社会開発調査部報告書

NO. 52

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

THE DETAILED DESIGN STUDY
ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(PLARIDEL, CABANATUAN AND SAN JOSE BYPASSES)

FINAL REPORT

MAIN TEXT

JICA LIBRARY
J1171437[5]

December 2002

KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD

S S F
CR(6)
02-158

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

THE DETAILED DESIGN STUDY
ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(PLARIDEL, CABANATUAN AND SAN JOSE BYPASSES)

FINAL REPORT

MAIN TEXT

December 2002

KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD

EXCHANGE RATE

23 August 2002

1US$ = ₱52.28
1US$ = Yen 120.18
1₱ = Yen 2.299
Source: Central Bank of the Philippines

PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Detailed Design Study on Upgrading Inter-Urban Highway System along the Pan-Philippine Highway (Plaridel, Cabanatuan and San Jose Bypasses) and entrusted the study to the Japan International Cooperation Agency (JICA).

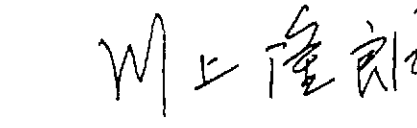
JICA selected and dispatched a study team headed by Mr. Mitsuo Kiuchi of Katahira & Engineers International, and consisting of Katahira & Engineers International and Yachiyo Engineering Co., Ltd, to the Philippines, three times between March 2001 and October 2002.

The team held discussions with the officials concerned of the Government of the Philippines and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship 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 team.

December, 2002



TAKAO KAWAKAMI
President
Japan International Cooperation Agency

December 2002

Mr. TAKAO KAWAKAMI
President
Japan International Cooperation Agency

Letter of Transmittal

Dear Sir,

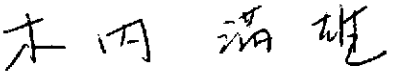
We are pleased to submit to you the Final Report of the detailed design study on Upgrading Inter-Urban Highway System along the Pan-Philippine Highway (Plaridel, Cabanatuan and San Jose Bypasses) in the Republic of the Philippines. The report reflects the advice and suggestions of the authorities concerned of the Government of Japan and your Agency.

This report presents the results of the Study which had the objectives of providing the new concept of upgrading measures for the highway system and applying it to the highway design, and carrying out a detailed design study on the three bypasses that were proposed for solving the present and future traffic congestions. This report is divided into six parts which include present condition of the project area, engineering surveys, detailed design, cost estimate, preparation of draft tender documents, project evaluation and implementation program.

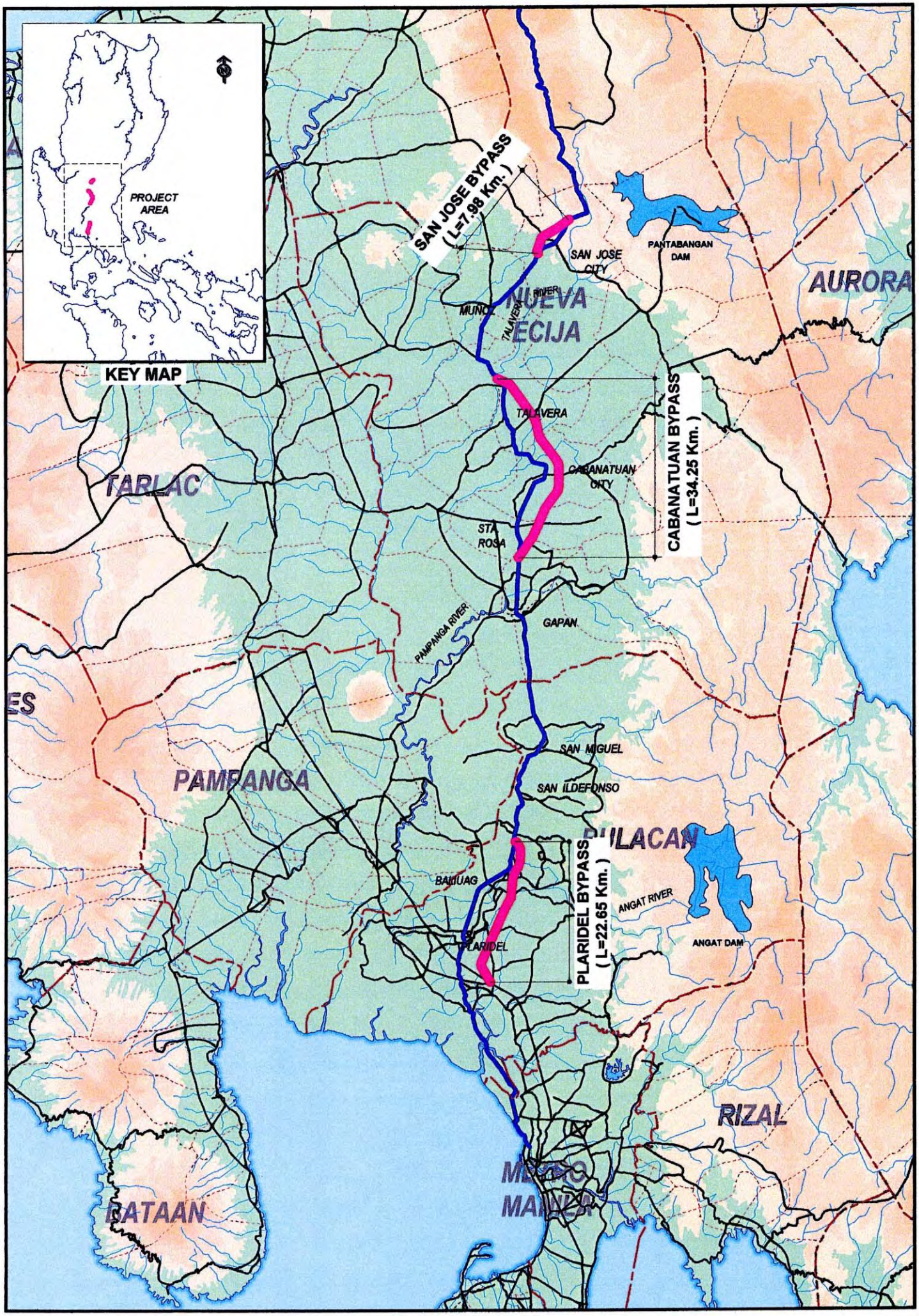
Considering the present and future traffic demand in the study area, this project is urgent and necessary for the Philippines. We recommend that the Government of the Philippines realizes this project with high priority.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs and the Ministry of Land, Infrastructure and Transport of Japan. We also wish to express our deep gratitude to the Department of Public Works and Highways and other authorities concerned of the Government of the Philippines for the close cooperation and assistance extended to us during the course of the Study.

Very truly yours,



MITSUO KIUCHI
Team Leader
The Study Team for the Detailed Design
Study on Upgrading Inter-Urban Highway
System along the Pan-Philippine Highway
(Plaridel, Cabanatuan and San Jose Bypasses)



LOCATION MAP

THE DETAILED DESIGN STUDY
ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(PLARIDEL, CABANATUAN AND SAN JOSE BYPASSES)

DRAFT FINAL REPORT

Table of Contents

Location Map

PART V COST ESTIMATE AND PREPARATION OF (DRAFT) TENDER DOCUMENTS

PART VI PROJECT EVALUATION AND IMPLEMENTATION PROGRAM

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AADT	:	Annual Average Daily Traffic
AASHTO	:	American Association of State Highway and Transportation Officials
AC	:	Asphalt Concrete
ADT	:	Average Daily Traffic
B/C	:	Benefit / Cost Ratio
BOC	:	Bureau of Construction, DPWH
BOD	:	Bureau of Design, DPWH
BOD	:	Biological Oxygen Demand
BOE	:	Bureau of Equipment, DPWH
BOM	:	Bureau of Maintenance, DPWH
BSD	:	Bird Species Diversity
CBD	:	Central Business District
CEO	:	City Engineering Office
CIM	:	Curb Inlet Manhole
DAO	:	DENR Administrative Order
DEO	:	District Engineering Office
DENR	:	Department of Environment and Natural Resources
DILG	:	Department of Interior and Local Government
DPWH	:	Department of Public Works and Highways
ECA	:	Environmentally Critical Area
ECC	:	Environmental Compliance Certificate
ECP	:	Environmentally Critical Project
EIA	:	Environmental Impact Assessment
EIARC	:	Environmental Impact Assessment Review Committee
EIRR	:	Economic Internal Rate of Return
EIS	:	Environmental Impact Statement
EMB	:	Environmental Management Bureau
EMK	:	Equivalent Maintenance Kilometer
FS	:	Feasibility Study
GDP	:	Gross Domestic Product
GNP	:	Gross National Product
GOJ	:	Government of Japan
GOP	:	Government of the Philippines
GRDP	:	Gross Regional Domestic Product

GVA	:	Gross Value Added
HCM	:	Highway Capacity Manual
HUDCC	:	Housing and Urban Development Coordinating Council
ICC	:	Investment Coordinating Committee
IEE	:	Initial Environmental Examination
JICA	:	Japan International Cooperation Agency
JRA	:	Japan Road Association
JSTE	:	Japan Society of Traffic Engineers
LGUs	:	Local Government Units
LOS	:	Level of Service
MBA	:	Maintenance By Administration
MBC	:	Maintenance By Contract
MMT	:	Multi-Partite Monitoring Team
MNTC	:	Manila North Tollways Corporation
MPN	:	Most Probable Number
NPAAAD	:	Network of Protected Agricultural Areas and Agro-Industrial Development
NAPOCOR	:	National Power Corporation
NCR	:	National Capital Region
NEDA	:	National Economic and Development Authority
NEPC	:	National Environmental Protection Council
NHA	:	National Housing Authority
NIA	:	National Irrigation Administration
NLE	:	North Luzon Expressway
NLEE	:	North Luzon Expressway East
NSO	:	*National Statistics Office*
NSCP	:	National Structural Code of the Philippines
O-D	:	Origin-Destination
PAFs	:	Project Affected Families
PAGASA	:	Philippine Atmospheric Geophysical and Astronomical Services Administration
PAPs	:	Project Affected Persons
PCC	:	Portland Cement Concrete
PCU	:	Passenger Car unit
PHMMS	:	Philippine Highway Maintenance Management System
PGA	:	Proponent Government Agency

PMO	Project Management Office
PNP	Philippine National Police
PPFP	Provincial Physical Framework Plan
PPP	Philippine Population Projection
RAP	Resettlement Action PLan
RIDF	Rainfall Intensity Duration Frequency
ROW	Right-of-Way
SAFDZ	Strategic Agricultural and Fishery Development Zone
SDP	Social Development Program
SP	Sangguniang Panlungsod
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
TWG	Technical Working Group

PART I

INTRODUCTION

CHAPTER 1
INTRODUCTION

1.1 Introduction

In response to the request from the Government of the Philippines (hereinafter referred to as "GOP"), the Government of Japan (hereinafter referred to as "GOJ") has decided to conduct the *Detailed Design Study on Upgrading Inter-Urban Highway System along the Pan-Philippine Highway (Plaridel, Cabanatuan and San Jose Bypasses)* in the Republic of the Philippines (hereinafter referred to as "the Study"), and in this connection has exchanged Notes Verbales with the GOP concerning the Implementation of the Study.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the GOJ, undertook the Study in accordance with the relevant laws and regulations enforced in Japan.

On behalf of the GOP, the Department of Public Works and Highways (hereinafter referred to as "DPWH") shall act as the counterpart agency to the Japanese Study Team and also as the coordinating body in relation with other concerned governmental and non-governmental organizations under the above-mentioned Notes Verbales exchanged between the two governments. The DPWH shall also take responsibilities that may arise from the products of the Study.

1.2 Background

In the Philippines, the systematic road network development began in the late 1960s. Initially the road development thrust was to expand the road network to provide basic access to major regions. Since the middle of 1980s, the GOP has experienced the prematured road deteriorations such as pavement and bridge deteriorations as well as road damages like slope failures and landslides due to natural calamities. To cope with such situations, the GOP's emphasis for road development was placed on rehabilitation and conversion of existing roads to stronger roads against natural calamity. In line with this policy, various road projects have been implemented.

Recent years' economic growth brought about a sharp increase of road traffic in and around Metro Manila and regional growth pole cities. Particularly urban sections along arterial roads encountered sharp increase of not only local traffic but also through traffic, thus the road function, particularly the traffic function of arterial roads is being seriously affected. Upgrading of traffic function of arterial roads and proper sharing of road function with roads of lower categories are becoming vital issues to be addressed in the road development policies particularly along the Pan-Philippine Highway.

The road section from Sta. Rita, Plaridel to San Jose of the Pan-Philippine Highway (hereinafter referred to as "the Highway") starts at about 40 km north of Metro Manila and extends for about 123.5 km. It is located in Region III and within the economic influence area of Metro Manila. Along the Highway, small and medium size urban centers are situated at about 10 km interval and urbanization is expanding along the Highway as a ribbon type development. In urban sections, the traffic function of the

Highway is being seriously affected due to the high composition of slow and disorderly moving traffic such as tricycles and jeepneys.

To cope with these issues, the DPWH with the technical assistance of JICA conducted the *Feasibility Study on Upgrading Inter-Urban Highway System along the Pan Philippine Highway (Sta. Rita – San Jose Section)* (hereinafter referred to as "the F/S") in 1999 to solve these issues. The F/S proposed three bypasses: Plaridel, Cabanatuan and San Jose bypasses, which were proposed to be constructed by stages and the initial stage was targeted to be completed in year 2010.

1.3 Objective

Objectives of the Study are:

- To conduct the Detailed Design Study for the construction of the Plaridel, Cabanatuan and San Jose Bypasses along the Pan-Philippine Highway,
- To transfer technology on highway development through the Study.

1.4 Study Area

The Study area covers Plaridel, Cabanatuan and San Jose Bypasses which were proposed in the Feasibility Study on Upgrading Inter-Urban Highway System along the Pan-Philippine Highway conducted by JICA in November 1999.

1.5 Scope of the Study

The Study covered the following items (see Table 1.5-1):

- Review of relevant studies and the Feasibility Study
- Engineering surveys
  - Topographic survey
  - Supplemental traffic survey
  - Soil and geotechnical survey
  - Supplemental hydrological survey
- Basic design
- Environmental impact assessment
- Detailed design
- Preparation of the draft tender and contract documents

TABLE 1.5-1 SCOPE OF STUDY

	Plaridel Bypass		Cabanatuan Bypass		San Jose Bypass	
	Initial Stage	Ultimate Stage	Initial Stage	Ultimate Stage	Initial Stage	Ultimate Stage
Basic Design						
· Planning	●	●	●	●	●	●
· Basic Design	●	●	●	●	●	●
· Drawings	●	●	●	●	●	●
· Quantity calculation	●	●	●	●	●	●
· Cost estimate	●	●	●	●	●	●
EIA (* 1)	●		●		●	
Detailed Design						
· Detailed design	●	●	●	●	●	●
· Construction Plan	●	–	●	–	●	–
· Drawings	●	●	●	●	●	●
· Quantity calculation	●	–	●	–	●	–
· Cost estimate	●	–	●	–	●	–
· Draft bid document	●	–	●	–	●	–
· Implementation Program	●	–	●	–	●	–

Notes: ● *Items covered by the Study*

– *Items excluded from the Study*

*(*1) Land acquisition is executed with ultimate stage width prior to the Initial Stage of Construction, therefore, social impacts on land acquisition and resettlement of affected people, etc., were assessed for the ultimate stage width.*

1.6 Study Schedule

Figure 1.6-1 presents the work schedule of the Study, which commenced in the middle of March 2001 and completed by the end of December 2002 for a total duration of about 21 months.

1.7 Organization for Executing the Study

JICA organized a Study Team and technical supervisors for the Study, while DPWH organizes a Counterpart Team and a Steering Committee to collaborate with the JICA Study Team in carrying out the Study. The organization chart is shown in Figure 1.7-1.

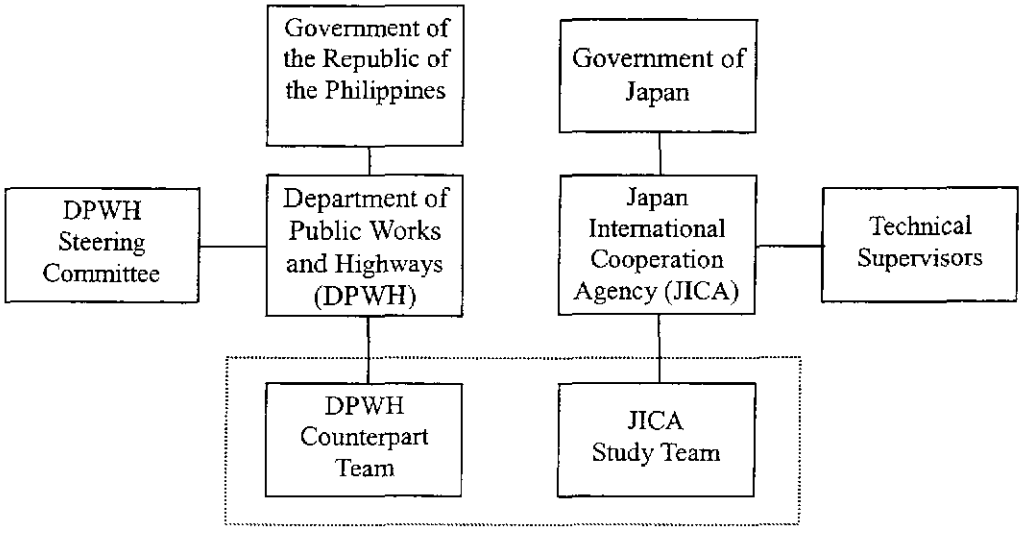
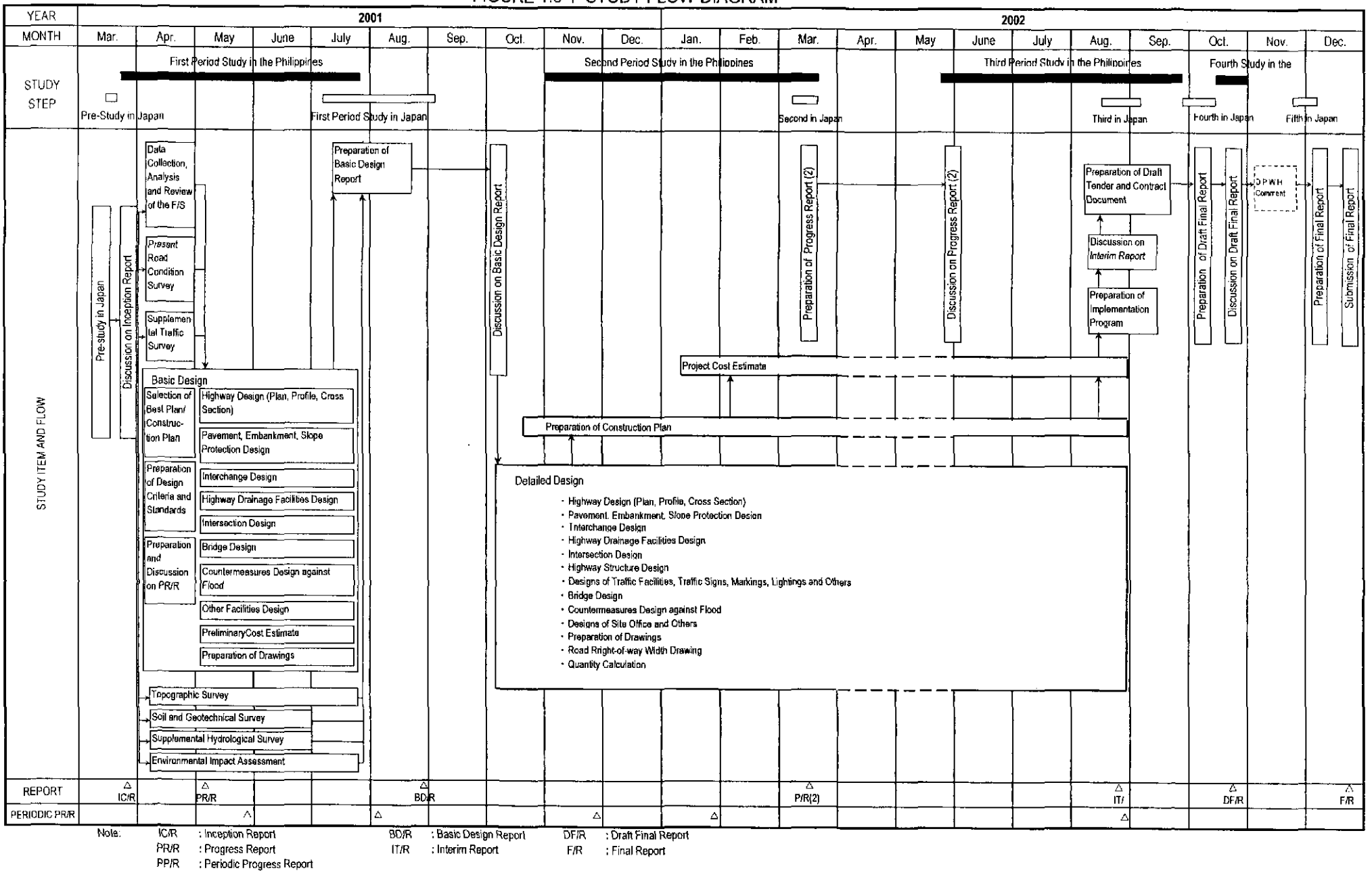


FIGURE 1.7-1 ORGANIZATION CHART

FIGURE 1.6-1 STUDY FLOW DIAGRAM



Note: IC/R : Inception Report
PR/R : Progress Report
PP/R : Periodic Progress Report
BD/R : Basic Design Report
IT/R : Interim Report
DF/R : Draft Final Report
F/R : Final Report

The members involved in the Study are as follows:

DPWH Steering Committee

1.	Undersecretary **TEODORO T. ENCARNACION**	:	Chairman
2.	Director **BIENVENIDO C. LEUTERIO**, Bureau of Design Director **GILBERTO REYES**, Bureau of Design	:	Co-Chairman (until Jan.25, 2002) Co-Chairman (since Jan. 25, 2002)
3.	Director **LINDA M. TEMPLO**, Planning Service	:	Member
4.	Project Director **DANILO C. TRAJANO**, PMO - PJHL	:	Member
5.	Project Director **GODOFREDO Z. GALANO**, PMO - BOT Proj.	:	Member
6.	Project Director **GERONIMO S. ALONZO**, PMO-FS	:	Member
7.	Regional Director **ALFREDO TOLENTINO**, DPWH, Region III	:	Member
8.	Mr. **SEIICHI ONODERA**, JICA Highway Advisor for DPWH	:	Member (Until June 30, 2001)
9.	Mr. **JOJI NAKANO**, JICA Highway Advisor for DPWH	:	Member (Since July 1, 2001)
10.	Mr. **MOTOI OKUDA**, JICA Bridge Expert	:	Member

Technical Working Group

Chairperson	:	Mr. **GILBERT S. REYES**, Asst. Director/Director, BOD
Vice-Chairperson	:	Mr. **FAUSTINO N.STA. MARIA, JR.**, Project Manager II, PMO-FS (Project Team Leader)
Member (Regular)	:	Mr. **VIRGILIO CASTILLO**, Project Manager II, PMO-PJHL Ms. **BIENVENIDA FIRMALINO**, Project Manager II, PMO-BOT Projects Mr. **JUANITO ALAMAR**, Engineer V, PMO-FS Ms. **CAROLINA CANUEL**, Engineer IV, DPD, PS Mr. **ALBIN CARREON**, Chief, PDD, DPWH Reg. III Mr. **SEIICHI ONODERA**, JICA Highway Advisor Mr. **MOTOI OKUDA**, JICA Highway Advisor Mr. **MITSUO KIUCHI**, Team Leader, JICA Study Team
Member (On Call)	:	Provincial Planning and Development Officer, Bulacan (by invitation) Provincial Planning and Development Officer, Nueva Ecija (by invitation) City Planning and Development Officer, Cabanatuan City (by invitation) City Planning and Development Officer, San Jose City (by invitation) District Engineer, Bulacan 1st Engineering District District Engineer, Bulacan 2nd Engineering District District Engineer, Nueva Ecija 1st Eng'g District District Engineer, Nueva Ecija 2nd Eng'g District

Secretariat	:	Ms. **BELLA H. RESURRECCION**, Economist IV, PMO-FS Ms. **THELMA C. MAGNO**, Economic Researcher, PMO-FS

DPWH Counterpart Team

A.	Key Staff	Assignment
1.	**Faustino Sta. Maria Jr.**	Team Leader / Sr. Traffic Engineer
2.	**Juanito Alamar**	Project Coordinator / Bid Document & Specification Specialist
3.	**Marieta Velasco**	Construction Planner
4.	**Generoso Joves**	Soil / Geotechnical Engineer
5.	**Antonio Yaptangco**	Traffic Facility / Interchange Engineer
6.	**Arturo Flores**	Geodetic Engineer
7.	**Giles Miranda**	*Hydrological / Hydraulic Engineer*
8.	**Remegio Caleze**	Bridge Engineer
9.	**Francis Escobar**	Highway Structure / Drainage Engineer
10.	**Shirley Castro**	Cost Estimator
11.	**Rosita Ruth Managuelod**	Cost Estimator
12.	**Cesario Vicente**	Traffic Engineer

B.	Technical Support Staff	
1.	**Antonio Valenzuela**	Engineering Assistant
2.	**Casan Busran**	AutoCad Operator
3.	**Mark Joel Castillo**	AutoCad Operator
4.	**Romeo Naungayan**	Draftsman

C.	Administrative Support Staff	
1.	**Ma. Lourdes Santos**	*Budget Officer*
2.	**Esperanza Agustin**	*Secretary*
3.	**Jasmin Figueras**	Word Processor
4.	**Ricardo Ting**	Duplicating Machine Operator

JICA Technical Supervisor

Mr. TSUYOSHI MATSUMOTO	Director of Study Department, Infrastructure Development Institute
Mr. KIYOSHI DACHIKU	Director of 4th Research Department, Infrastructure Development Institute
Mr. RYOSUKE KIKUCHI	Director of 2nd Research Department, Infrastructure Development Institute
Mr. HIROO ODA	Senior Counselor, Infrastructure Development Institute

JICA Study Team

• Team Leader	:	**Mr. Mitsuo Kiuchi**
• Deputy Team Leader/Highway Engineer	:	**Dr. Shingo Gose**
• Traffic Facility/Interchange Engineer	:	**Mr. Yoshinobu Fujii**
• Highway Structure/Drainage Engineer	:	**Mr. Katsuaki Mitani (April 1 - June 23, 2001)**
• Highway Structure/Drainage Engineer	:	**Mr. Masami Kimishima (June 24-the end of Aug. 2001)**
• Highway Structure/Drainage Engineer		**Dr. Ahmed El-Hakim (since October 30, 2001)**
• Bridge Engineer (1)	:	**Dr. Jovito C. Santos**
• Bridge Engineer (2)	:	**Mr. Nobuo Kobayashi**
• Construction Planner	:	**Mr. Goichi Miyasaka (until March 19, 2002)**
• Construction Planner	:	**Mr. Toshinori Toda (since May 20,2002)**
• Cost Estimator	:	**Mr. Kazufumi Honma**
• Bid Document/Specification Specialist	:	**Mr. Akimi Mochizuki**
• Geodetic Engineer	:	**Mr. Larry L. Janolo**
• Soil/Geotechnical Engineer	:	**Mr. Lee Sang Gyoon**
• Hydrological/Hydraulic Engineer	:	**Mr. Takeshi Nishijima**
• Environmental Specialist	:	**Ms. Annabelle Herrrera**
• Traffic Engineer	:	**Mr. Shuichi Yashiro**