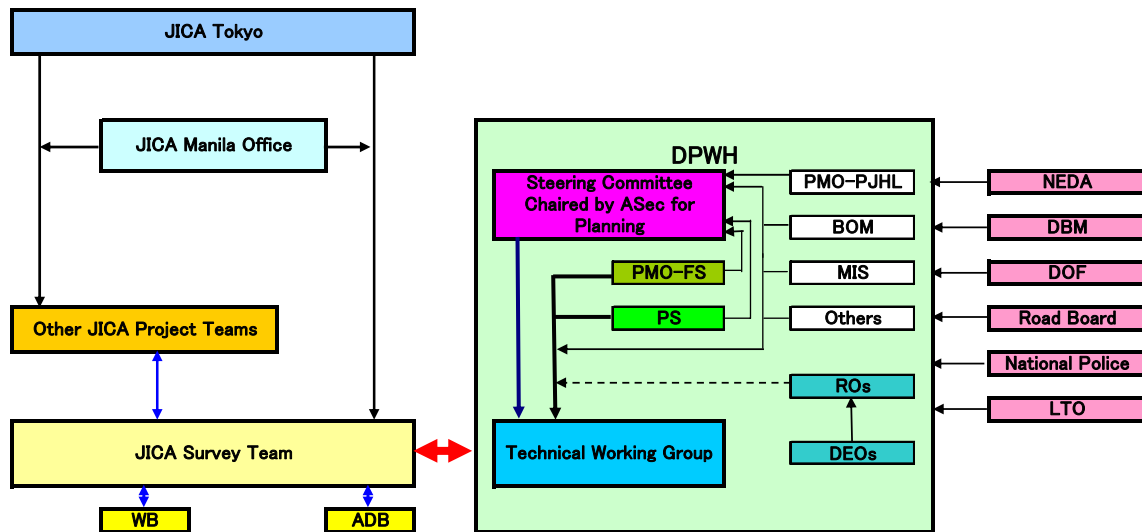


Figure 1.5.1 Inter-Organizational Linkage for Survey

## **2. CURRENT SITUATION OF THE ROAD SECTOR**

### **2.1 NATIONAL POLICY AND DEVELOPMENT PLANS**

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

The country will focus on strategic measures and activities, which will spur economic growth and create jobs in the Medium-Term Philippine Development Plan (MTPDP), 2004-2010. This can only be done with a common purpose to put the economic house back in working order.

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

The government is aiming to achieve its growth targets on account of 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.

#### **(2) Medium-Term Infrastructure Program of DPWH (MTIP), 2005-2010**

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

Under the program DPWH is seeking to accomplish:

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 Government with the following pertinent thrusts relating to road infrastructure:
  - Complete the Nautical Highways.
  - 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, traffic management and intersection improvement 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 through the paving and improvement of 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.

### **(3) Nautical Highway System**

The Philippines will develop from fragmented and island economies separated by mountains and seas into a unified, well-integrated economy where people and goods can move and trade swiftly and efficiently, locally and internationally, if an efficient transport network is developed. Inter-island routes provide regular roll-on roll-off (RORO) 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 RORO system to transport product from Mindanao through Visayas to Luzon. It will reduce travel time by 10 hours and costs by 40% for passenger and 30% for cargo.

In addition to the Western Nautical Highway, the nautical highway system shall be completed through the other two routes, the Central Nautical Highway and the Eastern Nautical Highway.

### **(4) State of the Nation Address (SONA)**

The 2009 State of the Nation Address (SONA) on July 27, 2009 is summarized as follows:

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 Republic 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. In summary;

1. The Republic has a strong economy in a good fiscal position to withstand global shocks.
2. The Republic built new modern infrastructure and completed unfinished ones.
3. The economy is fairer to the people than ever before.
4. The Republic 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 Government's accomplishments, sectoral and more detailed in nature, the SONA strategic infrastructure road projects are one of the major focuses for development of the country to support the GOP's second phase of economic reforms. More specifically, the accomplishment of the restructuring of the Philippine economy into the five Super Regions, introduced in 2006 as a development concept to boost economic growth and job creation, including North Luzon Agribusiness Quadrangle, Luzon Urban Beltway, Central Philippines, Agribusiness Mindanao, and Cyber Corridor, is envisaged.

### **(5) Direction of the Road Sector Development Policy in the Next MTPDP (2011-2015)**

Following the current MTIP of DPWH (2005-2010), DPWH intends to develop a next program for 2010-2015. But under the present condition the actual work on preparation of the next program has not started, though the continuation of the successive programs is ascertained in DPWH. But it is certainly 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 rehabilitation of them, rather than development of new roads. In 2010 the next program oriented to this direction will be established by DPWH.

## 2.2 CURRENT SITUATION OF THE ROAD SECTOR

### (1) Road 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 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 Network

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".

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) and the remaining 13,987 km are secondary national roads.

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

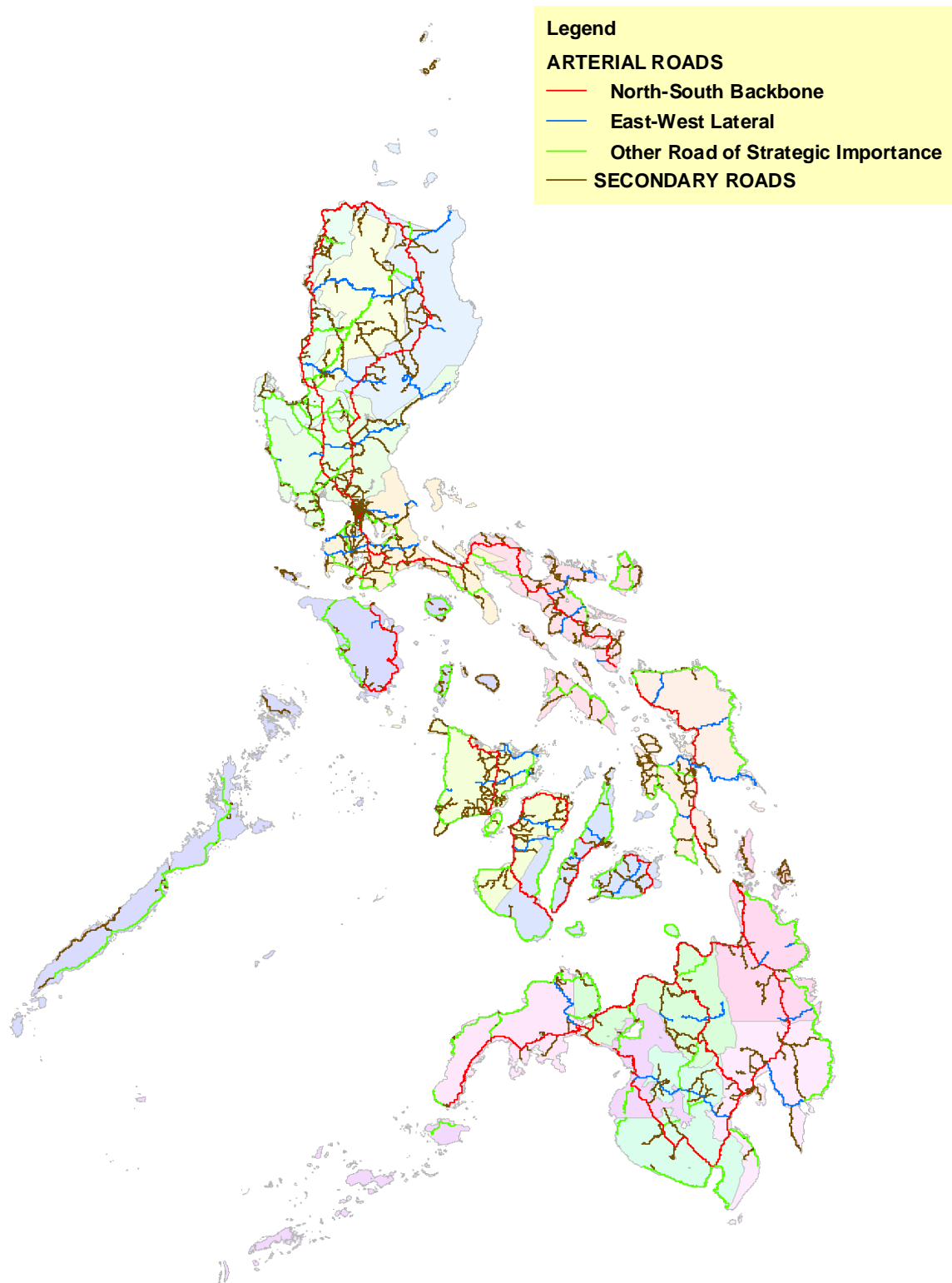


Figure 2.2.1 Existing National Road Network Map (2007) by Functional Classification

### (3) Road Condition

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. 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.

**Table 2.2.1 National Road Length by Classification, Surface Type and Condition (2008)**

Surface Type		Road Condition	Road Classification by Function				Total	%
			Arterial Roads			Secondary Roads		
			North-South Backbone	East-West Lateral	Other Roads of Strategic Importance			
P A V E D	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		<b>2,850</b>	<b>478</b>	<b>2,447</b>	<b>2,317</b>	<b>8,092</b>	<b>27.3%</b>
	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		<b>2,279</b>	<b>1,612</b>	<b>3,483</b>	<b>6,211</b>	<b>13,584</b>	<b>45.8%</b>
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		<b>5,129</b>	<b>2,090</b>	<b>5,930</b>	<b>8,527</b>	<b>21,677</b>	<b>73.1%</b>	
U N P A V E D	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		<b>116</b>	<b>873</b>	<b>1,520</b>	<b>5,384</b>	<b>7,894</b>	<b>26.6%</b>
	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		<b>0</b>	<b>3</b>	<b>2</b>	<b>75</b>	<b>80</b>	<b>0.3%</b>
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		<b>117</b>	<b>876</b>	<b>1,522</b>	<b>5,460</b>	<b>7,974</b>	<b>26.9%</b>	
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		<b>5,246</b>	<b>2,965</b>	<b>7,452</b>	<b>13,987</b>	<b>29,650</b>	<b>100.0%</b>	

Notes: No Assessment

Surface Type

Source: RBIA/DPWH

: Road section either under construction or for implementation, bridge and/or segment length less

: Based from the actual surface type during the conduct of Visual Road Condition Survey (Feb-Oct)

### (4) Bridge Condition

According to the bridge inventory survey conducted by DPWH in 2007, there are 7,744 bridges on national roads.



**Table 2.2.2 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
<b>TOTAL</b>	<b>6,325</b>	<b>258,318.06</b>	<b>560</b>	<b>40,569.91</b>	<b>6,885</b>	<b>298,887.97</b>	<b>667</b>	<b>13,617.76</b>	<b>192</b>	<b>2,428.72</b>	<b>859</b>	<b>16,046.48</b>	<b>7,744</b>	<b>314,934.45</b>

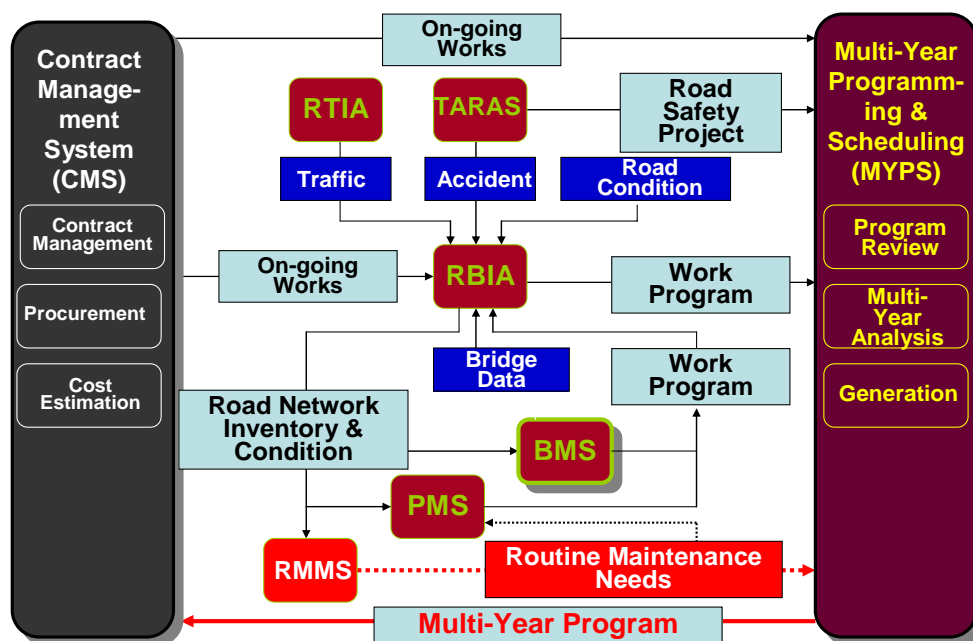
Source: DPWH

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 or Bailey bridge and located mostly on secondary roads. No structures such as submerged bridges (spillway or overflow) are included in the table.

#### (5) Road and Bridge Asset Management Systems

The DPWH, requiring for the management of 29,000 km of national roads, initiated the Road Information and Management Support System (RIMSS). 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 DPWH has developed the core processing tools for road planning, building (design and construction) and operation as illustrated in Figure 2.2.2 with the assistance of WB's NRIMP-1 and the ADB's 6<sup>th</sup> Road Project.



Source: PS/DPWH

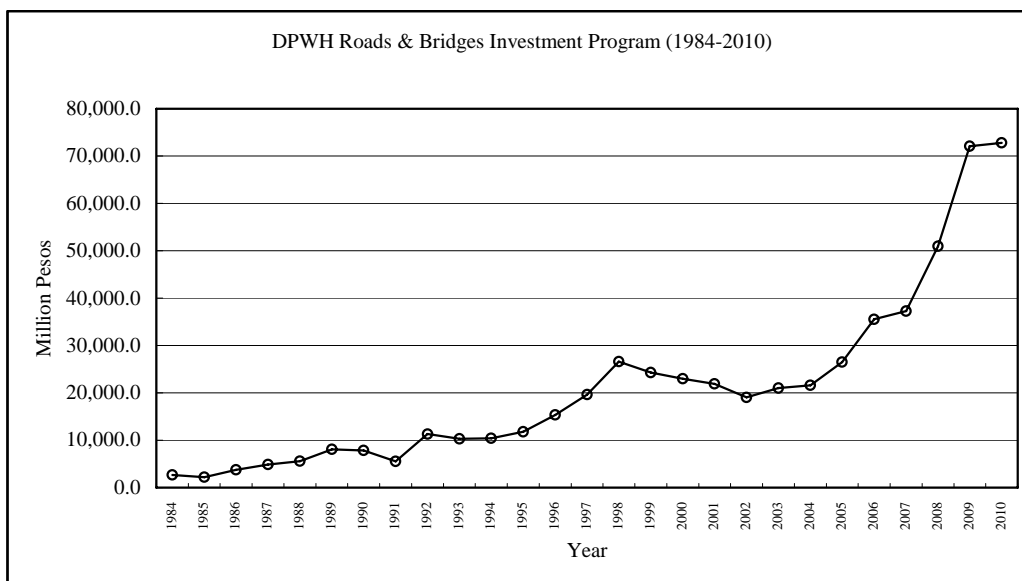
System	System Name	Cooperated by	Remarks
RTIA	Road Traffic Information Application	NRIMP-1 (WB)	
TARAS	Traffic Accident Recording and Analysis System	ADB (6 <sup>th</sup> )	Continued in RSIP (ADB 7 <sup>th</sup> )
RBIA	Road and Bridge Information Application	NRIMP-1 (WB)	
PMS	Pavement Management System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

Figure 2.2.2 Road Planning and Management Systems (Tools) of DPWH

## (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 2.2.3 (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).



Source: DPWH

**Figure 2.2.3 Trend of Roads/Bridge Budget Allocation (1986-2010)**

2) Budget Structure of DPWH (FY2008 and FY2009)

The itemized budget proposed by DPWH for FY 2008 and FY 2009 is shown in Table 2.2.3. The budget for routine (RM) and preventive maintenance (PM) of national roads and bridges are included in the category of “Programs”

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.

**Table 2.2.3 Structure of DPWH Budget (FY 2008 & FY 2009, in 1000 Php)**

Description	Personal Services & Maintenance	Capital Outlay (Investment/Construction)	FY 2008	FY 2009
<b>A. PROGRAMS</b>	○		<b>11,447,966</b>	<b>12,641,557</b>
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>B. PROJECTS</b>		○	<b>75,306,957</b>	<b>99,723,117</b>
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
<b>A+B Total Appropriations</b>			<b>86,754,923</b>	<b>112,364,674</b>

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	30.5%	34.3%
Road Investment Projects		

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

### 3) Budget for Road 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).

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 2.2.4.

**Table 2.2.4 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%		

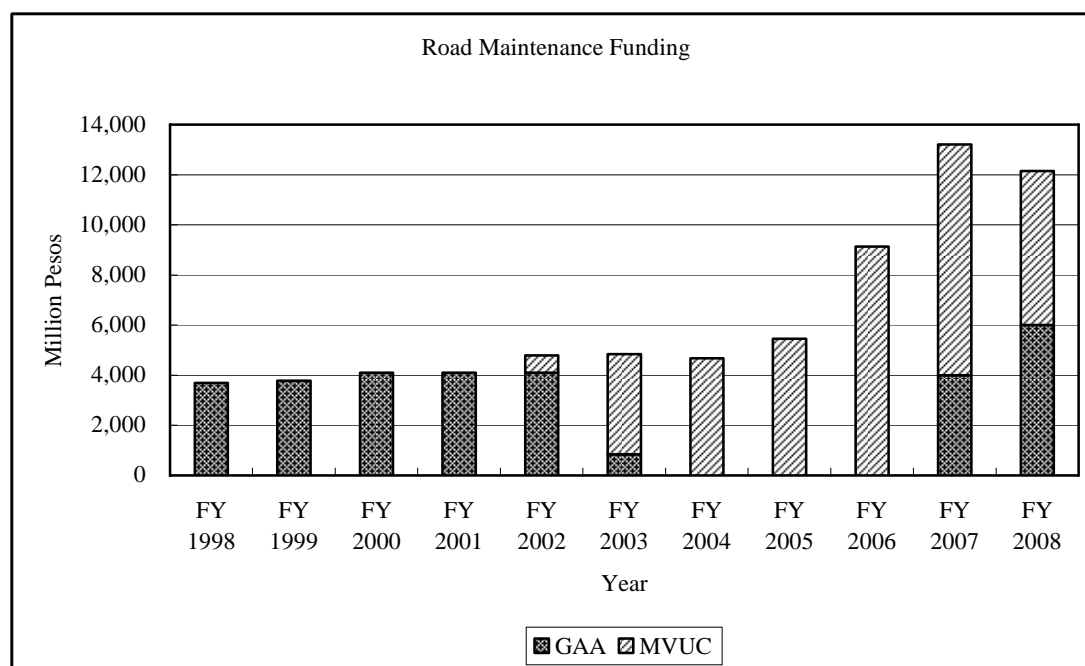
Source: Facts in Figures, Congressional Planning & Budget Department, House of Representatives, January 2008 (No.1)

Table 2.2.5 and Figure 2.2.4 show the road maintenance budgets from the MVUC and GAA.

**Table 2.2.5 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 2.2.5 above)

**Figure 2.2.4 Road Maintenance Funding (GAA and MVUC)**

## 2.3 KEY ISSUES IN THE ROAD SECTOR

### (1) Insufficient Budget Allocation and Low Level Expenditures

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. Though the Philippines has a higher density of roads (0.67 km/km<sup>2</sup>) 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. The existing inadequate condition of infrastructure, especially the lack of reliable, safe and efficient road network constitutes a major constraint in promoting regional growth.

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

DPWH estimated the investment/maintenance requirements for the national road network as of 31 December 2006 in the Pre-FS report. 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.

In addition, as planned budget allocation from MVUC from 2007-2010 is about Php 30 billion, it is also difficult to cover the total maintenance needs of Php 63 billion.

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 1<sup>st</sup> quarter or early 2<sup>nd</sup> quarter) and the civil works enforced implementation during the rainy season (due to the late budget release).

## **(2) Road Planning and Management Systems**

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 DPWH has been implementing the MTIP 2004-2010. However, as the DPWH does not have a long-term development plan itself, it should establish a highway (road) master plan for long-term.

The DPWH has developed comprehensive road planning and management systems with the assistance of the WB and ADB. However, the systems have become complicated and only specially trained staff are capable of using these.

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.

## **(3) Overloaded Vehicles**

Under Republic Act (RA) No. 8794 of 2000, the maximum allowable Gross Vehicle Weight (GVW) limits were increased 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.

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.

As an effort under the Partnership for Economic Governance Reforms (PEGR), AusAID conducted a study to enforce regulation on overloaded trucks along the national road network.

The reports concluded that the majority of the existing 23 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. The study 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. It also recommended that 20 new sites be added to the weighbridge network.

## **(4) Weakness and Insufficient Capacity in Planning, Implementation and Operation & Maintenance**

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.

Obtaining uniformity and consistency of QC/QA and repair manuals used by various inspectors throughout the country is important for bridge asset management. New or more assertive types of QC/QA and repair manuals to improve reliability and consistency of inspection data should be provided by DPWH, including performance testing of inspectors, use of control/reference bridges, and inspector certification.

#### (5) Construction Cost Increases

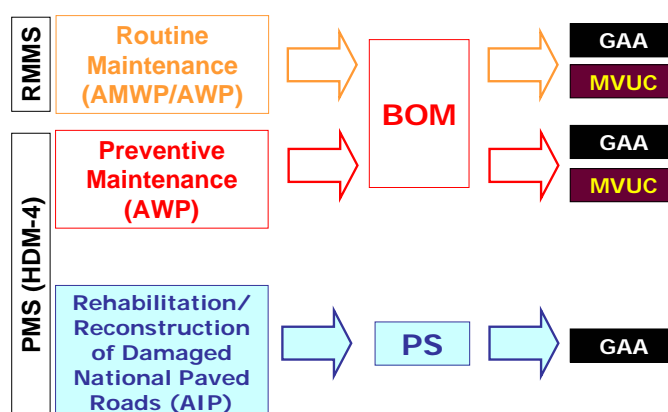
Construction costs had increased from 2003 to 2008 in line with the growth in the world economy. Prices of fuel, asphalt and steel have recorded significant increases. Although these markets prices decreased in line with the worldwide economic upheaval in late 2008, prices are at still higher levels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

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. Though current material prices are lower than those in the late 2008, it is still high compared to 2005 prices.

## 2.4 CURRENT SITUATION AND KEY ISSUES IN THE ROAD MAINTENANCE SECTOR

### (1) Current Road Maintenance Planning and Implementation System

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 as illustrated in the following figure.



DPWH has developed Road Maintenance Management System (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 RMMS can solve the current EMK budget allocation problem by considering the road condition (good, fair, poor and bad). However, as the program of RMMS is not yet operational, it needs a review.



## (2) Insufficient Budget Allocation and Low Expenditures in Road Maintenance Sector

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

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 (Table 2.4.1). 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.

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

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
	<b>Total</b>	<b>4,680</b>	<b>5,618</b>	<b>8,679</b>	<b>12,943</b>	<b>12,144</b>	<b>12,920</b>	<b>16,287</b>	<b>68,591</b>	<b>54,294</b>
								Per annum	<b>11,432</b>	<b>13,574</b>
							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			
	<b>Total</b>	<b>4,680</b>	<b>5,448</b>	<b>9,138</b>	<b>13,202</b>	<b>12,144</b>	<b>44,612</b>			
							Per annum	<b>8,922</b>		
Actual/Plan		1.00	0.97	1.05	1.02	1.00	1.01			

Source: DPWH

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

According to the Pre-FS report, DPWH needs the following road maintenance costs per year:

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
<b>Total (with RH)</b>	<b>Php 61.4 billion a year</b>
<b>Total (without RH)</b>	<b>Php 18.2 billion a year</b>

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.

Therefore, it is apparent that the present budget allocation for national road maintenance has a big funding gap compared to the actual requirements. In order to meet the long-term needs for road maintenance and to keep sustainable funding, additional funding measures will be recommended (refer to Section 3.6(2)).

## 2.5 ROAD SAFETY

### (1) Traffic Accidents Recording and Analysis System (TARAS)

The Road Safety Section was established as a center of expertise for road safety in Panning Service of DPWH. A road accident analysis system called TARAS was established by the assistance of ADB with the preparation of various kinds of manuals or reports for the Road Safety Operation.

Accidents are recorded in the standard reporting form by PNP, and will be sent to the DPWH Regional Office. These data will be sent to the Central Office through the WAN. However, there is around two times of discrepancy between the accident numbers reported by PNP and the number in TARAS. For the effective collection of accurate data, police reporting forms should be simpler and clear. The old and very slow server system in DPWH should be replaced to meet with the current huge number of data.

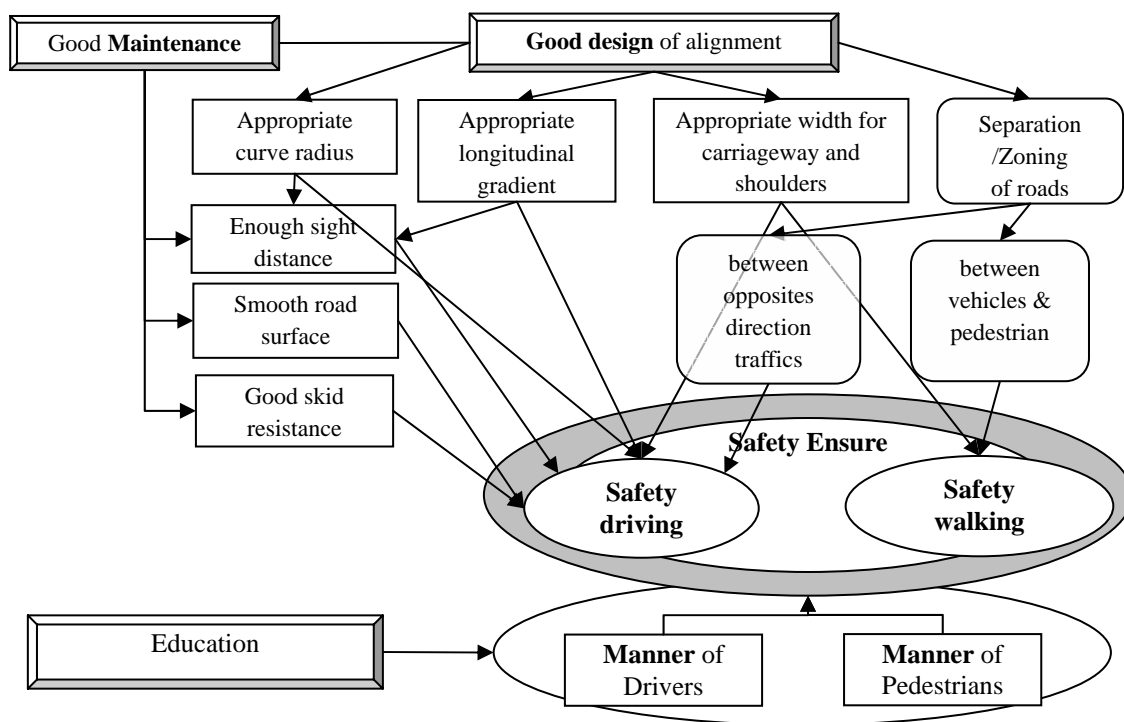
### (2) Road Safety Audits

There is a system called “Road Safety Audits”. The effective countermeasures for road safety could be ensured through this “Road Safety Audit” during the design and construction stages.

### (3) Technical countermeasures for 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 if minor mistakes are committed.

The road safety will be ensured by the proper attitude of the road user, supplemented with effective design as shown below. Furthermore, appropriate safety facilities should be provided, such as warning signs, guide boards, etc.



## 2.6 PLAN AND PROGRAMS ADDRESSING KEY ISSUES

### (1) Medium-/Long-Term Road and Bridge Improvement and Maintenance Plans

The DPWH should have clear and stable policies, strategies and targets for road asset valuation and management for long-term. The PMS/HDM-4 assist 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 road planning and it is recommended that DPWH utilize such facilities. The results of the road master plan study should be the basis for REAPMP-Phase 2 in the future.

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 therefore, 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 as illustrated in the following figure.

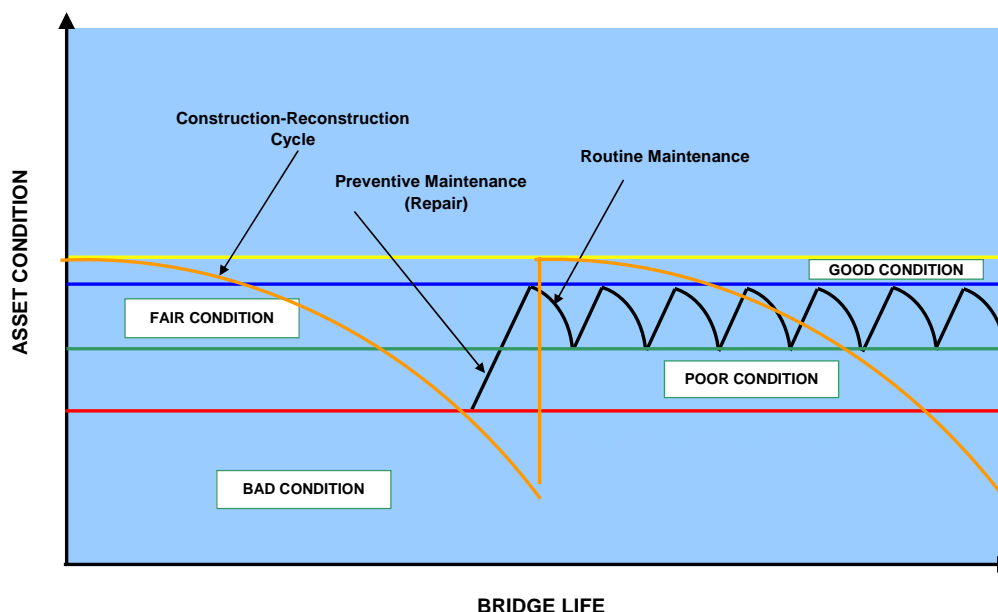


Figure 2.6.1 PM and RM in the Philippines' Bridge Life Cycle

### (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 countries among the developed countries adapting PMMC. The PMMC has also been introduced to the developing countries, mostly with the World Bank support.



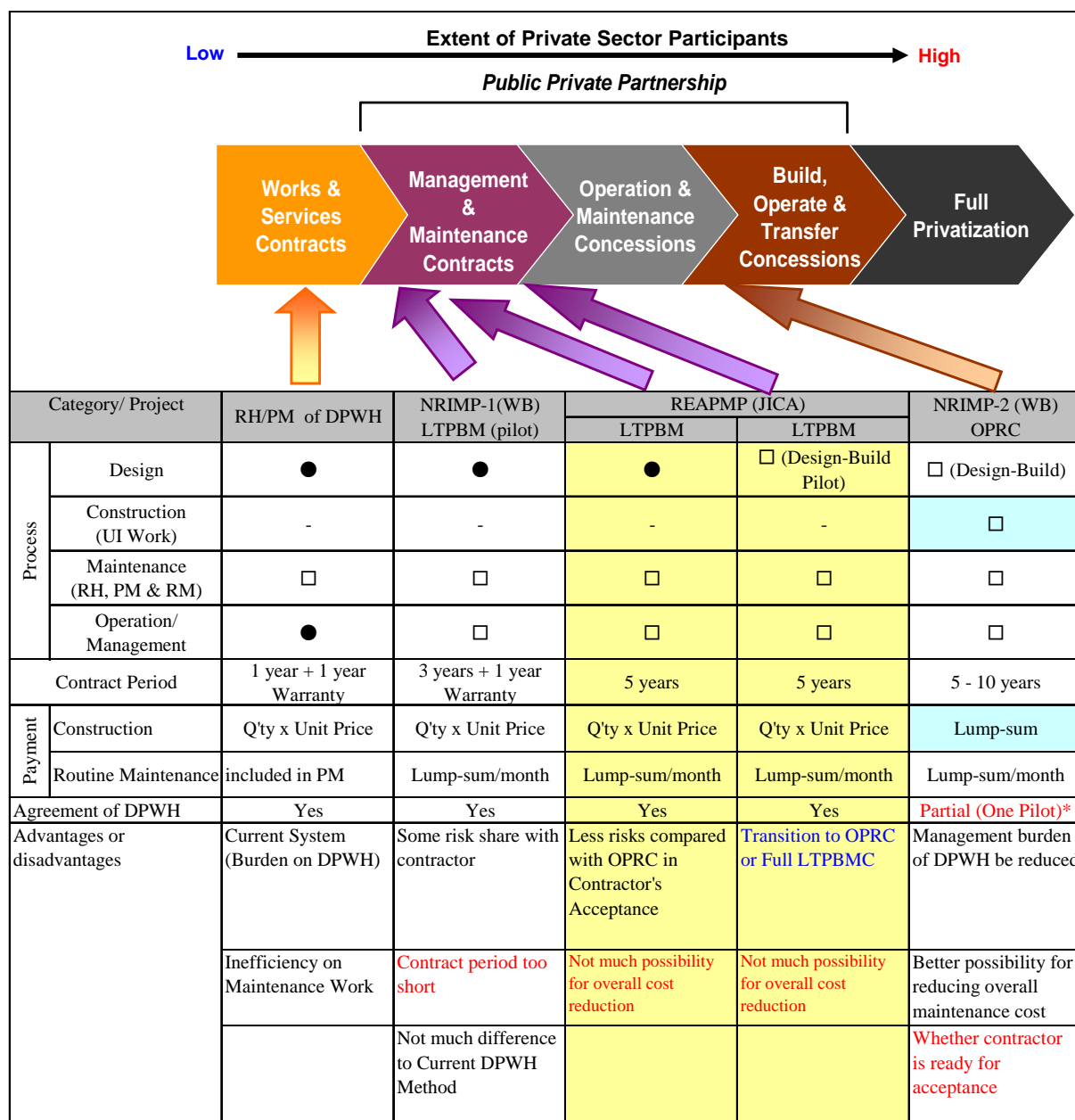


Figure 2.6.3 Extent of Private Sector Participation and PPP

2) Introduction 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 DPWH under NRIMP-1 has implemented three pilot projects (284 km in total) of LTPBM contracts in Region IV-A.

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 2.6.1 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. Inc.	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%)
<b>Unit Price per km</b>	<b>Php 7.8 million/km</b>	<b>Php 7.8 million/km</b>	<b>Php 7.1 million/km</b>
Contract Start Date	November 22, 2001	September 23, 2002	July 26, 2002
Revised Contact Start Date	January 21, 2002	September 23, 2002	July 26, 2002
PBM	January 21, 2002	October 01, 2002 (Year 1 & 2)	December 15, 2002 (Year 1)
PM (Year)	January 20, 2002 (Year 1 & 3)	January 01, 2004 (Year 3)	December 15, 2003 (Year 2)
PM ( Year)	December 20, 2002 (Year 3)		
Contract Duration	1,094 CD	1,094 CD	1,094 CD
PBM	90 CD (Year 1)	395 CD (Year 1)	350 CD (Year 1)
PM	180 CD (Year 2 & 3)	120 CD (Year 2)	116 CD (Year 2)
BM	217 CD	365 CD	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.

### 3) LTPBM or OPRC in NRIMP-2

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. The WB has 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 on the WB proposal and decided to adopt the hybrid- type LTPBM contract, except at least one pilot OPRC.

### (3) Donor Cooperation in the Road Network Development and Maintenance

#### 1) GOJ (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 1<sup>st</sup>, 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 1<sup>st</sup> – 25<sup>th</sup> loans from 1977 – 2005. OECF/JBIC directed its financial cooperation on the

North-South Axis to link Luzon with Leyte/Samar and Mindanao. Figure 2.6.4 shows the location map of the 1<sup>st</sup> to 25<sup>th</sup> loans for road improvement/upgrading projects.

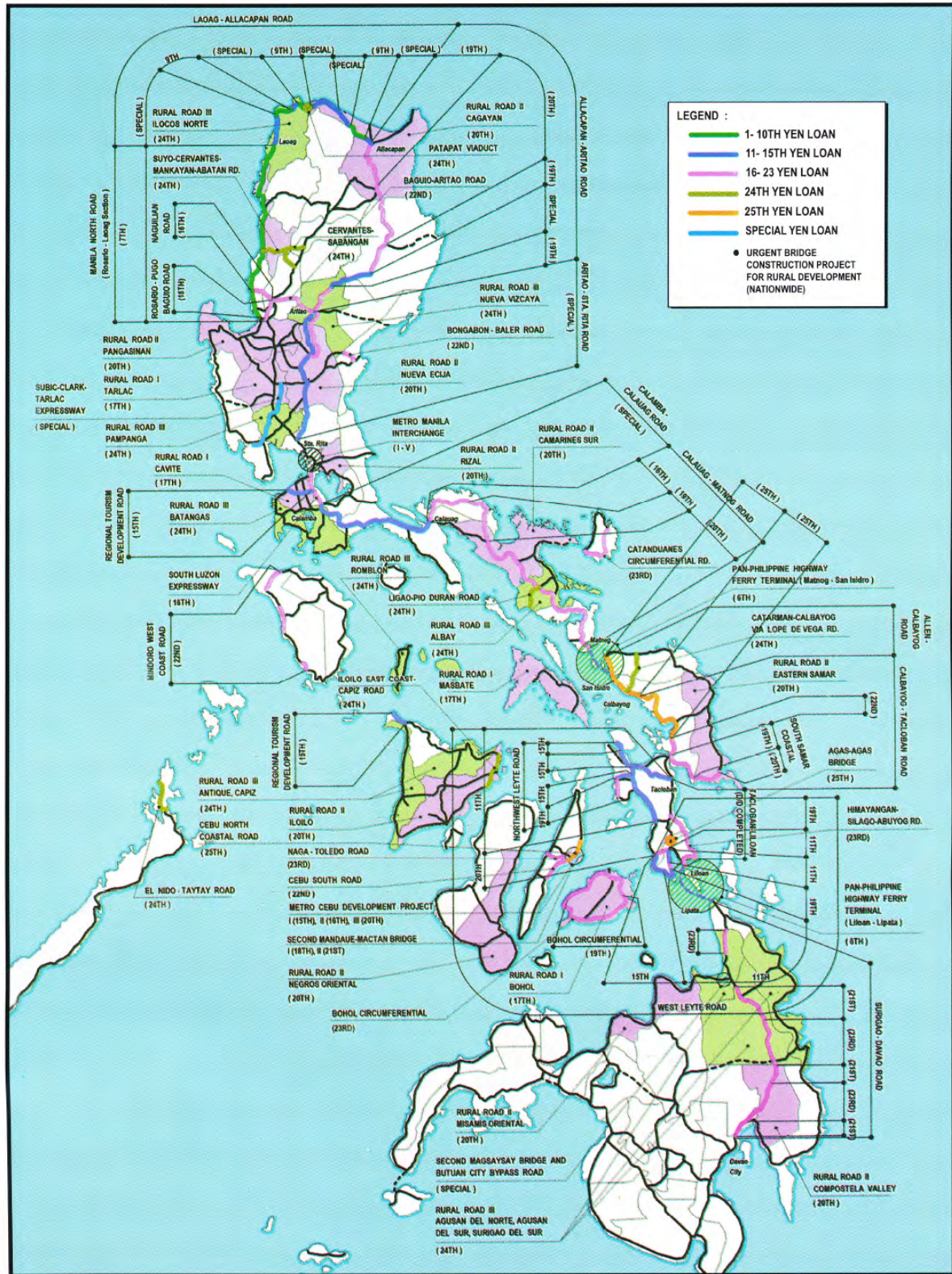


Figure 2.6.4 Road Improvement and Upgrading Projects by Yen Loans (1<sup>st</sup> – 25<sup>th</sup>)

2) World Bank

The NRIMP is a three-phase program (NRIMP 1, 2 and 3) of the WB and DPWH, originally scheduled 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.

NRIMP 2 will support national road improvement and asset preservation (Part A) and institutional and capacity development (Part B). The following table is summary of the project cost and financing plan for NRIMP-2 by project component.

**Table 2.6.2 Investment and Funding Plan of NRIMP-2**

Unit: US\$ Mill.

Component	IBRD	GOP		Grant (AusAID)	Total	Share
		GAA	Road Fund			
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%
<b>Sub-Total</b>	<b>123.92</b>	<b>114.58</b>	<b>0.00</b>	<b>0.00</b>	<b>238.50</b>	<b>100.0%</b>
	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%
<b>Sub-Total</b>	<b>86.91</b>	<b>6.95</b>	<b>186.98</b>	<b>0.00</b>	<b>280.84</b>	<b>100.0%</b>
	30.9%	2.5%	66.6%	0.0%	100.0%	
<b>Total of Road Works</b>	<b>210.83</b>	<b>121.53</b>	<b>186.98</b>	<b>0.00</b>	<b>519.34</b>	
	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	
<b>Total of ICD</b>	<b>20.59</b>	<b>25.01</b>	<b>0.00</b>	<b>10.50</b>	<b>56.10</b>	
	36.7%	44.6%	0.0%	18.7%	100.0%	
<b>Total Cost</b>	<b>231.42</b>	<b>146.54</b>	<b>186.98</b>	<b>10.50</b>	<b>575.44</b>	
	40.2%	25.5%	32.5%	1.8%	100.0%	
<b>Front-End Fee</b>	<b>0.58</b>				<b>0.58</b>	
<b>Total Financing</b>	<b>232.00</b>	<b>146.54</b>	<b>186.98</b>	<b>10.50</b>	<b>576.02</b>	
	40.3%	25.4%	32.5%	1.8%	100.0%	

Source: PAD/The World Bank, April 2008



### 3) Asian Development Bank

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. The following table is outline of the 6<sup>th</sup> and the 7<sup>th</sup> (Road Sector Investment Project: RSIP) road sector projects of ADB.

ITEM	ADB 6 <sup>th</sup> Road <sup>1)</sup>	RSIP (7 <sup>th</sup> ) <sup>2)</sup>	
		Tranche 1	Tranche 2 and 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 : <sup>1)</sup> 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.

### 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 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.

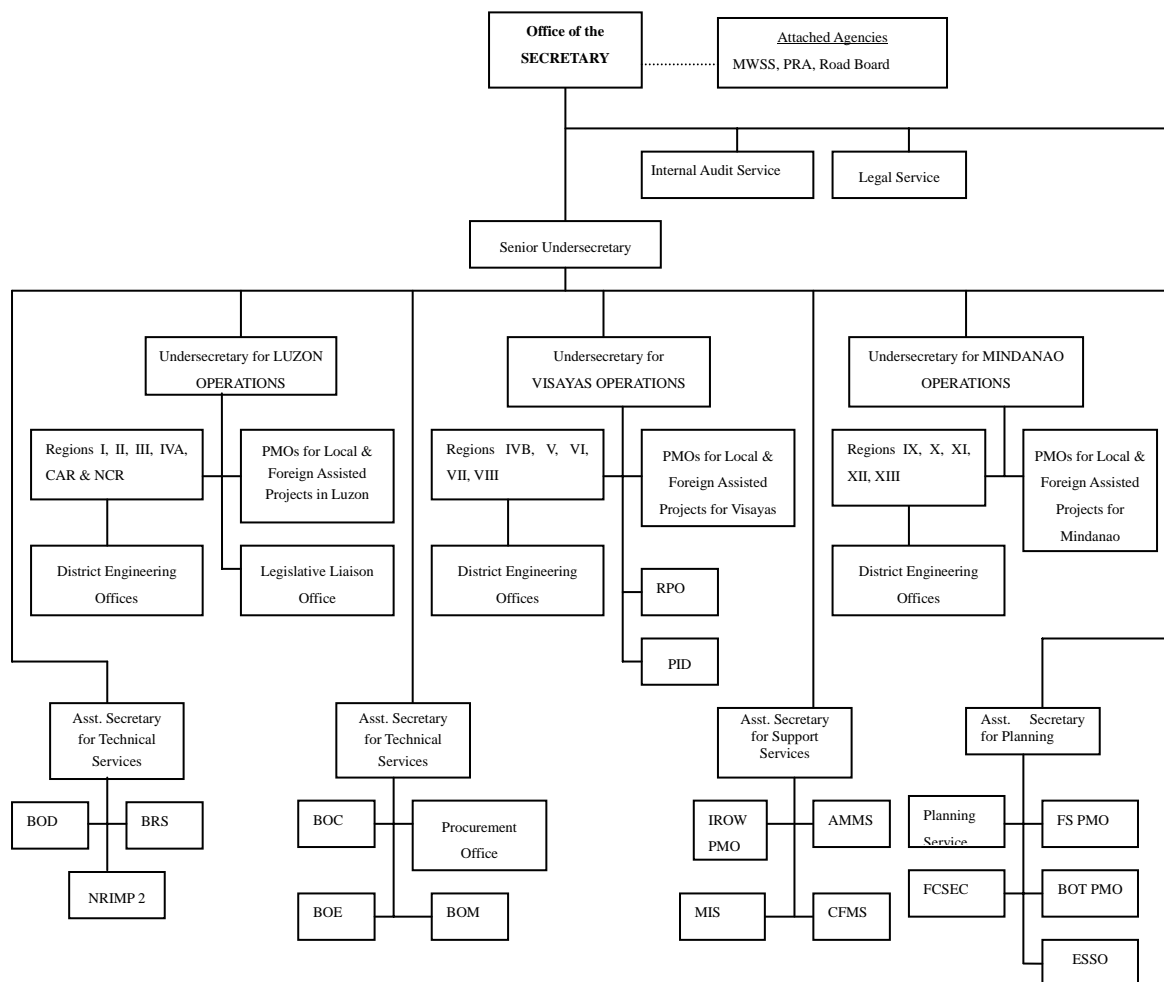
The existing organizational structure of DPWH is illustrated in Figure 3.1.1. The existing staffing for DPWH in terms of number of regular positions as of October 2006 is summarized in Table 3.1.1.

**Table 3.1.1 Existing Number of Plantilla Positions Under the Existing Organization Structure**

No.	Office	Existing Positions
1	Central Office	100
2	Services	1,212
3	Bureaus	1,135
4	Regional and District Offices	16,533
5	Project Management Offices	112
	Total	19,112

Source: DPWH Rationalization Plan, 2006

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



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

Source: DPWH Website: [www.dpwh.gov.ph](http://www.dpwh.gov.ph)

**Figure 3.1.1 Existing Organizational Structure of DPWH**

## 3.2 REFORM PLANS AND ANTICORRUPTION INITIATIVES

### (1) Reform Plans

The “Government Rationalization Program” pursuant to Executive Order No. 366 has resulted in a proposal for rationalizing the structure and manpower complement of the DPWH.

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.

The Regional and District Engineering Offices will now have a standardized plantilla/organizational structure. For the DEOs, its authorized plantilla positions would depend on its classification.

The rationalization plan will affect about 4,375 permanent personnel and an unspecified number of contractual/job order and casual employees.

## **(2) Reform Progress in DPWH CO, RO and DEOs**

### **1) DPWH Central Office**

As of the present, the implementation of the Department's Rationalization Plan is still awaiting approval by the DBM. However, the Department has pursued organizational changes and partial implementation of its Rationalization Plan within the limits of the authority of the Department Secretary.

### **2) DPWH Regional Offices**

The operations of the ROs have been affected by the retirement or resignation especially by the technical staff. The Survey 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.

### 3) District Engineering Offices

The DEOs 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. The Survey 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;
- (c) There is a high turnover rate for JO hirees, given the perception that they have to wait too long to be made permanent. 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 already 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 assurance for payment; 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.

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.

### **(3) Anticorruption Initiatives**

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.

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.

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

### 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. 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.

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.

### 3.4 CAPACITY OF THE PRIVATE SECTOR

#### (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 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	Up to Php 300 M

Size Range	License Category	Single Largest Project/ Required Track Record	Allowable Range of Contract Cost
		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 (PCAB)

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.

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.

## (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 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 is composed of various consulting organizations/associations. 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.

## (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. The BRS implements the Guidelines for the Accreditation of Private Testing

Laboratories. The Guidelines are used to evaluate the applicant laboratory's capability to comply with various conditions contained in said Guidelines.

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
<b>Total</b>				103	100.00

Source: BRS and Survey Team

### 3.5 MOTOR VEHICLE USER CHARGE (MVUC) AND ROAD BOARD

#### (1) Law and Implementing Rules and Regulations (IRR)

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.

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.

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).



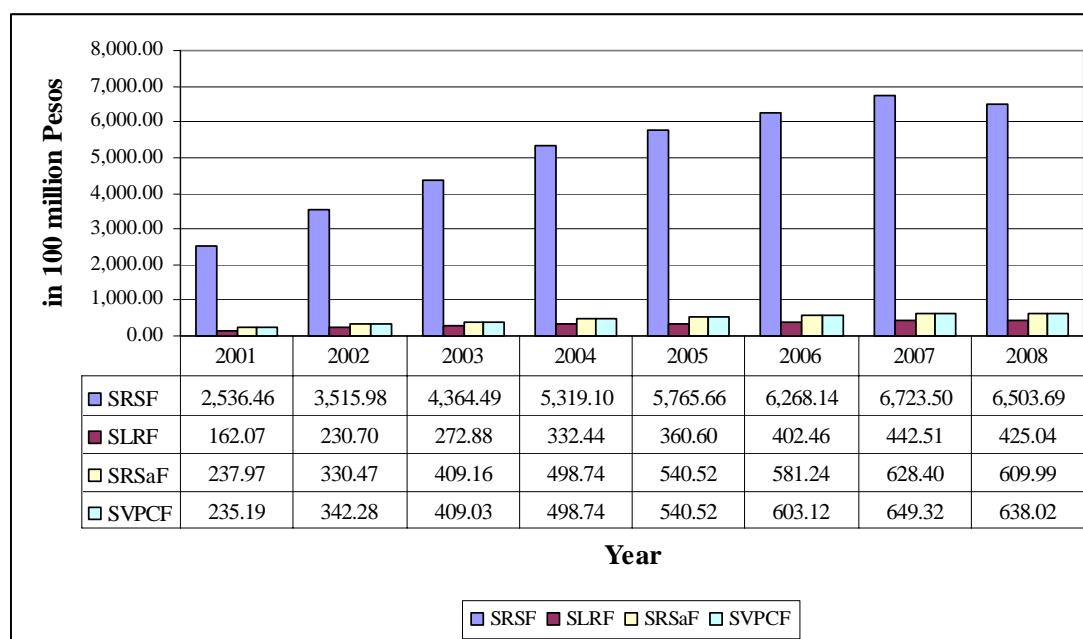
RA 8794 mandated the creation of a Road Board (RB) “to implement the prudent and efficient management and utilization of the special funds”. It is composed of seven (7) members, with the Secretary of the DPWH as ex-officio head, and the Secretaries of Finance, Budget and Management, and Transportation 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.

## (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

Figure 3.5.1 of shows the annual distribution of MVUC collections to the different special funds.



**Figure 3.5.1 Distribution by Special Fund of MVUC Collections, 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.)”.

### **(3) Major Issues for MVUC and Road Board**

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 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 “personally favorable projects” of legislators.

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.

### **(4) Reform Plan for Road Board Operation**

There are no existing proposed reform plans for Road Board operation. 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**

### **(1) Reform Plans of DPWH**

NRIMP-2, the proposed JICA REAPMP and ADB RSIP for the road sector have institutional and business process reforms embedded in the programs.

### **(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. 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.” Thus, there is an urgent need to supplement existing funding sources. These would include the following:

**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.

**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.

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.

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) 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. 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.

### **(4) Donor Cooperation in Institutional Capacity Development**

#### **1) GOJ (JICA TCP)**

JICA has been 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.

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 doe 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 but the GOJ has not yet made any commitment so far.

#### **2) World Bank**

The World Bank has been a key development partner in the sector. 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. Outline of the NRIMP ICB are as in the following table.

**Table 3.6.1 ICD Programs of NRIMP-1 and 2**

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

### 3) Asian Development Bank

ADB is a key partner for institutional capacity development through its 6<sup>th</sup> Road Project and the planned RSIP. The ICD programs of ADB 6<sup>th</sup> Road 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 in the following table.

**Table 3.6.2 ICD Programs of ADB RSIP**

ICB in ADB 6 <sup>th</sup> Road Project (1996-2007)	ICB 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	○	○	
Routine Maintenance Management System (RMMS)*	2. Project Management Information System (PMIS)	○	○	
Road Resealing Training (not implemented)	3. Infrastructure Development and Quality Assurance	○	○	○
Pavement Investigation	4. Environmental and Social Safeguard	○	○	○
Hazard Mapping	5. Gender Mainstreaming	○	○	
Project Coordination	6. Communication Network	○	○	
Benefit Monitoring and Evaluation	7. IT Facilities	○	○	
	8. Comprehensive Human Resource Development (HRD)	○	○	
Road Safety (NRSP, TARAS)	9. Traffic Accident Reporting and Analysis System (TARAS)	○	○	
	10. Road Safety Audit (RSA) system	○	○	○
	11. Road Partnership (Bantay Lansangan) Phase II	○	○	

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

#### (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

## 4. DESCRIPTION OF JICA ASSISTED ROAD ASSET MANAGEMENT PROGRAM

### 4.1 PROGRAM OBJECTIVES

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.

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 of RSIP. The GOJ (JICA) will also make a remarkable contribution towards bridging the gap in resources to accelerate the road asset improvement and preservation programs of DPWH through REAPMP.

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

### 4.2 PROGRAM OUTLINES

#### (1) 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.

**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 DPWH Reform monitoring assistance

## (2) Comparison of Project Scope with ICC-NEDA Approval

The NEDA ICC approved the REAPMP proposed by the DPWH in February 2008 but it was expired as of the end of August 2009. The investment plan of REAPMP was incorporated into the Medium Term Investment Plan (MTIP). The DPWH Secretary endorsed the MVUC Resolution to the Road Board for deliberation and approval of Php 2.7 billion representing the Road Fund Contribution.

As there are some major scope changes in the NEDA-approved REAPMP, a new proposal is required to submit to NEDA for approval, 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.
- 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)
<b>I. Road Upgrading / Improvement (UI)</b>	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			
	<b>Sub-Total</b>			<b>339.4</b>	<b>254.5</b>	<b>14.5</b>	<b>107.4</b>		<b>285.7</b>	<b>128.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-53.7</b>	<b>-126.1</b>	<b>-14.5</b>	<b>-107.4</b>	<b>0.0</b>
<b>II. Asset Preservation Programs</b>																		
<b>III.1 Long Term Performance Based Maintenance (LTPBM)</b>																		
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	
<b>Sub-Total</b>			<b>663.1</b>	<b>0.0</b>	<b>170.5</b>	<b>842.9</b>	<b>3,315.5</b>	<b>644.4</b>	<b>0.0</b>	<b>241.7</b>	<b>402.7</b>	<b>3,222.0</b>	<b>-18.7</b>	<b>0.0</b>	<b>71.2</b>	<b>-440.2</b>	<b>-93.5</b>	
<b>- Other LTPBM excluded by GOP</b>																		
JLM 5		Calbiga - Tacloban	100.0		6.4	100.0	500.0	0.0										
JLM 9		Calbayog - Allen Road	71.8		71.8		287.2	0.0										
<b>Sub-Total</b>			<b>171.8</b>	<b>0.0</b>	<b>78.2</b>	<b>100.0</b>	<b>787.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-171.8</b>	<b>0.0</b>	<b>-78.2</b>	<b>0.0</b>	<b>-787.2</b>	<b>0.0</b>
<b>III.2 Preventive Maintenance (PM)</b>																		
Pre-Fixed Road Links (moved from LTPBM)																		
HDM-4		selected Road links	481.0			481.0		93.0			93.0		93.0				93.0	0.0
<b>Sub-Total</b>			<b>481.0</b>	<b>0.0</b>	<b>0.0</b>	<b>481.0</b>	<b>0.0</b>	<b>593.0</b>	<b>0.0</b>	<b>0.0</b>	<b>593.0</b>	<b>0.0</b>	<b>112.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>112.0</b>	<b>0.0</b>
<b>Total of Road Works</b>																		
			<b>1,655.3</b>	<b>254.5</b>	<b>263.2</b>	<b>1,531.3</b>	<b>4,102.7</b>	<b>1,523.1</b>	<b>128.4</b>	<b>241.7</b>	<b>995.7</b>	<b>3,222.0</b>	<b>-132.2</b>	<b>-126.1</b>	<b>-21.5</b>	<b>-435.6</b>	<b>-880.7</b>	
<b>- Road Safety</b>																		
							Road Safety (123km)											

Notes:

UI: Upgrading / Improvement

RH: Rehabilitation

PM: Preventive Maintenance



### 4.3 ROAD UPGRADING/IMPROVEMENT (UI) COMPONENT

#### (1) Review of Sub-Projects in the Pre-FS

Eight LTPBM sub-projects and two UI sub-projects (outside LTPBME) 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 LTPBME subprojects in accordance with the field surveys conducted and discussions with the Technical Working Group (TWG)/DPWH reclassified two of six subprojects into the UI component. As a result, the UI component has four subprojects and the LTPBM component has four subprojects (Table 4.3.1).

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 preventive maintenance or rehabilitation (RH). The rehabilitation 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 / Nueva 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

**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)	Project Length (km)	New Pavement Length (km)	LTPBM (km)		Preventive Maintenance (PM)
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
PBM-2	JLM1	Luzon	Sta. Rita- Nueva Ecija	160.0	Bongabon - Rizal - Pantabangan - Baler				51.3	2.6		Not appropriate for LTPBM because of mountainous terrain
UI-2	JLM10	Luzon	Lipa - Alaminos - San Pablo - Tiaong	43.0	Sta. Rita- Bdr. Nueva Ecija	38.732	208.000			16.7	7.5	Needs confirmation of the starting point (Km) at RO-III
PBM-3	JLM2	Luzon	Sipocot- Baao	100.0	Lipa - Alaminos - San Pablo - Tiaong	75.115	95.510				19.5	Not appropriate for LTPBM because of mountainous terrain
PBM-4	JLM4	Mindanao	Surigao (Lipata) - Davao	161.0	Sipocot- Baao	371.160	480.146			109.5		Moved to Preventive Maintenance (PM) Program because of short length
Sub-Total				825.0								
UI-3	JLM8	Mindoro	Mindoro West Coast Road	119.0	Surigao (Lipata) - Bdr. Agusan D.N.	1113.500	1237.000				123.5	Sipocot - Baao is only 70 km while proposal was 100 km. Requirement is 109 km from provincial boundary to
UI-4	JLM11	Catanduanes	Circumferential Road	58.0	Carmen - Davao City (6-lane road)	1468.000	1516.000				48.0	Original proposal has two sections; one in Region XIII and other in Davao City (Region XI). One contract is difficult.
Sub-Total				177.0					217.6	118.4	0.0	Moved to Preventive Maintenance (PM) Program because of short length
Total				1,002.0					285.6	128.4	644.4	93.0

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

Note: \* Changed from LTPBM to PM

**(2) Selection Criteria and Priority**

Criteria for selection of the UI component are as follows:

- Roads whose upgrading/rehabilitation was/is funded under previous/on-going OECF/ JBIC loans (including gaps or additional links)
- Roads that support MTPDP and SONA Priorities – such as those boosting tourism, completing the nautical highways and promoting investments
- The road links proposed for the 27<sup>th</sup> yen loan. These are Bongabon~Baler road, Mindoro West Coast Road and Catanduanes Circumferential Road.

### (3) Design Standards

The following design standard of DPWH will be applied for REAPMP. Some widening of existing road will be required for UI projects.

**Table 4.3.3 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 Survey Team studied and recommends the road section width of the proposed road for normal section and alternative typical section applicable for Town proper area along the UI roads as shown in Figure 4.3.1 and Figure 4.3.2.

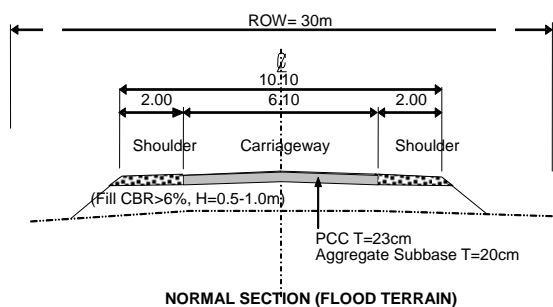
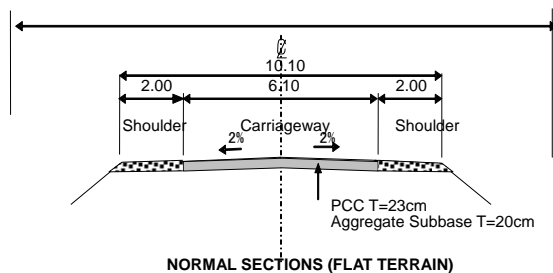


Figure 4.3.1 Typical Cross Sections

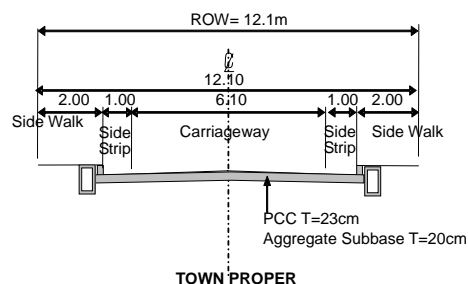


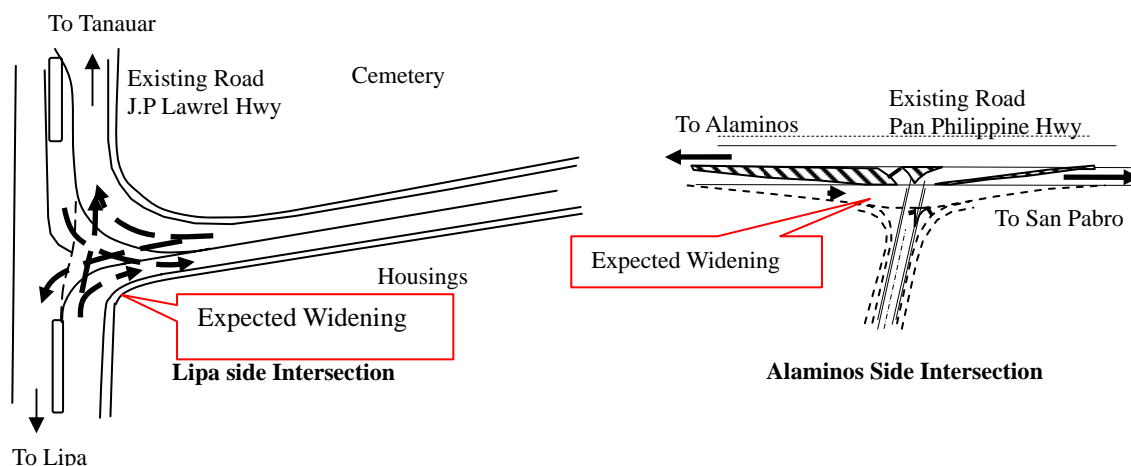
Figure 4.3.2 Typical Cross Sections

#### (4) Road Safety Measures

Road safety components in UI sections are as follows:

	Bongabon – Rizal - Baler Road	Mindoro West Coast Road	Lipa - Alaminos Road	Catanduanes Circumferential Road
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	-	-	-	-

Both side intersections of Lipa~Alaminos should be improved by acquiring necessary lands, because the current traffic volume along Laurel highway (Lipa side) and PPH (Alaminos side) are large (refer to Figure 4.3.3).



**Figure 4.3.3 Intersection Improvement Plan for Lipa and Alaminos Access Roads**

### (5) Contract Packaging

The 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.

### (6) Cost Estimates

#### 1) Unit Prices

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. The unit prices applied for cost estimation of reconstructed and widened bridges were derived based on-going and recently completed large projects of DPWH.

#### 2) Major Quantities

The major quantities for road works were derived using a three-stage adjustment process, as follows:

Step 1: Quantities in the detailed design reports were distributed proportionally to the road project packages based on the remaining length required for improvement/upgrading.

Step 2: The resulting provisional quantities were adjusted by reviewing the quantities against the detailed design drawings.

Step 3: The quantities were further adjusted based on the result of the visual inspection of road condition.

Major quantities of bridges were derived from the existing design 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.

#### 3) Construction Cost

Using the quantities and unit prices in the foregoing sections, the construction cost (base cost) of the UI projects was estimated at Php 4,440 million as shown in the following table.

Table 4.3.4 Estimated Construction Costs for UI Projects

ITEM /DESCRIPTION	UI-4/JLM11- Catanduanes			UI-1/JLM6- Bongabon – Bazar (without bypasses)			UI-3/JLM8- Mindoro West Coast			UI-2/JLM10- Lipa			Total
	Section 2	Section 3	Section 3	Section 1	Section 2	Section 3	Section 2	Section 3	Section 4	Section 5	UI Section	UI Section	
CONTRACT ROAD LENGTH (km)	9.97	54.24	24.08	27.26	17.51	49.34	17.51	49.34	62.08	24.48	16.73	285.67	
NEW PAVEMENT LENGTH (Km)	3.32	44.04	1.90	0.74	5.63	35.38	5.63	35.38	21.76	8.23	7.46	128.46	
FACILITIES FOR THE ENGINEER	3,448,000	12,768,000	6,840,000	4,636,000	4,538,000	15,387,000	4,538,000	15,387,000	10,082,000	7,104,000	4,909,000	70,112,000	
PART A	3.7%	1.0%	2.8%	3.7%	2.3%	2.8%	3.3%	2.8%	1.4%	2.3%	2.3%	1.6%	
OTHER GENERAL REQUIREMENTS	5,517,000	31,920,000	9,576,000	6,182,000	6,051,000	31,574,000	6,051,000	31,574,000	20,164,000	10,087,000	7,855,000	128,926,000	
PART B	3.7%	2.4%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	2.8%	3.3%	3.7%	2.9%	
PART C	8,896,000	182,627,000	13,037,000	17,364,000	20,671,000	154,401,000	20,671,000	154,401,000	126,620,000	33,537,000	27,854,000	588,007,000	
PART D	6.0%	13.7%	4.5%	10.4%	12.7%	13.9%	12.7%	13.9%	17.9%	11.0%	13.2%	13.2%	
SUBBASE AND BASE COURSE	5,459,000	82,194,000	3,581,000	1,395,000	18,035,000	92,782,000	18,035,000	92,782,000	77,765,000	27,213,000	9,785,000	318,209,000	
PART E	3.7%	6.2%	1.2%	0.8%	11.0%	8.4%	11.0%	8.4%	11.0%	8.9%	4.6%	7.2%	
SURFACE COURSES	40,105,000	451,758,000	25,127,000	9,808,000	74,118,000	482,171,000	45,481,000	482,171,000	325,003,000	118,870,000	90,822,000	1,617,782,000	
PART F	27.1%	33.9%	5.9%	5.9%	45.4%	43.4%	45.4%	43.4%	45.8%	39.1%	43.0%	36.4%	
STRUCTURES (Bridges)	56,269,000	11,693,200	72,067,000	0	13,929,000	67,227,000	13,929,000	67,227,000	37,540,000	63,315,000	3,276,000	430,555,000	
PART F(B)	38.0%	8.8%	24.6%	0.0%	8.5%	8.5%	8.5%	8.5%	6.1%	20.8%	1.6%	9.7%	
STRUCTURES (Roads)	6,488,000	3,293,000	1,065,000	8,663,000	224,000	73,530,000	224,000	73,530,000	785,000	337,000	11,239,000	135,254,000	
PART F(R)	4.4%	2.5%	0.4%	5.2%	0.1%	0.1%	0.1%	0.1%	6.6%	0.1%	5.3%	3.0%	
DRAINAGE AND SLOPE PROTECTION	13,666,000	372,713,000	125,959,000	110,661,000	13,389,000	112,290,000	13,389,000	112,290,000	53,200,000	20,657,000	30,849,000	853,364,000	
PART G	9.2%	27.9%	43.0%	66.3%	43.0%	10.1%	43.0%	10.1%	7.5%	6.8%	14.6%	19.2%	
MISCELLANEOUS STRUCTURES	7,035,000	37,639,000	32,792,000	6,649,000	10,914,000	70,065,000	10,914,000	70,065,000	51,207,000	20,241,000	22,553,000	239,085,000	
PART H	4.7%	2.8%	11.2%	4.0%	6.7%	6.3%	6.7%	6.3%	7.2%	6.7%	10.7%	5.8%	
DAYWORK/PROVISIONAL SUM	1,379,000	12,768,000	2,736,000	1,545,000	1,513,000	10,525,000	1,513,000	10,525,000	6,721,000	2,841,000	1,964,000	41,992,000	
PART K	0.9%	1.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	
Total	148,262,000	1,334,242,000	292,740,000	166,993,000	1,633,825,000	1,110,352,000	1,633,825,000	1,110,352,000	709,087,000	304,182,000	211,106,000	4,440,256,000	
Unit Cost (P/Php/km)	44,657,000	30,300,000	154,074,000	225,545,000	29,020,000	31,384,000	29,020,000	31,384,000	32,587,000	2,287,003,000	28,298,000	34,567,000	
Grand Total	1,482,594,000	1,482,594,000	459,643,000	459,643,000	10,440	31,384,000	10,440	31,384,000	32,587,000	2,287,003,000	28,298,000	4,440,256,000	

Notes: (1) Bridge Replacement, widening and Repair (Part F(B))  
 (2) Total Cost without Bridge Replacement, widening and Repair  
 (3) Unit Price for Road Improvement - Only (P/Php/km)  
 (4) Bridge Length (m): Replacement  
 Widening (1 lane to 2 lanes)

#### 4) Maintenance Cost Estimate

The routine maintenance cost of the UI roads and bridges after completion was estimated based on Equivalent Maintenance Kilometer (EMK) formula adopted by DPWH for economic analysis. The estimated RM cost per year is computed as in the following table.

**Table 4.3.5 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.
- Procurement assistance of civil works contractors.
- Construction supervision and project management.

#### 6) Other costs, including Tax, ROW Acquisition and Administration

The cost of ROW acquisition covers costs for (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 139.4 hectares of land needs to be acquired. The land acquisition cost and compensation cost for affected houses and structures were estimated at about Php 35 million and 24 million at the prevailing BIR zonal prices.

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.

### (7) Economic Evaluation

#### 1) Economic Benefit

The economic benefits estimated in this survey are basically the following two types:

- Savings in Vehicle Operating Cost (VOC)
- Savings in Passenger Travel Time Cost (TTC)

The basic VOC data (BVOC) prepared and updated by DPWH combines the TTC with VOC data (Running + Fixed + time) so as to express the Road User Cost (RUC).

The data and information listed below were collected for benefit estimation.

- Traffic Volume (AADT), present and future based on the DPWH data
- Unit VOC (including time cost), from DPWH
- Road Condition (by surface type), from the site survey by JICA survey team
- Type of Road Works (RH, PM, UI, and RM), defined by the JICA survey team
- Roughness Progression Pattern with traffic volume, from the results by JBIC Pre-FS

Basic Procedures for Benefit Estimation are as follows:

i) Benefit from Road Surface Improvement

Benefits of implementation of REAPMP projects were derived mainly from the improvement of road roughness or from maintaining the project roads in good condition. In this meaning, the procedures and methodologies applied to the benefit estimation are basically the same base for all roads of UI, LTPBM, PM roads, except for the Lipa-Alaminos Road (on which there is no traffic at present due to the collapse of side slope occurred in the late 1990s). Stepwise explanations are given below for the benefit estimation accruing from the road surface improvement:

Step I: Estimation of future roughness progression (increase in values of IRI) for both “Without project” and “With project” cases. (Patterns of roughness progression were taken from the results of JBIC Pre-FS. Traffic forecast was made applying the future traffic growth rates prepared by DPWH, or referring to the previous feasibility studies)

Step II: Analysis of relationship between IRI and VOC.

Step III: Estimation of unit VOC (Php/km) for both “Without” and “With” project cases applying the above relationship.

Step IV: Calculation of total VOC (Unit VOC x Traffic Volume x Road Length) for both cases.

Step V: Benefit estimation as differences of total VOC between “Without” and “With” project cases.

ii) Lipa-Alaminos Road

As the Lipa-Alaminos Road is closed and there is no traffic at present, a different methodology was adopted. DPWH carried out a feasibility study on this road in 2002 and forecasted the diverted traffic from other two alternative routes. Based on this information, VOC saving benefit of diverted traffic was estimated as differences of VOC of the longer distance alternative routes and the short-cut route via project route for the O-D pair between San Pablo City and Lipa City.

iii) Other Additional Benefits

For the Bongabon-Rizal-Pantabangan-Baler Road, only 2.6 km length is planned to be newly paved (from gravel to concrete). On the other hand, a large amount of investment cost has been allocated for the slope protection works because the project road is located in the mountainous area. Therefore, in addition to the above benefit (pavement improvement), benefit accruing from the slope protection works was also estimated taking into the alternative route (the south route in bad paved condition and longer distance) which will be used when the project road is closed in case of land slide disasters happened (assuming 15 days closing a year in total).



For the three UI roads, Lipa-Alaminos Road, Mindoro West Coast Road and Catanduanes Circumferential Road, benefit of the generated (induced) traffic was also estimated and added to the benefit of the normal traffic assuming the 30% of traffic of the normal traffic and 50% of unit benefit of the normal traffic in accordance with the Highway Planning Manual of DPWH.

The financial costs (capital cost and routine maintenance cost) were converted into the economic cost applying the Standard Conversion Factor (SCF=0.82).

The economic evaluation was carried out based on the following pre-conditions:

- Price Level: 2009 prices
- Evaluation Period: 20 years after opening year
- Residual Value: No residual values were counted
- Opportunity Cost of Capital (Discount Rate): 15%
- The results of evaluation are as summarized below:

Project ID	Road/ Section	New Pavement Length (km)	NPV (Mil.Php)	NPV/Cap	B/C	EIRR (%)
UI-1	Bongabon-Rizal-Pantabangan-Baler	2.6	47	0.2	1.2	17.5
UI-2	Lipa-Alaminos	7.5	150	1.1	2.1	28.1
UI-3	Mindoro West Coast Road	71.0	1,735	1.3	2.3	31.9
UI-4	Catanduanes Circumferential Road (Viga-Pandan Section)	47.4	157	0.2	1.2	17.9

All UI project roads are economically feasible with positive values of NPV/Cap applying the 15% of discount rate.

## 2) 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).

The results of estimation of effect indicators for UI roads are summarized in the following table:

Indicator Project	1	2	3	4	5	6	7
	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 to the above, the beneficiary population along the project roads is presented below:

Project	Indicator	
	Beneficiary population along the project roads	
UI-1: Bongabon - Baler	190,000	Aurora
UI-2: Lipa - Alaminos	540,000	Lipa City, San Pablo City, Alaminos
UI-3: Mindoro West Coast Road	420,000	Occidental
UI-4: Catanduanes Circumferential Road	230,000	Catanduanes

#### 4.4 LONG TERM PERFORMANCE-BASED MAINTENANCE (LTPBM) COMPONENT

##### (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.
- 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 project Preparedness, road network importance and economic and social development policy.

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.

## (2) Review of LTPBM Road Links of the Pre-FS Report and Proposal for REAPMP

The originally proposed LTPBM road links were reviewed and will be applied to four road links of 644 km total length (refer 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 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 LTPBME (LM-2.1). The traffic volume on these roads is higher than other road links and, therefore, higher level of service is envisaged.

## (3) Scope of LTPBM Project

The LTPBME projects under the REAPMP are of a hybrid type, which includes a combination of RH, PM, backlog maintenance, RM and road safety.

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 Sipocot - Baao road was selected for a pilot design-built scheme and others are designed by consultants employed by DPWH design under REAPMP-LTPBM. 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.

Regarding bridge works, the scope of LTPBM includes preventive maintenance and routine maintenance. 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 will be reconstructed in LTPBM contract since LTPBM in REAPMP is a hybrid type contract.

**Table 4.4.1 Bridges Selected on LTPBM Road Links**

	Road Section	DEO	Routine Maintenance		Preventive Maintenance	
			Number	Length	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	970.30	15	431.00
		Ilocos Sur 2nd D.E.O	38	1,964.50	23	1,279.50
		La Union 1st D.E.O	10	535.90	4	349.50
		La Union 2nd D.E.O	10	939.50	8	892.90
	<b>Sub-Total</b>		<b>95</b>	<b>4,837.20</b>	<b>57</b>	<b>3,112.90</b>
2	Sta. Rita - Nueva Ecija	Bulacan 1st D.E.O	12	561.90	10	452.90
		Bulacan 2nd D.E.O	17	500.40	16	411.40
		Nueva Ecija 1st D.E.O	21	622.00	19	557.50
		Nueva Ecija 2nd D.E.O	11	1,069.10	7	1,005.40
		<b>Sub-Total</b>	<b>61</b>	<b>2,753.40</b>	<b>52</b>	<b>2,427.20</b>
3	Sipoco - Baao	Camarines Sur 1st D.E.O	30	798.30	23	601.30
		Camarines Sur 2nd D.E.O	8	270.90	6	134.90
		Camarines Sur 4th D.E.O	9	216.10	7	168.10
		<b>Sub-Total</b>	<b>47</b>	<b>1,285.30</b>	<b>36</b>	<b>904.30</b>
4	Surigao - Davao	Agusan Del Norte D.E.O	24	1,174.50	21	1,023.50
		Surigao Del Norte D.E.O	25	778.40	24	752.60
		<b>Sub-Total</b>	<b>49</b>	<b>1,952.90</b>	<b>45</b>	<b>1,776.10</b>
<b>Grand Total</b>			<b>252.00</b>	<b>10,828.80</b>	<b>190.00</b>	<b>8,220.50</b>

Remark: Castellano bridge in Nueva Ecija and Paypay bridge in Agusan del Norte are recommended to reconstruction.

#### (4) Performance Standard and Intervention Schedule of LTPBM

##### 1) Performance Indicators

Performance standards/requirements represent the desired level of performance or output of the 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 LTPBM roads should be in good to fair conditions. The following table indicates road condition categories to be adopted for the LTPBM.

**Table 4.4.2 Road Condition Category**

Roughness Category	Roughness (IRI) in PMS (HDM-4)					
	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
Fair	3.1 – 5.0	4.0	4.1 – 6.0	5.0	6.1 – 9.0	7.5
Poor	5.1 – 7.0	6.0	6.1 – 8.0	7.0	9.1 - 12.0	10.0
Bad	> 7.0	8.0	> 8.0	9.0	> 12.0	14.0

Source: PMS/DPWH

The main 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 modern equipment must be used though costly.

##### 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 construction contract
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 construction contract

The following table shows a typical intervention pattern on LTPBM Road. Even if the current road condition is good, PM is required during the 5-year contract period.

**Table 4.4.3 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)

The LTPBM contract length is 644.4 km in total. The poor and bad condition roads of 240.7 km (37.3%) require RH during the 1<sup>st</sup> contract year. Fair condition road of 344.9 km (53.5%) will require PM (AC overlay) from the 1<sup>st</sup> to the 3<sup>rd</sup> 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.

## (5) Bridge

Prior to implementing the LTPBM, the performance indicators for bridge should be simply determined based on condition rating of the BMS of DPWH, which classifies the conditions into four categories such as good, fair, poor and bad.

In order to meet the performance level for bridges under the LTPBM, it must be maintained in fair/good condition as per BMS rating, and determined to be structurally or functionally stable. Bridges classified under preventive maintenance requirements are those with, at least more than one defect rated in poor condition. Bridges subject to rehabilitation are those rated as bad condition and are structurally or functionally unstable.

## (6) 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 contracts 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 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.

## (7) Road Safety Measures

A total of 123 km of accident black-spots have been identified from on the LTPBM road links based on the TARAS data. The proposed safety facilities from same data are summarized as follows:

Unit: Php Million

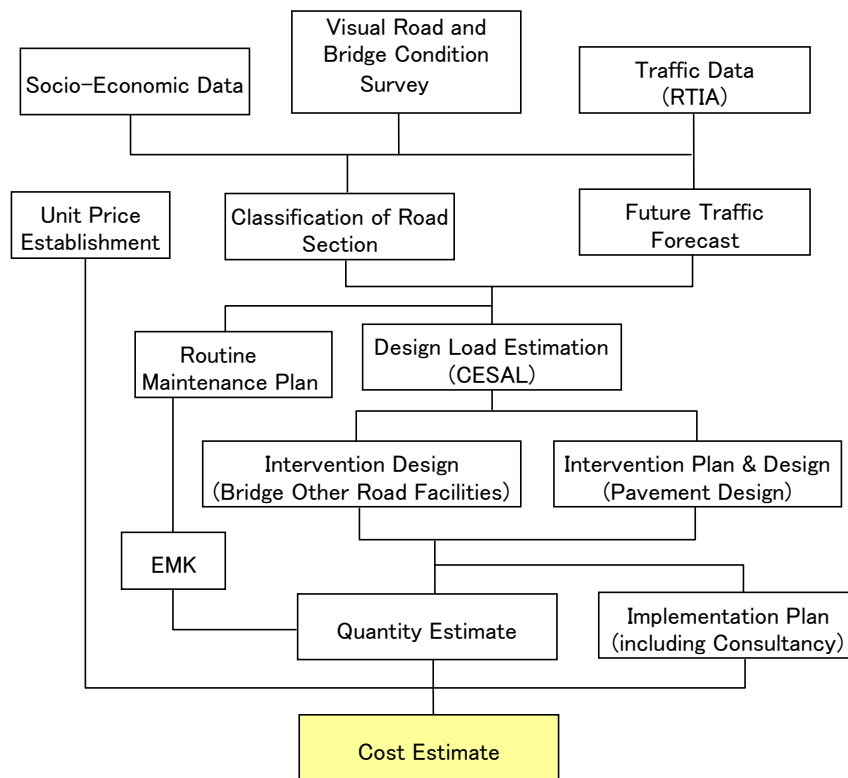
Road Section	Total length (km)	Black-spots (km)	Pavement Marking				Road signs		Guardrails		Total Base Cost
			Center Line		Edge Line		Qty	Cost	Qty(km)	Cost	
			Qty(km)	Cost	Qty(km)	Cost					
Aringay~Laong	242	34	4.53	2.72	68.0	27.2	68.0	1.36	1.7	8.5	39.78
St Rita~N Ecja	169	19	2.53	1.52	38.0	15.2	76.8	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
<b>Total</b>	<b>644</b>	<b>123</b>	<b>16.13</b>	<b>9.68</b>	<b>242.0</b>	<b>96.8</b>	<b>242.0</b>	<b>4.84</b>	<b>6.05</b>	<b>30.75</b>	<b>150.0</b>

Source: Table VI-1 Proposed Road Safety Facilities on LTPBME Roads of JBIC Pre-FS Report in July 2007.

## (8) Cost Estimates

### 1) General

Figure 4.4.1 shows the flowchart showing the procedure adopted by the Survey Team for conducting the LTPBM 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 4.4.1** Flowchart showing Procedure for Conducting Construction Cost Estimate

## 2) Unit Prices

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/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.

The unit prices applied for cost estimation of LTPBM bridges were based on available information related to bridge repairs executed by the DPWH, including those under the JICA TCP.

## 3) Major Quantities

Major quantities for LTPBM were 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).

Major quantities of bridges for LTPBM were estimated, considering the following:

- Repair or maintenance methods were selected for each existing bridge elements identified to be poor and bad conditions.
- Quantities of the damaged portions were estimated based on visual inspection

## 4) Construction Cost

Using the quantities and unit prices in the foregoing sections, the construction cost (base cost) of the UI projects were estimated at Php 8,392 million as shown in Table 4.4.4.

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.

**Table 4.4.4 Estimated Construction Costs for LTPBM Projects**

WORK ITEMS	PBM I/JLM3: Aringay - Laang		PBM 2/JLM8: Sta. Rita - Nueva Ecija		PBM 3 Sipocot - Baco		PBM 4 Surigao - Davao		Total
	Section 1	Section 2	Section 1	Section 2	Section 1	Section 1	Section 1	Section 1	
<b>SECTION LENGTH (Km)</b>	<b>146.00</b>	<b>96.12</b>	<b>73.77</b>	<b>95.50</b>	<b>109.48</b>	<b>109.48</b>	<b>123.50</b>	<b>644.37</b>	
<b>PART A FACILITIES FOR THE ENGINEER</b>	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%	15,897,982 1.1%	18,477,639 1.1%	82,871,310 1.0%	
<b>PART B OTHER GENERAL REQUIREMENTS</b>	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%	22,257,175 1.5%	25,868,694 1.6%	119,885,035 1.4%	
<b>PART C EARTHWORK</b>	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%	103,289,060 7.2%	46,559,600 2.8%	310,110,180 3.7%	
<b>PART D SUBBASE AND BASE COURSE</b>	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%	35,411,000 2.5%	45,496,960 2.7%	254,683,410 3.0%	
<b>PART E SURFACE COURSES</b>	2,081,779,540 76.1%	424,193,000 62.5%	781,132,730 68.0%	450,013,060 62.2%	976,625,520 67.8%	976,625,520 67.8%	1,157,044,550 69.5%	5,870,988,400 70.0%	
<b>PART F STRUCTURES</b>	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%	64,772,000 4.5%	111,608,000 6.7%	424,115,000 5.1%	
<b>PART G DRAINAGE AND SLOPE PROTECTION</b>	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%	44,613,000 3.1%	49,963,000 3.0%	241,952,000 2.9%	
<b>PART H MISCELLANEOUS STRUCTURES</b>	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%	47,128,000 3.3%	67,539,000 4.1%	300,896,000 3.6%	
<b>PART K DAYWORK/PROVISIONA L SUM</b>	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%	6,359,193 0.4%	7,391,056 0.4%	37,013,725 0.4%	
<b>PART M PREVENTIVE MAINTENANCE</b>	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%	124,260,000 8.6%	134,862,000 8.1%	749,184,000 8.9%	
<b>Total</b>	<b>2,734,350,942</b> <b>100.0%</b>	<b>678,736,458</b> <b>100.0%</b>	<b>1,149,131,314</b> <b>100.0%</b>	<b>724,056,918</b> <b>100.0%</b>	<b>1,440,612,930</b> <b>100.0%</b>	<b>1,440,612,930</b> <b>100.0%</b>	<b>1,664,810,499</b> <b>100.0%</b>	<b>8,391,699,060</b> <b>100.0%</b>	
<b>UNIT COST Php / KM</b>	<b>18,728,000</b>	<b>7,061,000</b>	<b>15,578,000</b>	<b>7,582,000</b>	<b>13,159,000</b>	<b>13,159,000</b>	<b>13,480,000</b>	<b>13,023,000</b>	
<b>Grand Total</b>	<b>3,413,087,399</b> <b>40.7%</b>	<b>1,873,188,232</b> <b>22.3%</b>	<b>1,440,612,930</b> <b>17.2%</b>	<b>1,664,810,499</b> <b>19.8%</b>	<b>8,391,699,060</b> <b>37.0%</b>	<b>8,391,699,060</b> <b>37.0%</b>	<b>8,391,699,060</b> <b>37.0%</b>	<b>8,391,699,060</b> <b>37.0%</b>	

Note: refer to Annex 8 as to details.



The RM cost of the LTPBM contracts 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 2002 to June 2009): 1.45
- Base Cost for Routine Maintenance at June 2009:  $70,798 \times 1.45 = \text{Php } 102,700 /\text{km}$

The estimated RM cost per year was computed as shown in the following table.

**Table 4.4.5 RM Cost Estimate for LTPBM 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)	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

## 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.

## 6) Other Costs including Tax, ROW Acquisition and Administration

The ROW acquisition and resettlement costs are not 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%.

## (9) Economic Evaluation

### 1) Economic Evaluation

The methodologies of economic benefit estimation for LTPBM projects are basically the same as the UI projects. The financial costs (capital cost and routine maintenance cost) were converted into the economic cost applying the Standard Conversion Factor (SCF=0.82).

The economic evaluation was carried out based on the following pre-conditions:

- Price Level: 2009 prices
- Evaluation Period: 10 years after opening year
- Residual Value: No residual values were counted

- Opportunity Cost of Capital (Discount Rate): 15%

The results of evaluation are as summarized below:

Project ID	Road/ Section	New Pavement Length (km)	NPV (Mil.Php)	NPV/Cap	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	Srigao (Lipata)-Bdr.Agusan D.N.	123.5	10,242	8.6	9.6	183

All LTPBM project roads are economically feasible with positive values of NPV/Cap applying the 15% of discount rate.

## 2) 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)

The results of estimation of effect indicators for LTPBM roads are summarized in the following table:

Indicator Project	1	2	3	4	5	6	7
	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 - Laoag	(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 – Bdr. Nueva Ecija	(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 - Baao	(2008) 7,746 (2018) 11,357	20	(2015) 5,380 (2018) 8,473	50→60	-	moderate	433.9
PBM-4: Surigao - Bdr. Agusan - D.N.	(2008) 4,493 (2018) 6,205	25	(2015) 2,640 (2018) 4,714	50→60	-	moderate	183.1

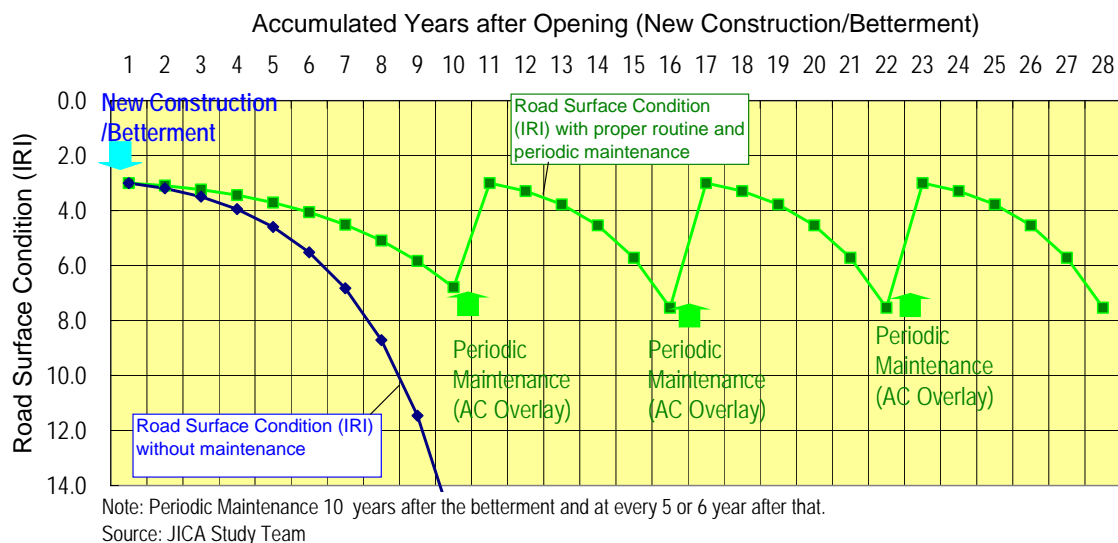
In addition above, the beneficiary population along the project roads is presented below:

Project	Indicator	Beneficiary population along the project roads	
		Population	Location
PBM-1: Aringay - Laoag		1,900,000	Ilocos Norte, Ilocos Sur, La Union
PBM-2: Sta. Rita – Bdr. Nueva Ecija		3,890,000	Bulakan, Nueva Ecija
PBM-3: Sipocot - Baao		1,530,000	Camarines Sur
PBM-4: Surigao – Bdr. Agusan – D.N.		1,030,000	Surigau del Norte, Agusan del Norte, Butuan City

## 4.5 PREVENTIVE MAINTENANCE (PM) COMPONENT

### (1) Scope of Preventive Maintenance (PM)

Sustainability of the road facilities after development or rehabilitation is the most important issue. 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.



**Figure 4.5.1 Typical Road Surface Deterioration With and Without Maintenance**

The PM for roads refers to works carried out before any serious defects occur. The 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 PM works in PMS/HDM-4 include preventive treatment, resurfacing, rehabilitation and reconstruction as shown in the following work categories (Table 4.5.1).

**Table 4.5.1 Preventive Maintenance Works in PMS/HDM-4**

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

## (2) Road Link Selection Criteria

The PM component for REAPMP 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:

- 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
- The proposed intervention works must show a positive NPV/Cap based on the HDM-4 runs.
- 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 10-20 km each, since AC overlay is costly as it requires batching plant, crushing plant and paving equipment and quality control laboratory.

### (3) Cost Estimate

The unit price for PM work is estimated at Php 6.6 million /km, including 4% detailed design, 8% construction supervision and 3.5% administration costs, as planned in PMS/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.

The total construction cost of the 3 pre-fixed road links was estimated at Php 1,297 million while that for PMS/HDM-4 selected road links was Php 2,761 million (refer to the following tables).

**Table 4.5.2 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 4.5.3 Cost of PMS/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
<b>Total</b>	<b>980.3</b>	<b>980.3</b>	<b>1,307.0</b>	<b>3,267.6</b>
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)

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.

#### (4) Economic Evaluation

The economic evaluation for PM projects conducted in this survey is for the 3 roads/ sections, pre-fixed road sections moved from the original LTPBM links. The procedures and methodologies applied to the economic evaluation are the same as presented in UI and LTPBM projects.

The economic evaluation was carried out based on the following pre-conditions:

- Price Level: 2009 prices
- Evaluation Period: 20 years after opening year
- Residual Value: No residual values were counted
- Opportunity Cost of Capital (Discount Rate): 15%

The results of evaluation are as summarized below:

Project ID	Road/ Section	New Pavement Length (km)	NPV (Mil.Php)	NPV/Cap	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 project roads are economically feasible with positive values of NPV/Cap applying the 15% of discount rate.

The evaluation indicators for the road links of 500 km in total selected by PMS/HDM-4 are NPV/CAP more than zero and EIRR is more than 15%.

## 4.6 INSTITUTIONAL CAPACITY DEVELOPMENT (ICD) AND TECHNICAL ASSISTANCE (TA) COMPONENT

### (1) Review of ICD Programs

The DPWH proposed JICA the revised ICD programs on 6<sup>th</sup> July 2009. The 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 18<sup>th</sup> August 2009 and during the SC meeting on 27<sup>th</sup> August 2009.

Table 4.6.1 shows the matrix for ICD Programs proposed by MIS/DPWH to be adopted by the Survey Team for REAPMP. The Survey Team included JICA TCP Phase 2 as this has been requested by DPWH to the GOJ, though not yet committed. It is noted that some ICD sub-programs of REAPMP are related to the proposed 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.***

System development for e-bidding was not recommended as it was still considered not adoptable to 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 4.6.1 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	Adoption
<ul style="list-style-type: none"> <li>Network Planning and Multi-Year Programming (Includes Multi-Year Programming and Scheduling (MYPS) Application and Road Traffic Information Application (RTIA))</li> </ul>	<ul style="list-style-type: none"> <li>Routine Maintenance Management System (RMMS)</li> </ul>	<ul style="list-style-type: none"> <li>Financial Management</li> </ul>	<ul style="list-style-type: none"> <li>Institutionalization of the New Planning Processes</li> </ul>	<ul style="list-style-type: none"> <li>RMMS</li> </ul>	<ul style="list-style-type: none"> <li>Quality Management and Enhancement for Road Construction / Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>e-Bidding</li> </ul>	No
<ul style="list-style-type: none"> <li>Road and Bridge Information Application (RBIA)</li> </ul>	<ul style="list-style-type: none"> <li>Pavement Management System (PMS)/Bridge Management System (BMS)</li> </ul>	<ul style="list-style-type: none"> <li>Independent Procurement Evaluator</li> </ul>	<ul style="list-style-type: none"> <li>Engineering Design Processes</li> </ul>	<ul style="list-style-type: none"> <li>TARAS</li> </ul>	<ul style="list-style-type: none"> <li>Quality Management and Enhancement for Bridge Construction / Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Overloaded Vehicle Control</li> </ul>	Yes, with overloaded vehicle improvement systems
<ul style="list-style-type: none"> <li>Road Infrastructure Surveys</li> </ul>	<ul style="list-style-type: none"> <li>Road Infrastructure Safety/TARAS</li> </ul>	<ul style="list-style-type: none"> <li>Support to Road Watch (Bantay Lansangan)</li> </ul>	<ul style="list-style-type: none"> <li>Environmental and Social Safeguards</li> </ul>	<ul style="list-style-type: none"> <li>Road Safety Audit</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of Capacity Enhancement of ROs and DEOs to all remaining regions</li> </ul>	<ul style="list-style-type: none"> <li>Communication Network</li> </ul>	Yes, Equipment supply
<ul style="list-style-type: none"> <li>Procurement of Automatic Traffic Classifiers</li> </ul>		<ul style="list-style-type: none"> <li>Strengthening Internal Control and Audit System</li> </ul>	<ul style="list-style-type: none"> <li>Advisory Services and Road Management</li> </ul>	<ul style="list-style-type: none"> <li>Project Management Information System (PMIS) Includes Project Cost Evaluation</li> </ul>		<ul style="list-style-type: none"> <li>IT Equipment and Software</li> </ul>	Yes, Equipment supply
<ul style="list-style-type: none"> <li>Procurement of Portable Weight Scales</li> </ul>		<ul style="list-style-type: none"> <li>Corporate Modernization/ support to implement the ISAP</li> </ul>	<ul style="list-style-type: none"> <li>Sector Reform and Road Board Strengthening</li> </ul>	<ul style="list-style-type: none"> <li>Environmental and Social Safeguard &amp; ROW</li> </ul>	<ul style="list-style-type: none"> <li>Slope and scouring protection works</li> </ul>	<ul style="list-style-type: none"> <li>Information Management Planning</li> </ul>	Yes, Consultancy Services
<ul style="list-style-type: none"> <li>Cost Estimation, Procurement Management</li> </ul>		<ul style="list-style-type: none"> <li>Independent Technical Auditor</li> </ul>	<ul style="list-style-type: none"> <li>Procurement and Estimation Services</li> </ul>	<ul style="list-style-type: none"> <li>Communication Network</li> </ul>		<ul style="list-style-type: none"> <li>Road Disaster Countermeasure Design and Construction</li> </ul>	No, Design Enhancement under JICA TCP Phase 2

Table 4.6.1 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 Adoption
<ul style="list-style-type: none"> <li>Strengthening of Environmental, Socio-Economic, and Land Acquisition Processes Includes IROW Application</li> </ul>		<ul style="list-style-type: none"> <li>Human Resource and Leadership Development</li> </ul>	<ul style="list-style-type: none"> <li>Special Road Surveys</li> </ul>	<ul style="list-style-type: none"> <li>IT Facilities</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of Contractors and Consultants</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Consultancy Services (Workshops)</li> </ul>
<ul style="list-style-type: none"> <li>Communication Network</li> </ul>			<ul style="list-style-type: none"> <li>Bridge Inspection Units and Service Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Road Partnership</li> </ul>	<ul style="list-style-type: none"> <li>Supply of Quality Control Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Equipment supply</li> </ul>
<ul style="list-style-type: none"> <li>IT Framework and Workstation</li> </ul>			<ul style="list-style-type: none"> <li>Traffic Classifiers and Service Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive Human Resource Development</li> </ul>	<ul style="list-style-type: none"> <li>Quality Control Enhancement</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Consultancy Services</li> </ul>
<ul style="list-style-type: none"> <li>Geographic Information System (GIS)</li> </ul>			<ul style="list-style-type: none"> <li>Survey Equipment and Service Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Gender Mainstreaming</li> </ul>	<ul style="list-style-type: none"> <li>Supply of Emergency Disaster Recovery Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Equipment supply</li> </ul>
<ul style="list-style-type: none"> <li>Database Management System (DBMS)</li> </ul>			<ul style="list-style-type: none"> <li>Materials Testing Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Quality Assurance System</li> </ul>	<ul style="list-style-type: none"> <li>Supply of non-destructive testing equipment, etc. for 13 ROs</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Equipment supply**</li> </ul>
<ul style="list-style-type: none"> <li>eNGAS</li> </ul>			<ul style="list-style-type: none"> <li>IT Equipment and Software</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure Development and Quality Assurance Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Finance for Workshop / OJT costs for RO/DEO Capacity Development (remaining 13 ROs)</li> </ul>	<ul style="list-style-type: none"> <li>Yes, Required Workshop/OJT costs**</li> </ul>
			<ul style="list-style-type: none"> <li>Communication Network</li> </ul>			<ul style="list-style-type: none"> <li>Reform Monitoring Assistance*</li> </ul>
			<ul style="list-style-type: none"> <li>Database Management System (DBMS)</li> </ul>			<ul style="list-style-type: none"> <li>Technical Assistance (Grant)</li> </ul>
			<ul style="list-style-type: none"> <li>Geographic Information System (GIS)</li> </ul>			<ul style="list-style-type: none"> <li>TA-1: Preparation of REAPMP Phase 2 Project</li> </ul>
			<ul style="list-style-type: none"> <li>Confirm Software Maintenance</li> </ul>			<ul style="list-style-type: none"> <li>TA-2: Preparation of PPP Projects</li> </ul>

Notes: \* Recommended by the JICA Survey Team

\*\* JICA TCP Phase I 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

The Survey Team recommends the following ICD components (programs) for REAPMP.

## (2) ICD-1: Overload Vehicle Control Enhancement

The Survey Team recommends refurbish of four existing weighbridge stations and installation of

eight new weighbridges (Figure 4.6.1)<sup>1</sup> which are selected based on the following conditions:

- Consistency with the recommended future weighbridge station network proposed in the AusAID 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.

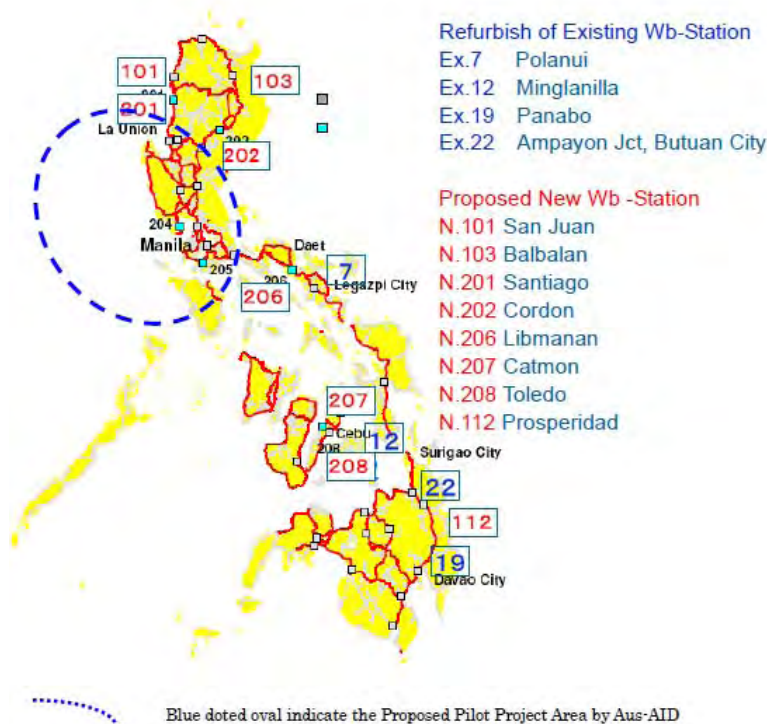


Figure 4.6.1 Location Map of Proposed Weighbridge Stations

The Survey Team recommended a combination of weighbridge station establishment and operation and control system improvement. The education and public information programs on overloaded control will be included in the ICD.

### (3) ICD-2: Quality Assurance Enhancement

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 ICB 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.

<sup>1</sup> The Survey Team has recently received 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.

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)

#### (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

#### (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/software and communication network of the DEOs. The REAPMP will cover the remaining 30 DEOs as a part of the collaboration program. REAPMP will include such training costs by DPWH to ensure a workable new equipment and system.

#### (6) ICD-5: Capacity Development Support for Remaining 13 Regions

The DPWH will expand the quality enhancement and management for highway and bridge construction and maintenance to all remaining 13 regions and DEOs under proposed JICA TCP Phase 2 or by own resources if TCP-2 is not approved by GOJ. REAPMP will provide equipment, mostly non-destructive testing devices and facilities necessary for workshops and OJTs.

## (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), including preparation of bidding documents and specification, bid evaluation and contract procedures
- System planning, development and operation guidance for weighbridges
- QAU enhancement
- Information management planning
- Enhancement of capacity of contractors and consultants (Workshops)
- Reform monitoring assistance services

## (8) Cost Estimate

The cost of ICD component was estimated 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.

The following Table 4.6.1 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 to be very conservative.

**Table 4.6.2 Comparison of Estimated ICD Costs with Pre-FS**

No.	Description	Estimated Cost in Pre-FS		REAPMP			Difference to Pre-FS (Mill Php)	Difference to Pre-FS (%)	
		Quantity	Estimated Cost (Mill Php)	Category					
				Equipment Supply	Consultancy Services	Activity of DPWH			Estimate Cost (Mill Php)
ICD-1	Overload Vehicle Control Enhancement	10	87				171	84	
	(1) Installation of New Weigh Bridge Stations at 8 locations:			X					62
	(2) Refurbishment of Existing Weighbridges at 4 locations:			X					
(3) Operation System Improvement (program development, installation and training)				X					
ICD-2	Quality Control Enhancement	8	107	X			267	160	
	(1) New satellite laboratories at 8 locations				X				
(2) Quality Control Enhancement									
ICD-3	Emergency Road Disaster Recovery Equipment for 10 DPWH DEOs	10	42	X			305	263	
ICD-4	Communication Network and IT Equipment						216	216	
	(1) IT Equipment and software			X					
(2) Information Management Planning					X				
ICD-5	Capacity Development Support for Remaining 13 Regions						161	161	
	(1) Non-destructive equipment			X					
	(2) Workshop and OJT Costs					X			40
Sub-Total:			236				1,221	986	
ICD-6	Consultancy Services for ICD		121		X		143	22	
	(1) Institutional Capacity Development for the above ICD-1(3), ICD-2(2) and ICD-4(2)		0						
	(2) Reform Monitoring Assistance		18						
	(3) Enhancement of Contractors and Consultants		103						
- Others (Slope, Safety, RMMS)									
Total:			357				1,365	1,008	

Note: Including VAT 12%

## **(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 on new weighbridges and refurbishment of existing 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: 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.

## 5. PROGRAM IMPLEMENTATION COST AND FUNDING PLAN

### 5.1 PROGRAM IMPLEMENTATION COST

#### (1) Summary of Program Implementation Cost

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	Administration	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.

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%	-

Value Added Tax (VAT) of 12 % was applied for civil works and consultancy service cost estimate. 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.

The following foreign and local currency components were applied by project component and category.

Currency Component	UI Projects		LTPBM Projects		PM Programs		ICB Programs	
	Civil Works	Consultancy	Civil Works	Consultancy	Civil Works	Consultancy	Civil Works/ Works/	Consultancy
FC	40%	38%	50%	38%	45%	0%	70%	68%
LC	60%	62%	50%	62%	55%	100%	30%	32%

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.

## (2) Cost Comparison with Pre-FS and NEDA-ICC Approval

The estimated project cost of REAPMP was Php 28,194 million in the Pre-FS/NEDA – ICC 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. 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 Cost Comparison with Pre-FS/NEDA ICC Approval

Component	Project Code No.		Project Name	Pre-FS / ICC-NEDA			JICA Survey			Difference to Pre-FS (%)	Remarks (and change of cost)		
	New	Old		GAA (Mill Php)	MVUC (Road (Mill Php))	Foreign (Yen Loan) (Mill Php)	Total (Mill Php)	GAA (Mill Php)	MVUC (Road (Mill Php))			Foreign (Yen Loan) (Mill Php)	Total (Mill Php)
<b>I. Road Upgrading / Improvement (UI)</b>	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 LTPBM to UI.
	UI-2	(JLM 10)	Lipa - Alaminos	264.9	53.5	368.8	687.2	177.6	0.0	185.2	362.8	52.8%	
	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	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
<b>Sub-Total</b>				<b>3,468.4</b>	<b>214.8</b>	<b>4,644.1</b>	<b>8,327.3</b>	<b>3,417.3</b>	<b>0.0</b>	<b>3,942.8</b>	<b>7,360.1</b>	<b>88.4%</b>	
<b>II. Asset Preservation Programs</b>													
<b>II.1 Long Term Performance Based Maintenance (LTPBM)</b>													
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%	
<b>Sub-Total</b>				<b>4,136.9</b>	<b>1,361.2</b>	<b>5,452.5</b>	<b>10,950.6</b>	<b>3,536.3</b>	<b>1,924.8</b>	<b>7,999.2</b>	<b>13,460.3</b>	<b>122.9%</b>	
<b>- Other LTPBM excluded by GOP</b>													
	JLM 5	Calbiga - Tacloban	583.6	264.9	737.0	1,585.5				0.0	0.0	0.0%	Implemented by GOP finance
	JLM 9	Calbayog - Allen Road	706.2	31.3	982.8	1,720.3				0.0	0.0	0.0%	
<b>Sub-Total</b>				<b>1,289.8</b>	<b>296.2</b>	<b>1,719.8</b>	<b>3,305.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0%</b>	
<b>II.2 Preventive Maintenance (PM)</b>													
	Pre-Fixed Road Links (moved from LTPBM)												
	HDM-4 selected Road Links												
<b>Sub-Total</b>				<b>1,900.5</b>	<b>806.7</b>	<b>2,301.7</b>	<b>5,008.9</b>	<b>553.2</b>	<b>280.3</b>	<b>1,231.2</b>	<b>2,064.8</b>	<b>88.8%</b>	Moved from LTPBM
				<b>1,900.5</b>	<b>806.7</b>	<b>2,301.7</b>	<b>5,008.9</b>	<b>1,745.3</b>	<b>884.3</b>	<b>3,880.7</b>	<b>6,510.3</b>	<b>130.0%</b>	
				<b>37.94%</b>	<b>16.11%</b>	<b>45.95%</b>	<b>100.00%</b>	<b>26.81%</b>	<b>13.58%</b>	<b>59.61%</b>	<b>100.00%</b>		
<b>Total of Road Works</b>				<b>10,795.6</b>	<b>2,678.9</b>	<b>14,118.1</b>	<b>27,592.6</b>	<b>8,698.9</b>	<b>2,809.2</b>	<b>15,822.7</b>	<b>27,330.8</b>	<b>99.1%</b>	
				<b>39.12%</b>	<b>9.71%</b>	<b>51.17%</b>	<b>100.00%</b>	<b>31.83%</b>	<b>10.28%</b>	<b>57.89%</b>	<b>100.00%</b>		
<b>- Road Safety</b>													
				66.0	28.0	83.1	177.1	0.0	0.0	0.0	0.0	0.0%	
				(included in UI and LTPBM)									
<b>III. Institutional Capacity Development (ICD)</b>													
				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%		
				23.5			23.5	0.0	0.0	0.0	0.0	0.0%	To be proposed for JICA TA (Grant)
<b>Grand Total</b>				<b>11,054.4</b>	<b>2,706.9</b>	<b>14,432.6</b>	<b>28,193.9</b>	<b>8,966.5</b>	<b>2,809.2</b>	<b>17,290.2</b>	<b>29,065.8</b>	<b>103.1%</b>	
<b>% Share</b>				<b>39.2%</b>	<b>9.6%</b>	<b>51.2%</b>	<b>100.0%</b>	<b>30.8%</b>	<b>9.7%</b>	<b>59.5%</b>	<b>100.0%</b>		
<b>Japanese Yen Equivalent:</b>				<b>¥21,965.1</b>	<b>¥5,378.6</b>	<b>¥28,677.6</b>	<b>¥56,021.3</b>	<b>¥17,816.4</b>	<b>¥5,581.8</b>	<b>¥34,355.6</b>	<b>¥57,753.8</b>		
Notes: Currency Exchange Rates				US\$ 1.00=	Php. 47.80	=	95.00 J.Yen						
				US\$ 1.00=	Php 1.00=	=	1.987 J.Yen						
				US\$ 1.00=	Php 1.00=	=	0.0209						
				US\$ 1.00=	Php 1.00=	=	0.5033						

## 5.2 FUNDING PLAN

### (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). Referring to the ICC NEDA approval, the JICA Survey Team recommends the following funding share of GAA, MVUC and GOJ.

**Table 5.2.1 Funding Share by Program Component and Source**

Component and Category	GOP		GOJ (Yen Loan)		Remarks (Eligibility of Loan)
	GAA	MVUC (Road Fund)	L.C. Portion	F.C. Portion	
<b>I Road Upgrading / Improvement (UI)</b>					
- 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%
<b>II Road Asset Preservation Programs</b>					
<b>II.1 Long Term Performance Based Maintenance (LTPBM)</b>					
- 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%
<b>II.2 Preventive Maintenance (PM)</b>					
- 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%
<b>III Institutional Capacity Development (ICD)</b>					
- 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%

### (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 5.2.2).

Table 5.2.2 Summary of Project Cost and Funding by Program Component and Source

Component and Category	Foreign Currency Portion						Local Currency Portion						Total						
	GOJ			GOP			GOJ			GOP			GOJ			GOP			
	Yen Loan	GAA	Total	Road Fund	GAA	Total	Yen Loan	GAA	Total	Road Fund	GAA	Total	Yen Loan	GAA	Total	Road Fund	GAA	Total	
	Mill JPY	Mill JPY	Mill JPY	Mill Pph	Mill Pph	Mill Pph	Mill JPY	Mill Pph	Mill Pph	Mill Pph	Mill Pph	Mill Pph	Mill JPY	Mill Pph	Mill Pph	Mill Pph	Mill Pph	Mill Pph	
<b>Civil Works</b>																			
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																			
III.1 Long Term Performance Based Maintenance (LTPBM)	7,443.9		0.0		7,443.9	1,248.8	1,248.8	1,248.8			3,746.3	9,925.2	1,248.8	1,248.8	2,497.5			14,887.8	
III.2 Preventive Maintenance (PM)	3,600.1		0.0		3,600.1	603.9	603.9	603.9			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		15,603.3	2,949.4	3,438.5	1,852.7			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			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			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	
Interest during construction	1,271.2		0.0		1,271.2						0.0	1,271.2	0.0	0.0	0.0			1,271.2	
Commitment Charge	181.2		0.0		181.2						0.0	181.2	0.0	0.0	0.0			181.2	
Total	21,773.2	0.0	0.0		21,773.2	6,332.3	8,966.5	2,809.2			11,775.7	34,355.6	8,966.5	2,809.2	11,775.7			57,753.8	
(Share)	37.7%	0.0%	0.0%		37.7%	21.8%	30.8%	9.7%			62.3%	59.5%	30.8%	9.7%	40.5%			100.0%	

Notes: Currency Exchange Rates

US\$ 1.00=

Php 1.00=

=

47.80

=

95.00 J.Yen

=

1.987 J.Yen

0.0209

=

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**

Year	GOP		GOJ Yen Loan (Mill JPY)	Total	
	GAA (Mill)	Road Fund (Mill Php)		(Mill JPY)	(%)
2010	16.8	0.0	353.0	386.3	0.7%
2011	598.7	163.2	3,345.9	4,859.7	8.4%
2012	4,540.5	1,658.8	17,439.8	29,757.9	51.5%
2013	2,657.3	563.6	8,352.4	14,752.3	25.5%
2014	897.4	287.2	3,276.9	5,630.6	9.7%
2015	168.3	89.6	980.8	1,493.3	2.6%
2016	87.5	46.9	606.8	873.8	1.5%
Total	8,966.5	2,809.2	34,355.6	57,753.8	100%
(Share)	30.8%	9.7%	59.5%	100.0%	

## 6. ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

### 6.1 EXISTING DATA RELATED TO THE PROJECTS

#### (1) Collection of Existing Data

The most principal existing data for environmental and social considerations of REAPMP are 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). The manuals of environmental and social considerations issued by DPWH and DENR-EMB were also collected to check conformity with the JICA/JBIC Environmental Guidelines.

#### (2) Summary of Environmental Survey for Projects

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 the following table.

**Table 6.1.1 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)
<b>I. Road Upgrading / Improvement (UI)</b>										
	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
<b>Total</b>				<b>285.7</b>	<b>128.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>22</b>	<b>809</b>
<b>II. Long Term Performance Based Maintenance (LTPBM)</b>										
	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
<b>Total</b>				<b>644.4</b>	<b>0.0</b>	<b>241.7</b>	<b>402.7</b>	<b>3,222.0</b>	<b>2</b>	<b>129</b>
<b>III. Preventive Maintenance (PM)</b>										
	Pre-Fixed Road Links (moved from LTPBM)			93.0			93.0			
	HDM-4 selected Road links			500.0			500.0			
<b>Total</b>				<b>593.0</b>	<b>0.0</b>	<b>0.0</b>	<b>593.0</b>	<b>0.0</b>	<b>0</b>	<b>0</b>

Note: UI; Upgrading / Improvement, RH; Rehabilitation, PM; Preventive Maintenance, RM; Routine Maintenance

Of the above table, 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 from 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,

Summary of environmental baseline survey for UI road projects is described in the form of JICA Guidelines using EIA reports and other existing data. The items in the form include;

- Social environment: Affected people/ Related people/ Group, Land use and local resource utilization, Local infrastructure/ Social organization, Economy, Nation's health and hygiene,
- Natural Environment: Geographical feature and Geology, Fauna, Flora and Habitat, Coast and sea, Lake, River system, Seashore/ Climate,
- Pollution: Present pollution, Complaint which people make the biggest concern, Countermeasures against pollution,
- Others.

### (3) Scoping and Mitigation Measures

Regarding the items in the scoping matrix identified having some expected impacts, the environmental management plan was made in consultation with counterparts and with reference to the EIS report compiled by the local counterparts and the ECC. The project activities are divided into three periods, namely, before, during and after construction.

Scoping Matrix for the eight UI and LTPBM projects is made in consultation with counterpart personnel of DPWH. The avoidance, mitigation measures and monitoring plan were made in consultation with counterparts with reference to the EIS (or IEE) report compiled by the Philippine side and the ECC, or with reference to Project Description and CNC.

Of the eight projects, Table 6.1.2 shows scoping matrix for UI-3, Mindoro West Coast Road Project (70km). Its corresponding mitigation measures and monitoring requirements are as shown in Table 6.1.3. Table 6.1.4 is a summary of scoping, mitigation measures and monitoring plans for other UI and LTPBM projects.

**Table 6.1.2 Scoping Matrix (Mindoro West Coast Road Project)**

Name of Sub-Project		UI-3 Mindoro West Coast Road (70km UI)	
	Item	Rating	Reasons
Social Environment: *Impacts on "Gender" and "Children's Right" may be related to all social environment criteria.	1	Involuntary Resettlement	<b>B</b> Resettlement (13 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.
	3	Land Use and Utilization of Local Resources	<b>B</b> Land acquisition (54 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.
	5	Existing Social Infrastructures and Services	No influence on the local water and electricity demand is 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 project road.
	7	Misdistribution of Benefit and Damage	Consensus building of construction was made by stakeholder meetings.
	8	Cultural heritage	No precious heritage and historic relics located along the proposed route.
	9	Local Conflicts of Interest	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.
	11	Sanitation	<b>B</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>B</b> There is fear of infection diseases such as HIV/AIDS through employed construction workers.

Name of Sub-Project			UI-3 Mindoro West Coast Road (70km UI)	
Item		Rating	Reasons	
Natural Environment	13	Topography and Geographical Features		Geographical Features would not be changed.
	14	Soil Erosion	<b>B</b>	Soil Erosion may be occur by civil engineering works.
	15	Groundwater		No possibility of dropping the groundwater level because excessive pumping wouldn't be carried out.
	16	Hydrological Situation	<b>B</b>	Hydrological situation may be influenced by the inflow of sediments from quarry.
	17	Coastal zone		No civil engineering works to cause seashore erosion.
	18	Flora, Fauna and Biodiversity		No serious impacts on flora and fauna are expected under current situation.
	19	Meteorology		Meteorology wouldn't be affected by road project.
	20	Landscape		No scenery to be considered along the proposed route. Roadside planting would cause positive impact on scenery.
	21	Global Warming		Not so much CO2 emission.
Pollution	22	Air Pollution	<b>B</b>	Dust would be discharged by construction machinery and vehicles during and after construction.
	23	Water Pollution	<b>B</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.
	25	Waste	<b>B</b>	Construction and solid wastes would be generated during construction.
	26	Noise and Vibration	<b>B</b>	Noise and Vibration would be generated by construction machinery and vehicles during and after construction.
	27	Ground Subsidence		Excessive pumping to occur ground subsidence wouldn't be carried out during and after construction..
	28	Offensive Odor		No possibility to generate offensive odor.
	29	Bottom Sediment		No possibility to generate bottom sediment.
	30	Accidents	<b>B</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>B</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.

**Table 6.1.3 Avoidance, Mitigation Measures and Monitoring Plan****UI-3 Mindoro West Coast Road**

Impact	Avoidance and Mitigation Measures	Monitoring Requirements	Responsibility
<b>I . Project activity - before construction</b>			
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
<b>II . Project activity - during construction</b>			
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	- Cancellation 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 administrator (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	- Cancellation 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
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



Impact	Avoidance and Mitigation Measures	Monitoring Requirements	Responsibility
<b>III. Project activity - after construction</b>			
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

**Table 6.1.4 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 occur by civil engineering works.	B	Soil Erosion may be occur by civil engineering works.	B	Soil Erosion may be occur 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 pumping wouldn't be carried out.		level because excessive pumping wouldn't be carried out.		because excessive pumping 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	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	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		No possibility of soil contamination during construction.		No possibility of soil contamination during construction.		No possibility of soil contamination during construction.
	25	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	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		Excessive pumping to occur ground subsidence wouldn't be carried out during and after construction..		Excessive pumping to occur ground subsidence wouldn't be carried out during and after construction..		Excessive pumping to occur ground subsidence wouldn't be carried out during and after construction..
	28		No possibility to generate offensive odor.		No possibility to generate offensive odor.		No possibility to generate offensive odor.
	29		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 -Bao Road		PBM-4. Surigao(Lipata)-Davao City*	
Item		Rating	Reasons	Rating	Reasons	Rating	Reasons	Rating	Reasons
Social Environment: (社会環境) *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.
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		No impact is		No impact is		No impact is

Name of Sub-Project		PBM-1. Aringay -Laoag City		PBM-2. Sta.Rita (Bulacan)-Nueva Ecija		PBM-3. Sipocot -Bao Road		PBM-4. Surigao(Lipata)-Davao City*		
Item		Rating	Reasons	Rating	Reasons	Rating	Reasons	Rating	Reasons	
			expected.		expected.		expected.		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.	

#### **(4) Alternative Standard Cross Section Plans for UI Projects**

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) UI-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 impact on the following items has become larger if the ROW width becomes wider, especially on involuntary resettlements.

- Soil Erosion
- Hydrological Situation
- Flora, Fauna and Biodiversity
- Air Pollution
- Water Pollution
- Waste
- Noise and Vibration
- Accidents
- Involuntary Resettlement
- Land Use and Utilization of Local Resources
- Sanitation
- Hazards (risk) Infectious Diseases such as HIV/AIDS

##### **3) UI-3 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. According to the scoping result in Table 6.1.2, 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. As larger ROW width increases quantity of works, more dust is emitted. In conclusion, the larger ROW causes more impacts on environments.

##### **4) UI-4 Catanduanes Circumferential Road**

The result of environmental evaluation on impact items was the same as UI-2 Lipa-Alaminos Road.

## **6.2 ACQUISITION OF ENVIRONMENTAL CLEARANCE**

### **(1) EIA System in the Philippines**

#### **1) EIA Procedures**

The Philippine Environmental Impact Statement System (PEISS) was established by Presidential Decree (PD) No. 1151 in 1977, known as the Philippine Environmental Policy. The EIA

procedures cover Environmentally Critical Projects (ECPs) presumed to have significant negative impacts on environment or projects proposed in Environmentally Critical Areas (ECAs).

According to the Revised Procedural Manual of the DAO No. 30, once a project is implemented, the Environmental Compliance Certificate (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 Certificate of Non-Coverage (CNC) is issued when the project is not covered by the EIA system, and if it does not require securing an ECC.

## 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 review by the Environmental Impact Assessment Review Committee (EIARC) on the submitted EIS.

In the Philippines, a new environmental 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 a project outline report. Projects in category D are required to obtain CNCs.

The important factors to classify the project in a category A or B are the ECPs indicating a project which will cause large impacts and the ECAs meaning an area which is likely to be affected. The category is decided based on the consolidated information. The road and/or bridge project is included in the subject project of the ECPs.

Table 6.2.1 shows approval requirements which include, depending on the scale of the subject project, the EIS by the central office, EIS by the regional offices, and IEE investigation and checklist. It also shows that the EIS shall be submitted to the EMB central office or the EMB regional offices. ECC will only be acquired after the examination of the EIS. IEE investigation checklist is 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 6.2.1 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 road project has a bridge component, the total length of road and bridges will be considered.  
 - Critical slope is equal to 50% slope or 26.57° angle

Source: Social and Environmental Management Systems (SEMS) Operations Manual, DPWH, April 2003

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.

## (2) Acquisition of Environmental License from Domestic System

Table 6.2.2 shows the acquisition status of project environmental license. Four projects belong to the UI component while another four to the LTPBM component. These four UI projects are the subject matter of the EIA Study and ECC were 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 has been issued.

**Table 6.2.2 Acquisition Status of Project Environmental License**

Project No.	Classification	Document reviewed by EMB	ECC/ CNC	Issuer	Project Owner	Validity
1. Aringay-Laoag City	LTPBM	Project Description	CNC 5th Sept. 2007	EMB, DENR Region I	DPWH	N/A
2. Bongabon - Pantabangan - Baler Road	UI (Remarks: Jct.PPH – Rizal Route 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. Sta.Rita (Bulacan)-Nueva Ecija	LTPBM	Project Description	CNC 24th July. 2008	EMB, DENR	DPWH	N/A
4. Lipa-Alaminos Road	UI	IEE Study	ECC 28th January 2008	EMB, DENR, Calabarzon Region IV	DPWH	Valid
5. Sipocot-Baao Road	LTPBM	Project Description	CNC 15th Feb. 2008	EMB, DENR, Region V	DPWH	N/A
6. Catanduanes Circumferential Road	UI	EIS	ECC 15th Oct. 1995	EMPES, DENR, Region V	PMO-Dept. of DPWH, Catanduanes	Valid*
7. Mindoro West Coast Road	UI	EIS	ECC 27th Sept. 2001	DENR, Region IV	DPWH	Valid*
8. Surigao(Lipata) -Davao City*	LTPBM	Project Description	CNC 21st Feb. 2008	EMB, DENR, Caraga Regional Office	DPWH	N/A

Remarks: \* 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)

### (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 in the consultation 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 UI-3 (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, reimplementing 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<sup>2</sup> 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

### (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, World Bank assisted project.

The latest edition, now called the Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy or LARRIPP shall provide guidance to those preparing resettlement action plans (RAPs) and safeguards instrument for Indigenous Peoples (IPs) affected by infrastructure projects implemented by the DPWH irrespective funding source (foreign or local).

#### 1) Land Acquisition and Expropriation

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.

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<sup>2</sup> 50 % hiring of unskilled labor & 30 % of skilled labor from the local residents (RA 6685 and DPWH Department Order 51 series of 1990).

An act (RA 8974) to facilitate the acquisition of right-of-way (ROW), site or location for national government infrastructure projects was assigned and took effect in November 2000.

## 2) Involuntary Resettlement

### 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

The Resettlement Action Plan (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.

The Infrastructure Right-of-Way (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.

## (2) Resettlement Requirements for REAPMP

Affected house survey was conducted for the town areas in UI-2, UI-3 and UI-4 projects. 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”.

Since the route from Lipa City to Malarayat golf course 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, the number of residents to be affected is listed for four ROW alternatives as in Table 6.3.1.

**Table 6.3.1 Affected Residential Houses (Building) on Lipa – Alaminos Road**

Alternatives	ROW	Lipa City - Malarayat Golf Course
1	14.1m	8
2	12.0m	3
3	10.1m	0
4	9.1m	0

Note: Alternative 2 (ROW 12.0m) was finally adopted for REAPMP.

Affected house survey was conducted since the major cities like Viga and Pandan are located in an urban area. Based on the distance between the centerline of the road and the wall of the existing house shown on the alignment drawings, the number of affected houses was estimated for four alternatives as in Table 6.3.2.

**Table 6.3.2 Affected Residential Houses (Building) on Catanduanes Circumferential Road**

Package 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: Alternative 2 (ROW 12.0m) was finally adopted for REAPMP.

Affected house survey was conducted since two cities, Sablayan and Calintaan are located in an urban area. Based on the distance between centerline of the road and the wall of the existing houses, the number of affected residents is listed for four alternatives in Table 6.3.3.

**Table 6.3.3 Affected Residential Houses (Building) on Mindoro West Coast Road**

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: Alternative 2 (ROW 12.0m) was finally adopted for REAPMP.

The affected structures of buildings made of timber, concrete, galvanized roof, etc., on these roads belong to middle-class categories in the Philippines.

### (3) Avoidance and Mitigation Measures for PAPs

As mentioned above, resettlement is required for ROW acquisition. The following mitigation measures are required for these Project Affected Families (PAFs):

- DPWH should comply with Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy (LARRIPP)
- 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

### (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.

### (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 the UI projects, since alignment change and road widening are planned in part, deforestation will be required. Estimation of the amount of deforestations is shown in Table 6.4.1. Actually, 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.

**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.

### (3) Social Environment (Resettlement)

At the detailed design stage, basic data should be collected for the RAP, including 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 study should comply with IROW Procedural Manual (DPWH, April 2003). The Resettlement Action Plan (RAP) should comply with Land Acquisition, Resettlement, Rehabilitation and Indigenous Peoples' Policy (LARRIPP).

**(4) HIV/AIDS**

The HIV/AIDS problems described in JICA/JBIC guidelines are not taken up in the Philippines EIA system. Considering 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 might occur. Therefore, a concrete plan needs to be established for public health.

**(5) Environmental Checklist**

The environmental checklist (Table 6.4.2) for roads and railways provided in the JBIC Environmental guidelines was used to confirm environmental considerations for both UI and LTPBM projects of REAPMP. The results showed that the environmental and social considerations to the project undertaken based on the Philippines EIA system has conformed closely to the JICA (and JBIC) guideline.

**Table 6.4.2 Environmental Checklist**

Category	Environmental Item
1 Permits and Explanation	(1) EIA and Environmental Permits
	(2) Explanation to the Public
2 Mitigation Measures	(1) Air Quality
	(2) Water Quality
	(3) Noise and Vibration
3 Natural Environment	(1) Protected Areas
	(2) Ecosystem
	(3) Hydrology
	(4) Topography and Geology
4 Social Environment	(1) Resettlement
	(2) Living and Livelihood
	(3) Heritage
	(4) Landscape
	(5) Ethnic Minorities and Indigenous Peoples
5 Others	(1) Impacts during Construction
	(2) Monitoring
6 Note	Reference to Checklist of Other Sectors
	Note on Using Environmental Checklist

## **7. IMPLEMENTATION PLAN**

### **7.1 INSTITUTIONAL SETUP FOR PROGRAM IMPLEMENTATION**

#### **(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).

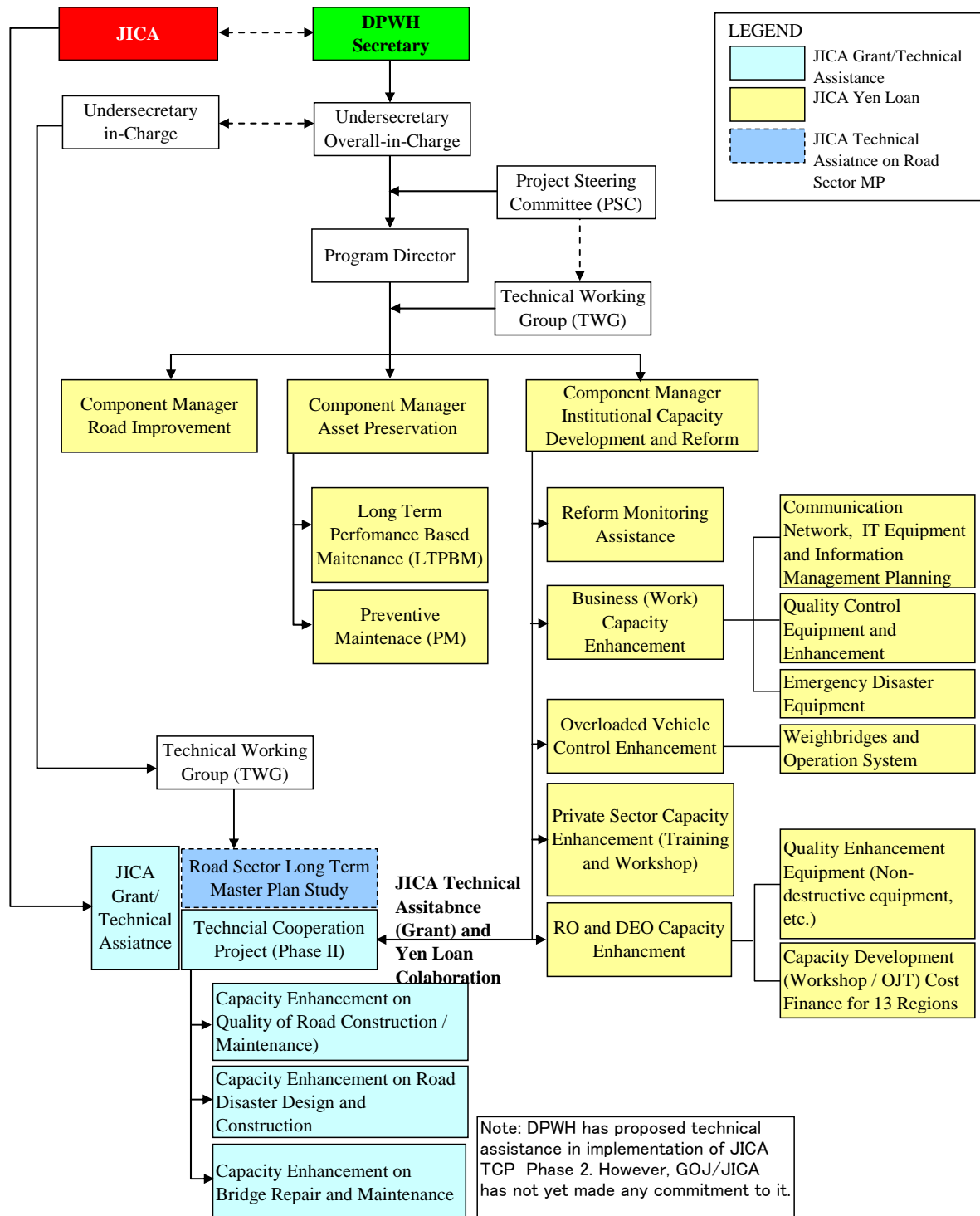
#### **(2) Project Implementation and Management Organization**

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.

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 II) under proposal and Road Sector Long Term Master Plan Study to be proposed in the future.

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.



**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).

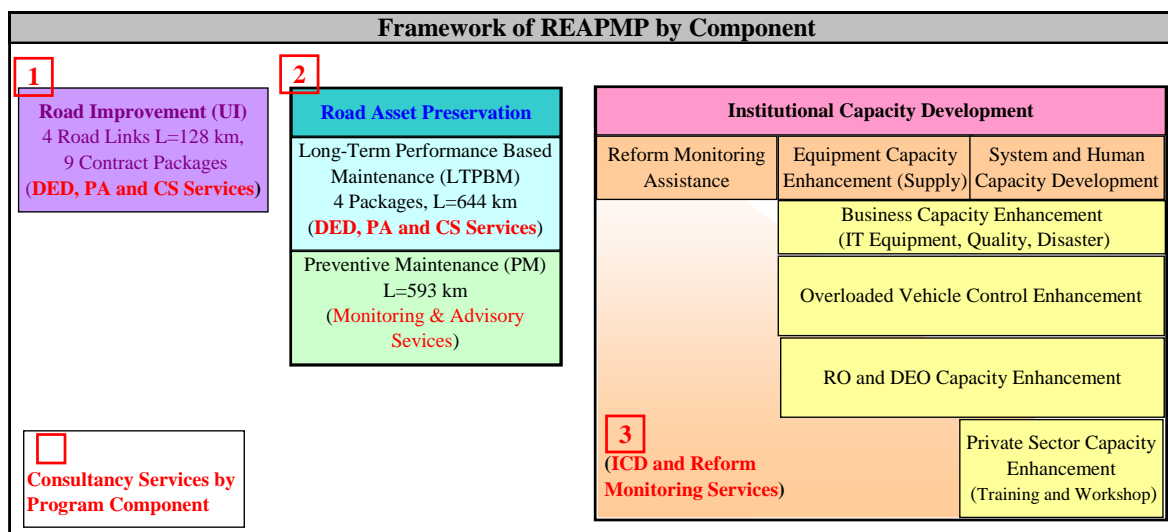


Figure 7.1.2 Framework (Component) of REAPMP

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. ICD Component will be coordinated by its designated Component Manager in close coordination with MIS and other relevant units, including BRS, BOE, PS, etc.

## 7.2 IMPLEMENTATION SCHEDULE

Figure 7.2.1 shows the overall Program implementation schedule. The Program implementation period will be from 2010 to 2017. The final report of JICA preparatory survey for REAPMP is submitted in October 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).

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)
<b>JICA Loan Preparation</b>													
- JICA Preparatory survey		Mar.2009	Oct.2009	7	■								
- Project Appraisal		Nov.2009		1	■								
- L/A & E/N		Feb.2010	Mar.2010			■							
<b>Project Implementation</b>													
<b>1. Road Improvement (UI)</b>													
- Procurement of Consultants	128	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							■	■	■
<b>2. Asset Preservation</b>													
<b>2.1 Long Term Performance-Based Maintenance (LTPBM)</b>													
- Procurement of Consultants	644	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								■	■
<b>2.2 Preventive Maintenance (PM)</b>													
- Preparation (DPWH)	593	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				■	■	■	■	■	■
<b>3. Institutional Capacity Development (ICD) and Reform Monitoring</b>													
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

## 7.3 CONSULTANCY SERVICES

### (1) Framework of Consultancy Services

As there are three different components under REAPMP, the proposed consultancy services should match the program implementation framework illustrated in Figure 7.1.2. 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 agreed action plans.

## **(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.

The expatriate engineers will be assigned to the central team and provide guidance on field survey and check the detailed engineering designs 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.

## **(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

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 the DPWH officers on LTPBM contracts, including work concept, responsibility, interventions measurement and payment methods.

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.

## **(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

## 7.4 TECHNICAL ASSISTANCE

The DPWH has proposed to the GOJ the implementation of Technical Cooperation Project Phase II (TCP-Phase II) 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 II after a joint project appraisal on TCP-Phase I, 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 program.

In the case of that GOP/JICA could not agree on TCP-Phase II, the Survey Team recommends that DPWH should expand institutional capacity development project to the remaining 13 regions by using equipment and training facilities provided under REAPMP.

In the Pre-FS report, DPWH has proposed to conduct the detailed engineering and parcellary surveys, through consulting services for preparation of REAPMP Phase II. 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 Survey Team recommends that the study and engineering design should be subject to the technical assistance scheme of GOJ. The Survey Team will also recommend that the DPWH establish clear and stable future policies, strategy involving LTPBME, 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.

## 7.5 PROCUREMENT PLAN

### (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 JICA 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 shall be applied as far as these have no conflict with the JICA/JBIC procurement guidelines.

## (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) 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.SA.9184.

## (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 shall be about 70-80 million Php, except PM-A1, PM-A2 and PM-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)
<b>A. Pre-Fixed Road Links</b>					
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>B. HDM-4 selected Road Links</b>					
	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.

#### (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	

#### (5) Consultancy Services

Three consultancy services will be procured for 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.

## 7.6 MAINTENANCE AT POST-CONSTRUCTION STAGE

The contractor shall be responsible for carrying out routine maintenance at his own cost up to the final acceptance for UI and PM projects. 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.

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 as follows:

- Expansion of the funds needed for road maintenance not realized in current political environment
- Revision of inadequate provisions of RA 8794 on overloading by legislation and provision of stiffer penalties not realized
- Difficulty in sector reform involving attraction of more contractors to road maintenance
- Allocation of funds and selection of projects based on objective techno-economic criteria through PMS/HDM-4 distorted by external interference
- Prospect for insufficient quality of asphalt pavement due to current cost disadvantage and low technical capability of contractors

- Natural disasters caused by heavy tropical-type rainfall, typhoons and earthquakes



## **8. PERFORMANCE INDICATORS**

The Pre-FS Report on REAPMP by JICA and DPWH provided a set of Performance Indicators to be established 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 the similar way 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 Project Performance Indicators and Monitoring Methods

Performance Indicators	Baseline 2009 or 2010	Targets				Data Collection & Reporting		Responsibility
		2011	2012	2013	After 2013	Frequency	Data Collection Instrument	
<b>1. Greater Efficiency in Planning and Funding</b>								
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
<b>2. Improvement of Road Conditions or Service Level</b>								
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
<b>3. Reduction in Road User Costs</b>								
3.1 Reduction in Vehicle Operating Cost, vs. 2009	tbn	-10%	-15%	-20%	-25%	Annual	HDM-4	PS
3.2 Increase in Travel Speed based on Spot Surveys, vs 2009	tbn	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
<b>4. Improved Project Implementation</b>								
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 Projects 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
<b>5. Others</b>								
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, tbn: to be measured

## 9. AGREED ACTION PLANS

To provide for the efficient and effective implementation of REAPMP as well as the entire road asset preservation/enhancement and management program, the Pre-FS for REAPMP conducted by JICA and DPWH produced a set of agreed actions to be adopted and carried out by GOP. 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 type of recommendations, together with the actions to be taken by GOP in the starting years of the REAPMP implementation, the evaluated intensity of the features of the action measures, and the intensity of the relation with JICA resulting from involvement in REAPMP or the 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 features of the action measure for the intensity to be evaluated include the importance, urgency, and difficulty. According to the relative intensity, action measures are ranked A, B, or C for each of the three features. Thus the necessity of the action measure is evaluated.

The proposed set of agreed action plans has not finalized as yet. The updated draft for the Recommendations/Action Plans matrix, produced jointly by the two consultant teams (this team and KEI team), is as shown in Table 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
<b>II. PLANNING AND FINANCING ASPECTS</b>				
II.1 Improve National Road Network Based on Definitive Long-Term Asset Preservation Framework	II.1.1 Establish long-term asset preservation/maintenance strategy	B	C	-
	II.1.2 Enhance Multi-Year (Medium-Term) Rolling Program (Network/Program Analysis) based on the long-term strategy	A	A	REAPMP, NRIMP, RSIP
	II.2 Make Routine Maintenance Management System (RIMS) workable	B	B	RSIP
	II.3 Provide timely matching counterpart fund for Preventive Maintenance Component of REAPMP	A	A	REAPMP
II.4 Improve ICT System for Road Planning and Management	II.4.1 Install communication facilities to connect 30 DEOs to DPWH WAN	B	A	REAPMP-ICD
	II.4.2 Supply IT hardware and software to remaining 30 DEOs	B	B	REAPMP
	II.4.3 Provide expert advisory and training services to MIS for evaluation and prioritization of IT projects	B	B	REAPMP
<b>III. TECHNICAL ASPECTS</b>				
III.1 Improve/Upgrade Maintenance Practices	III.1.1.a Sustain MBC (from current 70% to 90%)	B	C	-
	III.1.1.b Continue PM works by contract using sizable packages to attract contractors	A	A	REAPMP-PM
	III.1.2 Introduce Design-Build (DB) scheme as pilot case in REAPMP	B	A	REAPMP-LTPBM
	III.1.3.a.1 Enhance and institutionalize LTPBMC (including pilot projects under REAPMP)	A	A	REAPMP-LTPBM
	III.1.3.b Orient/educate contractors on LTPBMC	B	A	REAPMP-LTPBM
	III.1.4.a Undertake road condition rating using IRI measurements	B	A	JICA-TCP/REAPMP
	III.1.4.b Conduct training of project engineers, maintenance inspectors, et al	B	A	JICA-TCP/REAPMP
	III.1.7.b Supply emergency disaster recovery equipment	B	A	REAPMP-ICD
	III.1.8.a Implement programs for JICA Technician Cooperation for improvement of quality management for highway and bridge	B	A	REAPMP, JICA-TCP
	III.1.8.b Conduct master plan study on road and bridge asset valuation and management	B	A	JICA-TCP
	III.2.1.a Undertake revision/updating of DPWH design guides (1982) and standard drawings	B	A	NRIMP-II
	III.2.3 Improve design preparation and review process/QA check-engineer capacity of BOD/RO/DEOs	B	A	REAPMP-ICD
	III.4.1 Fully implement DPWH procurement manual including timelines and downloadable SBDs down to District Level	B	C	-
	III.4.1.a.1 Install and implement Agency Performance Indicators for procurement	B	C	-
	III.4.1.a.2 Apply stiff sanctions for breaches on procurement rules	B	C	-
III.4 Provide for More Effective Procurement Practices	III.4.1.b Improve and decentralize computerized eligibility screening and post qualification of bidders down to District level	B	B	RSIP-I
	III.4.1.d Provide for procurement evaluation (audit) system by third parties	B	B	NRIMP-II
	III.4.2 Undertake capacity building program for DPWH, local contractors and consultants for road maintenance works	A	A	REAPMP-ICD
	III.4.3.a Adopt new IRR for RA 9184 for locally-funded and foreign-assisted projects under national competitive bidding	B	C	-
	III.4.3.b Review and improve contract conditions to address one-sided conditions	B	C	-
	III.5.1.b.1 Train engineers and foreman of contractors, introduce qualification requirements based on examination	B	A	REAPMP-ICD
	III.5.1.b.2 Use Constructor's Performance Evaluation System (CPES) and develop Consultant's Performance Evaluation System for eligibility screening and monitoring of performance	B	C	-
	III.5.2.a.1 Train, equip, fund and field more QAU's for maintenance works	B	A	-
	III.5.2.a.2 Strengthen/install additional field laboratories to handle materials testing and QA	B	A	REAPMP-ICD
	III.5.2.a.3 Strengthen validation teams composed of senior officials	B	A	-
	III.5 Strengthen Project Management	III.5.3.a Establish a performance management system for DPWH planning, design, construction and maintenance engineers with incentives and sanctions	B	C
III.6.2.a.1 Refurbish/upgrade inoperable weighbridges (at least 15 weighbridges)		B	A	REAPMP-ICD
III.6.2.a.4 Install additional weighbridges		B	A	REAPMP-ICD
III.6.2.a.5 Provide dedicated MVUC Special Road Safety Fund for O&M of weighbridges		B	A	REAPMP-ICD
III.6.2 Reduce the Incidence of Overloaded Vehicles		B	A	-
<b>III. GOVERNANCE AND ACCOUNTABILITY ASPECTS</b>				
III.1 Strengthen Internal Control System	III.1.1 Establish Program Office (REAPMO) 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.3.2 Enhance capability of DPWH staff under the streamlined organization	B	A	REAPMP-ICD
III.3 Rationalize Staffing and Improve Productivity	III.3.a Support capacity development of DPWH, contractors and consultants to increase outsourcing of road services	B	A	REAPMP-ICD
	III.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; C - 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	Long-Term Action Measures	More Immediate Action Measures	Type of Recommendations	JICA Related	Donor Assistance
<b>I. PLANNING AND FINANCING ASPECTS</b>	<b>I.2 Optimize Project Selection and Budget Allocation for Asset Preservation</b>	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	-
<b>I.3 Raise Road Maintenance Fund Levels to Cover Needs.</b>		I.3.1.a Mobilize additional funds for road maintenance through ODA with MYUC and GAA as counterpart funds	C	C	-
		I.3.1.b Increase current MYUC 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	NRMP-II
<b>II. TECHNICAL ASPECTS</b>	<b>II.1 Improve/Upgrade Maintenance Practices</b>	I.3.1.d Include Road Fund as a priority area for monitoring.	C	B	NRMP-II/PEGR
		II.1.3.c Adopt large-sized contract packages to attract local contractors	C	B	NRMP-II
		II.1.7.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	-
<b>II.3 Enhance Road Safety Considerations</b>		II.2.1.b Institutionalize value engineering for projects costing at least P1p 50 M	C	C	NRMP-II
		II.2.2 Make operational computer assisted Cost Estimation System (CES)	C	B	NRMP-II
		II.3.1.a Provide implementation guidance and training on TARAS data review, encoding and analysis down to DEOs	C	B	RSIP-I
<b>II.4 Provide for More Effective Procurement Practices</b>		II.3.1.b Undertake renewal/installation of computers and IT for TARAS at ROs and DEOs	C	B	NRMP-II, RSIP-I
		II.3.1.c Review and establish better coordination between PSP and DPWH	C	B	RSIP-I
		II.3.2 Revise/wupdate/improve geometric design guide (1982) to enhance safety aspects	C	C	-
<b>II.5 Strengthen Project Management</b>		II.4.1.c Propose JICA to become a member of the MBB and allowed to use the harmonized edition of FIDIC conditions of contract	C	A	REAMP
		II.5.1.a.1 Engage private consultants and technical auditors to assist DPWH in maintenance project supervision	C	B	-
		II.5.1.a.2 Utilize Project Management and Construction Supervision Manuals prepared by JICA TCP-Phase I	C	A	REAMP
<b>II.6 Reduce the Incidence of Overloaded Vehicles</b>		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.6.2.a.2 Provide impounding areas for overloaded vehicles	C	B	PEGR
<b>III. GOVERNANCE AND ACCOUNTABILITY ASPECTS</b>	<b>III.4 Improve Road Service Facilities</b>	II.6.2.a.3 Install computer system for recording and giving warning for overloading	C	C	-
		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
<b>III.3 Rationalize Staffing and Improve Productivity</b>		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.3.3.b Establish qualification system of contractors and consultants to increase outsourcing of road services	C	C	-
<b>III.4 Improve Road Service Facilities</b>		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	C	-
		III.4.2 Promote work ethics with emphasis on public service and accountability.	C	A	JICA/TCP
		III.4.3 Implement rationalization plan or alternative plan (if RP is not approved) to right-size DPWH	C	B	NRMP-II

Note: JICA: (Relation with JICA) : A - JICA related programs; B - On-going/planned by NRMP, ADD-RSP, AinsAID-PEGR; C - Not by JICA but other donors;  
Type of Recommendations: A: Strong, B: Medium, C: Long-term

## 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)
<b>I. Road Upgrading / Improvement (UI)</b>									
	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
<b>Total</b>			<b>286</b>	<b>128</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>809</b>
<b>II. Long Term Performance Based Maintenance (LTPBM)</b>									
	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
<b>Total</b>			<b>644</b>	<b>0</b>	<b>242</b>	<b>403</b>	<b>3,222</b>	<b>2</b>	<b>129</b>
<b>III. Preventive Maintenance (PM)</b>									
	Pre-Fixed Road Links (moved from HDM-4 selected Road links)		93			93			
<b>Total</b>			<b>593</b>	<b>0</b>	<b>0</b>	<b>593</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Grand Total</b>			<b>1,523</b>	<b>128</b>	<b>242</b>	<b>996</b>	<b>3,222</b>	<b>24</b>	<b>938</b>

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. 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.