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

PREPARATORY SURVEY FOR EXPRESSWAY PROJECTS IN MEGA MANILA REGION

CENTRAL LUZON LINK EXPRESSWAY PROJECT (Phase I)

FINAL REPORT MAIN TEXT

NOVEMBER 2012

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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EI
JR(先)
12-155

CLLEX

EXCHANGE RATE

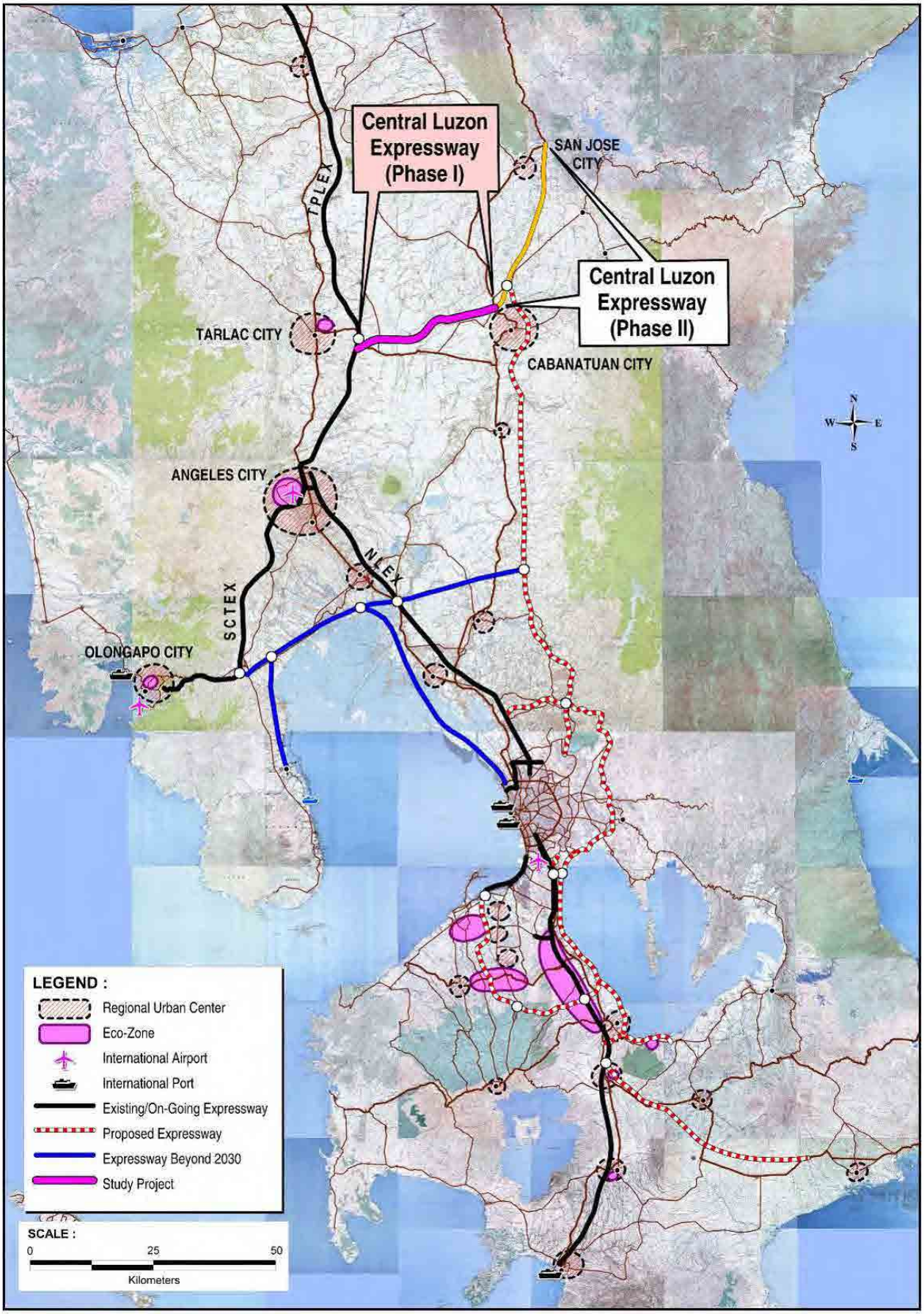
July 2011

1PhP= 1.86 Japan Yen

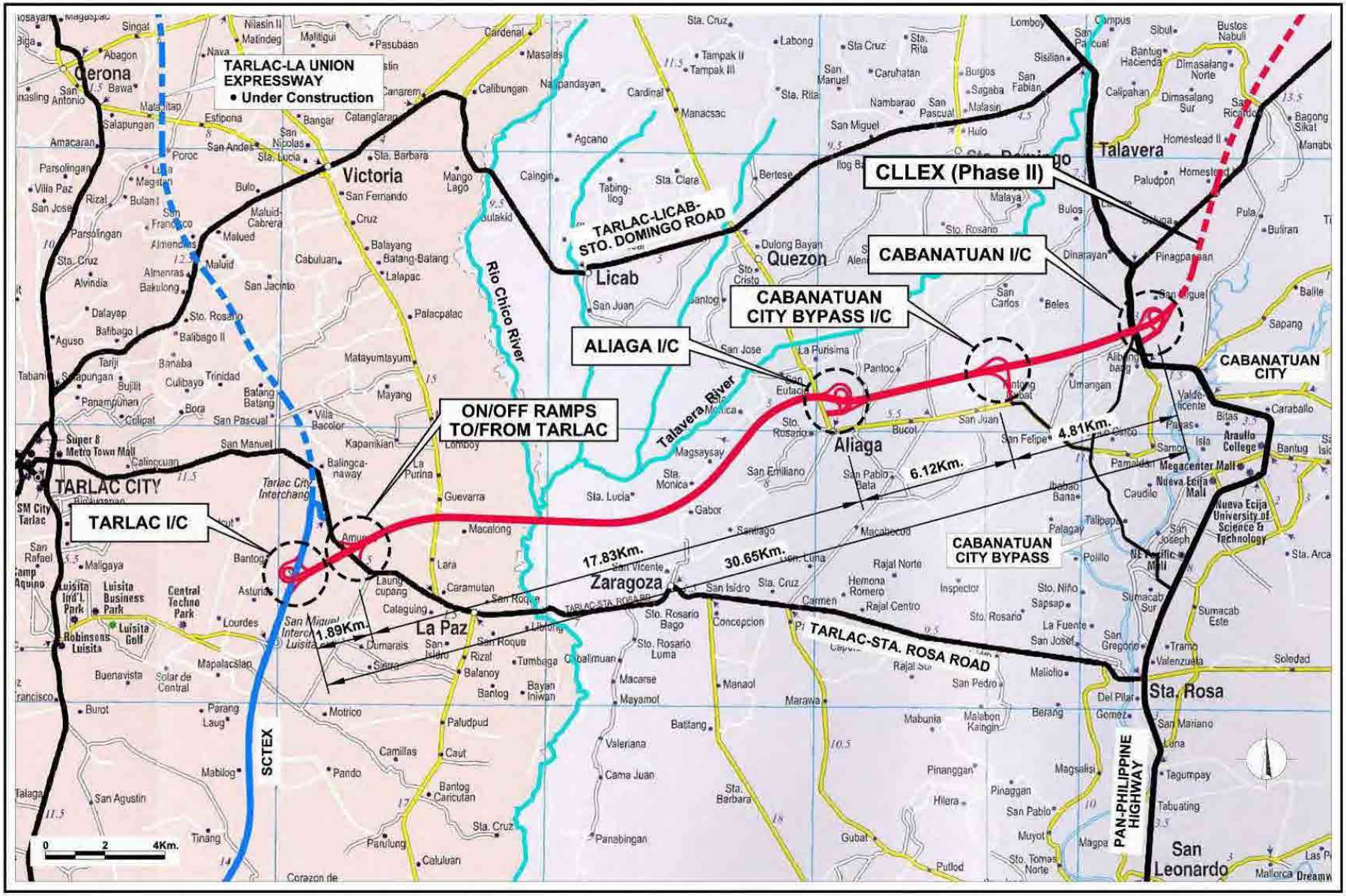
1US$=43.7Philippine Peso

1US$= 81.2 Japan Yen

Central Bank of the Philippines



LOCATION MAP OF CLLEX



PROPOSED CLLEX ALIGNMENT AND LAYOUT OF INTERCHANGES

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ACRONYMS AND ABBREVIATIONS

ADB	:	Asian Development Bank
B/C	:	Benefit/Cost Ratio
BCDA	:	Bases Conversion Development Authority
BLT	:	Build-Lease-Transfer
BOT	:	Build-Operate and Transfer
CAAP	:	Civil Aviation Authority of the Philippines
CDCP	:	Construction Development Corporation of the Philippines
CLEx	:	Central Luzon Expressway
DBFO		Design, Build, Finance and Operate
DBP	:	Development Bank of the Philippines
DENR	:	Department of Environment and Natural Resources
DBM	:	Department of Budget and Management
DOF	:	Department of Finance
DOTC	:	Department of Transportation and Communications
DPWH	:	Department of Public Works and Highways
DTI	:	Department of Trade and Industry
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
EIS	:	Environmental Impact Statement
EO	:	Executive Order
FIRR	:	Financial Internal Rate of Return
GDP	:	Gross Domestic Product
GFS	:	Government Financing Support
GOCCs	:	Government-Owned and Controlled Corporations
GOJ	:	Government of Japan
GRP	:	Government of the Republic of the Philippines
HSH	:	High Standard Highway
ICC	:	Investment Coordinating Committee
IEE	:	Initial Environmental Examination
IFC	:	International Finance Corporation of World Bank Group
IRR	:	Internal Rate of Return
JICA	:	Japan International Cooperation Agency
KOICA	:	Korean International Cooperation Agency
LAPRAP	:	Land Acquisition Plan and Resettlement Action Plan
LGUs	:	Local Government Units
LRTA	:	Light Rail Transit Authority
MARINA	:	Maritime Industry Authority
MRG	:	Minimum Revenue Guarantee
MIAA	:	Manila International Airport Authority
MMDA	:	Metro Manila Development Agency
MRT	:	Mass Rail Transit
MRTC	:	Metro Rail Transit Corporation
NCR	:	National Capital Region
NDC	:	National Development Corporation
NEDA	:	National Economic Development Authority
NGO	:	Non-Governmental Organization
NLEx	:	North Luzon Expressway
NPER	:	Net Public Expenditure Reduction
NPV	:	Net Present Value
O&M	:	Operation and Maintenance
ODA	:	Official Development Assistance
OSG	:	Office of the Solicitor General
PD	:	Presidential Decree
PEA	:	Philippine Estate Authority
PEGR	:	Philippines-Australia Partnership for Economic Governance Reform
PIP	:	Public Investment Plan
PMO-BOT	:	Project Management Office for Build-Operate-Transfer
PNCC	:	Philippine National Construction Company
PNR	:	Philippine National Railways
PPA	:	Philippine Port Authority
PPP	:	Public-Private Partnership
R.A.	:	Republic Act
RAP	:	Resettlement Action Plan
ROW	:	Right of Way
SC	:	Steering Committee
SCTEx	:	Subic-Clark-Tarlac Expressway
SLEx	:	South Luzon Expressway
SPC	:	Special Purpose Company
STAR	:	Southern Tagalog Arterial Road
STOA	:	Supplemental Toll Operation Agreement
TCA	:	Toll Concession Agreement
TOA	:	Toll Operation Agreement
TOC	:	Toll Operation Certificate
TOR	:	Terms of Reference
TPLEx	:	Tarlac-Pangasinan-La Union Expressway
TRB	:	Toll Regulatory Board
TWG	:	Technical Working Group
USAID	:	United States Agency for International Development
WACC	:	Weighted Average of Capital Cost
WB	:	World Bank

EXECUTIVE SUMMARY

1 BACKGROUND OF THE CLLEX PROJECT

The Philippines has been experiencing relatively slower economic development partly due to limited flow of direct investments into manufacturing sector compared to other rapidly growing ASEAN countries after the recovery from Asian Economic Crisis. In order to foster both domestic and foreign investments, improving overall investment climate including road network has been an urgent matter. In particular, the economic activities are extremely concentrated in Metro Manila where 37% of GDP and 13% of total population are accumulated in merely 0.2% of the country's land. This extreme concentration causes serious congestion and delays of distribution of goods and movement of people, resulting to huge damage to economy and lowering the country's international competitiveness as an investment destination. Likewise living condition in Metro Manila has eroded due to air pollution and traffic noise caused by chronic congestion. In summary, solving traffic congestion in Metro Manila by networking surrounding cities and upgrading/expanding highways around Mega Manila – the area covering Metro Manila, Central Luzon and CALABARZON – contributes to improvement of both investment climate and living climate.

Central Luzon Link Expressway (CLLEX) improves access between the two-north large cities, Tarlac and Cabanatuan, and supports industrialization of North part of Mega Manila and eases the extreme concentration in Metro Manila as CLLEX allows better connection between North part of Mega Manila and Metro Manila. Central Luzon is expected to increase its efficiency as an industrial hub with Clark Airport receiving international flights.

In 2010, JICA-assisted High Standard Highway Network Development Master Plan (hereinafter referred to "HSH Master Plan Study") formulated the expressway network in the 200 km radium sphere from Metro Manila. The Study recommended CLLEX as one of eight first priority projects.

In 2010, DPWH completed the Feasibility Study for the Proposed Central Luzon Expressway (now Central Luzon Link Expressway) (hereinafter referred to 2010 FS) under the supplemental agreement of JICA-funded Arterial Bypass Project.

In 2010, JICA-assisted Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Projects (hereinafter referred to as "PPP Infra Projects"). This Study prioritized PPP expressway projects in accordance with the criteria established which are based on the necessity and urgency of project, profitability of the project and implement-ability of the project. Phase I of CLLEX was ranked no. 4 out of 10 priority projects.

2 NECESSITY OF THE CLLEX PROJECT

CLLEX is needed from the viewpoints of the following;

- To reduce traffic congestion of Pan Philippine Highway (or Daang Maharlika)
- To strengthen lateral (east-west) road network.
- To develop regional growth pole cities to decongest overconcentration of socio-economic activities in Metro Manila.
- To develop impoverish area of the Pacific Ocean Coastal area through development of Cabanatuan City which functions as a hub city for the area.
- To develop an integrated multi-modal logistics/transport system
- To promote PPP projects.

3 OBJECTIVE OF THE CLLEX PROJECT

The objectives of CLLEX Project are summarized as follows:

- To provide fast, safe, comfortable and reliable mode of transport in Region III for socio-economic development.
- To decongest traffic of Pan-Philippine Highway (or Daang Maharlika)
- To support sound development of Regional Growth Pole Cities of Tarlac City and Cabanatuan City, thus contributing to the decongestion of over-concentration of Metro Manila
- To form an important lateral (east-west) link of overall Expressway network of Region III
- To provide faster access from Metro Manila to Cabanatuan City which is the base (or hub) city for Pacific Ocean Coastal Area Development

4 TRAFFIC DEMAND FORECAST

4.1. Existing Traffic Condition

(1) Traffic Volume

Traffic volume along major roads in Central Luzon as well as in the road network surrounding the CLLEX is shown in **FIGURE 4.1-1**. As seen in the figure, the two major highways (Manila North Road and Pan Philippine Highway) exhibited high number of traffic. The NLEX is also carrying a very heavy traffic confirming the very active socio-economic exchanges between cities in the North and Metro Manila.

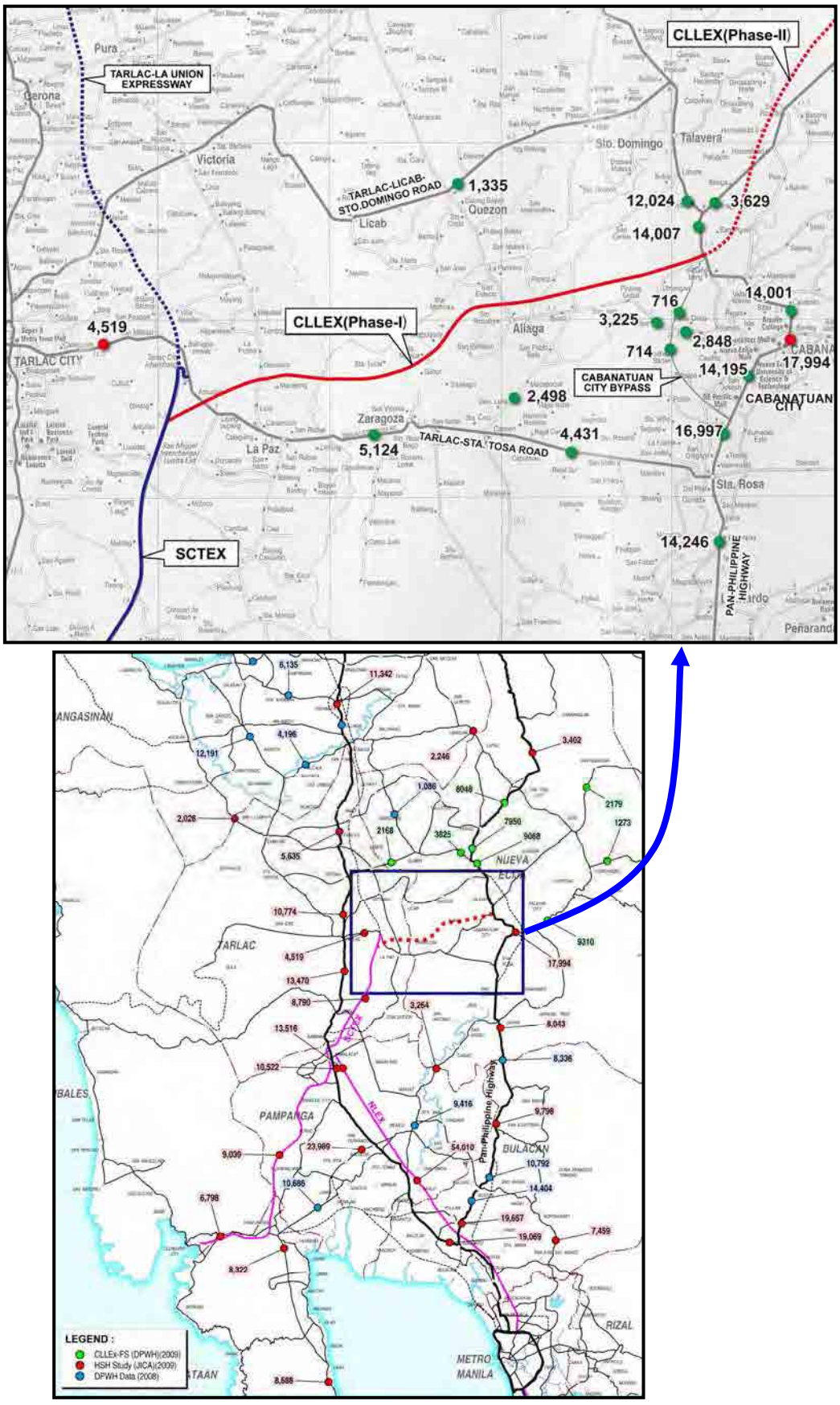


FIGURE 4.1-1 TRAFFIC VOLUME IN CENTRAL LUZON

(2) Travel Speed

The study entitled 'Feasibility Study of the Proposed Central Luzon Expressway', 2010, carried out a travel speed survey. The raw data used to plot travel speed shown in **FIGURE 4.1-2** and **4.1-3** were taken from the said study. The following were observed from the figures:

- Tarlac – Sta. Rosa Road is relatively congested free except at the center of towns of La Paz, Zaragosa and its approach to Tarlac. Travel time to traverse the 39.9 km road is about 60 minutes.
- Tarlac - Carmen – Cabanatuan Road (via Aliaga) is also free of traffic congestion except of its approach to Tarlac and Pan Philippine Highway (Cabanatuan side). Average travel time is about 69 minutes to cross the 46 km route.
- Gapan - Cabanatuan – Talavera (Pan Philippine Highway) has a severe traffic congestion from Sta. Rosa all the way to Carmen – Cabanatuan Road. Traffic congestion is particularly heavy inside Cabanatuan City where local and through traffic merges. At the center of Cabanatuan City, most of the traffic is composed of jeepneys which served local traffic. Average travel time from Gapan to Cabanatuan reaches about 60 minutes for merely 24 km road. Likewise, average travel time from Cabanatuan to Talavera (10 km) is about 24 minutes.
- Pan Philippine Highway (NLEX Sta. Rosa Exit to San Jose) observed serious traffic congestion at the town centers of Ildefonso, Sta. Rosa, Cabanatuan, Talavera, Sto. Domingo and San Jose.

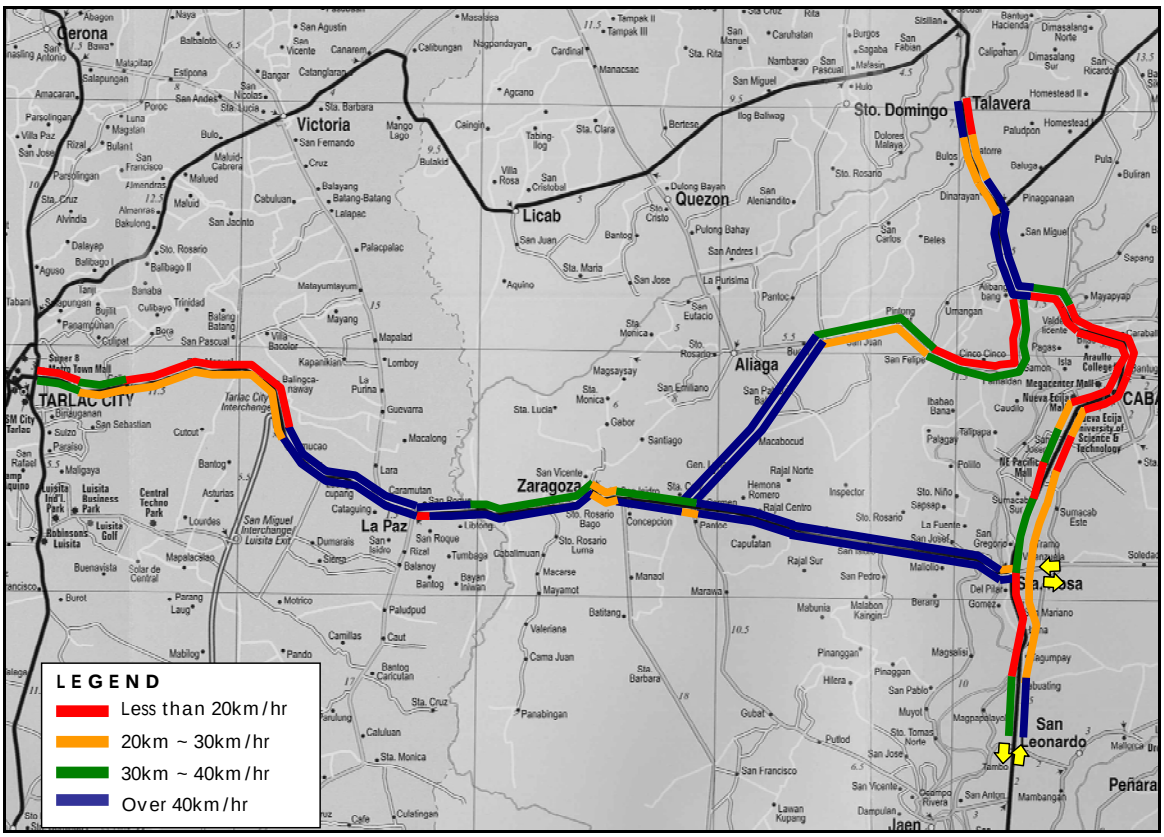


FIGURE 4.1-2 TRAVEL SPEED (AFTERNOON PEAK)

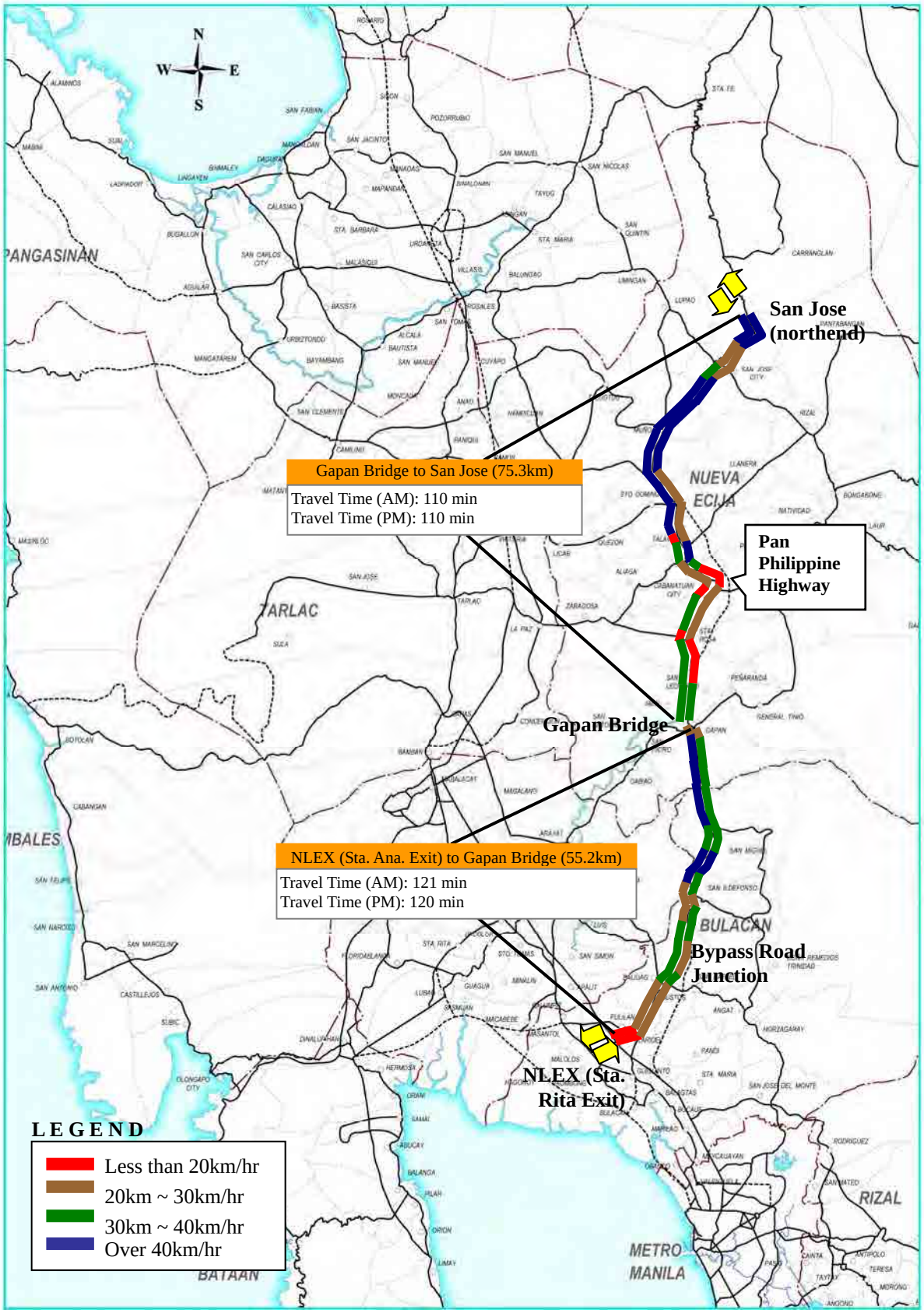


FIGURE 4.1-3 TRAVEL SPEED ALONG PAN PHILIPPINE HIGHWAY

(3) Toll Rate vs. Traffic Volume

In order to set the proper toll rate of CLLEX, the traffic volume and the amount of revenue are estimated by traffic assignment model. **FIGURE 4.1-4** shows the result of traffic assignment of toll rate.

- In case of toll free, total traffic volume to enter CLLEX is 16,197 vehicles/day
- The toll rate for getting higher revenue is about 3.0 to 4.5 Peso/km and the amount of revenue is about 1.14 and 1.18 million Peso/day. Although maximum amount of revenue is 4.0 peso case, traffic volume to enter CLLEX is only 8,628 vehicle /day which is about half of toll free case.
- The desirable toll rate for attractive to motorist and higher revenue is 3.0 Peso/km. total traffic volume to enter CLLEX is 11,236 vehicle/day (70% of toll free case) and estimated toll revenue 1.14 million Peso/day. 3.0 Peso/km in year 2017 converts about 2.2 Peso /km in year 2011. This toll rate is the almost same as that of NLEX and other present interurban expressway. Most motorists may accept the 3.0 peso/km in year 2017.

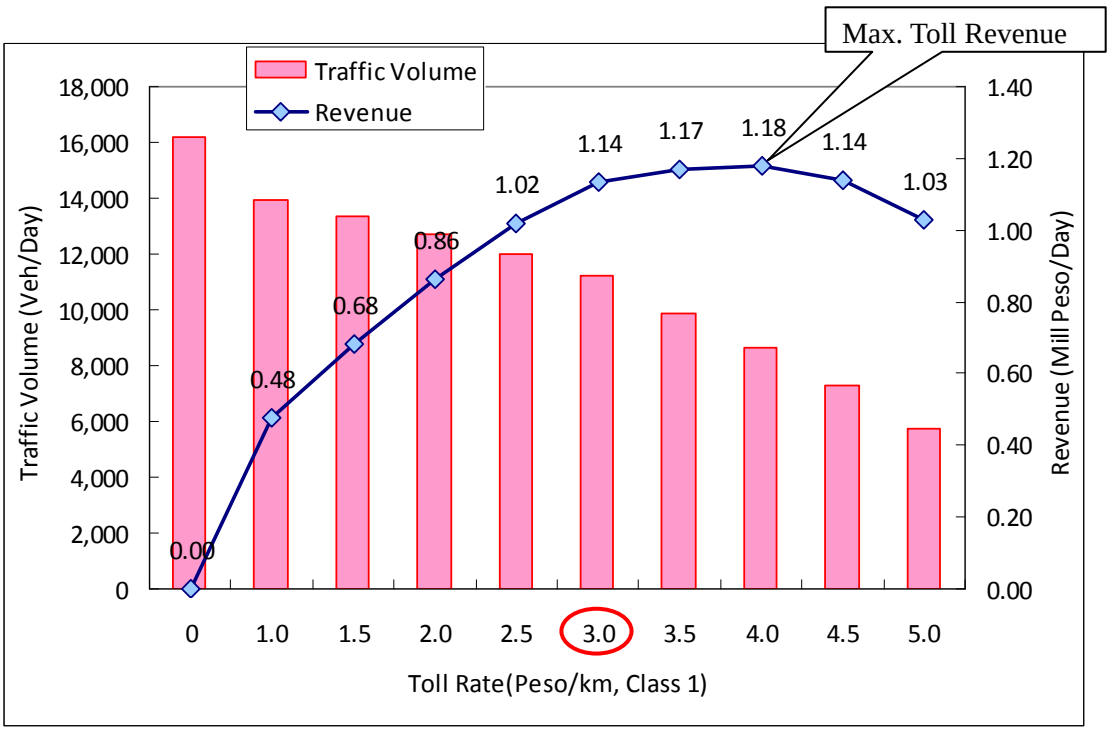


FIGURE 4.1-4 TOLL RATE VS REVENUE (YEAR 2017)

4.2. Future Traffic Volume on CLLEX PHASE-1 Section

To estimate the traffic volumes on CLLEX, traffic demand system data developed on the Study of Master plan on High Standard Highway Network Development funded by JICA was used. The number of lane of CLLEX PHASE-1 section assumed to be 4 lanes both directions after discussion with DPWH. The total volume to enter CLLEX Phase 1 and total vehicle*km are shown as **TABLE 4.2-1** in the year 2017, 2020 and 2030.

TABLE 4.2-1 TRAFFIC VOLUME AND VEHICLE KM (CLLEX PHASE-1)

Item	Vehicle Class	Year 2017	Year 2020	Year 2030
Traffic Volume	Class 1	9,052	10,967	15,450
	Class 2	2,886	3,030	4,346
	Class 3	241	257	381
	Total	12,629	14,254	20,177
LOS		A	A	A
Volume/Capacity Ratio		0.17	0.19	0.23
Vehicle*km	Class 1	256,672	289,609	410,372
	Class 2	78,158	82,733	119,680
	Class 3	6,321	6,837	10,457
	Total	341,151	379,179	540,509

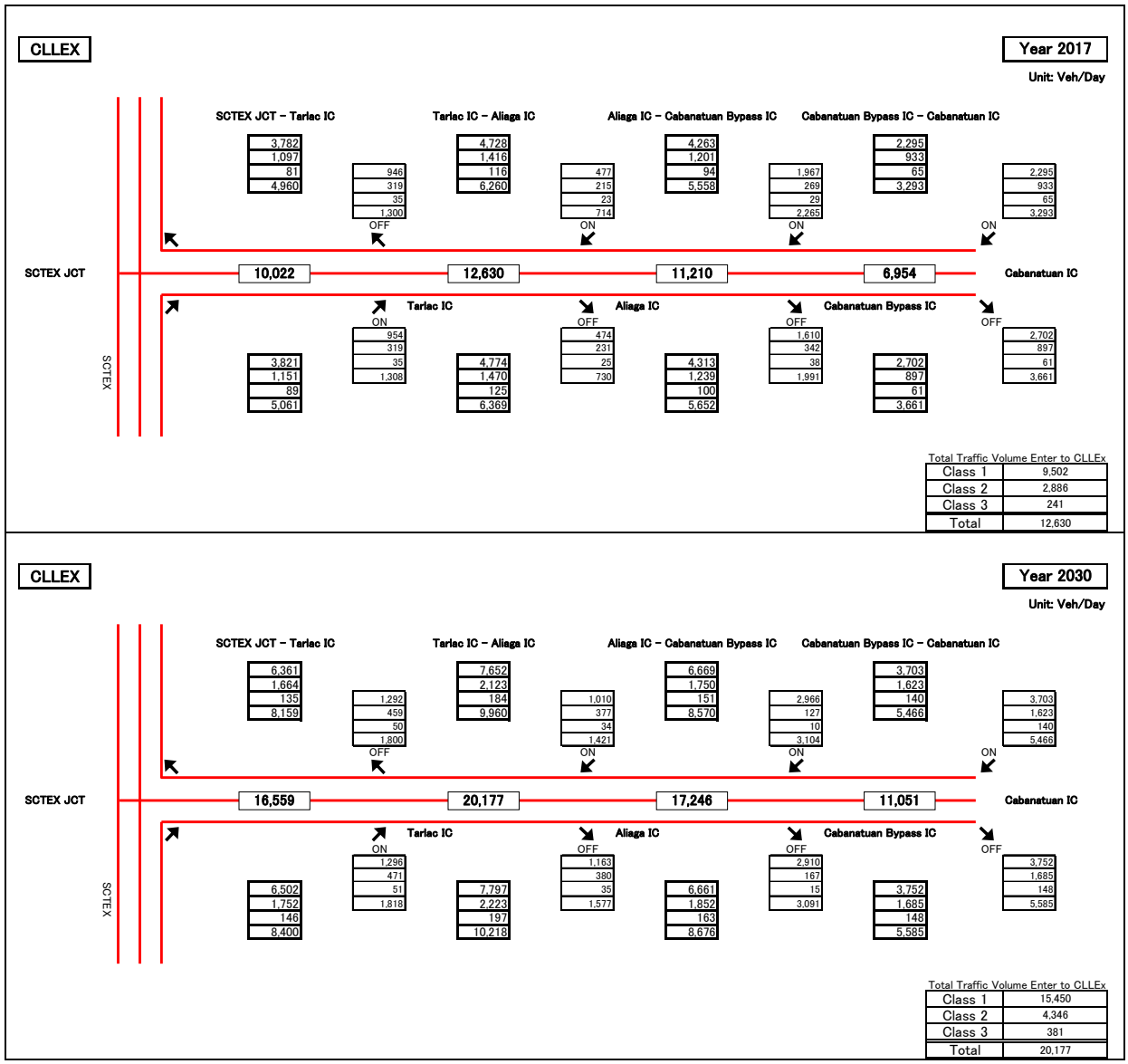


FIGURE 4.2-1 TRAFFIC PROJECTION OF CLLEX PHASE-1

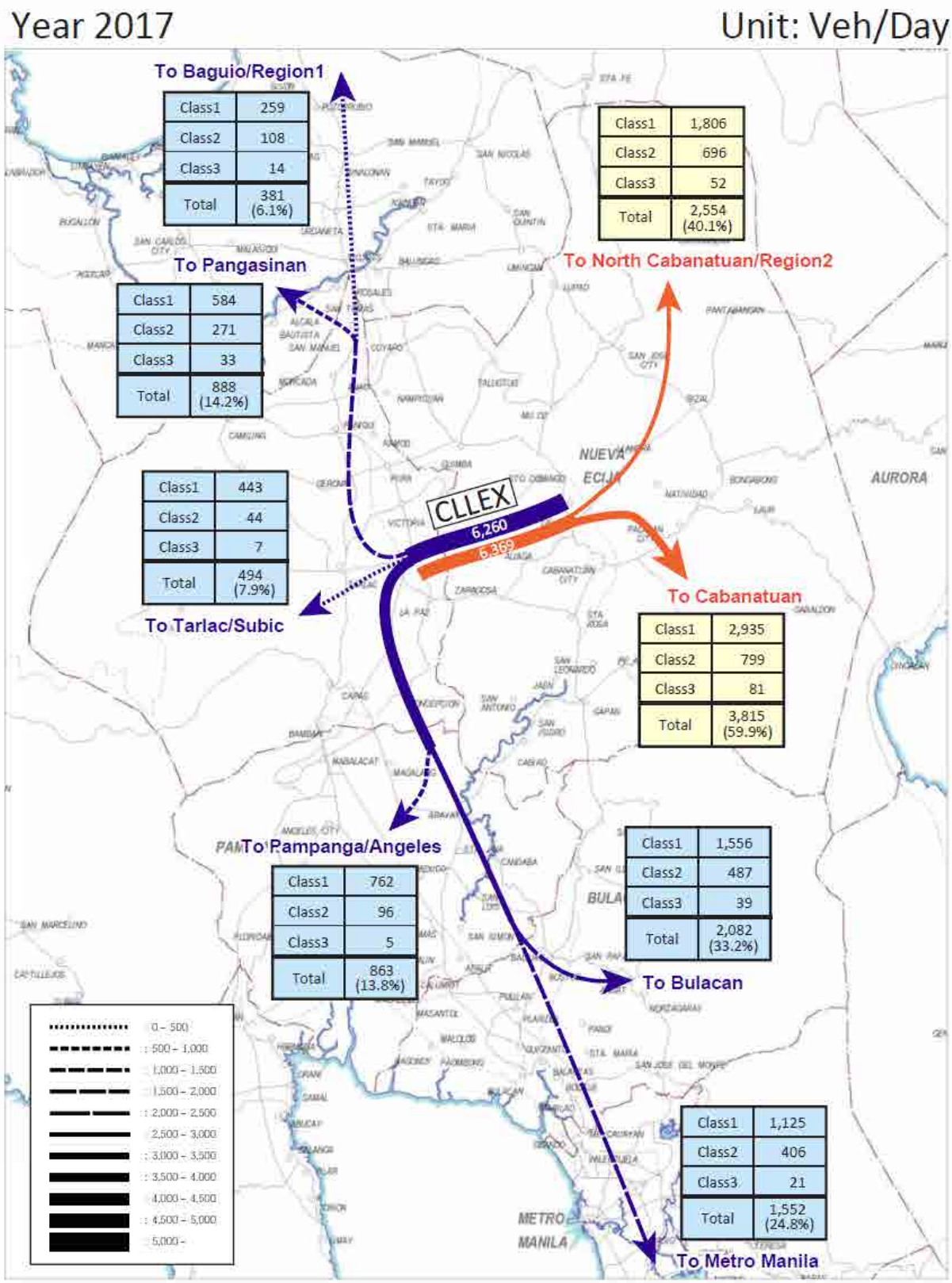


FIGURE 4.2-2 TRAFFIC FLOW OF CLLEX PHASE-1 BY DESTINATION (YEAR 2017)

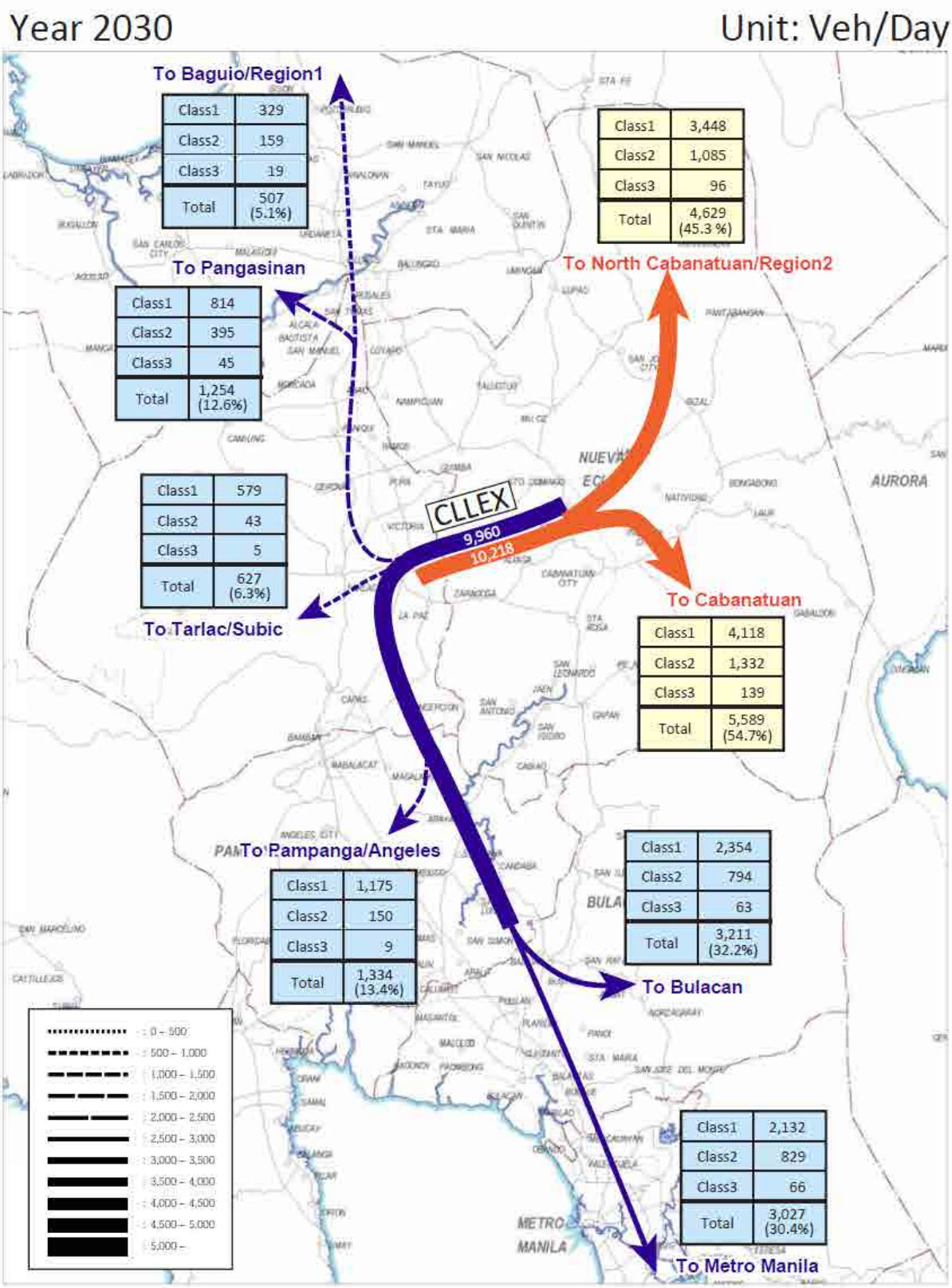


FIGURE 4.2-3 TRAFFIC FLOW OF CLLEX PHASE-1 BY DESTINATION (YEAR 2030)

5 REVIEW OF 2010 FEASIBILITY STUDY OF CLLEX PHASE-1

5.1. Technical Issues of CLLEX in the past study

The feasibility study of CLLEX was completed in 2010. Some technical issues have found as follows (see **FIGURE 5.1-1**):

- Tarlac I/C needs to be reviewed on how to connect with SCTEX / TPLEX.
- No I/C was planned for 28 km stretch between Tarlac and Cabanatuan cities. One I/C will be needed at about Aliaga Municipality.
- Cabanatuan Interchange (I/C) was planed at the location of a 5-leg intersection, thus quite complexed I/C was planned. A church was built at the proposed I/C location. Therefore, review of I/C is needed.
- Access to / from south area of Cabanatuan City, it should be to pass the congested area in the city centre of Cabanatuan, thus it is necessary to improve direct accesses to / from the southern Cabanatuan City.
- CLLEX passes though flood-prone area. The bridge location and its length need to be reviewed.
- Toll Collection System should be studied.

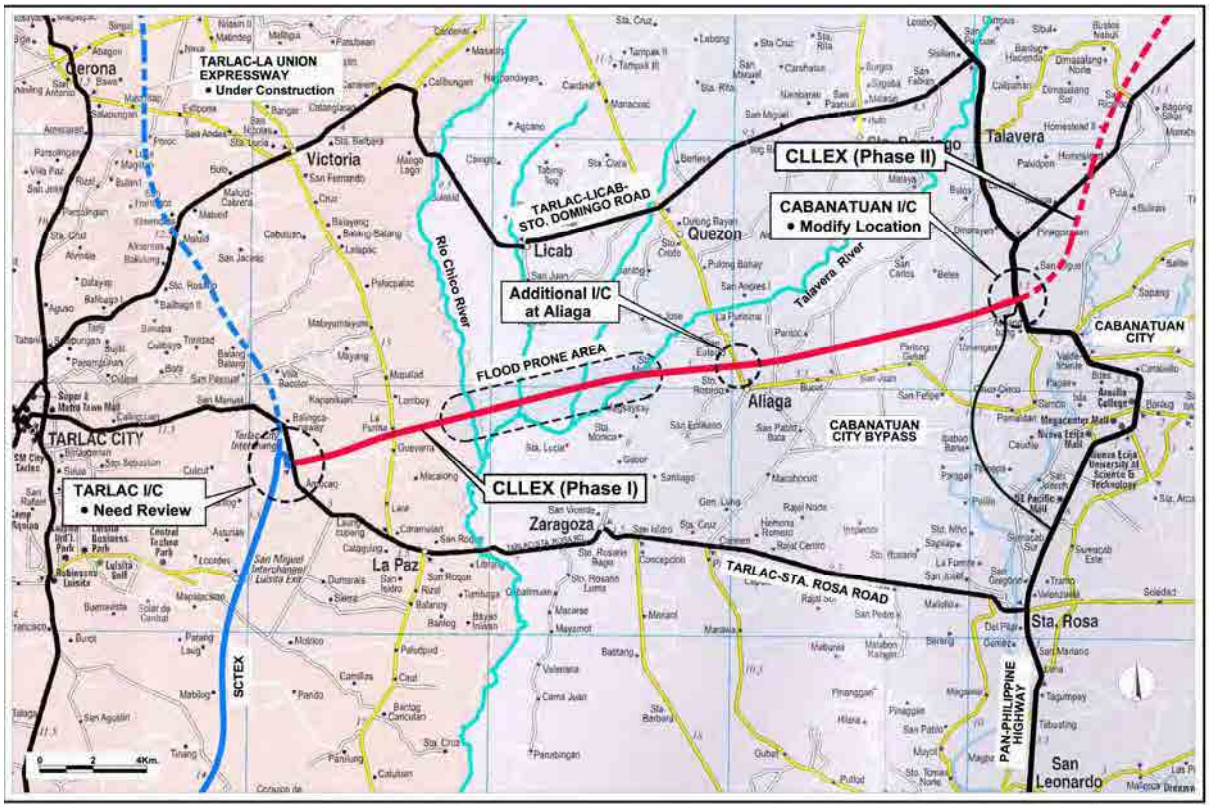


FIGURE 5.1-1 TECHNICAL ISSUES OF CLLEX PHASE-1

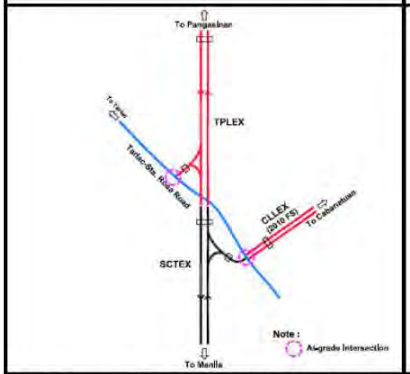
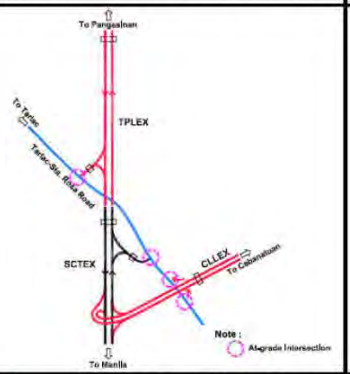
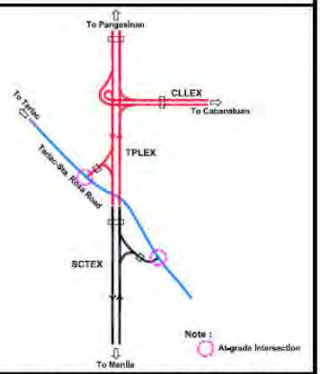
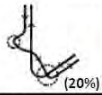
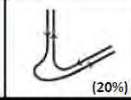
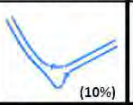
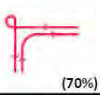
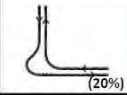
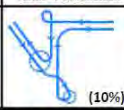
5.2. Direct Connection with the expressway of SCTEx or TPLEx

The 2010 FS proposed that CLLEX was not directly connected with SCTEx, but was connected via the national road of Tarlac – Sta. Rosa Road. The type of Tarlac Interchange was changed. According to the latest plan of SCTEx and TPLEx, Tarlac Interchange is a half interchange at CLLEX and another half interchange at TPLEx. To maintain efficient traffic flow on the expressways, two expressways should be directly connected, but not via national or provincial road.

Three (3) alternative connection options were studied. The evaluation of 3 alternatives is shown in **TABLE 5.2-1**, and then the alternative-2 (connected with SCTEx) was recommended due to the following reasons;

- Alternative-2 provides direct connection between 2 expressways.
- Most preferred alternative for traffic between Manila side and Cabanatuan City, which is the predominant traffic flow.

TABLE 5.2-1 ALTERNATIVES OF CONNECTION BETWEEN CLLEX AND SCTEX/TPLEX

ALTERNATIVE - 1			ALTERNATIVE - 2			ALTERNATIVE - 3		
Concept : • Proposed plan by 2010 FS. • CLLEx is connected with SCTEx via Intersection.			Concept : • CLLEx is directly connected with SCTEx. • On and off ramps is provided from/to Tarlac-Sta. Rosa Road for better linkage between Tarlac and Cabanatuan.			Concept : • CLLEx is directly connected with TPLEx.		
								
Manila ⇆ Cabanatuan	Pangasinan ⇆ Cabanatuan	Tarlac ⇆ Cabanatuan	Manila ⇆ Cabanatuan	Pangasinan ⇆ Cabanatuan	Tarlac ⇆ Cabanatuan	Manila ⇆ Cabanatuan	Pangasinan ⇆ Cabanatuan	Tarlac ⇆ Cabanatuan
 (70%)	 (20%)	 (10%)	 (70%)	 (20%)	 (10%)	 (70%)	 (20%)	 (10%)
• All via national road • Longer than Alternative-2	• All via national road	• All via national road • Shortest connection	• Shortest connection • Best linkage	• Longer than Alternative-3, but traffic is not so high	• Good connection • Longer than Alternative-1	• Longest connection	• Shortest connection	• Complicated
X	X	O	O	△	O	△	O	X
Not Recommended			Recommended			Not Recommended		

5.3. Additional Interchange at Aliaga Municipality

The 2010 FS proposed no interchange between Tarlac and Cabanatuan City for the extension of 28 km. In general, the longest interval of interchanges is set at 15 to 25 km, an interval of 28 km is too long and additional exits should be needed during emergency cases.

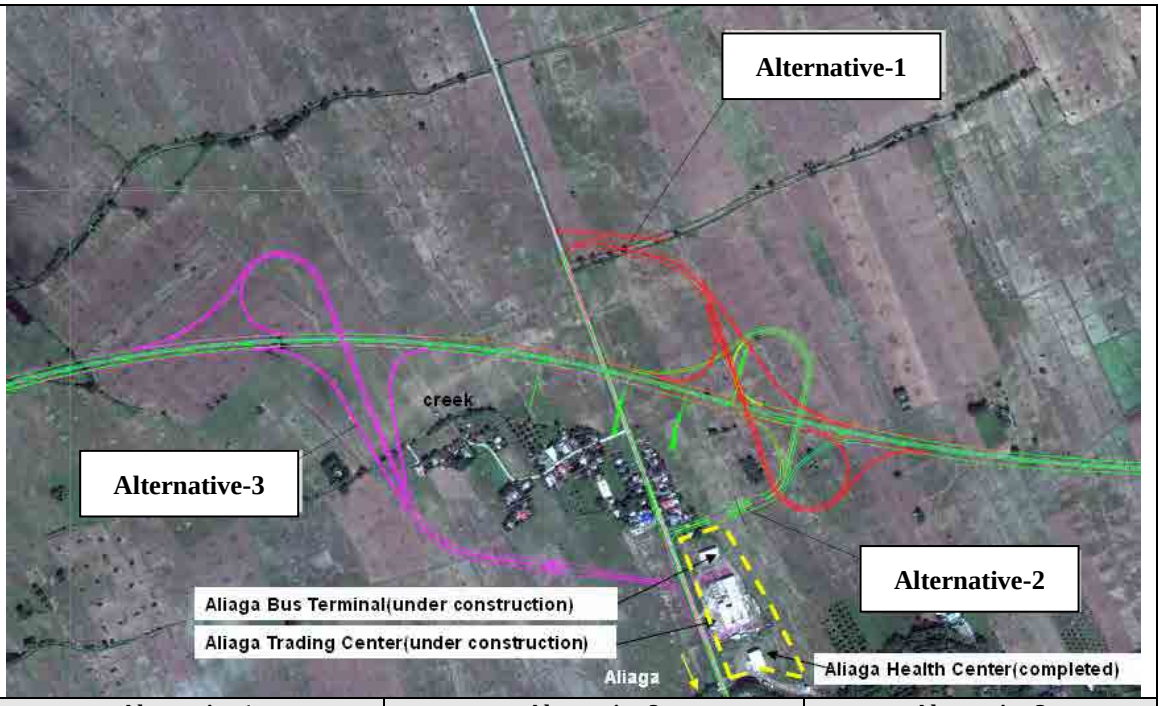
- Maximum Interval : 30 km
- Standard Interval
  - ✧ Mega City, Major Industrial Area : 5 ~ 10 km

- ✧ Rural Area with Small to Medium Cities : 15 ~ 25 km
- ✧ Rural Area and Mountainous Area : 20 ~ 30 km

In view of the above, it is necessary to add an interchange in the Municipality of Aliaga. Three (3) interchange alternatives were prepared for comparison as shown in **TABLE 5.3-1**, which also shows evaluation of alternatives. Alternative-2 was recommended due to the following reasons;

- It provides efficient access to New Development Site.
- Least construction cost.
- Although two houses are affected, it achieves the minimum ROW acquisition or land take.

TABLE 5.3-1 ALIAGA INTERCHANGE OF COMPARATIVE STUDY

Plan						
	Alternative 1		**Alternative 2**		**Alternative 3**	
Concept	Indirect connection with Aliaga Trading Center		Direct connection with Aliaga Trading Center		Direct connection with Aliaga Trading Center	
Ramp length	1,581m		1,204m		2,081m	
Relocation	0		2 houses		0	
Construction Cost	△	Middle	○	Least	X	Highest
Social Environment	○	No relocation	△	2 houses of relocation	○	No relocation
Natural Environment	△	Medium land take of Agri-land.	○	Smallest land take of Agri-land.	X	Largest land take of Agri-land.
Construction Cost	△	Higher than Alt. 2	○	Lowest	X	Highest
Accessibility to Aliaga Trading Center / Bus Terminal	X	Poor	○	Good	○	Good
Rank	2		**1**	**Recommended**	3	

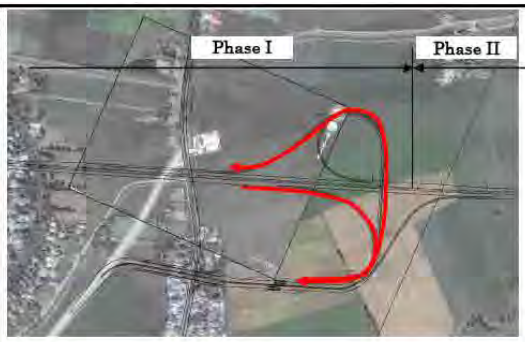
5.4. Cabanatuan IC Location

At the location of Cabanatuan Interchange proposed by the 2010 FS, the new church was built, thus the IC location is required to be re-planned. The following recommendations should be considered.;

- CLLEX center line alignment should be shifted to avoid affecting the new church.
- Interchange location should be almost at the same location selected by the 2010 FS.
- An alignment of the proposed Cabanatuan Ring Road will be selected by the City Government with due consideration of new interchange location.

The 2010 FS proposed two (2) stages development of the interchange for CLLEX Phase 1 and Phase 2, and ramps constructed during Phase-1 are proposed to be abandoned during Phase 2. The stage development of the interchange is necessary, however, it should be planned to avoid useless investment during Phase-1. Two alternatives were studied and evaluated as shown in **TABLE 5.4-1**. The alternative-2 was recommended, since it can avoid useless investment during Phase-1.

TABLE 5.4-1 CABANATUAN INTERCHANGE COMPARATIVE STUDY

Plan					
	Alternative 1		**Alternative 2**		
Concept	• Recommended by FS 2010 • To construct interim ramp for Phase I and to construct trumpet type of IC for Phase II • To demolish interim ramp when extension of Phase II is implemented.		• To construct trumpet type of IC with stage development. Two ramps (in red color) is constructed at the initial stage. Remaining two ramps (in black color) is constructed when Phase II is implemented.		
Road Length (Main)	+0m		+200m		
Ramp Length (Phase I)	820m		1,413m		
Relocation	Phase I: 3 houses, Phase II : 12 houses (including new church)		Phase I: 12 houses, Phase II: 0 house		
Social Environment	X	• Relocation of a new church is practically impossible. • Relocation of 3 houses along interim ramps during Phase 1 becomes useless (unnecessary relocation is required).	○	• Unnecessary relocation can be avoided.	
Natural Environment	△	• Land acquired for the interim ramps during Phase I becomes useless during Phase II. (Unnecessary land take of agri-land.)	○	• Unnecessary ROW acquisition can be avoided.	
Traffic flow of expressway and ordinal road	△	• Phase I: 2 at-grade intersection required. Traffic flow is disturbed at these intersections. • Phase II: 1 at-grade intersection required.	○	• Phase I and II: 1 at-grade intersection. Traffic is less disturbed than Alternative-I.	
Phase I Construction Cost	X	• Phase I: Construction cost for interim ramps wasted since these are not used in Phase II.	○	• Unnecessary investment can be avoided.	
Rank	2		1	Recommended	

5.5. Improvement of access CLLEX To/From Southern Cabanatuan City

The only road traversing Cabanatuan City in the north-south direction is the Pan-Philippine Highway (or Daang Maharlika) which is heavily congested due to huge number of slow moving vehicles such as tricycles and jeepneys. Travel speed on this road within Cabanatuan City is very slow with less than 15km/hour. Cabanatuan IC of CLLEx is located at northern periphery of Cabanatuan City, which will attract traffic to/from northern area of Cabanatuan City. Traffic from southern area will rarely utilize Cabanatuan IC, thus some measures is required for traffic generated in southern areas of Cabanatuan City. It is recommended that another half interchange (only on-ramp and off-ramp

from/to southern Cabanatuan City) should be constructed. Traffic generated from southern Cabanatuan City will use City Bypass and Quezon-Aliaga-Cabanatuan Road to access to CLLEX. This Cabanatuan City Bypass Interchange is proposed to be located at about 4 km west of Cabanatuan City Bypass.

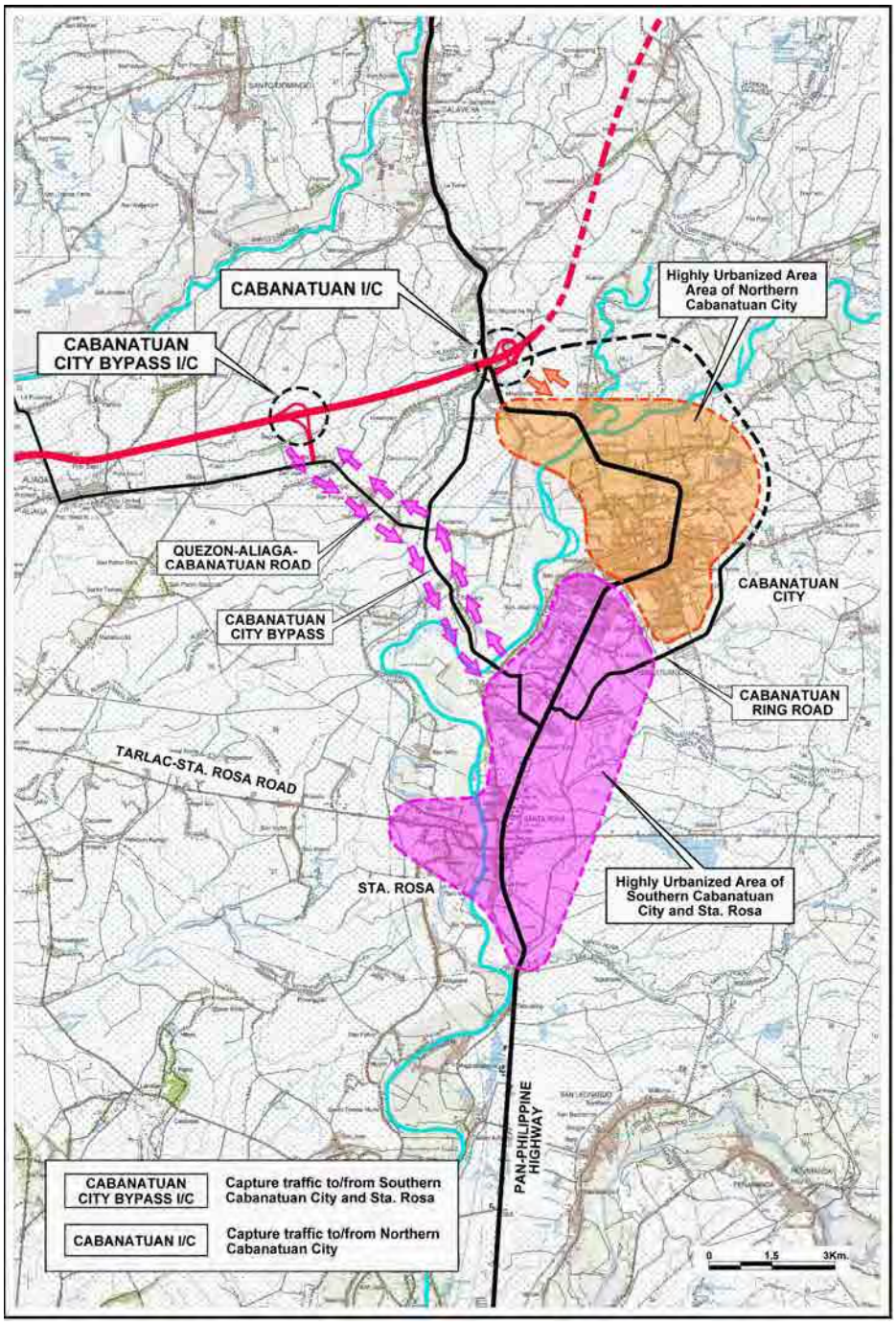


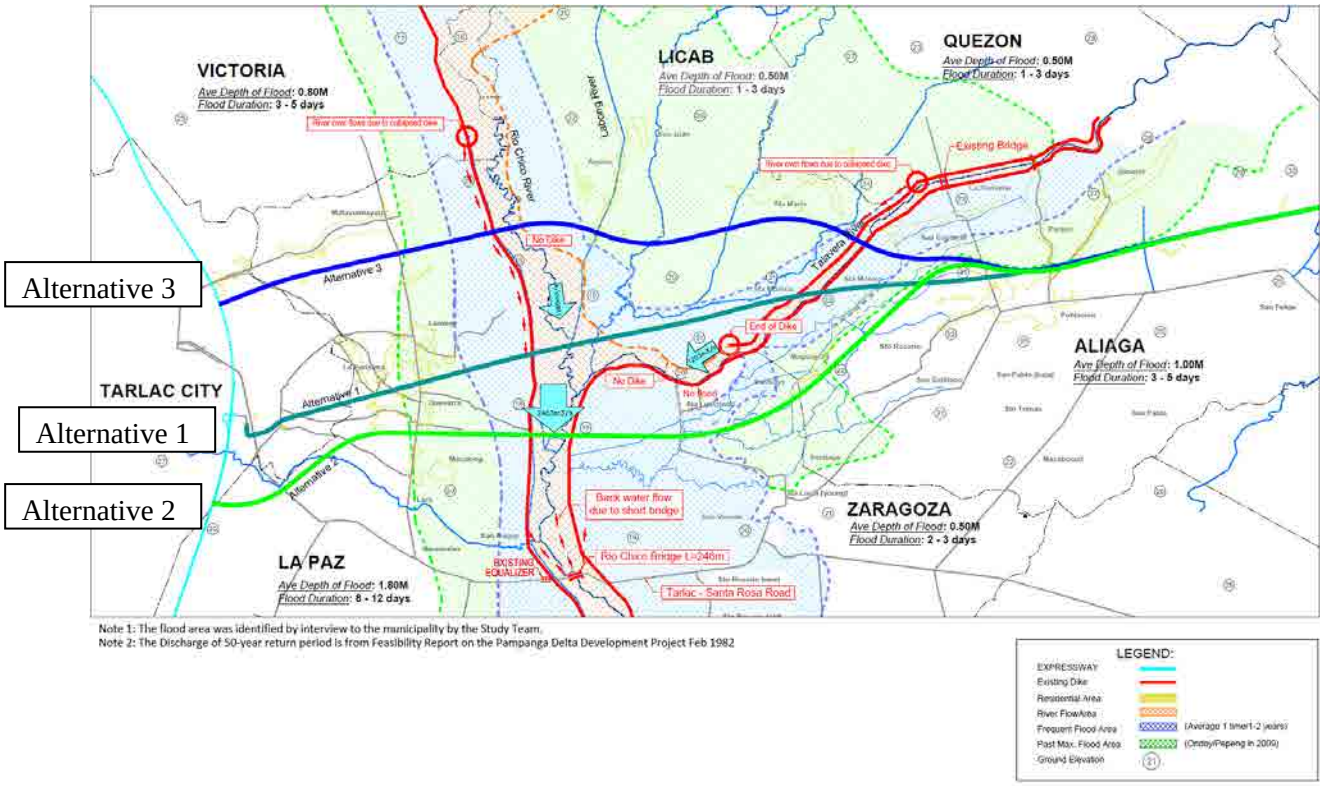
FIGURE 5.5-1 NEED OF CABANATUAN CITY BYPASS IC

5.6. Appropriate CLLEX Alignment in the Rio Chico Flood-Prone Area

(1) Condition of Flood-Prone Area

The CLLEX project has to traverse the flood-prone area. There are two (2) big rivers, namely Rio Chico River and Talavera River. There are other four (4) small rivers. All of these rivers join into one river, and then it is called as Rio Chico River. The longitudinal slope of the Rio Chico river bed is very flat at about 1/3,000 (or 0.03%), therefore, velocity of the flood water is estimated as not so fast. All rivers in Rio Chico River Area overflow the banks and flood area extends for quite wide area. Flood areas were identified by interviews to municipality officials, which is illustrated in **FIGURE 5.6-1**.

- The Ordinary river flow area (orange color) is frequent flood area (average 1 time/1-2 years), the past maximum flood area by Typhoon Ondoy/Pepeng in 2009 is shown in green color.
- The water velocity in the frequent flood areas (blue area) is very slow except the vicinity of the ordinary river flow area.
- The water velocity in the area (green area) between the frequent flood area and the past maximum flood area is minimal and almost dead water.



Note 1: The flood area was identified by interview to the municipality by the Study Team.
Note 2: The Discharge of 50-year return period is from Feasibility Report on the Pampanga Delta Development Project Feb 1982

FIGURE 5.6-1 FLOOD CONDITION AT RIO CHICO A FLOOD-PRONE AREA

(2) Alternative Alignment study passing through Flood-prone Area Rico Chico River

Three (3) alternative alignments as shown in **FIGURE 5.6-**1 were studied.

Alternative-1: Alignment recommended by the 2010 FS. The alignment starts at SCTEx Tarlac Interchange entrance/exit point. It traverses at slightly upstream side of confluence point of Rio Chico River and Talavera River.

Alternative-2: This alignment starts at SCTEx and traverses at the downstream side of confluence point.

Alternative-3: This alignment starts at TPLEx and passes through the upstream side of confluence point.

TABLE 5.6-1 EVALUATION OF ALIGNMENT ALTERNATIVES

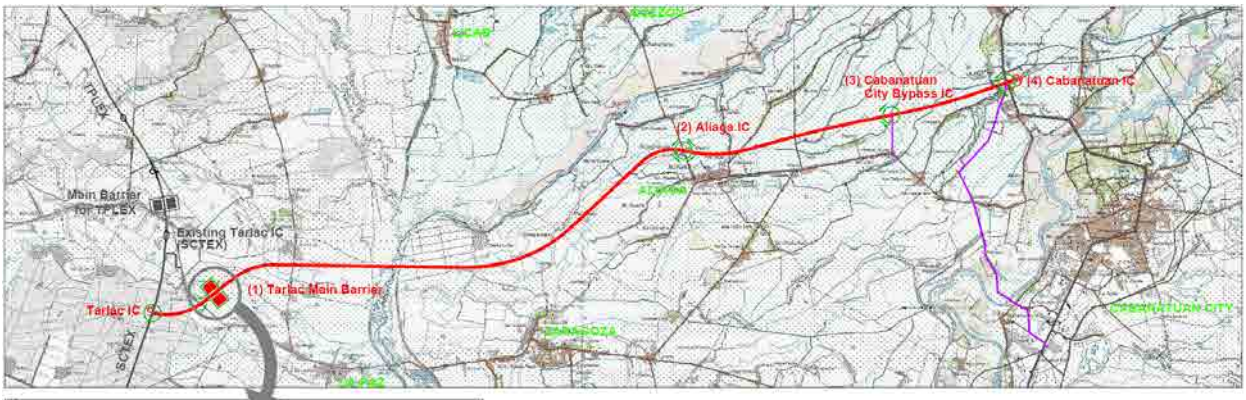
(Confidential)

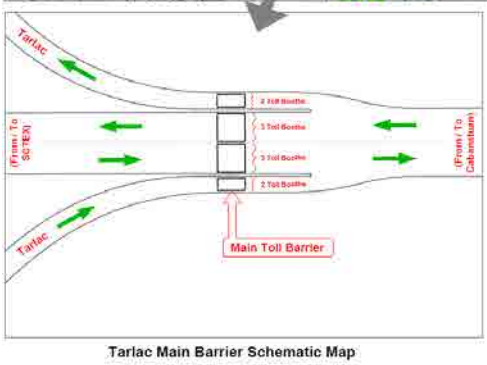
The evaluation of alternative alignments is shown in **TABLE 5.6-1**. The alternative-2 was recommended due to the following reasons;

- The most preferred alignment for traffic between Manila side and Cabanatuan City which is dominant traffic on CLLEX.
- The alignment passes through the area where there are banks on both sides of the river; therefore water course is controlled and stable. Flood water overflows the banks, thus enough bridge length needs to be provided.
- Number of affected houses is the least.
- Construction cost is the least, although it is almost the same as Alternative-3.
- Alternative-1 passes through the confluent points of two rivers, not appropriate for the alignment to pass.
- From the view point of river crossing location, Alternative-3 is also appropriate, however, from the view points of traffic efficiency, Alternative-3 is not recommended.

5.7. Toll Collection System of CLLEX

Toll fee should be imposed based on travel distance based toll to assure fairness to expressway users, hence the closed toll collection system should be established which is shown in **FIGURE 5.7-1**. Number of toll booth was computed on the assumption that toll collection would be done manually. Actual toll collection shall be partially done by the electronic toll collection system. Weigh-in-motion equipment for overloaded truck control, administrative maintenance office, and toll houses are also planned at the strategic locations.





Tarlac Main Barrier Schematic Map

Toll Collection System Is Proposed As CLOSED SYSTEM

NAME	DESCRIPTION		NO. OF TOLL BOOTH *
(1) Tarlac Main Barrier	From SCTEX	: Pay SCTEX Toll And Get Ticket For CLLEX	3
	From Tarlac IC	: Get Ticket For CLLEX	2
	To SCTEX	: Pay CLLEX Toll And Get Ticket For SCTEX	3
	To Tarlac IC	: Pay CLLEX Toll	2
(2) Aliaga IC	Entrance	: Get Ticket	2
	Exit	: Pay CLLEX Toll	2
(3) Cabanatuan City Bypass IC	Entrance	: Get Ticket	2
	Exit	: Pay CLLEX Toll	2
(4) Cabanatuan IC	Entrance	: Get Ticket	2
	Exit	: Pay CLLEX Toll	3
	TOTAL		23

Note: * Number of Toll Booth is estimated by future traffic volume and service time (entrance - 6 sec/veh., exit 14 sec/veh.)

FIGURE 5.7-1 PROPOSED TOLL COLLECTION SYSTEM OF CLLEX

6 SCOPE OF THE PROJECT

The proposed CLLEX is to be constructed in the provinces of Tarlac and Nueva Ecija, which are part of Region III. The starting point of the expressway is at Tarlac City (about 125km. from Manila), and ends at Cabanatuan City (CLLEX Phase I). The proposed Project has a ROW of 60 meters in width, and a length of 30.7 kilometers.

6.1. Outline of the CLLEX Project

The proposed CLLEX alignment and interchange layout has been planned and summarized as below.

TABLE 6.1-1 OUTLINE OF CLLEX PHASE-1

Project Name	Central Luzon Link Expressway (CLLEX) Project : PHASE 1
Project Proponent	Department of Public Works and Highways (DPWH)
Project Contents	Expressway construction through La Paz, Aliaga and Cabanatuan City including 7 bridges.
Expressway Length	30.7 km
Number of Lane	4-lane
ROW (width)	60m
Number of I/C	5
Number of Bridges and Length	7 bridges, 1,886 m
Equalizing Zone Length	3.78 km
Number of Overpass / Underpass for Intersecting Roads	Overpass: 1, Underpass: 37, Total: 38
Toll Collection System	• Closed toll collection • Toll Fee: Distance-based toll fee • Manual and Electrons toll collection booths • Weigh-in-motion equipment to control overloaded truck

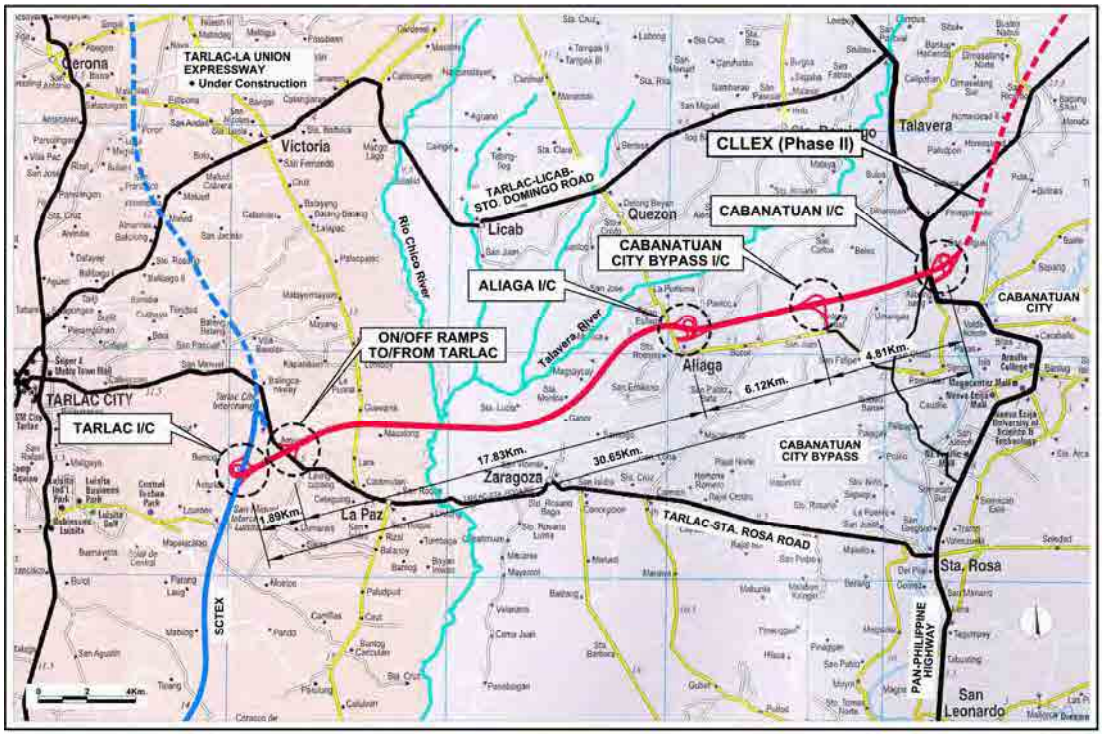


FIGURE 6.1-1 PROPOSED CLLEX ALIGNMENT AND LAYOUT OF INTERCHANGES

6.2. Design Standard

The design concept is to provide a high speed toll road that allows safe and efficient movement of traffic as an expressway with fully controlled access, especially to improve the access from Tarlac (connection to SCTEx) to Cabanatuan (Pan Philippines Highway) in the total length of 30.73km.
The following standard is mainly used as reference in CLLEX PHASE-1 design, and the geometrical design standards are set up as shown in **TABLE 6.2-1**.

- A Policy on Geometric Design of Highways and Streets, AASHTO 2004
- Highway Safety Design Standards Part 1 Road Safety Design Manual, May 2004, DPWH
- Japan Road Association, Road Structure Ordinance,2004
- Highway design manual, Metropolitan Expressway Co., Ltd., Japan
- Highway design manual, NEXCO, Japan

TABLE 6.2-1 GEOMETRICAL DESIGN STANDARD OF CLLEX

Category	Item	Unit	Roadway Standard	Ramp way Standard
Basic Element	Design Speed	km/h	100	40
	Design Vehicle	-	WB-15	WB-15
	Stopping Sight Distance	m	185	50
	Passing Sight Distance	m	670	270
Cross Section Element	Pavement Type	-	Asphalt Concrete	Asphalt Concrete
	Number of lane	nos	4	1
	Lane Wide	m	3.50	3.50
	Median Width	m	3.00	1.00
	Inner Shoulder Width	m	1.00	1.00
	Outer Shoulder Width	m	2.50	2.50
	Normal Cross fall	%	2.00	2.00
	Maximum Super Elevation		6.00	6.00
	Super Elevation	%	Exhibit 3-26	Exhibit 3-26
	Maximum relative Gradients	%	0.43	0.66
Horizontal Alignment	Minimum Radius	m	437	50 (absolute 43)
	Minimum Transition Curve length	m	56	22
	Minimum Radius not requiring Transition Curve	m	2560	525
	Super elevation Run off	%	0.43	0.66
Vertical Alignment	Maximum Vertical Gradient	%	3 (absolute 4)	6 (absolute 7)
	Minimum K Value Crest	%	85.0	6.0
	Minimum K Value Sag	%	52.0	9.0
	Minimum Vertical Curve Length	%	60	60
	Maximum Composition Grade	%	-	11.5
	Vertical Clearance (Road)	m	5.200	5.200

6.3. Typical Roadway Cross Section

Typical cross sections of roadway, viaduct and bridge are illustrated as **FIGURE 6.3-1**.

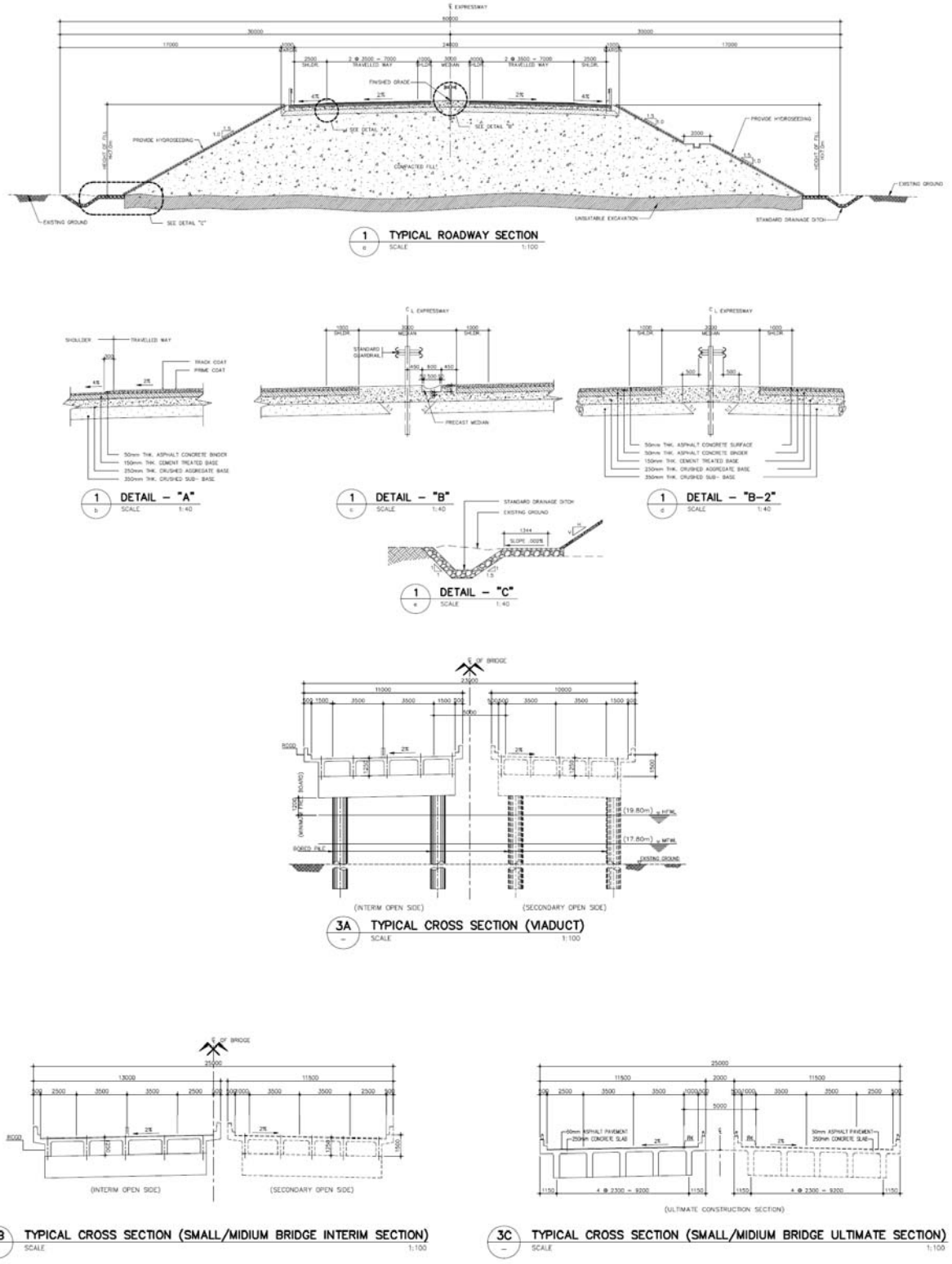


FIGURE 6.3-1 TYPICAL CROSS SECTION

7 PROJECT COST

(Confidential)

TABLE 7-1 ESTIMATED CONSTRUCTION COST OF CLLEX PHASE-1

(Confidential)

TABLE 7-2 ESTIMATED OPERATION AND MAINTENANCE COST OF CLLEX PHASE-1

(Confidential)

8 ECONOMIC EVALUATION

8.1. Assumption and Indicators of Economic Analysis

(Confidential)

TABLE 8.1-1 UNIT VOC BY FOUR (4) VEHICLE TYPES IN 2011 (Peso/km/veh)

(Confidential)

TABLE 8.1-2 UNIT TRAVEL TIME COST IN 2011 (Peso/min/veh)

(Confidential)

8.2. Results of Economic Analysis

(Confidential)

TABLE 8.2-1 THE RESULTS OF ECONOMIC ANALYSIS

(Confidential)

8.3. Economical Project Sensitivity

(Confidential)

TABLE .8.3-1 PROJECT SENSITIVITY

(Confidential)

9 PPP SCHEME

Project IRR which is the internal rate of return when all costs including ROW acquisition are shouldered by the private sector, is estimated about 3.5%. The project needs financial support of the Government. Otherwise, the private sector will not be interested. For the projects with low Project IRR, the possible PPP modalities are as follows;

Type-1	Design and build by the Government and lease the facility to the private. The Private operates and maintains the facility and pays lease fee to the Government (SCTEx model). Traffic demand and revenue risks shall be borne by the private.
Type-2	The private sector undertakes just O & M. Toll rate can be reduced compared to other modality.
Type-3	Design, build and O & M by the private. The facility is leased to the Government who shall pay lease fee to the private (MRT-3 model). The Government shall bear the traffic demand and revenue risk

Type-1 was selected due to the following reasons;

- The Government can recover its investment from lease fee.
- The Government can utilize ODA fund which provides soft loan with low interest rate, long repayment period with long grace period.
- Because of ODA soft loan, total project cost becomes much less than Type-3. Since Type-3 has to secure higher interest rate fund and shorter repayment loan from the private commercial banks.

Financial analysis was undertaken based on the following PPP modality;

Option-1: Stage Development (Initially 2-lane Widen to 4-lane	Government	• ROW Acquisition • Design & Build of 2-lane Expressway (Yen loan)
	Private	• Installation of toll collection facility • O & M (2-lane) • Design & Build & Finance Widening (2 to 4-lane) • O & M (4-lane) • Pay lease fee to the Government (or Toll revenue sharing between GOP and the Private)
Option-2: Full Development (4-lane from the Beginning)	Government	• ROW Acquisition • Design & Build of 4-lane Expressway (Yen loan)
	Private	• Installation of toll collection facility • O & M (4-lane) • Pay lease fee to the Government (or Toll revenue sharing between GOP and the Private)

10 FINANCIAL EVALUATION

10.1. Assumption and Conditions of Financial Analysis

(Confidential)

TABLE 10.1-1 ASSUMPTIONS AND CONDITIONS OF FINANCIAL ANALYSIS

(Confidential)

TABLE 10.1-2 ASSUMPTION FOR LEASE FEE

(Confidential)

10.2. Results of Financial Analysis

(Confidential)

TABLE 10.2-1 FINANCIAL ANALYSIS RESULTS OF CLLEX PHASE-1 OPTION-1 (2-lane to 4-lane)

(Confidential)

TABLE 10.2-2 FINANCIAL ANALYSIS RESULTS OF CLLEX PHASE-1 OPTION-2 (4-lane)

(Confidential)

11 ENVIRONMENTAL AND SOCIAL CONSIDERATION

11.1. Prediction / Assessment and Mitigation of the Impacts and Monitoring

Impact to natural and social environment for directly affected area and its PAPs are predicted and magnitude of the impact is assessed based on the Study. Assessment results, mitigation measures and monitoring in Pre-construction / construction phase and Operation / maintenance phase are shown in **TABLE 11.1-1** and **TABLE 11.1-2**.

TABLE 11.1-1 EIA RESULTS (PRE-CONSTRUCTION AND CONSTRUCTION PHASE)

	Item	Assessment	Mitigation Measures	Monitoring Item
1	Involuntary Resettlement	A total of 64 structure (i.e. residential houses) with 67 households (or 337 people) will be affected. All of them except 1 household (5 people) are informal settlers. One household is tenant. A total of about 507 farm land lots (or 201 ha.) will be affected. About 95.6% are land owners, about 1.3% are tenants, About 3.1% are free occupants with permit of land owners.	• To prepare Final RAP with full consensus with PAPS, and inventories of land and other assets.	• Inventory of land and asset • Valuation of land and assets by replacement cost.
			• To provide relocation sites for PAPs to be relocated.	• Relocation sites are provided and at PAPs' satisfaction.
			• To provide just (or fair) compensation, relocation sites, and other supports that are stated in LARRIPP/WB OP 4.12.	• Valuation is made at the replacement cost and fair compensation is offered to PAPs.
2	Local Economy such as Employment	(+) Demands for labor to the construction and related work are expected to be increased temporarily, which further stimulates local economy. (-) Shops and small businesses locating on CLLEX I/C construction sites will have to be relocated.	• To assure priority employment of PAPs during construction. Construction contract between DPWH and the selected contractor shall specify this condition.	• Contract specified this condition. • They are employed during construction.
			• To provide just (or fair) income loss compensation and rehabilitation assistance.	• PAPs are provided such compensation and assistance.
3	Land Use	About 201 ha of lands, almost all of which are palay (rice) field will be lost and change to CLLEX. These lots along the new road and around the interchanges might be converted to market places / shopping malls, or residential uses.	• Respective LGUs shall amend city/municipality Land Use Plan and Zoning Ordinance to control unorderly urban development along CLLEX and to restrict conversion of farm land to other land use purposes, and strictly enforce amended zoning ordinance.	• Zoning ordinance is amended and implemented.
	Utilization of Local Resources	Project site is located in abundant sand/gravel resources, construction of pavement and bridges/other structure can utilize these resources.	• Detailed design shall adopt construction methods which utilize available local resources.	• Local resources are incorporated in design. • Local resources are used.
			• Construction contract between DPWH and the selected contractor shall specify maximum utilization of available local resources.	• Utilization of local resources are specified in the contract. • Local resources are used.
	Farm Land	About 201 ha of farmland will be lost by this project in exchange to the expressway. Negative impact to farmers is expected in a form of loss of lands. Division of farmlands by CLLEX might cause inconvenience to access their cultivating lands.	• To provide just (or fair) compensation, replacement of land when feasible and other supports such as disturbance compensation and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12.	• Fair valuation is made, fair compensation is estimated and paid.
			• Detailed design shall be undertaken focusing on maintaining of existing irrigation system and existing farm roads to assure accessibility to farm lands. • Detailed design shall be undertaken to provide accessibility between the lands divided by CLLEX by providing enough box-culverts.	• Detailed Design is made in accordance with this concept. • Designed features are constructed and functioning efficiently as design concept.

	Item	Assessment	Mitigation Measures	Monitoring Item
4*	Social Institution, and Local Decision-making	No concern regarding Social Institution and Local Decision-making system were raised by PAPs.	• Although no concern was raised by PAPs, DPWH shall continue to dialogue with social institution and local decision-making bodies.	• Any concerns are raised.
	Social Infrastructure	There are some universities and hospitals in Tarlac, Aliaga and Cabanatuan. During the construction, it might create difficulty in access to those social infrastructure due to the increasing in vehicles and congestion by construction.	• To construct temporary road within the road right-of-way for transporting construction materials, equipment and laborers. • To implement proper traffic management with close coordination with local police and barangay captains. • To provide proper information on construction schedule and traffic management plan.	• These are specified in the contract. • These are implemented.
5*	Poor	About 58.7% of affected households belong to the poor (or below Region III poverty threshold). (+) Demands for labor to the construction and related work are expected to be increased temporarily, which further stimulates local economy. (-) Shops and small businesses locating on CLLEX I/C construction sites will have to be relocated	• Qualified skilled workers and laborers in the Direct Impact Areas (DIA) duly endorsed by the Brgy. Captains will be given priority in hiring during implementation of the project. • To include condition of priority employment of PAPs below poverty line into construction contractor's contract.	• These are specified in the contract. • These are implemented by the Contractor.
			• To provide just (or fair) compensation for income loss and rehabilitation assistance in accordance with LARRIPP/WB OP 4.12.	• Fair compensation and rehabilitation assistance are made.
9*	Water Use, Water Rights	All project areas are provided with the irrigation system.	• To assure by Detailed Design that the existing irrigation system shall not be disturbed. Irrigation channels and their maintenance roads shall be provided with box culverts and when necessary, rechanneling of irrigation canal shall be designed. • Inventory of drainages and irrigation distribution means must be cataloged with lawful owners and practical users' name. In case of the area where CLLEX Project takes place, the water right for irrigation belongs to National Irrigation Administration (NIA). Just allocation of irrigation water to the farmers is NIA's responsibility.	• Detailed Design incorporated this requirement. • Designed features are constructed and functioning efficiently
10*	Sanitation	Sanitary condition around construction site is anticipated to become worse due to generation of wastes during the construction.	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be undertaken by DPWH to ensure proper management of the solid and domestic wastes generated.	• These requirements are specified in the contract. • These are properly implemented.

	Item	Assessment	Mitigation Measures	Monitoring Item
11*	Risk, HIV/AIDS, Infectious disease	Temporally increase in infectious and communicable diseases is possible during construction phase due to influx of construction workers. Poor sanitary environment can generate and spread communicable diseases such as diarrhea, common cold, and such.	• Temporary sanitation facilities such as garbage bins and portable toilets must be provided by the Contractor at the construction area. • Regular disposal of the solid and domestic wastes to the designated disposal areas duly-approved by respective LGUs and DPWH must be strictly complied with. • Weekly inspection of the work sites must be undertaken by DPWH to ensure proper management of the solid and domestic wastes generated. • To provide Information, Education and Communication (IEC) on healthy behavior and Sexually Transmitted Disease (STD) to the construction workers.	• These requirements are specified in the contract. • These are properly implemented.
12*	Accident	Accidents involving construction works, vehicles and machineries operation are anticipated. Traffic accidents may happen by construction vehicles and heavy machines during construction. Construction personnel, particularly operators of heavy equipment and machineries may experience respiratory ailments. Fall down from higher position such as piers and bridges may happen.	• To construct temporary construction road within road right-of-way, implement traffic management plan in coordination with local police and inform construction schedule, etc. to people within the project area to prevent traffic accidents. • To implement proper stock piling of materials, watering of soils and covering materials to prevent dusting. • To educate construction workers on various construction safety measures, and strictly implement such safety measures. • To provide adequate lighting and reflectors and construction warning signs at construction sites as well as at traffic accident-prone sections of roads. • To provide temporary fences so as ordinary people not to enter in the construction sites.	• These are specified in the contract. • These are properly implemented.
14	Soil Erosion	During the construction stage, erosion is likely to occur mainly by intense rain.	• To provide proper temporary drainage system to prevent water concentration at certain locations. • To provide temporary dike within the road right-of-way to prevent flow of eroded soils. • For high embankment construction section, to cover embankment by vinyl sheet during heavy rain for prevention of slope collapse.	• These are incorporated in the contract. • These are properly implemented.
15	Groundwater	Groundwater table at project site is between GL-0.5m and GL-4.3m deep. Groundwater level might temporarily be dropped during construction by cutting off of recharge source e.g. surface water flow.	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage.	• These are specified in the contract. • These are properly implemented.
16	Hydrology	CLLEx traverses the flood-prone area where the river bed gradient is very gentle	• To design and construct sufficient length of bridges and also provide sufficient number of box-culverts in order not to change and worsen the	• These are incorporated in the detailed design.

	Item	Assessment	Mitigation Measures	Monitoring Item
		(1/3,000). Due to insufficient river banks distance, sufficient river channel capacity is not provided, thus storm water overflows the banks. By construction of CLLEx, hydrological condition may be affected if proper design is not made.	current condition. • During construction, to undertake bridge substructure construction only during dry season and to avoid stockpiling of materials in a manner to disturb water flow.	• Check work schedule of the Contractor
17	Flora, Fauna and Biodiversity	Agricultural flora, mainly rice, and trees growing in CLLEX alignment are expected to be removed. Removal of such flora also causes impact. Slightly on local ecology and biodiversity negatively.	• To obtain "Permit To Cut" prior to tree cutting activities along the alignment. • To limit Tree cutting only within the required ROW. • Relocation of trees will be carefully undertaken. • Reforestation at areas designated by the DENR-FMB to replace cut tree species. Replacement ratio and species to be introduced will be determined by the DENR-FMB (Forest Management Bureau).	• These are properly implemented.
20*	Global Warming	It is estimated that total emission of CO_2 will be about 59,584 tons during construction phase.	• To use clean filters and mufflers of engines. • To minimize idling of engines. • To minimize traveling frequencies between construction sites and origin by making and executing efficient construction materials transportation schedule. • To prohibit old model equipment and vehicles. • To follow mitigation measures suggested for AIR POLLUTION. • To off-set this impact, plant enough trees along expressway and interchange sites.	• These requirements are specified in the contract. • These are properly implemented.
21*	Air Pollution	Air quality was measured at 4 stations in dry season (2010 FS) and 7 stations in wet season (2011). Results shows that highest values of TSP, SO_2 and NO_2 are 299 (DENR Standard: 300), 30 (DENR Standard: 340) and 11 (DENR Standard: 260), respectively. Although SO_2 and NO_2 are far below DENR standard, TSP at one station in Cabanatuan City is close to DENR Standard. Construction work near the section to Cabanatuan City needs to be done carefully.	• To spray exposed ground with water to minimize dust re-suspension. • To cover temporary stockpiles of excavated materials and construction spoils with tarpaulin or sack materials. • To transport and dispose construction spoils regularly to hauled areas duly-approved by the DENR/LGUs. • To perform regular maintenance of construction vehicles, heavy equipment and machineries. • Follow mitigation measures suggested for GLOBAL WARMING. • Aggravation of air pollution will be minimized by adoption of above measures, considering that most of construction sites are located in the rice field areas.	• Measure air quality quarterly. • These are specified in the contract. • These are properly implemented.
22*	Water Pollution	Water quality was measured at 2 stations in dry season (2010 FS) and 7 stations in wet	• To adopt construction method minimizing generation of drainage water (e.g. river realignment plan for substructure construction).	• These are specified in the contract.

	Item	Assessment	Mitigation Measures	Monitoring Item
		season (2011). In dry season, all of BOD, TSS and Total Coliforms exceeded DENR Standard. In wet season, BOD exceeds DENR Standard at one station, TSS at 4 stations and TC at 5 stations. It is important not to worsen water quality than at present.	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and to prevent oil leakage. • Aggravation of water quality will be minimized by adoption of above measures.	• These are properly implemented.
23*	Soil Contamination	During the construction, excavated soil, surface water and oil from vehicles and machineries may pollute the ground.	• To seal, remove, or contain solid wastes and other construction hazardous materials off from bare ground to prevent seeping into the ground especially when it rains. • To install and manage portable toilets for construction workers properly. • To maintain machineries and generators and prevent oil leakage. • Aggravation of soil contamination will be minimized by adoption of above measures.	• These are specified in the contract. • These are properly implemented.
24*	Waste	Construction debris and excavated soil are generated during the construction. Human waste will be generated from workers during construction and operation.	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them at the disposal sites approved by respective LGUs and DPWH. • To select eco-friendly waste disposal methods. • To edificate and educate construction workers. • To conduct EIS on the disposal site if the site is to be newly developed for the project. • Effect of waste will be minimized by adoption of above measures.	• These are specified in the contract. • These are properly implemented.
25*	Noise and Vibration	Noise level was measured along the national roads at 3 stations in dry season (2010 FS) and 5 stations in wet season (2011). Noise level at all stations exceeded DENR Standard. It is important to adopt measures not to worsen noise level than at present. Noise and vibration occur from machineries and vehicles used during construction work, hence construction work and transporting of materials need to be carefully done.	• To bore piles using a special boring equipment will be adopted during foundation works instead of pile driving. • To use noise suppressors equipped machineries. • To work in day time or non-critical time to minimize noise disturbance to adjacent residential areas. • To install temporary noise barriers at noise sensitive areas such as residential, schools, and places of worships to maintain noise level at permissible limit. • To strictly prohibit overloading on trucks. • Aggravation of noise and vibration will be minimized by adoption of above measures, considering that most construction sites are located in the rice field area.	• Measure noise quarterly. • These are specified in the contract. • These are properly implemented.

	Item	Assessment	Mitigation Measures	Monitoring Item
27*	Offensive Odor	Possible offensive odor might be generated from construction vehicles and portable toilets for workers during construction.	• To seal, remove, or contain solid wastes and other construction wastes. • To dispose them off in an LGU approved solid wastes disposal site. • To install and manage portable toilets for construction workers properly. • To do good camp management.	• These are specified in the contract. • These are properly implemented.
29*	Traffic Congestion	During the construction, trucks transporting construction materials will cause traffic congestion.	• To implement traffic management plan in coordination with local police. • To transport materials during off-peak hours. • To prohibit parking of construction-related vehicles on the national/provincial roads. • To use temporary construction road built within the acquired road right-of-way as much as possible. • To educate truck drivers.	• These are specified in the contract. • These are properly implemented.

TABLE 11.1-2 EIA RESULTS (OPERATION AND MAINTENANCE PHASE)

	Item	Assessment	Mitigation Measures	Measures Monitoring Item
3	Farm Land	Estimated monetary values of paray that would yield in the land acquired for CLLEX were estimated to be 14.75 million pesos per year. Some of PAPs who lose farm land might face financial difficulty if their losses of income sources are not properly compensated or alternative means of compensation have been provided.	• To adopt high productivity farming methods and high yield seeds. • To educate and finance farmers so as for them to adopt above	• Check rice production of provinces of Tarlac and Nueva Ecija.
			• Proper compensation such as job training and prioritized job opportunity.	• Number of PAPs who received training. • Number of jobs provided to PAPs
12*	Accident	CLLEX will be built as 4-lane divided facility with center median and international geometric design standard is adopted. Traffic on CLLEX will not be so heavy; therefore, occurrence of accidents will be unlikely due to quality of the facility. Accident may occur only when a driver does not follow traffic rules and regulations. Traffic on existing roads will be decreased, thus accidents will be expected to reduce.	• Educate drivers to follow traffic rules and regulations. • Install traffic signboards at appropriate places. • Regularly repair roads and bridges to ensure good condition for vehicle movement.	• Check report of Concessionaire.
20*	Global Warming	Amount of GHG e.g. CO_2 is expected to increase as number of vehicles travel through CLLEX increases. But CO_2 is estimated to decrease 16,810 tons, 21,073 tons and 34,654 tons in 2017, 2020 and 2030, respectively compared with the without Project case.	• To use clean filters and mufflers of engines • To minimize idling of engines • To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape • To prohibit old model vehicles • To strengthen vehicle emission regulation	• Check report of Concessionaire on traffic volume and travel speed.
21*	Air Pollution	Predicted air qualities such as NOX, $SO^2$and PM-10 are less than 1μg/Ncm with CLLEX. During all parameters are below DENR Standards.	• To use clean filters and mufflers of engines • To minimize idling of engines • To maintain vehicle mechanics, engines, oil filter, exhaust pipe, and such in proper shape • To prohibit old model vehicles • To strengthen vehicle emission regulation	• Measure air quality quarterly.
22*	Water Pollution	Litters on road surface and eroded soils from embankment slope may cause water pollution, however, minimal impact.	• Implement proper road maintenance.	• Check maintenance report of the Concessionaire.

11.2. RAP Requirement

Overall RAP requirements are shown in **TABLE 11.2-1**.

TABLE 11.2-1 OVER-ALL RAP REQUIREMENTS

(Confidential)

11.3. Summary of Relocation Assets

TABLE 11.3-1 shows number of residential houses, households and people affected and relocated.

TABLE 11.3-1 NUMBER OF RESIDENTIAL HOUSE, HOUSEHOLD AND PEOPLE AFFECTED

Municipality/ City	Barangay	No. of Residential Houses Affected	No. of Household Affected	No. of People Affected	PAPs with Loss of Income
La Paz	Macalong	2	2	14	0
	Laungcapang	1	1		
	Sub-Total	3	3	14	0
Aliaga	Pantoc	3	3	158	0
	Betes	2	2		
	Bucot	1	1		
	Umangan	25	26		
	Sub-Total	31	32	158	0
Cabanatuan City	Caalibang-bangan	27	37	162	4
Total		61	67	334	4

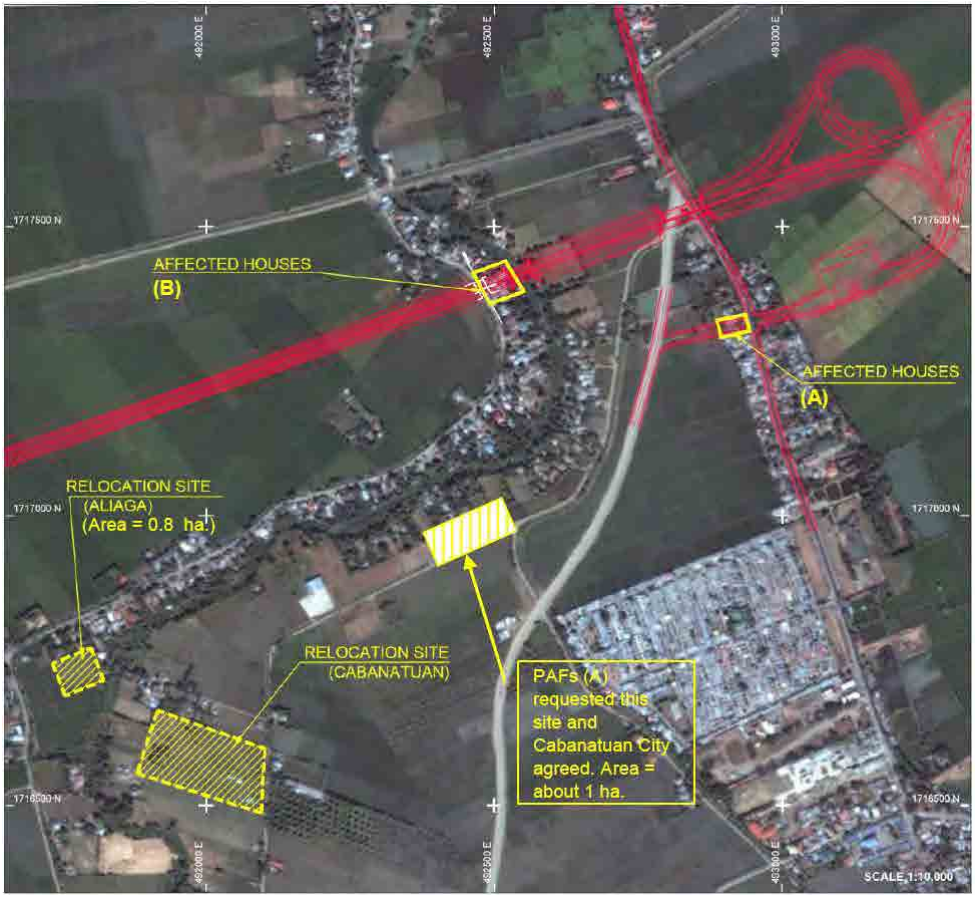


FIGURE 11.3-1 FINALLY PROPOSED RELOCATION SITES (Umangan, Aliaga Municipality)

11.4. Organization Chart of RAP Implementation

Organization chart of RAP Implementation is shown in **FIGURE 11.4-1**.

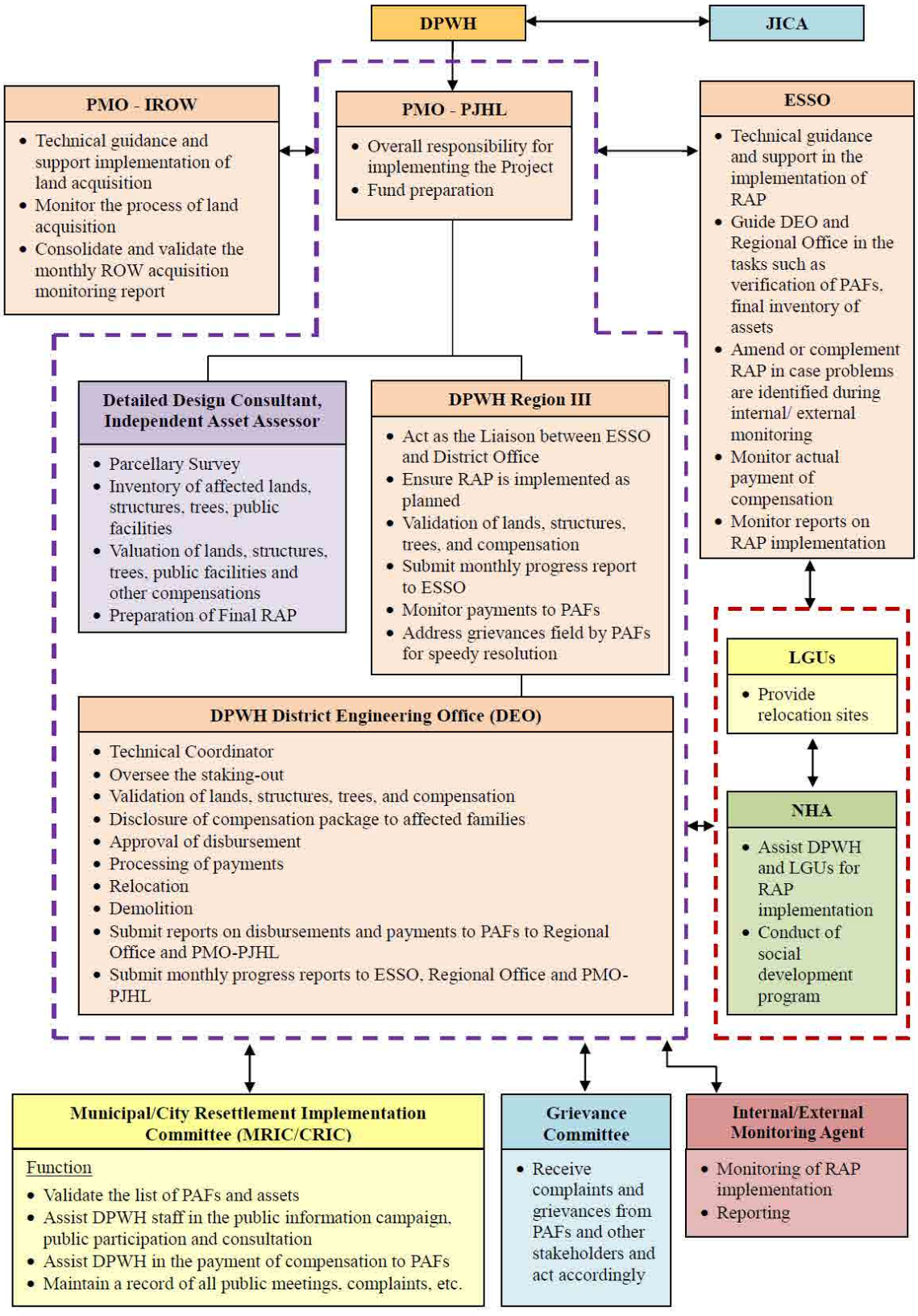


FIGURE 11.4-1 RAP IMPLEMENTATION ORGANIZATION

11.5. RAP Implementation Process

RAP implementation process is shown in **FIGURE 11.5-1**. The implementation schedule is described as **TABLE 11.5-1**.

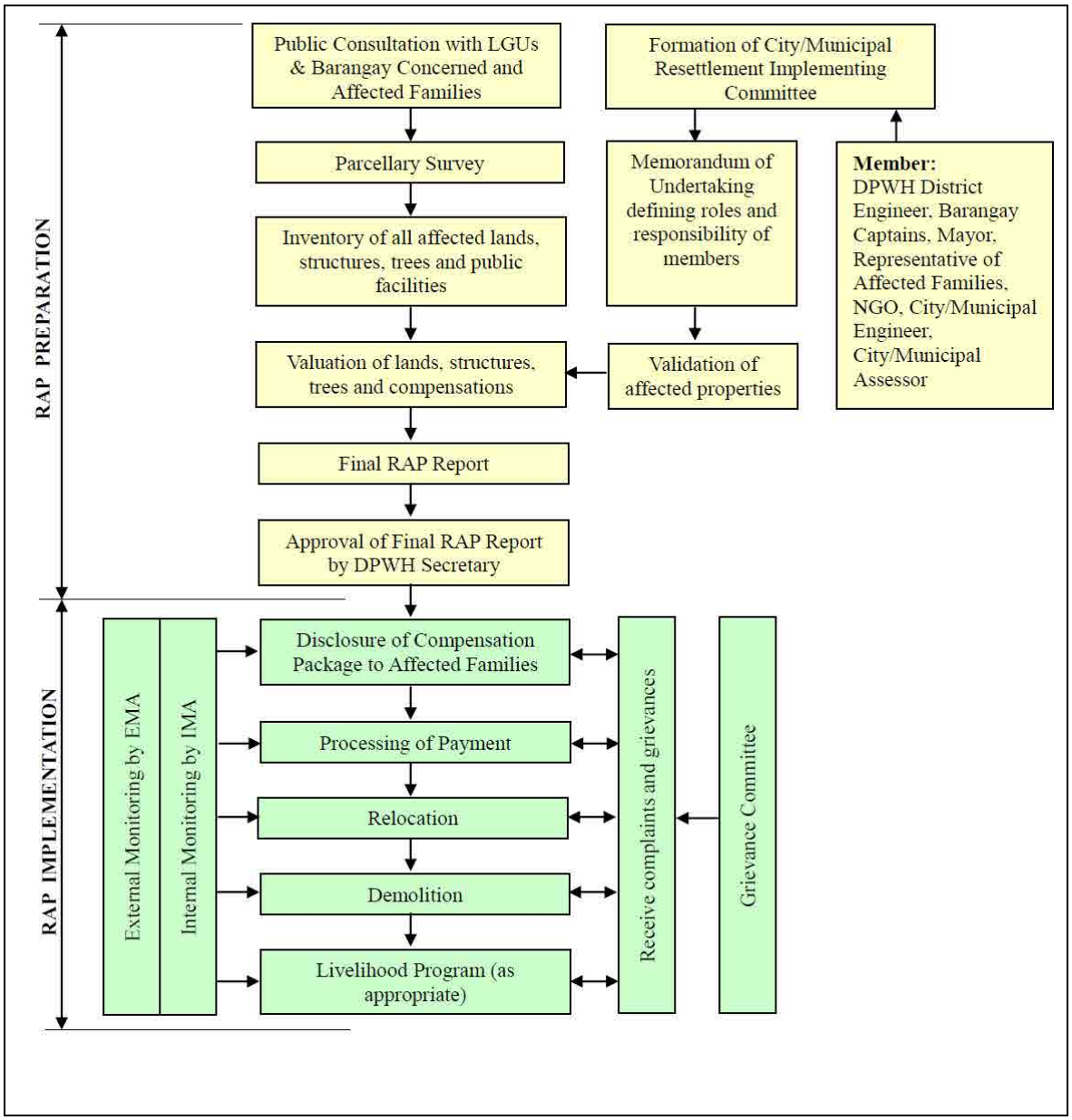


FIGURE 11.5-1 RAP IMPLEMENTATION PROCESS

TABLE 11.5-1 RAP IMPLEMENTATION SCHEDULE

Activities	2011				2012				2013	
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
First Disclosure (PCM)										
Preparation of RAP										
Conduct of Parcellary Survey										
Validation of APs and Finalization of RP										
Approval of the Final RP										
Formation of the CRIC										
Disclosure of final RP to APs										
Notification of APs										
Compensation										
Provision of Replacement Land										
Relocation to Replacement Land										
Income Restoration										
Approval of Road Design										
Commencement of Civil Works										
Monitoring & Evaluation										
Internal Monitoring										
External Monitoring and Evaluation										

12 PROJECT IMPLEMENTATION

(1) Implementation Strategy

(Confidential)

(2) Recommended Implementation Strategy

(Confidential)

(3) Implementation Schedule

(Confidential)

TABLE 12-1 IMPLEMENTATION SCHEDULE

(Confidential)

13 OPERATION AND EFFECT INDICATORS

(1) Selected Operation and Effect Indicators

In order to enable project monitoring and evaluation on the basis of consistent indicators, operation and effect indications are introduced for ODA loan projects. Operation and effect indicators are basically equivalent to the outcome indicators and performance indicators used by the World Bank. For this study, they are defined as follows:

- Operation indicators: quantitative measure of the operational status of project.
- Effect indicators: quantitative measure of the effects generated by a project.

In view of project objective and expected effects, the indicators as **TABLE 13-1** were selected.

TABLE 13-1 OPERATION AND EFFECT INDICATORS

Operation and Effect Indicators		Data Collection Method
Operation Indicators	Traffic Volume of CLLEX (veh./day)	Traffic count survey
	Toll Revenue	Data collection from Operator
Effect Indicators	Traffic Congestion Rate (Volume/Capacity Rate)	Calculation based on Traffic count survey
	Travel Time Saving (veh.-hour/day)	Calculation based on Travel Time Survey
	Travel Time Cost Saving (Peso/Year)	Calculation based on Time Cost and Travel Time Survey

(2) Study and Estimation of Operation and Effect Indicators

The summarized operation and effect indicators are shown in **TABLE 13-2**.

TABLE 13-2 OPERATION AND EFFECT INDICATORS

	Indicators	Road Name	Baseline (2009)	Target (2020)
Operation Indicators	Traffic Volume (vehicle /day)	CLLEX (Tarlac IC ~ Aliaga IC)	-	14,255
	Toll Revenue (Thousand Peso/day)	CLLEX		1,535
Effect Indicators	Traffic Congestion Rate (V/C Rate)	Tarlac – Sta. Rosa Road (Zaragosa)	0.56	0.41
		Pan Philippine Highway (San Leonardo)	0.83	0.85
	Travel Time (hr:min)	Cabanatuan – Balintawak		
		Via SCTEX(Thru Aliaga)	2:14	Via SCTEX and CLLEX 1:53
		Via Pan-Philippine Highway	3:06	
	Travel Time Saving (hours / day)	Due to transferred traffic from Tarlac -Sta. Rosa road and PPH to CLLEX	-	5,162
	Travel Time Cost Saving(Peso/year)		-	1.26 billion

Note: Opening Year = Year 2018

CHAPTER 1

INTRODUCTION

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND AND BRIEF HISTORY OF THE PROJECT

1.1.1 Background of the Project

The Philippines has been experiencing relatively slower economic development partly due to limited flow of direct investments into manufacturing sector compared to other rapidly growing ASEAN countries after the recovery from Asian Economic Crisis. In order to foster both domestic and foreign investments, improving overall investment climate including road network has been an urgent matter. In particular, the economic activities are extremely concentrated in Metro Manila where 37% of GDP and 13% of total population are accumulated in merely 0.2% of the country's land. This extreme concentration causes serious congestion and delays of distribution of goods and movement of people, resulting to huge damage to economy and lowering the country's international competitiveness as an investment destination. Likewise living condition in Metro Manila has eroded due to air pollution and traffic noise caused by chronic congestion. In summary, solving traffic congestion in Metro Manila by networking surrounding cities and upgrading/expanding highways around Mega Manila – the area covering Metro Manila, Central Luzon and CALABARZON – contributes to improvement of both investment climate and living climate. Central Luzon Link Expressway (CLLEX) improves access between the two-north large cities, Tarlac and Cabanatuan, and supports industrialization of North part of Mega Manila and eases the extreme concentration in Metro Manila as CLLEX allows better connection between North part of Mega Manila and Metro Manila. Central Luzon is expected to increase its efficiency as an industrial hub with Clark Airport receiving international flights.

1.1.2 Brief History of the Project

In 2010, JICA-assisted High Standard Highway Network Development Master Plan (hereinafter referred to "HSH Master Plan Study") formulated the expressway network in the 200 km radium sphere from Metro Manila. The Study recommended CLLEX as one of eight first priority projects.

In 2010, DPWH completed the Feasibility Study for the Proposed Central Luzon Expressway (now Central Luzon Link Expressway) (hereinafter referred to 2010 FS) under the supplemental agreement of JICA-funded Arterial Bypass Project.

In 2010, JICA-assisted Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Projects (hereinafter referred to as "PPP Infra Projects"). This Study prioritized PPP expressway projects in accordance with the criteria established which are based on the necessity and urgency of project, profitability of the project and implementability of the project. Phase I of CLLEX was ranked no. 4 out of 10 priority projects.

1.2 OBJECTIVES OF THE PROJECT

Objectives of the project are as follows:

OBJECTIVES OF THE PROJECT

(i) To provide fast, safe, comfortable and reliable means of transport in Region III for socio-economic development.
(ii) To decongest traffic of Pan-Philippine Highway (or Daang Maharlika).
(iii) To support sound development of Regional Growth Pole Cities of Tarlac City and Cabanatuan City, thus contributing to the decongestion of over-concentration of Metro Manila.
(iv) To form an important lateral (east-west) link of overall Expressway network of Region III.
(v) To provide faster access from Metro Manila to Cabanatuan City which is the base (or hub) city for Pacific Ocean Coastal Area Development.

1.3 THIS REPORT

This report presents all the findings and recommendations made for the Central Luzon Link Expressway (CLLEx) Project.

CHAPTER 2

ROAD SECTOR OVERVIEW

CHAPTER 2
ROAD SECTOR OVERVIEW

2.1 PHILIPPINE DEVELOPMENT PLAN (2011 – 2016)

Philippine Development Plan (PDP), 2011-2016 was announced in 2011. Development policies of infrastructure are as follows;

DEVELOPMENT POLICIES OF INFRASTRUCTURE

"**Accelerating Infrastructure Development"**

(1) To optimize resources and investment
- Improve project preparation, development and implementation
- Synchronize planning and budgeting
- Coordinate and integrate infrastructure initiative

(2) To attract investments in infrastructure
- Improve the institutional and regulatory environment of the infrastructure sector
- Encourage PPPs

(3) To foster transparency and accountability in infrastructure development
- Encourage stakeholder participation

(4) To adopt to climate change and mitigate the impacts of natural disasters
- Institutionalize Climate Change Act (CCA) and Disaster Risk Reduction Management (DRRM)

(5) To provide productive employment opportunities
- Adopt a labor-intensive scheme where applicable.

With regards to the transport sector, issues and challenges are established as follows;

TRANSPORT SECTOR ISSUES AND CHALLENGES

(a) Assessment and Issues
- Lack of integrated and coordinated transport network
- Overlapping and conflicting functions of transport and other concerned agencies
- Transport safety and security concerns

(b) Strategic Plan and Focus
- Adopt a comprehensive long-term National Transport Policy (NTP)
- Develop strategic transport infrastructure assets
  - Prioritize asset preservation
  - Provide access to major and strategic tourism destinations and production areas
  - Promote environmentally sustainable and people-oriented transport

(c) Develop an Integrated Multi-modal Logistics and Transport System
- Identify and develop strategic logistics corridors based on a National Logistics Master Plan
- Improve RORO terminal system
- Explore ASEAN connectivity through sea linkages

(d) Separate the Regulatory and Operation Functions of Transport and Other Concerned Agencies. To address the overlapping and conflicting functions of transport and other concerned agencies.

(e) Comply with Safety and Security Standards. To ensure transport safety and standards.

(f) Provide Linkages to Bring Communities into the Mainstream of Progress and Development. To promote conflict-affected and highly impoverished areas.

2.2 ROAD DEVELOPMENT GOALS

Public Investment Program (PIP) (2011 - 2016) was formulated by DPWH in 2011. Goals were set as follows;

DEVELOPMENT GOALS UNDER PIP

1. Provide safe environment through quality infrastructure facilities;
2. Increase mobility and total connectivity of people through quality infrastructure resulting to improved quality of life;
3. Strengthen national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
4. Facilitate the decongestion of Metro Manila via a transport logistics system that would ensure efficient linkages between its business centers and nearby provinces;
5. Implement more Public-Private Partnership (PPP) projects for much needed infrastructure and level playing field for investment;
6. Study the mechanism for longer maintenance period for roads and bridges; and
7. Generate more transport infrastructure with minimal budget cover or contingent liabilities.

Strategic focuses were set as follows;

STRATEGIC FOCUS

- Implement activities in the following order of priorities:
  a. Maintenance or asset preservation – to preserve existing roads in good condition
  b. Rehabilitation – to restore damaged roads to their original designed condition
  c. Improvement – to upgrade road features so that they efficiently meet traffic demands; and
  d. New Construction
- Prioritize upgrading of the national road network, as to quality and safety standards
- Prioritize national roads to address traffic congestion and safety in urban centers and designated strategic tourism destinations
- Completion of on-going bridges along national roads
- Develop more Public-Private Partnership (PPP) projects for much needed infrastructure and level playing field for investments
- Study the mechanism for a longer maintenance period (5 – 10 years) in road and bridges construction contract provision
- Prioritize flood control projects in major and principal river basins to address climate change based on master plan and adopting new technologies in flood control and slope management
- Prioritize adequate flood control and upgraded drainage design standards and facilities in flood-disaster prone areas to mitigate loss of river and damage to properties
- Promote innovative technology such as geo-textiles and coco-netting in slope protection and soil erosion control
- Promote retarding basin and rain water harvesting for non-domestic use
- Prioritize water supply in designated strategic tourist destinations/centers

2.3 Master Plan on High Standard Highway Network

The study of master plan on High Standard Highway (HSH) Network Development was conducted in Year 2010. **Figure 2.3-1** shows the proposed HSH network in Metro Manila and 200 km sphere. Based on this master plan, Public Investment Program (2011-2016) for expressway projects was formulated.

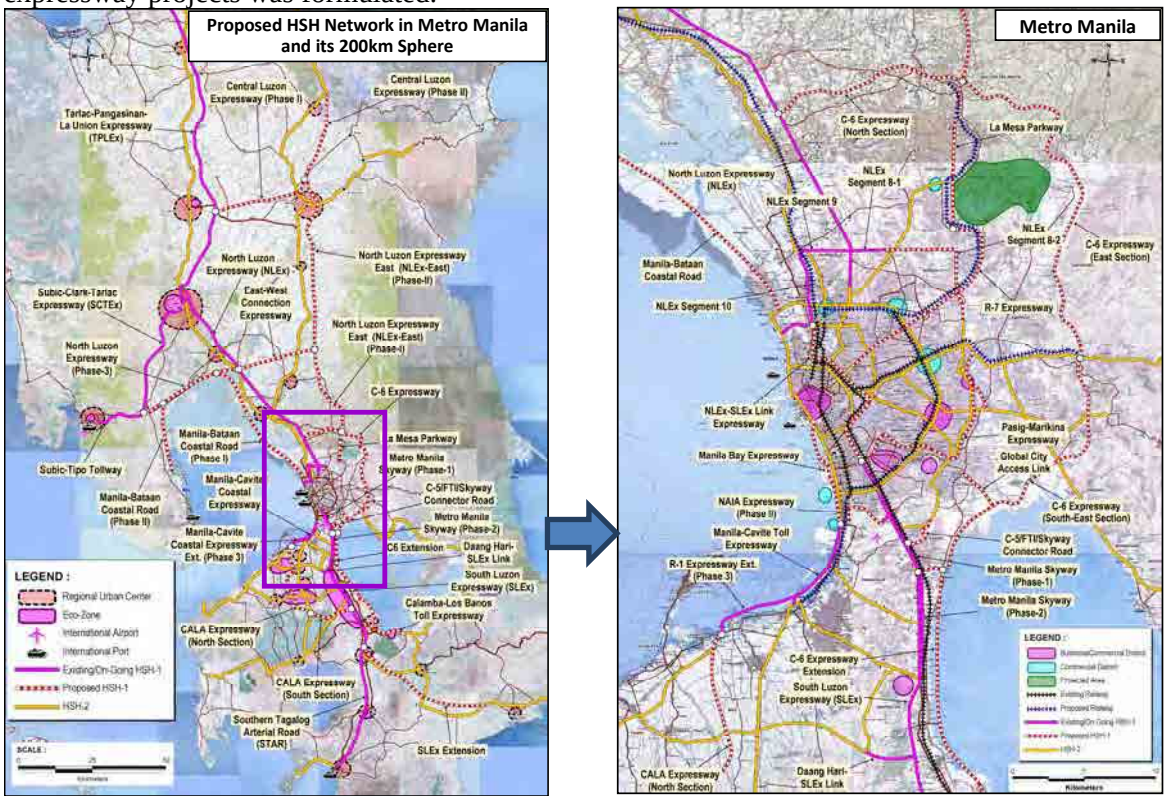


FIGURE 2.3-1 PROPOSED HSH NETWORK

Source: The Study of Master plan on High Standard Highway Network Development, 2010, JICA

CLLEX is one of the 1st priority projects in this Master plan shown in **Table 2.3-1**.

TABLE 2.3-1 PROPOSED HSH PROJECTS PRIORITY

	Name of HSH	Length (km)	Cost (billion pesos)
1st Priority Group	NLEx–SLEx Link Expressway	13.4	31.14
	CALA Expressway	41.8	19.67
	C-5/FTI/SKYWAY Connector Rd.	3.0	4.76
	NAIA Expressway (Phase 2)	4.9	12.18
	C-6 Expressway/Global City Link	66.5	54.29
	Central Luzon Expressway (CLLEX)	63.9	29.23
	SLEx Extension (to Lucena)	47.8	16.45
	Calamba-Los Banos Expressway	15.5	5.23
	Sub-total	256.8	172.95
2nd Priority Group	R-7 Expressway	16.1	25.81
	NLEX East / La Mesa Parkway	103.0	38.94
	Manila – Bataan Coastal Road	70.3	72.94
	NLEX (Phase 3)	36.2	28.42
	East-West Con. Expressway	26.6	16.48
	C-6 Extension	43.6	18.61
	Manila Bay Expressway	8.0	46.54
	Pasig Marikina Expressway	15.7	49.58
	Sub-total	319.5	297.32
TOTAL		576.3	470.27

Source: The Study of Master plan on High Standard Highway Network Development, 2010, JICA

2.4 Current Road Infrastructure Sector and its Development Plan Related to the Project

DPWH Public Investment Program (PIP) for 2011 -2016 contains the following target and priority programs

TABLE 2.4-1 TARGET OUTCOMES OVER THE MEDIUM TERM

	Year			Requirement
	2011	2014	2016	
a. National Arterial Roads (15,987 km)	94% Paved	100% Paved in good condition		· Paving of 1,443km · Rehab./ widening/ upgrading/ construction of 2,828km
b. National Secondary Roads (15,372 km)	72% Paved	81% Paved	100% Paved in good condition	· Paving of 3,329km · Rehabilitation of 1,798km
c. National Bridge (330,089m) (7,792 bridges)	95%	98%	100% Permanent	· Replacement of 8,544 lm of temporary bridges · Improvement of 6,047 lm of existing bridges · Construction of 2,154 lm new bridges · Repair/rehabilitation of 104,293 lm of bridges

Source: Public Investment Program (2011-2016) As of April 2012, DPWH

Under the PIP for 2011-2016, DPWH is envisaging a total investment of 698,084 million pesos. Of this total investment requirement in the PIP, 585,938 million pesos or 84% is earmarked for the highway sector, 83, 948 million pesos (12%) for flood control works and 28,198 million pesos (4%) for other locally-funded projects over the six (6) year program.
The total investment requirement for 2013 up to 2016 is based on the annual 10% increase from the approved budget of 99,490 million pesos for Y2012.

TABLE 2.4-2 (2011-2016) PUBLIC INVESTIMENT PROGRAM SUMMARY

List of Project	Prior Year	Proposed Allocation (in Million Pesos)						
		2011	2012	2013	2014	2015	2016	Total (2011-2016)
1.Roads	**75,703**	**75,047**	**81,246**	**91,697**	**101,347**	**113,722**	**122,878**	**585,938**
-Foreign assisted project	41,490	19,566	14,257	30,313	28,889	35,186	39,162	167,645
-PPP	-	-	1,474	11,164	7,450	4805	-	24,894
-Locally funded project	34,213	55,481	65,243	50,219	65,008	73730	83,715	393,398
2.Flood Control Project	**19,692**	**11,166**	**10,816**	**12,523**	**13,854**	**14,960**	**20,628**	**83,948**
-Foreign assisted project	13,283	2,978	2,300	2,670	3,728	6656	12,406	30,738
-Locally funded project	6,419	8,188	8,517	9,853	10,127	8304	8,221	53,211

List of Project	Prior Year	Proposed Allocation (in Million Pesos)						
		2011	2012	2013	2014	2015	2016	Total (2011-2016)
3. Other Locally Funded DPWH Project	**36,288**	**4,474**	**7,428**	**5,219**	**5,181**	**3,738**	**2,157**	**28,198**
GRAND TOTAL	**131,683**	**90,687**	**99,490**	**109,439**	**120,383**	**132,421**	**145,663**	**698,084**

Source: Public Investment Program (2011-2016) As of April 2012, DPWH

2.5 Past and Future Plan of Other Donor's Project Related to PPP Policies

(1) Technical Assistance by ADB, AusAID, and CIDA

In terms of capacity building, "Technical Assistance for Strengthening Public-Private Partnerships in the Philippines" are being carried out as of November 2011. This is a capacity development program financed by ADB AusAID (the Australian Agency for International Development), and CIDA (The Canadian International Development Agency). The purpose of the program is to help the Philippines to clear obstacles and to pave the way for PPP. Under this program, ADB provides a US$1.5 million grant, AusAID provides a US$7 million grant and CIDA provides a US$1.2 million grants. The program is to run from April 2011 to July 2013.

The expected outputs of the program are 1) Strengthening of PPP Enabling Framework, 2) Strengthening Capacity of the PPP Center, 3) Institutionalization of PPP Best Practice and 4) Establishment of Long-term Financing and Risk Guarantee Mechanisms.

(2) Other Programs and Activities

Besides ADB TA, there are several assistance programs planned by GoP and foreign agencies.

Singapore Cooperation Enterprise (SCE) has agreed with GoP to provide TA to promote PPP. The objectives of SCE TA are to:

- Achieve an in-depth understanding of the benefits and challenges for greater private sector participation in the financing of public sector projects; and the policy actions required to strengthen the enabling environment, legislative and regulatory frameworks for PPP;
- Build capabilities for key public sector officials involved in the procurement and implementation of infrastructure projects, through the implementation of a pilot PPP transaction; and
- Provide examples of Singapore's infrastructure procurement process by sharing Singapore's lessons and experience in developing successful and commercially viable PPP projects.

It was agreed that SCE will provide a grant worth approximately S$1.423 million (P48.373 Million) to DOTC for PPP capacity development of DOTC. GoP will provide counterpart fund of S$ 270,100. The grant will cover one-year period. Based on the Joint Press Release issued by SCE and Temasek Foundation on March 31, 2011, SCE will work with the DOTC to develop institutional capabilities for key agencies within the Philippine Government responsible for the procurement of infrastructure projects under the PPP framework.

Furthermore, according to the Joint Press Release, SCE will send a team of Singapore PPP experts to work with DOTC to prepare and structure a pilot project for procurement under the PPP framework. The pilot project will provide a real-life and hands-on case study where Philippine Government officials can adapt relevant lessons from Singapore to bring projects to a biddable and bankable stage.

SCE will also help DOTC organize a series of capacity building workshops to build capacity for some 100 Philippine Government officials in the development and implementation of PPP transactions. During these workshops, Singapore public sector agencies, such as Public Utilities Board, Singapore Sports Council and Institute of Technical Education, will share with the workshop participants the key challenges Singapore had faced, including the policy considerations, regulatory framework and practical experiences in implementing Singapore's PPP projects. The Singapore private sector players involved in Singapore's PPP projects will also share the perspective of the private sector investors and project developers in investing in a PPP project.

There is also information about assistance coming from the World Bank. According to the World Bank's website, they are interested in helping specific projects, such as expansion of the LRT System and the sewerage system in Manila. There can be further assistance that is directed towards individual projects.

2.6 Relation between other ODA Loan Projects

Project related of CLLEX is Plaridel Bypass Project.

Plaridel Bypass Project

A Plaridel Bypass road aims to ease serious traffic congestion and enhance transportation capacity and efficiency around Plaridel City, one of the core cities north of Metro Manila. The bypass also aims to enhance the function of the Philippine-Japan Friendship Highway which connects urban areas north of Metro Manila to the Cabanatuan City and Cagayan Valley Area from where agricultural products originate and are transported to Metro Manila areas.

Pradiel Bypass consist of two phase, financed under a loan agreement between the Government of the Philippines and Japan International Cooperation Agency (JICA). Phase 1 of the overall Plaridel Bypass is under implementation.
Phase 2 starts at the town of San Rafael and proceeds towards the northerly direction to the town of San Ildefonso, both are in the province of Bulacan.

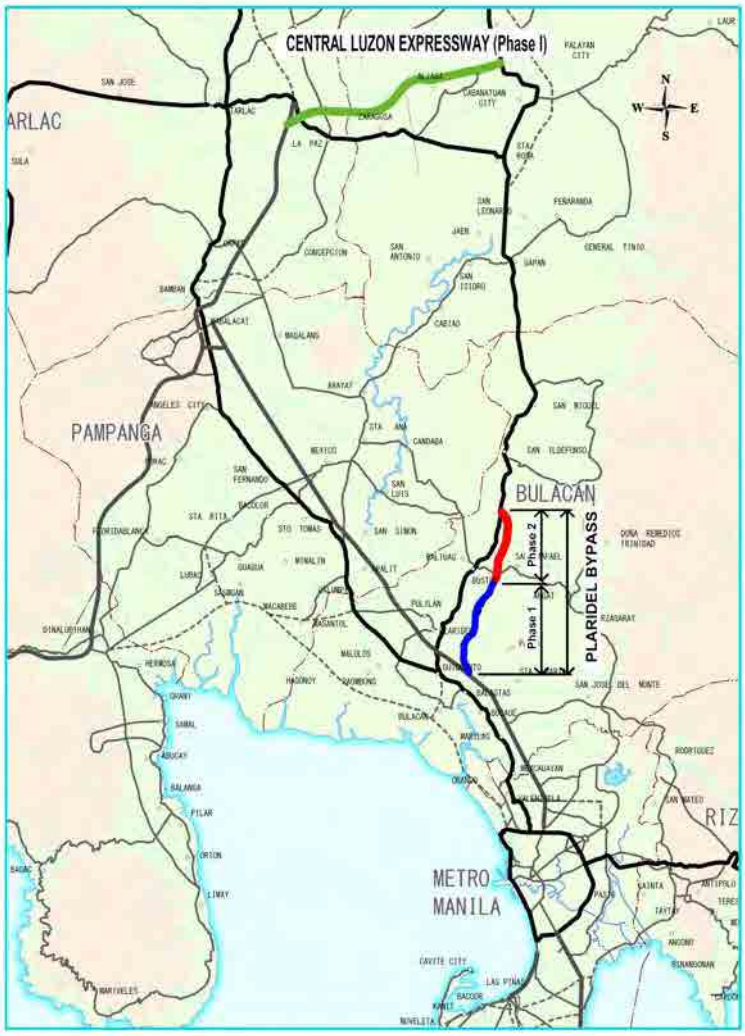


Figure 2.6-1 Location Map of Plaridel Bypass and CLLEX

2.7 Lesson and Countermeasure from the Similar Past Project

Interview surveys were conducted to government officials and the private O& M companies in order to identify the bottleneck and recommendation in the Preparatory Survey for PPP infrastructure Development Project (JICA 2011).

Table 2.7-1 shows the summary of major issues and bottlenecks of PPP project and corresponding recommendations.

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
1. Legal Framework	1.1 There are two laws/E.O. to allow the private sector to invest infrastructure projects: a) RA 7718 (BOT Law) and its IRR b) EO 423 and its Guidelines and Procedure for entering into joint venture agreement between the Government and the private entities. ▪ No NEDA ICC nor NEDA Board's project approval is required. ▪ Head of Agency has authority to approve the JV Agreement regardless of project cost.	1.1 Options: **Option 1** : EO 423 be abolished and integrated into RA 7718 **Option 2** : Modification of Guidelines and Procedure - Project should be approved by NEDA ICC or NEDA Board - Ceiling of project cost should be specified. - Enough time should be given to challengers.
	1.2 Modification of IRR of RA 7718 Amendments of IRR is being studied on i) Approval of Individual Projects and Draft Contract, ii) List of Priority Projects, iii) Publication of Invitation, iv) Approving Authority for the Contract, v) Contract Variation, vi) Protest Fee, vii) Timelines, viii) Substitution/Withdrawal of a Member of a Consortium/Joint Venture, ix) Government Shoulder the Differential, x) Period of Comparative Bids Preparation, xi) Information Disclosure of Unsolicited Proposal, xii) New ROW Acquisition Under Unsolicited Proposal	1.2 Amendments should be finalized as early as possible.
	1.3 Creation of PPP Laws Present BOT Law is for the one type of PPP schemes, which should be improved by adding other PPP schemes so as to add more flexibility to other types of PPP schemes and to specify the Government's responsibilities.	1.3 Study on creation of PPP Law should start.

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
2. Institutional Framework	2.1 Lack of Experiences/Capacity of Government Officials for Planning and Implementation of PPP Projects - Historically, planning and implementation of BOT projects was led by the private sector's initiative. - The Government is discouraging the unsolicited proposals. - The Agencies are required to be more pro-active and take a leadership for PPP projects.	2.1 Agencies should take a leadership for promotion of PPP projects. - Develop priority projects with implementation priority and firm implementation schedule. - The roles of the private sector, government agencies and other authorities as well as LGUs in transport infrastructure development in operation and management needs to be defined.
	2.2 No PPP Project Specialized Office except DPWH.	2.2 Organize PPP Specialized Office.
	2.3 BOT Center has been not so active.	2.3 In close coordination with Agencies, BOT center should be more active in project development of PPP projects.
	2.4 Strengthening of DPWH Planning Service and PMO-BOT - In line with the DPWH Rationalization Plan, DPWH is planning to upgrade existing PMO-BOT to PPP Service.	2.4 PMO-BOT should be upgraded to PPP Service as early as possible.
	2.5 Materials for PPP Capacity Development and manuals/standards are incomplete. - Training materials for PPP - Standard PQ/Tender and Draft Toll Concession Agreement - O & M manual	2.5 Necessary materials, standards and manuals should be prepared. DPWH should establish regular PPP training course.
3. PPP Project Financing	3.1 Long period (sometimes years) is required for financial closure due to unfavorable offer of banks to the investor (short repayment period with no grace period and high interest rate). Some commercial banks are not familiar with the PPP project financing.	3.1 PPP fund to finance the private entities needs to be created.
	3.2 Delay in ROW acquisition delays financial closure.	3.2 Refer to 4.4

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
3. PPP Project Financing	3.3 Project Development Fund (PDF) of BOT Center is not fully utilized.	3.3 PDF needs to be revitalized by increasing fund as well as establishment of rules and guidelines for usage.
	3.4 On the part of financing the Government expenditure, it is still relying on the project loans from the international lending institutions and/or bilateral sources.	3.4 PPP fund to finance the Government expenditure needs to be studied and established.
4. Bottlenecks in PPP Project Cycle	4.1 <u>Master Plan/Basic Plan/Project Identification Stage</u> • Master Plan and/or basic plans were not updated. • Listing of projects and their implementation schedule was not updated. • Project promotion has been largely relied on the private sector.	4.1 Master Plan, project list and project implementation priority should be always updated and firm implementation schedule and corresponding budgeting should be done.
	4.2 <u>Business Case/Feasibility Study Stage</u> • Level of feasibility studies has been incomplete/inadequate. • Soon after a feasibility study is completed, it has been difficult to go into a tendering stage due to unfixed ROW, lack of ECC, lack of LGUs' endorsement, etc. • Agencies' capacity and local consultants' capacity to undertake a feasibility study of PPP project is not sufficient.	4.2 • More fund and time should be spent for this study • Complete information and documents for NEDA's project approval and succeeding tendering should be prepared.
	4.3 <u>Project Approval Stage</u> • Lengthy time is required until the project is approved by NEDA ICC or NEDA Board.	4.3 • Complete information and documents should be prepared during the feasibility study stage. • NEDA should undertake seminars on "ICC Project Evaluation Procedure and Guidelines".

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	4.4 <u>ROW Acquisition / Resettlement Stage</u> • Preparation of IROW plan and parcellary plan takes long time due to inaccurate land registration, difficulty to locate land owners, inaccurate record of lot boundary, etc. • A lot of documentations are needed and lot owners have difficulty to prepare required documents. • Land valuation is made based on BIR land valuation for the first offer, and based on Provincial/ City Appraisal Committee or Land Bank valuation for the second offer, these are close to, but still lower than market value. • In case that land owners fail to prepare complete documents, expropriation is the only solution. • ROW acquisition Teams are not provided sufficient logistics (like service vehicles, computers, etc.). • More staff who are familiar with ROW acquisition are needed. • Some Toll Concession Agreements include the private sector's funding for ROW acquisition.	4.4 • Preparation of IROW plan and parcellary plan and succeeding ROW acquisition should start soon after the project is approved by NEDA Board or NEDA ICC. • Once major critical documents are prepared, cash advance by the private sector should be made to PAPs through the Government, which shall be refunded to the private sector. This arrangement should be specified in TCA. • Land value should be based on the prevailing market price. • Enough logistics support such as service vehicles, computers, etc. should be provided for ROW acquisition team, cost of which should be included in the project cost. • IROW Procedural Manual should be updated and more staff should be trained.
	4.5 <u>Tender Stage</u> *1) Government Projects* • Selection of Consultants and Contractors takes lengthy time. - Consultant selection - over 8 months - Contractor selection - over 10 months *2) Selection of Project Proponent of PPP Project* • Selection of project proponent takes lengthy time - over 12 months *3) Unsolicited Proposal* • Takes much longer time to finalize due to many disputes and counteroffers and negotiation of contract terms such as toll rates, risk allocation, etc.	4.5 *1) Government Projects* • Selection of Consultants should target 6 months or less. • Selection of Contractor should target 8 months or less. *2) Selection of Project Proponent of PPP Project* • Selection of Project Proponent should target 10 months or less. • Agency should undertake project campaign and enough information should be disclosed before the project is advertized. • All tender conditions and draft Toll Concession Agreement should be agreed between DPWH and TRB before advertisement.

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	4.6 Contracting Stage • Review of Toll Concession Agreement (TCA) by TRB usually takes lengthy time. • Approval of NEDA Board also takes lengthy time.	4.6 • Close coordination between NEDA and Agencies should be made.
	4.7 Toll Operation Agreement Stage • Review by TRB of toll adjustment formula and other O & M aspects take considerable time.	4.7 • From the feasibility study stage, TRB should be involved.
	4.8 Fund Procurement/Preparation Stage • Government - Budget constraints and delay in budget release - Difficult to cope with cost overrun. • Private - Delay in attaining financial closure due to difficulty in meeting lender's requirement such as complete ROW acquisition, government financial support, approval of toll rates and toll rate adjustment formula. - Difficult to find appropriate financer (short repayment period with no grace period, and high interest rates). - Unexpected changes requiring additional costs due mainly to additional facilities required by LGUs and LGU fees.	4.8 • Government - Needs provision of adequate annual budget. - Needs to tap ODA. • Private - Creation of fund to finance the private sector for infrastructure project implementation should be studied.
	4.9 Detailed Design Stage • Lacks proper coordination with LGUs, thus modification of design, requirement of additional facilities, etc. is required by LGUs. • Lacks proper coordination with utility companies for relocation/protection of public utilities affected.	4.9 • Proper coordination with LGUs and utility companies should be done during the feasibility study. • Value engineering should be exercised.

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

TABLE 2.7-1 MAJOR ISSUES AND BOTTLENECKS OF PPP PROJECTS

	Issues and Bottlenecks of PPP Projects	Recommendations
4. Bottlenecks in PPP Project Cycle	4.10 Construction Stage • Delayed construction due to delayed delivery of ROW and financial closure. • Needs more strict quality control and schedule control.	4.10 • An Independent Certificate Engineer should be employed at the cost of the Government.
	4.11 Operation and Maintenance Stage • Approval of toll fee and adjustment of toll fee by TRB is delayed. • Increase of toll fee is usually objected by the people and politicians and adoption of new toll rate is delayed.	4.11 • TRB should approve toll fee and its adjustment in accordance with provisions of TCA. • The Government should compensate the loss of revenue due to delayed increase of toll rates. • TRB and operators should jointly make information disclosure to the people why toll rates and toll adjustment are needed and determined and what are benefits of users.
	4.12 End of Contract and Facility Transfer Stage No experience on this stage, yet.	-

Source: Preparatory Survey for Public-Private Partnership (PPP) Infrastructure Development Project (JICA2010)

2.8 DPWH Organization and Current O& M Company

(a) DPWH Organization (Central Office)

Organization chart of DPWH is shown in **Figure 2.8-1**. Offices within the DPWH which are related to the development of PPP projects are highlighted and discussed below.

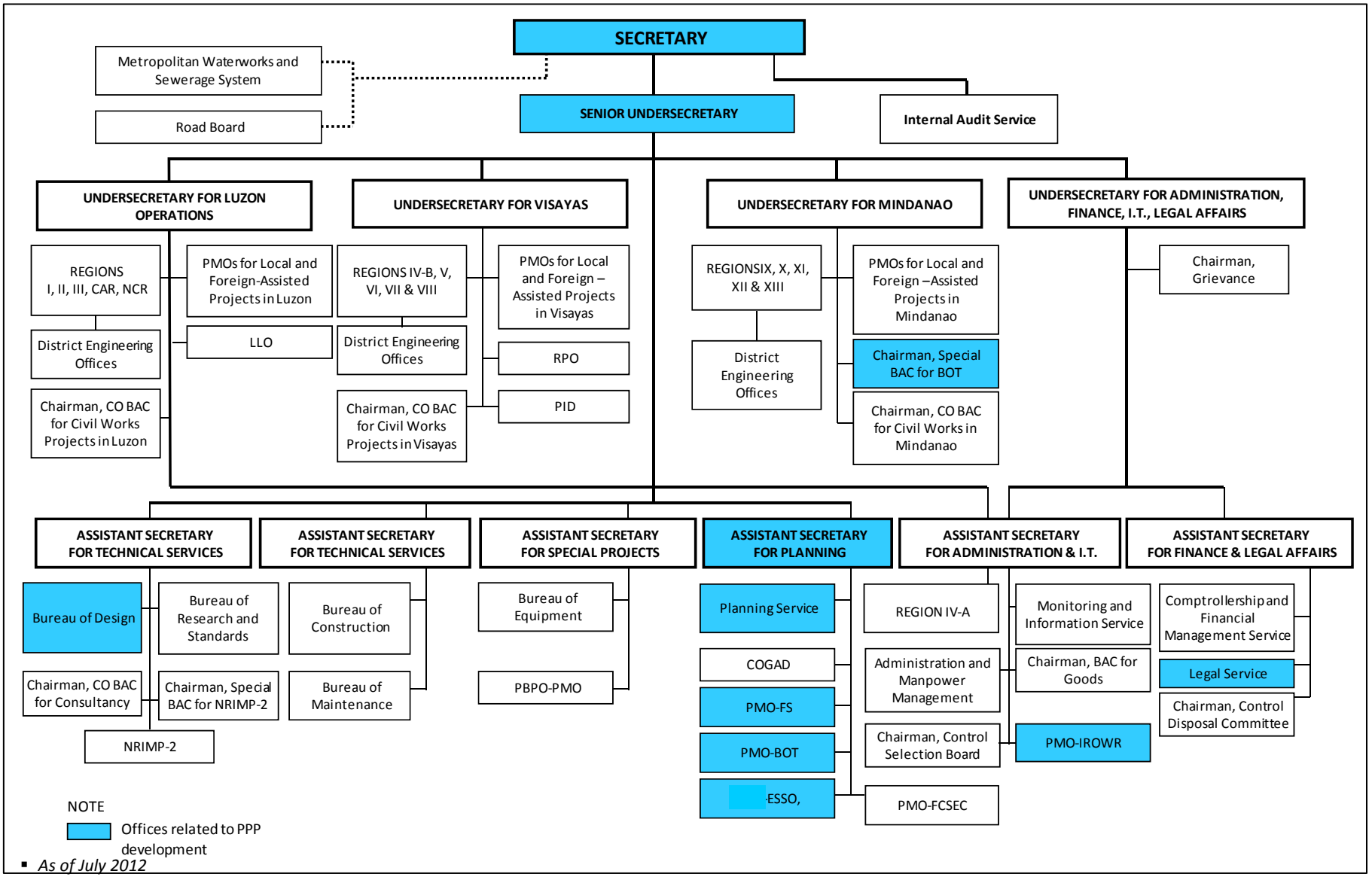
Planning Service (PS)
Tasked to formulate policies, plans and programs for the development of the national road network, which includes expressways; prepare PPP proposals for ODA financing; maintain a national road database; and prepare multi-year and annual budgets for the construction (including right-of-way and engineering) and maintenance of national roads.

PMO-Feasibility Studies (PMO-FS)
Assigned to conduct/supervise FS of major foreign-assisted and locally-funded road and expressway projects; and assist the PS and PMO-BOT in preparing project proposals for ODA financing.

PMO-Built-Operate-Transfer (PMO-BOT)
Tasked to identify and initiate projects for BOT/PPP implementation; prepare/review feasibility studies (FS) and proposals for BOT/PPP projects for approval of the NEDA-Investment Coordinating Committee (ICC); prepare bidding documents; participate in negotiations and finalization of BOT/PPP contracts; and monitor/supervise the implementation of BOT/PPP projects.

Environmental and Social Services Office (ESSO)
Involved in preliminary planning activities related to Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Rapid Social Assessment, Resettlement Action Plan (RAP); conduct public consultations on PPP projects; conduct Information, Education and Communication (IEC) on environment-related concerns; and compliance and effects monitoring of ECC conditions and Environmental Management Plan (EMP).

PMO-Infrastructure Right-of-Way and Resettlement (PMO-IROWR)
Tasked to consult with LGUs, local communities, project affected persons, and the designer/contractor for PPP projects; coordinate with the Presidential Commission for the Urban Poor (PCUP) and the National Housing Authority (NHA) on the relocation of squatter families; conduct census and tagging of affected lots and improvements; coordinate with the Bureau of Internal Revenue or BIR (for zonal valuation), Registry of Deeds (for titles), Assessor's Office, and DAR (for land conversion); coordinate and negotiate with affected property owners on the sale of their properties; coordinate with the Office of the Solicitor General (OSG) for filing of expropriation proceedings; and effect payment of affected properties.



Source: DPWH website

FIGURE 2.8-1 ORGANIZATION CHART OF DPWH

(b) Overview of Current toll expressway companies for construction and O&M

Table 2.8-1 shows the summary of toll expressway investors and O&M companies and **Table 2.8-2** shows the summary of current toll collection system and traffic control system.

TABLE 2.8-1 Toll Expressway Company

Investors	Operating Expressway(length)	O&M Companies	Remarks
Manila North Tollways Corp.(MNTC)	・ North Luzon Expressway (82.6km) ・ Subic-Tipo Tollway (8.5km)	Tollways Management Corp.	Metro Pacific Investment Corp.(Hong Kong Fund)
(BCDA)	・ Subic-Clark-Tarlac Expressway (93.8km) ・	Tollways Management Corp.	Construction by ODA fund
Private Infrastructure Development Corp. (PIDC)	・ Tarlac-Pangasinan-La Union Expressway (88.0km under construction)	―	PIDC was established by ten (10) local contractor companies
UEM-MARA Philippine Corp.	・ Manila-Cavite Coastal Expressway (8.8km) and Extension (11.2km)	Direct operation	Malaysian Fund
Citra Metro Manila Tollways Corp./ San Miguel Corp.	・ Skyway：PhaseI (9.4km) ・ South Luzon Expressway (13.4km) ・ Skyway：PhaseII (6.8km)	Skyway O&M Company	Indonesia Fund
San Miguel Corp.	・ South Luzon Expressway (37.2km)	South Luzon Tollways Corp.	Philippine Fund
Ayala Corp/	・ Daang Hari SLEx Link Road		Philippine Fund
San Miguel Corp.	・ Southern Tagalog Arterial Road (STAR) (41.9km)	Star Infrastructure Development Corp.	Philippine Fund

TABLE 2.8-2 Toll Expressway's Toll Collection System and Traffic Control System

Operating Expressway(length)	Toll Collection System	Traffic Control System
・ North Luzon Expressway (82.6km)	・ Cash, EC-tag, Easy Trip	Yes, CCTVs, Vehicle detectors and VMSs (Variable Message e Sign) are installed.
・ Subic-Clark-Tarlac Expressway (93.8km) ・ Subic-Tipo Tollway (8.5km)	・ Cash only	Not yet installed
・ Manila-Cavite Coastal Expressway (8.8km) and Extension (11.2km)	・ Cash only	Not yet installed
・ Skyway：PhaseI (9.4km) ・ South Luzon Expressway (13.4km) ・ Skyway：PhaseII (6.8km)	・ Cash, E-pass	Yes, CCTVs are installed.
・ South Luzon Expressway (37.2km)	・ Cash, E-pass	Yes, CCTVs and VMSs are installed.
・ Southern Tagalog Arterial Road (STAR) (41.9km)	・ Cash only	Not yet installed

CHAPTER 3

SOCIO-ECONOMIC CONDITION OF THE PROJECT AREA AND REGIONAL DEVELOPMENT PLAN

CHAPTER 3
SOCIO-ECONOMIC CONDITION OF THE PROJECT AREA AND REGIONAL DEVELOPMENT PLAN

3.1 SOCIO-ECONOMIC CONDITIONS

3.1.1 Physical Profile

As mentioned, the project is located in Region III specifically in the provinces of Tarlac and Nueva Ecija. Region III, better known as the Central Luzon Region, is composed of six provinces namely Nueva Ecija, Tarlac, Pampanga, Bulacan, Aurora, Zambales and Bataan. The region covers about 22,014.6 square kilometers or equivalent to 6.4% of the land area of the country. **Table 3.1.1-1** shows the land area share of Region III to country as well as share of neighboring regions to the country.

TABLE 3.1.1-1 POPULATION SHARE

Region	Land Area (sq. km.)	Share to Philippines (%)
Philippines	344,879.4	
CAR	20,122.28	5.8
NCR	619.5	0.2
Region I	13,012.6	3.8
Region II	28,228.8	8.2
Region III	**22,014.6**	**6.4**

Source: National Statistics Office

3.1.2 Demographic Trend

The population of Region III reaches 9.7 million in 2007. This number represents 11% of the total population of the country. Growth rate of population recorded at 2.4% annually from 2000 to 2007. This is higher that the growth rate posted in the neighboring regions like CAR, Region I, Region III and NCR as shown in **Table 3.12-1**. This high growth of population is expected to continue partly due to population spillover from NCR and recent development in the area.

Population of Barangays Directly Affected by the Expressway Project

The alignment of CLLEX originates from Tarlac City and traverses the municipalities of Lapaz (Tarlac side), Zaragasa (Cabanatuan side), Aliaga and terminates at Talavera. There are 29 barangays located in Nueva Ecija (Cabanatuan side) with total population of 135,072 and there are 10 barangays located in Tarlac side with total population of 28,857 as presented in **Table 3.1.2-2**. The total area covered by these barangays is about 245 km^2 of which 203 km^2 is located in Cabanatuan side and the remaining is on the side of Tarlac. Barangays directly affected by the expressway project is illustrated in **Figure 3.1.2-1**

TABLE 3.1.2-1 DEMOGRAPHIC TREND IN THE STUDY AREA

Region	Province	Actual Population				Land Area	Density (persons/sq km)				Past Annual Population Growth Rate		
		1990	1995	2000	2007	(sq km)	1990	1995	2000	2007	1990-1995	1995-2000	2000-2007
Philippines		60,703,206	68,616,536	76,504,077	88,574,614	340,575	178	201	225	260	2.48	2.20	2.11
NCR		7,948,392	9,454,040	9,932,560	11,553,427	620	12,830	15,261	16,033	18,650	3.53	0.99	2.18
CAR		1,146,191	1,254,838	1,365,220	1,520,743	19,422	59	65	70	78	1.83	1.70	1.55
Region I		3,550,642	3,803,890	4,200,478	4,545,906	13,013	273	292	323	349	1.39	2.00	1.14
Region II		2,340,545	2,536,035	2,813,159	3,051,487	28,229	83	90	100	108	1.62	2.10	1.17
Region III		6,338,590	7,092,191	8,204,742	9,720,982	22,015	288	322	373	442	2.27	2.96	2.45
	Aurora	139,573	159,621	173,797	187,802	3,147	44	51	55	60	2.72	1.72	1.11
	Bataan	425,803	491,459	557,659	662,153	1,373	310	358	406	482	2.91	2.56	2.48
	Bulacan	1,505,219	1,784,441	2,234,088	2,826,926	2,796	538	638	799	1,011	3.46	4.60	3.42
	***Nueva Ecija**	**1,312,680**	**1,505,827**	**1,659,883**	**1,853,853**	**5,751**	**228**	**262**	**289**	**322**	**2.78**	**1.97**	**1.59**
	Pampanga	1,295,929	1,401,756	1,618,759	1,911,951	2,063	628	680	785	927	1.58	2.92	2.41
	***Tarlac**	**859,708**	**945,810**	**1,068,783**	**1,243,449**	**3,054**	**282**	**310**	**350**	**407**	**1.93**	**2.47**	**2.19**
	Zambales	369,665	289,512	433,542	493,085	593	96	76	113	129	(4.77)	8.41	1.86
	Angeles City	236,686	234,011	263,971	314,493	60	3,925	3,881	4,378	5,215	(0.23)	2.44	2.53
	Olongapo City	193,327	179,754	194,260	227,270	103	1,872	1,740	1,881	2,200	(1.45)	1.56	2.27
Project Area (Nueva Ecija + Tarlac)		**2,172,388**	**2,451,637**	**2,728,666**	**3,097,302**	**8,805**	**247**	**278**	**310**	**352**	**2.45**	**2.16**	**1.83**

Source: NSO, 2007

*Note: *CLLEX is located in the provinces of Nueva Ecija and Tarlac*

TABLE 3.1.2-2 POPULATION OF BARANGAYS DIRECTLY AFFECTED BY THE PROJECT

	Province / City / Municipality	Barangay	Land Area (Sq. Km.)	Population		Growth Rate (% per annum)
				2000	2007	
NUEVA EJICA	**NUEVA ECIJA**		**5,751.300**	**1,659,883**	**1,853,853**	**1.59**
	Aliaga		**86.576**	**50,004**	**61,270**	**2.95**
		Betes	3.719	1,542	1,889	2.94
		Bibiclat	4.339	6,212	7,612	2.95
		Bucot	5.784	3,930	4,815	2.94
		La Purisima	4.915	1,451	1,778	2.95
		Magsaysay	3.288	1,855	2,273	2.95
		Pantoc	5.157	1,651	2,023	2.95
		Poblacion Centro	0.529	1,414	1,733	2.95
		Poblacion East I	0.343	1,700	2,083	2.95
		Poblacion East II	0.433	1,297	1,589	2.94
		Poblacion West III	0.376	985	1,207	2.95
		Poblacion West IV	0.464	646	792	2.95
		San Carlos	4.029	2,238	2,742	2.94
		San Emiliano	1.630	873	1,070	2.95
		San Eustacio	7.777	1,283	1,572	2.94
		San Felipe Matanda	2.646	2,089	2,560	2.95
		San Juan	5.630	3,931	4,817	2.95
		San Pablo Bata	1.456	1,686	2,066	2.95
		Santa Monica	3.906	764	936	2.94
		Santo Rosario	3.165	1,963	2,405	2.94
		Sunson	2.047	633	776	2.95
		Umangan	7.211	2,679	3,283	2.95
	Cabanatuan City		**163.628**	**222,859**	**259,267**	**2.19**
		Caalibangbangan	4.057	6,167	8,456	4.61
		Dalampang	1.764	1,559	1,585	0.24
	Licab		**46.088**	**21,593**	**23,675**	**1.32**
		San Jose	2.235	1,017	1,115	1.32
		San Juan	10.417	2,788	3,057	1.32
		Aquino	1.396	1,712	1,877	1.32
	Talavera		**83.256**	**97,329**	**105,122**	**1.11**
		Mamandil	3.492	904	976	1.10
		San Miguel na Munti	2.298	2,634	2,845	1.11
	Zaragosa		**76.826**	**37,645**	**40,355**	**1.00**
		Santa Lucia Old	15.957	956	1,025	1.00
		Santa Lucia Young	6.205	2,654	2,845	1.00
TARLAC	**TARLAC**		**3,053.600**	**1,068,783**	**1,243,449**	**2.19**
	La Paz		**102.166**	**52,907**	**61,324**	**2.13**
		Guevarra	6.144	3,872	4,488	2.13
		Kapanikian	1.730	1,601	1,856	2.13
		La Purisima	3.662	2,400	2,782	2.13
		Lomboy	4.137	2,897	3,358	2.13
		Laungcupan	4.2305	2,443	2,832	2.13
		Macalong	4.282	1,865	2,162	2.13
	Tarlac City		**201.365**	**262,481**	**314,155**	**2.60**
		Amucao	4.8365	2,187	2,618	2.60
		Balingcanaway	6.789	5,181	6,201	2.60
		Bantog	5.859	1,696	2,030	2.60
		Cut-cut II	0.098	443	530	2.59

Source: NSO, 2007

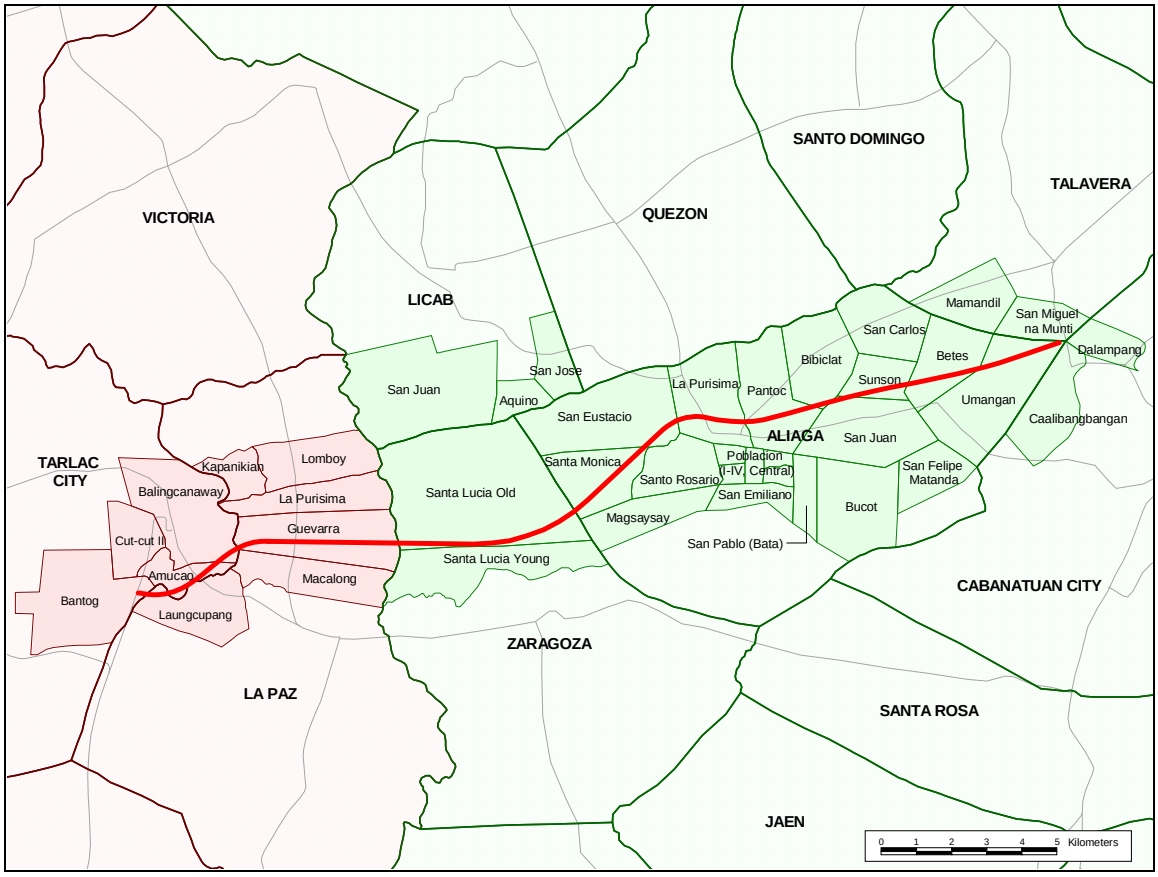


FIGURE 3.1.2-1 ALIGNMENT OF CLLEX SHOWING DIRECTLY AFFECTED BARANGAYS

3.1.3 Economic Trend

The economic performance of Region III as well neighboring provinces is depicted in **Figure 3.1.3-1**. The three regions are considered the economic engine of the country which is reflected in the very high economic growth. NCR for instance even surpassed the national average. Although Region III's growth is lower than the two regions, this growth is still very high compared to other regions in the country.

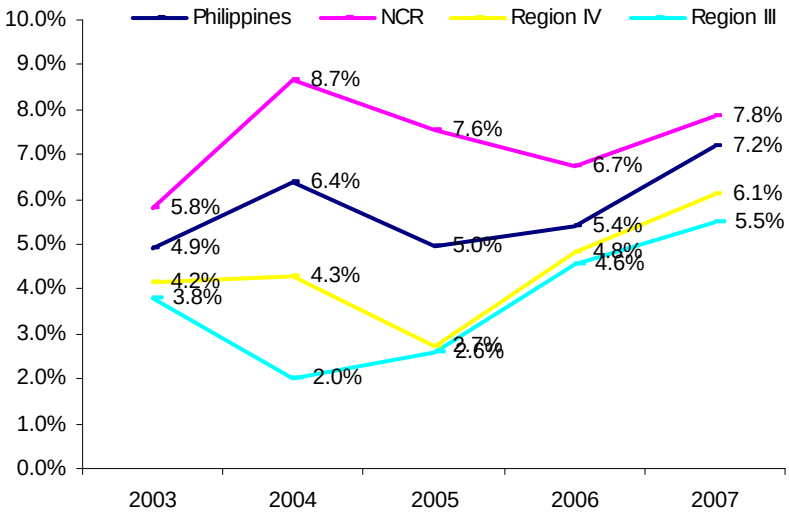


FIGURE 3.1.3-1 GDP AND GRDP GROWTH RATE

The industrial structure of the economy of the study area as well as surrounding regions is shown in **Table 3.1.3-1**. Region III's industrial structure is a balanced share of primary, secondary and tertiary. It is interesting to note that although Region III is known to possess a fertile flat land, the share of agriculture is limited to just 25% and service industry shoot to 40%. As mentioned, the region is absorbing the spillover population and activities in NCR thus service sector is beginning to lead the region's economy.

In terms of economic growth rate, Region III had a healthy growth ranging from 2% to 6%. Although this is lower that the growth rate of the country in the same period, it is expected that the region will continue to grow and eventually overtake the national average due to its strategic location sitting beside NCR. Further, the region has strategic infrastructure assets like international airport and international port. The complete operation of SCTEX and its eventual integration with NLEX will further facilitate the economic development of the region. This is further enhances once the TPLEX opened for public to use. Therefore, economic prospect of the region is very bright.

TABLE 3.1.3-1 INDUSTRIAL STRUCTURE OF THE ECONOMY, 2007

	Primary	Secondary	Tertiary	Total
Philippines	251,272	445,486	671,883	1,368,641
NCR	1	151,135	295,656	446,793
CAR	4,338	18,794	7,315	30,447
Region I	17,294	5,832	17,270	40,396
Region II	13,711	4,349	9,126	27,187
Region III	27,963	40,500	45,539	114,001
IN PERCENTAGE				
Philippines	18	33	49	100
NCR	0	34	66	100
CAR	14	62	24	100
Region I	43	14	43	100
Region II	50	16	34	100
Region III	**25**	**36**	**40**	**100**

Source: NSO, 2007

3.1.4 Per Capita GDP and GRDP

The per capita GRDP in current price and constant price are shown in **Table 3.1.4-1** and **Table 3.1.4-2** respectively. As expected, NCR being the capital of the country has the highest per capita GRDP which almost 3 fold higher than the national average. Per capita GRPD of Region III is a bit lower that the national average at .70.

The country's per capita GRDP grew by 3.8% per annum from 2003 to 2007. Highest growth is realized in NCAR and followed by Region I, Region II and Region III. Except NCR, all regions recorded growth with less than the national average.

TABLE 3.1.4-1 PER CAPITA GRDP IN CURRENT PRICE

Unit: Peso

	2003	2004	2005	2006	2007	
Philippines	52,718	58,149	63,556	69,365	74,947	1.00
NCR	148,743	165,814	184,758	205,117	223,332	2.98
CAR	66,749	71,247	75,556	82,523	85,319	1.14
Region I	27,943	30,725	33,405	35,996	38,063	0.51
Region II	26,829	30,474	30,369	33,799	36,605	0.49
Region III	**39,407**	**42,256**	**45,789**	**49,469**	**52,351**	**0.70**

TABLE 3.1.4-2 PER CAPITA GRDP IN CONSTANT PRICE

Unit: Peso

	Per Capita GRDP					Growth Rate
	2003	2004	2005	2006	2007	2003-2007
Philippines	13,252	13,789	14,186	14,681	15,429	3.87
NCR	31,730	33,867	35,742	37,856	40,252	6.13
CAR	17,848	18,111	17,919	18,208	19,120	1.74
Region I	7,209	7,442	7,727	7,988	8,286	3.54
Region II	7,590	8,228	7,649	8,122	8,511	2.91
Region III	**11,092**	**11,054**	**11,142**	**11,448**	**11,904**	**1.78**

3.1.5 Employment

The number of establishment in Region III reaches 84,361 in 2007. This number is higher that the number of establishment recorded in the neighboring provinces except Metro Manila. The said number of establishments generated 421,962 employments in the region.

TABLE 3.1.5-1 NUMBER OF ESTABLISHMENTS AND EMPLOYMENTS BY REGION/PROVINCE: LUZON

Region/Province	No. of Establishments			No. of Employments		
	2005	2006	2007	2005	2006	2007
Philippines	782,980	783,065	783,869	5,479,297	4,984,883	5,187,793
NCR	195,412	195,632	196,426	1,976,359	1,869,507	2,025,751
CAR	14,762	14,744	14,738	70,444	61,717	62,731
Region I	44,134	44,117	44,082	175,325	144,269	144,495
Region II	23,978	23,982	23,932	88,827	69,271	69,052
Region III	**84,368**	**84,344**	**84,361**	**480,020**	**419,320**	**421,962**
Bataan	6,026	6,027	5,982	39,501	36,796	34,686
Bulacan	23,152	23,135	23,139	129,883	113,827	113,674
Nueva ecija	**18,239**	**18,228**	**18,148**	**65,273**	**49,198**	**49,006**
Pampanga	19,104	19,091	19,165	136,087	120,074	125,567
Tarlac	**9,172**	**9,169**	**9,158**	**51,587**	**45,697**	**44,071**
Zambales	7,335	7,355	7,431	53,865	50,629	51,936
Aurora	1,340	1,339	1,338	3,824	3,099	3,022
Luzon Total	362,654	362,819	363,539	2,790,975	2,564,084	2,723,991

Source: NSO, Statistical Sampling and Operations Division, 2000 List of Establishments

3.2 REGIONAL DEVELOPMENT PLAN

The Philippine Development Plan (2011 – 2016) is pursuing the following national development policies;

NATIONAL DEVELOPMENT POLICIES

- Development of an integrated multi-modal logistics/transport system to achieve an economic corridor
- Decongestion of Metro Manila
- Promotion of development of impoverished area
- Promotion of PPP projects for acceleration of infrastructure development

Due to economic growth in the capital regions, economic sphere is expanding from Metro Manila towards its neighboring regions of Region III and Region IV-A. Thus, the development strategy cannot be planned only for Metro Manila but involving Region III and Region IV-A as a whole. Overall development strategy will be as follows;

1) 200 km radius sphere from Metro Manila

- Metro Manila together with Region III and Region IV-A will continue to propel the country's economy.

- To promote decentralization and to mitigate overconcentration of Metro Manila, regional urban centers outside Metro Manila shall be developed. (see **Figure 3.2-1)**

- Strategic areas along the Pacific coast shall be regarded as the impoverished areas for universal development and accessibility to those areas shall be strengthened. (see **Figure 3.2-2)**

- In order to support tourism development, the tourism development axes shall be developed for the strategic areas of tourism development. (see **Figure 3.2-2)**

2) Metro Manila and its suburbs

- Due to accumulation of infrastructure of expressways, international airports and ports and economic zones along the north-south direction, the north-south industrial development beltway which connects Batangas-Metro Manila-Clark-Tarlac will be the key axis for the development of the Metropolitan areas and the country as a whole. (see **Figure 3.2-3)**

- Sound urbanization of Metro Manila and its suburbs shall be achieved. (see **Figure 3.2-1)**

3) North of Metro Manila

- Clark-Subic corridor shall be developed as a logistic axis not only for the country but also for the southeast and ASEAN countries. (see **Figure 3.2-3)**

- To support the development of CAR and Region I, the North-West Luzon development axis shall be developed. (see **Figure 3.2-3)**

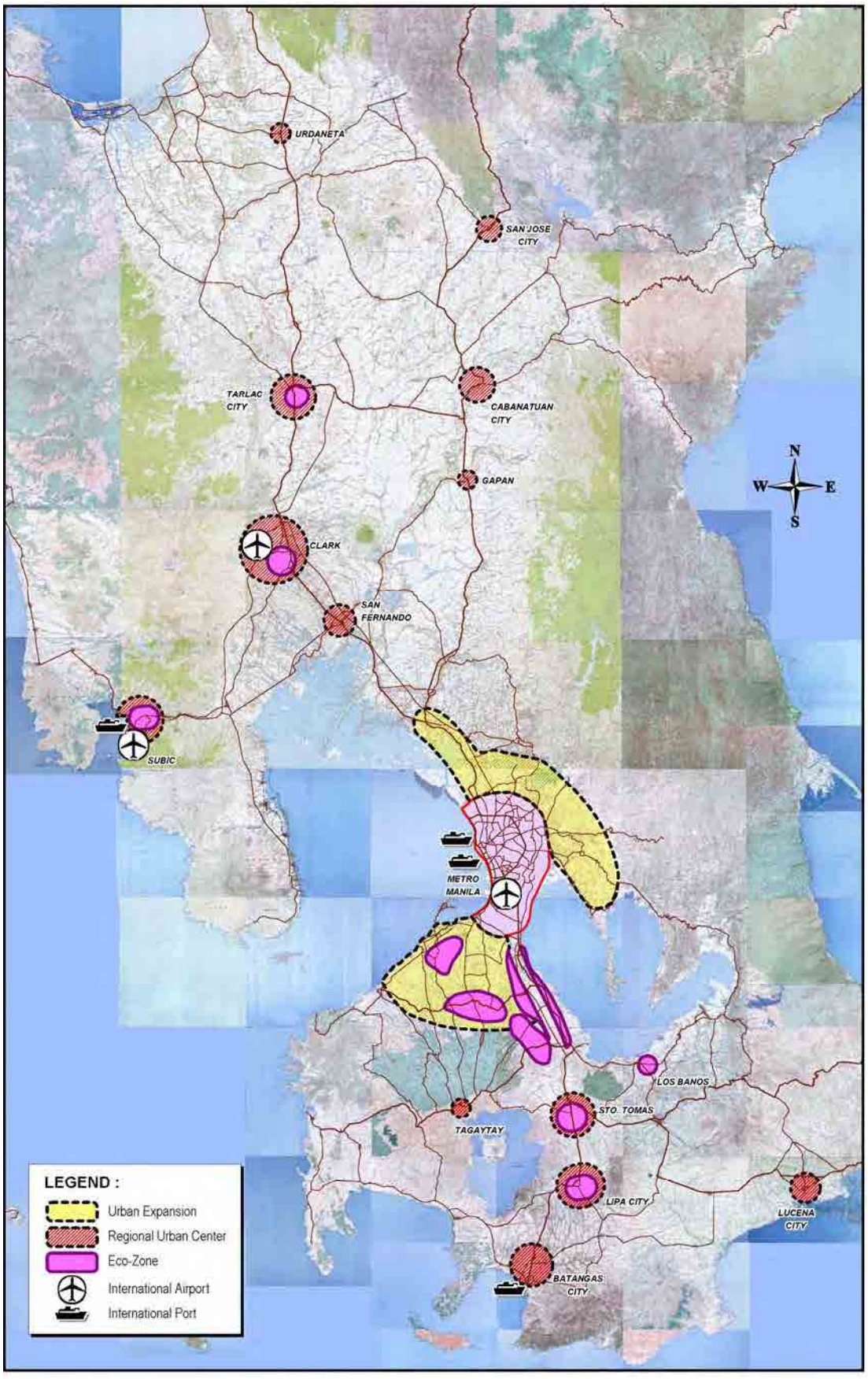
- For the development of Region II, the North-East Luzon development axis shall be developed. (see **Figure 3.2-3)**

4) South of Metro Manila

- To support the development of Region V, the South-Luzon development axis shall be developed. (see **Figure 3.2-3)**

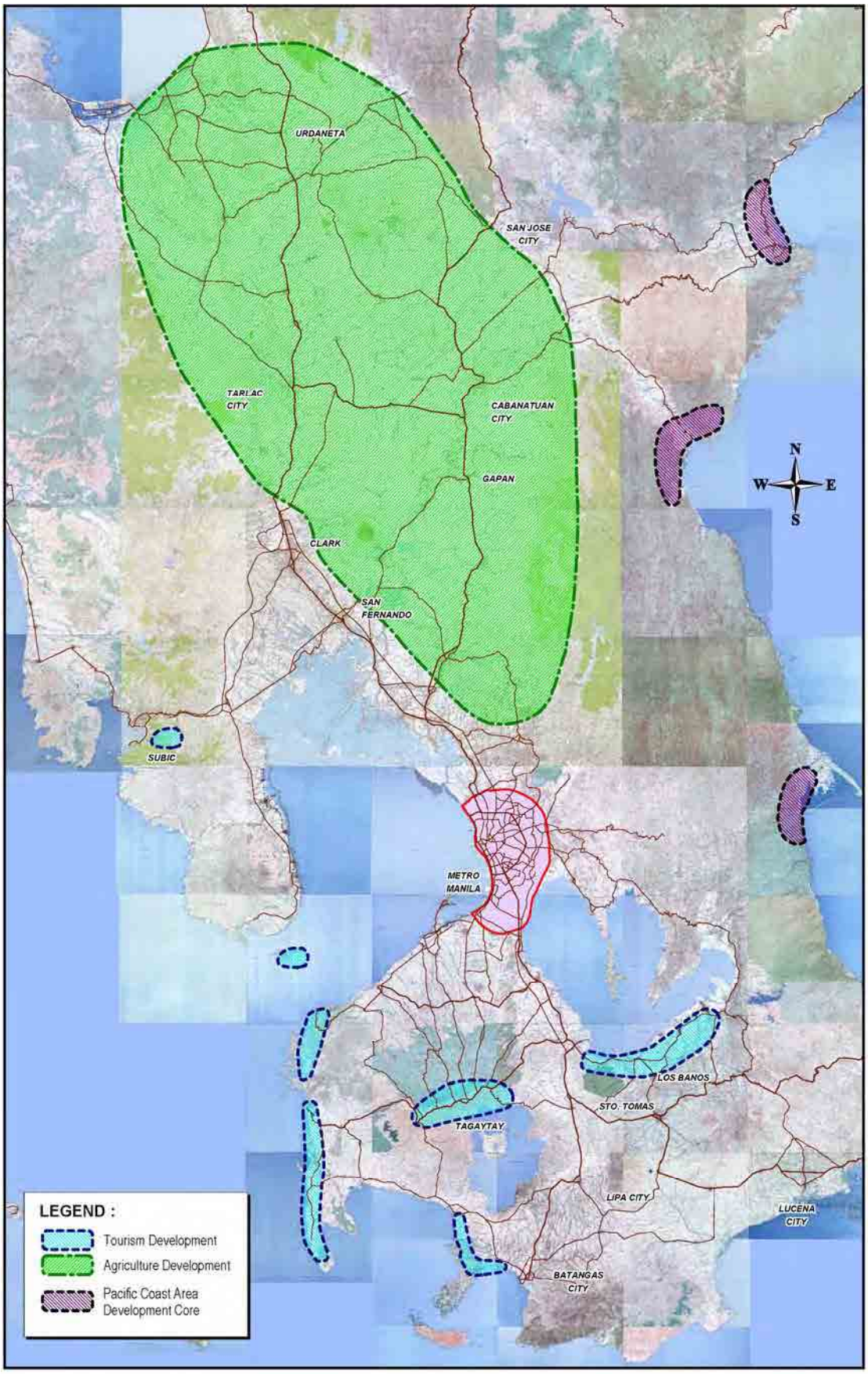
5) Overall Regional Development Scenario

- Overall regional development scenario is shown in **Figure 3.2-4.**



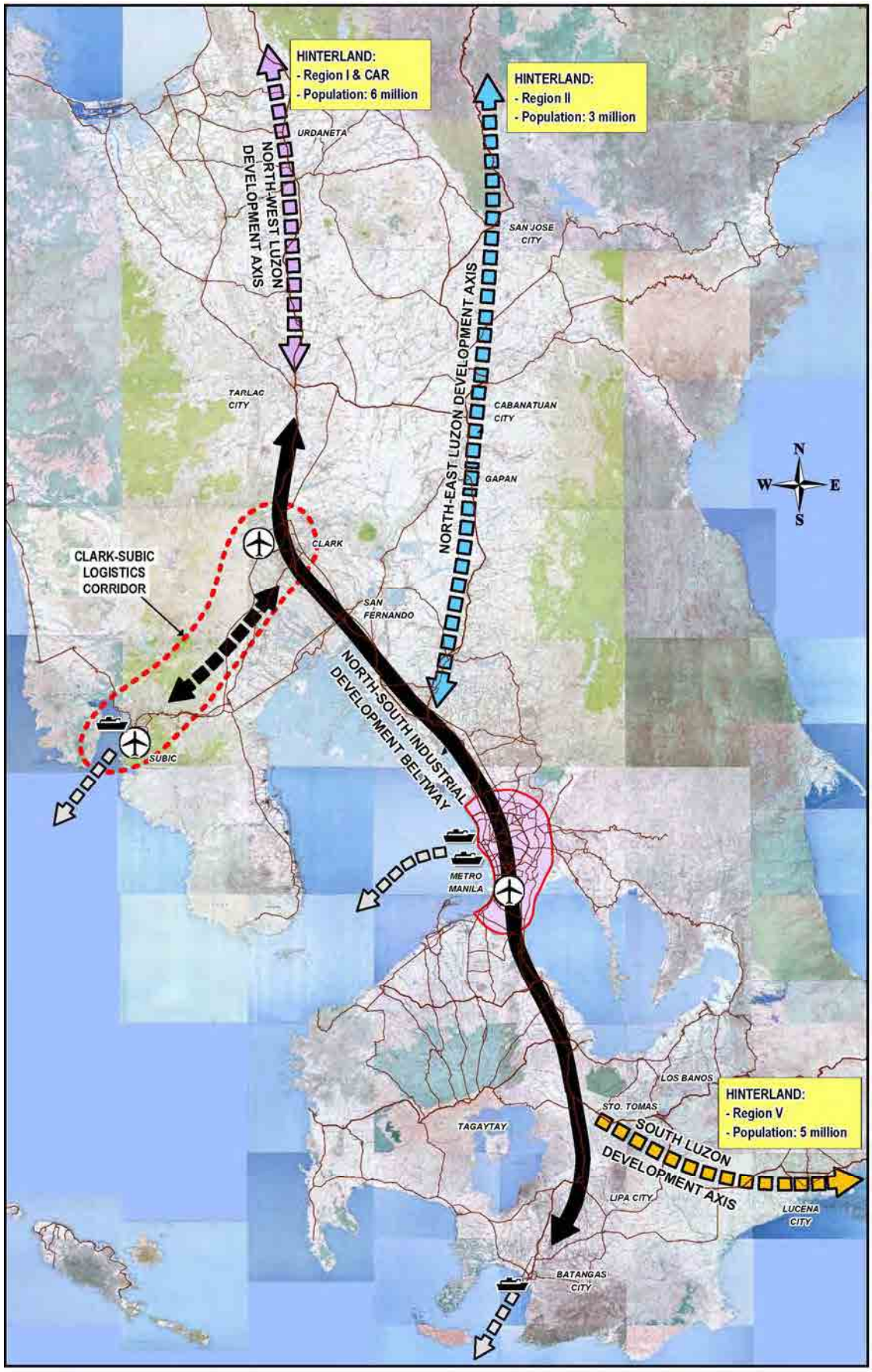
Source: HSH Development Master Plan, JICA, 2010

FIGURE 3.2-1 URBAN DEVELOPMENT STRUCTURE



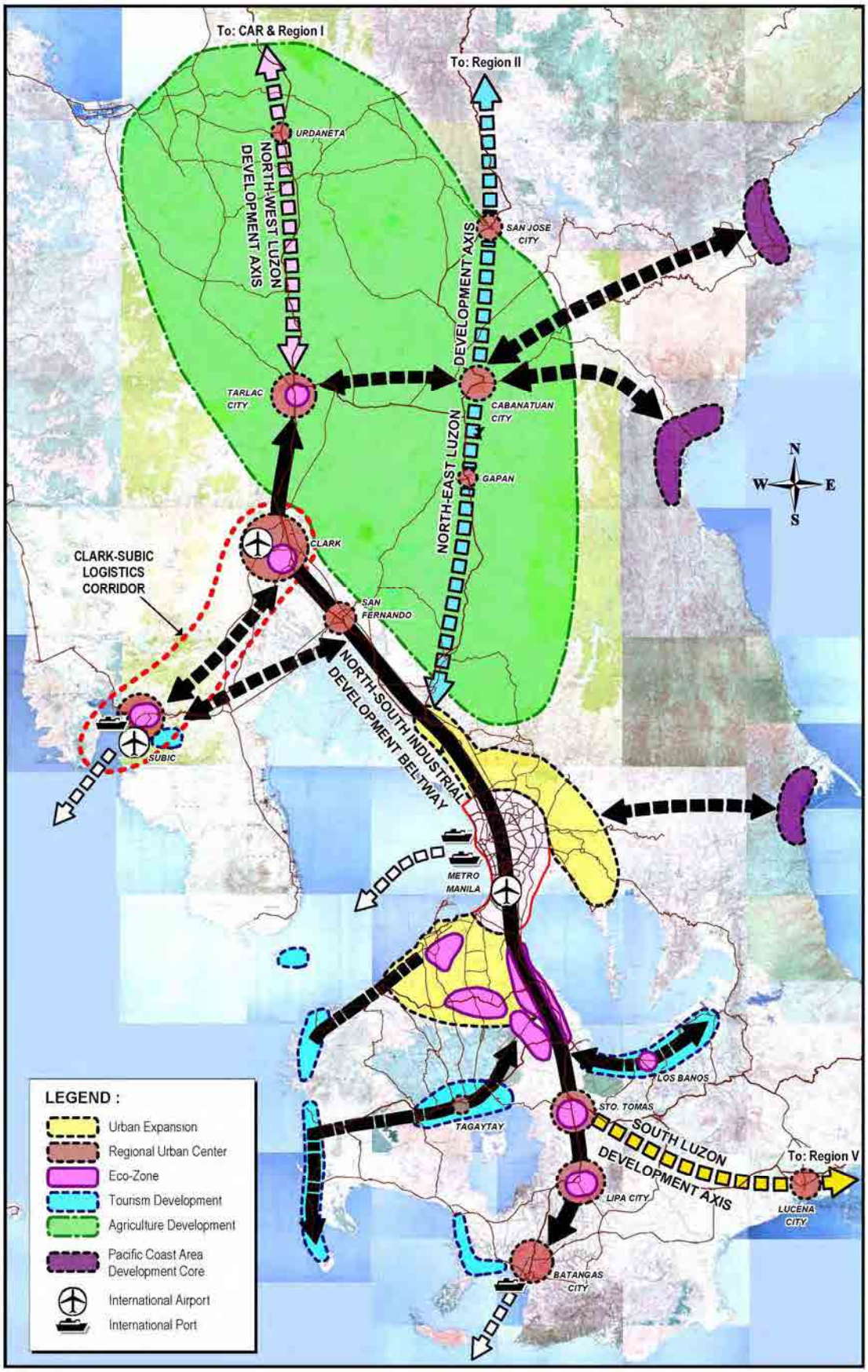
Source: HSH Development Master Plan, JICA, 2010

FIGURE 3.2-2 AGRICULTURE AND TOURISM DEVELOPMENT AND PACIFIC COAST DEVELOPMENT



Source: HSH Development Master Plan, JICA, 2010

FIGURE 3.2-3 DEVELOPMENT AXES



Source: HSH Development Master Plan, JICA, 2010

FIGURE 3.2-4 DEVELOPMENT STRATEGY : 200KM RADIUS SPHERE OF METRO MANILA

3.3 MANUFACTURING COMPANIES IN THE PROJECT INFLUENCE AREA

1) Luisita Industrial Park, San Miguel, Tarlac (as of Sept. 2009)

- Land area: 120 ha.
- Number of factories/establishments in operation: 7
- Type of factories/establishments

Type of Factories/Establishment	No. of Factories	No. of Employees
Feed Mill	1	45
Electrical Parts/Equipment	2	500
Electronic/IT Related Parts	1	800
Vehicle Parts/Transport Equipment	3	4,500
Total	**7**	**5,845**

Outline of major factories are as follows;

a) San Miguel Foods, Inc.
- Share of Capital : 100% Domestic
- Floor area
  - Factory : 10,000 sq. m
  - Stock Yard : 34,000 sq. m
  - Warehouse : 10,000 sq. m
- No. of Employees : 45
- Products : Animal Feeds (7,500 ton/month)
- Where does raw material come from?
  - Corn : Within the country
  - Soya : Argentina
- Where are the products consumed? Within Region III

b) Sanyo Semiconductor Manufacturing Philippines, Corp.
- Share of Capital : 100% Japan
- Floor area
  - Factory : 4,205 sq. m
  - Stock Yard/Warehouse : 425 sq. m
- No. of Employees : 143
- Products : Integrated Circuits (30 Million pcs/month)
- Where does raw material come from?
  - IC Chips : Japan
  - Lead Frames : Overseas, Laguna, Cavite
  - Mold Resin : Japan, Thailand, Laguna
- Where are the products transported?
  - Japan : 70%
  - Hongkong : 15%
  - Taiwan : 10%
  - Singapore : 5%

c) SDE Philippines, Corp.
- Share of Capital : 100% Japan
- Floor area
  - Factory : 2,147 sq. m
- No. of Employees : 68

- Products : Circuit & Assembly Board (59,000 pcs/month)
  Applicator Parts (3,200 pcs/month)
- Where does raw material come from?

POM	:	Singapore
Circuit & Assembly Board Parts	:	Japan

- Where are the products transported?

Japan	:	14%
USA	:	1%
ASEAN	:	9%
Region III	:	67%
Region IV-A	:	9%

2) Bio-fuel Factory in San Mariano, Isabela, Region II

Itochu Corp. Japan is constructing a bio-fuel factory in San Mariano City, Isabela, Region II. The factory will be constructed and completed in May 2012. 8,000 hectares of land around the factory will be converted to sugar cane land by March 2012 which will be expanded to 10,000 hectares by May 2012 and further expanded to 25,000 ha.

The project will employ 3,000 families for sugar cane productions and about 10,000 employments will be created.

54,000 kl/year or about 200,000 l/day of bio-fuel will be produced and transported to Metro Manila.

The Pan Philippine Highway will be used for transportation, however, when CLLEx will be completed, CLLEx will be used instead of the Pan Philippine Highway from Cabanatuan City to NLEx which is currently suffering traffic congestion at urban areas.

CHAPTER 4

TRAFFIC STUDY

CHAPTER 4
TRAFFIC STUDY

4.1 PRESENT TRAFFIC CONDITION

4.1.1 Type of Surveys Carried Out

A number of surveys were carried out to better understand the characteristics of the study area as shown in the table below:

TABLE 4.1.1-1 TYPE OF SURVEYS CARRIED OUT

Survey Type		Number of Samples
a.	Willing to Pay Survey for Car Users	820
b.	Interview Survey to Trucking Companies	10
c.	Interview Survey to Bus Companies	9
d.	Interview Survey to Manufacturing Companies	5

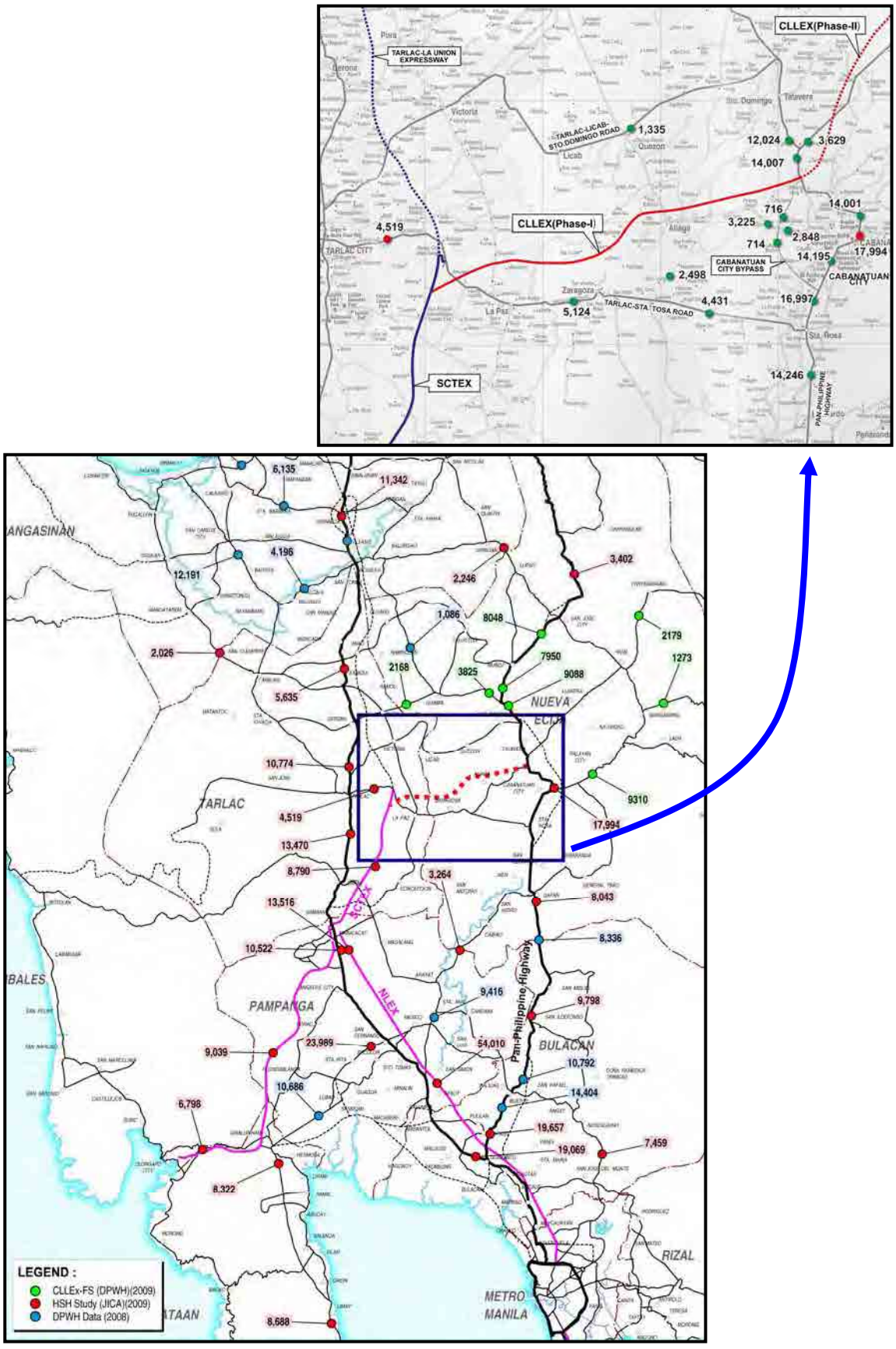
Other important data such as traffic volume was sourced out from the two reports which are Feasibility Study of the Proposed Central Luzon Expressway (DPWH, 2010) and The Study of Master Plan on High Standard Highway Network Development (JICA, 2010) and DPWH count stations. Travel speed data of the road network in the study area was taken from the Feasibility Study of the Proposed Central Luzon Expressway.

4.1.2 Traffic Volume

Traffic volume along major roads in Central Luzon as well as in the road network surrounding the CLLEX is shown in **Figure 4.1.2-1**. As seen in the figure, the two major highways (Manila North Road and Pan Philippine Highway) exhibited high number of traffic. The NLEX is also carrying a very heavy traffic confirming the very active socio-economic exchanges between cities in the North and Metro Manila.

Construction of CLLEX provides smooth connection between two major cities in the north. Currently, there are two roads that motorists may take from Tarlac City to Cabanatuan City, Tarlac - Sta. Rosa Road, and Tarlac – Talavera Road. These roads run parallel to the future Central Luzon Link Expressway (CLLEX). The Tarlac – Sta. Rosa Road is becoming the main corridor of commuters coming from Cabanatuan City and nearby cities and municipalities going to Metro Manila due to heavy traffic congestion along the Pan Philippine Highway. This road connects motorist to two expressways that guarantee them smooth travel. At first, they will be connected to SCTEX, then to NLEX which brings them to Metro Manila. Volume of traffic at three count stations assigned along Tarlac – Sta. Road have the following numbers: Lapaz - Zaragosa section (5,124), Zaragosa - Sta. Rosa section (4,431), and Aliaga - Cabanatuan section (2,498) as shown in **Figure 4.1.2-1**. Traffic volume at intersection counts is shown in **Figure 4.1.2-2** to **Figure 4.1.2-4**.

The Tarlac – Talavera Road on the other hand is used by motorist going further north like San Jose City and Tuguegarao City. This road serves as bypass road to avoid heavy congestion at Sta. Rosa – Talavera section of Pan Philippine Highway when using the Tarlac-Sta. Rosa Road. Traffic volume at Licab – Quezon section of Tarlac – Talavera Road is 1,335.



Note : All data in AADT; June and May refers to actual month of survey

FIGURE 4.1.2-1 TRAFFIC VOLUME IN CENTRAL LUZON AND ROAD NETWORK SURROUNDING CLLEX

unit: vehicle/day

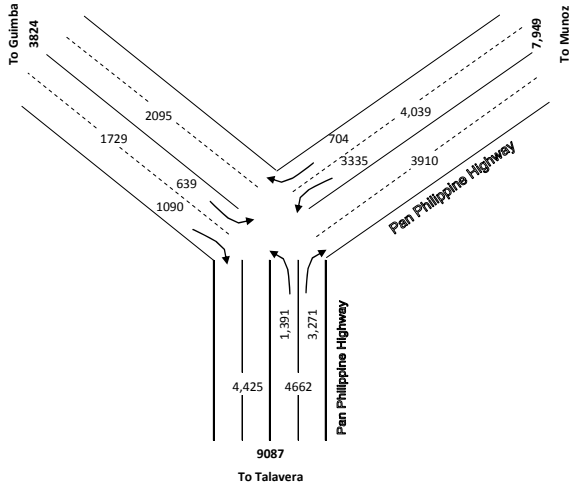


FIGURE 4.1.2-2
TALAVERA/GUIMBA/MUNOZ JUNCTION

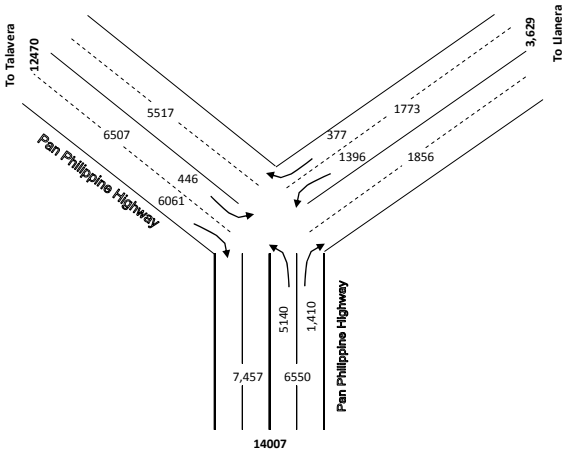


FIGURE 4.1.2-3
CABANATUAN/TALAVERA/LLANERA JUNCTION

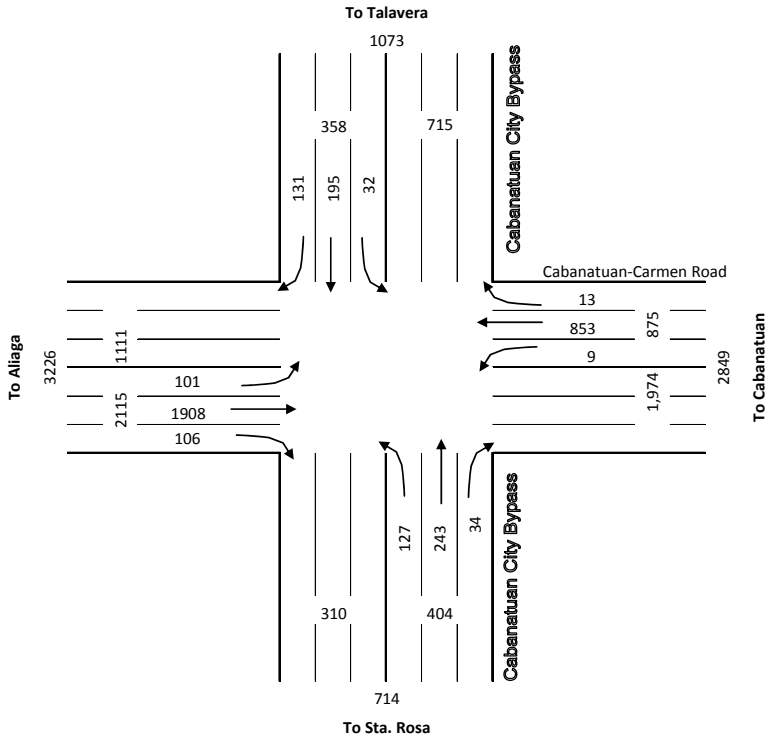


FIGURE 4.1.2-4 ALIAGA/TALAVERA/STA.ROSA/CABANATUAN JUNCTION

4.1.3 Hourly Variation of Traffic

Hourly variation of traffic at the two roads (i.e. Tarlac - Sta. Rosa Road, Tarlac – Talavera Road) connecting Tarlac City and Cabanatuan City are shown from **Figure 4.1.3-1** to **Figure 4.1.3-4**. At the Tarlac – Sta. Rosa Road, three count stations were assigned at the following sections: Lapaz-Zaragosa, Zaragosa-Sta. Rosa, and Aliaga-Cabanatuan.

At Lapaz-Zaragosa section, high traffic volume is observed from 8:00AM to 7:00PM where traffic registered constantly exceeded 100. Highest volume of traffic is in the direction of Lapaz and recorded between 1:00PM to 2:00PM and 4:00PM to 5:00PM.

Peak hour traffic is observed at noon time from 12:00 to 5:00PM. Highest number of recorded traffic in an hour is 216. At Zaragosa - Sta. Rosa Road, traffic volume seems to be constant and exceeded 100 vehicles on both directions from 8:00AM until 5:00PM. Hourly variation of traffic at the Pan Philippine Highway is shown in **Figure 4.1.3-5** to **Figure 4.1.3-6**.

unit: vehicle/hour

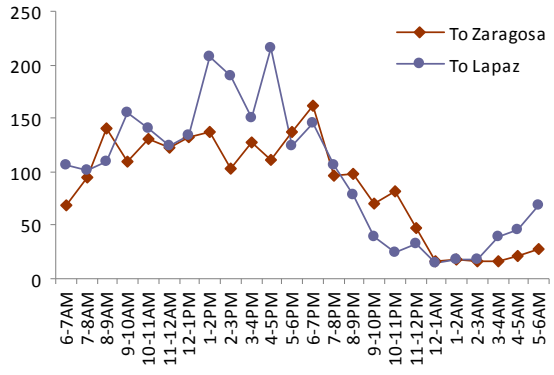


FIGURE 4.1.3-1 TARLAC – STA. ROSA ROAD (LAPAZ-ZARAGOSA SECTION)

unit: vehicle/hour

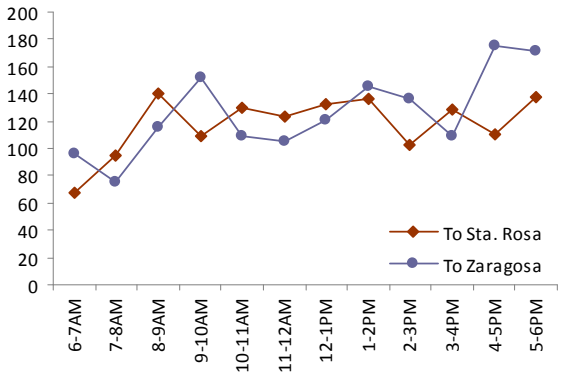


FIGURE 4.1.3-2 TARLAC – STA. ROSA ROAD (ZARAGOSA-STA. ROSA SECTION)

unit: vehicle/hour

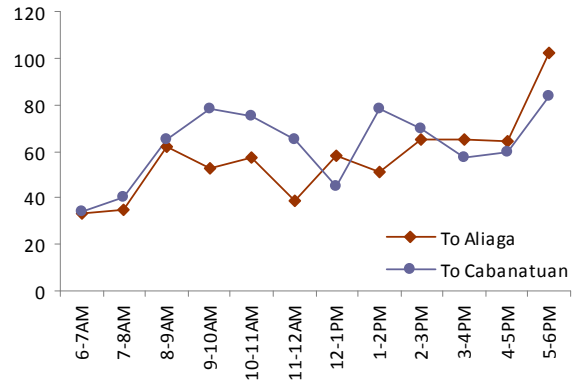


FIGURE 4.1.3-3 TARLAC – STA. ROSA ROAD (ALIAGA-CABANATUAN SECTION)

unit: vehicle/hour

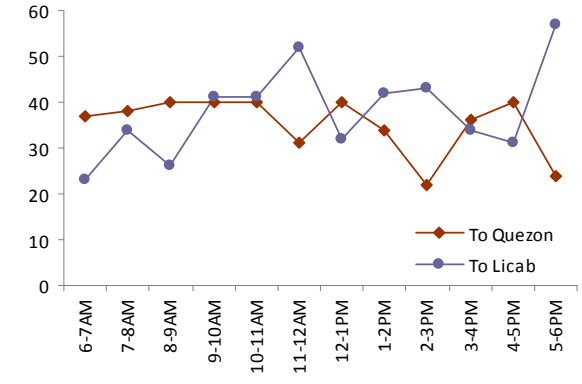


FIGURE 4.1.3-4 TARLAC – TALAVERA ROAD (LICAB-QUEZON SECTION)

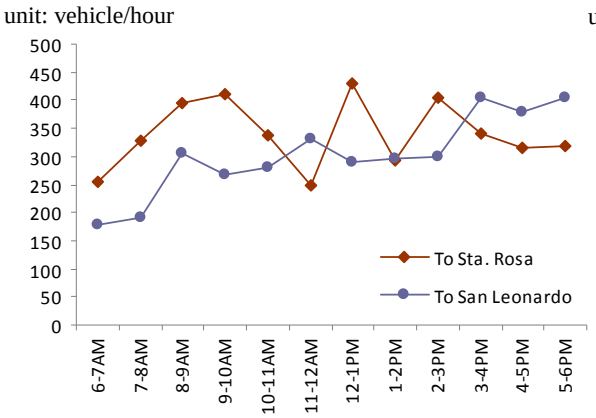


FIGURE 4.1.3-5 PAN PHILIPPINE HIGHWAY (SAN LEONARDO-STA. ROSA)

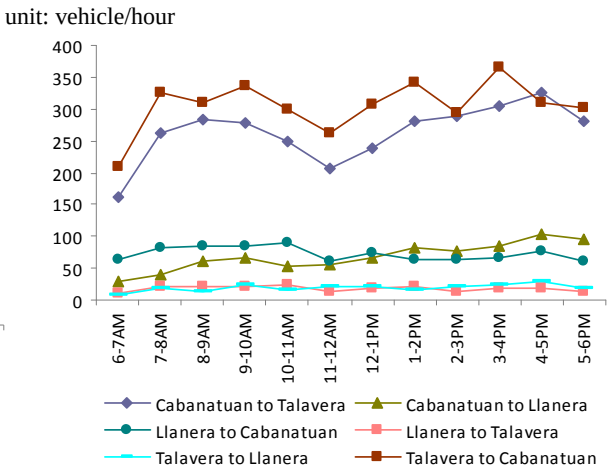


FIGURE 4.1.3-6 PAN PHILIPPINE HIGHWAY (CABANATUAN-TALAVERA-LLANERA JUNCTION)

4.1.4 Traffic Composition

Vehicles traversing Tarlac - Sta. Rosa Road are dominated by cars and trucks. At Lapaz-Zaragosa section, share of car reaches 42% of traffic and the same number is reached by trucks. Share of jeepney is 13% and share of bus is merely 4%. At Zaragosa - Sta. Rosa section, proportion of different transport mode has not changed; car (47%), jeepney (20%), bus (3%), and truck (30%) The decline on the share of bus means that perhaps some buses took the Aliaga - Cabanatuan route and their destination is most likely Region II. See **Figure 4.1.4-1** and **Figure 4.1.4-2**.

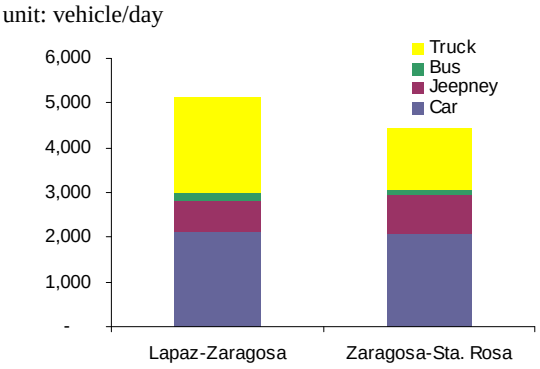


FIGURE 4.1.4-1 TRAFFIC COMPOSITION AT TARLAC - STA. ROSA ROAD

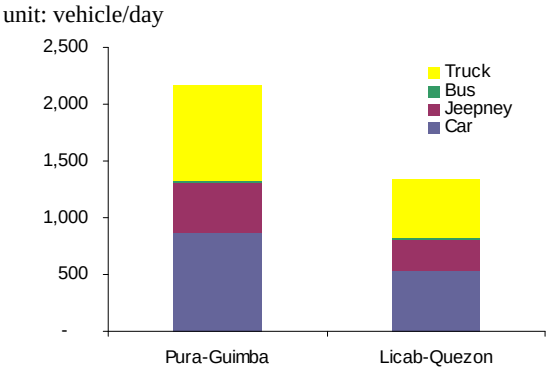


FIGURE 4.1.4-2 TRAFFIC COMPOSITION AT OTHER ROADS CONNECTING TARLAC SIDE AND CABANATUAN SIDE

Composition of vehicles plying Pan Philippine Highway is shown in **Figure 4.1.4-3**. Share of different transport mode at San Leonardo - Sta. Rosa section of Pan Philippine Highway are: 42% for car, 10 for jeepney, 5% for bus and 43% for truck. Share of jeepney substantially increased to 28% inside Cabanatuan City (Palayan Road – Mabini St.) and share of truck reduced to just 27%. Jeepney which is the main public transportation in medium cities is mixing with through traffic that created serious traffic congestion.

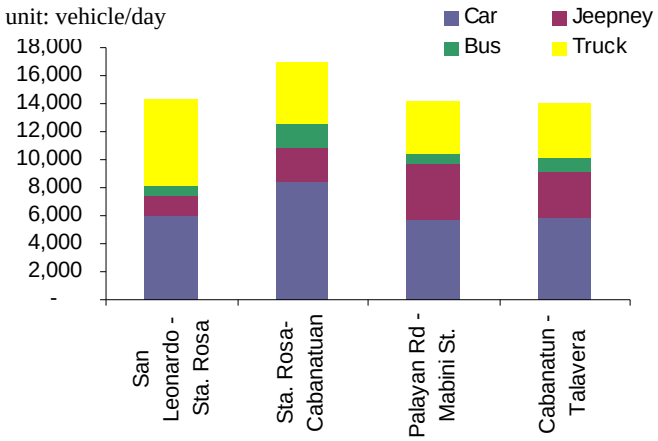


FIGURE 4.1.4-3 TRAFFIC COMPOSITION AT PAN PHILIPPINE HIGHWAY

4.1.5 Travel Speed

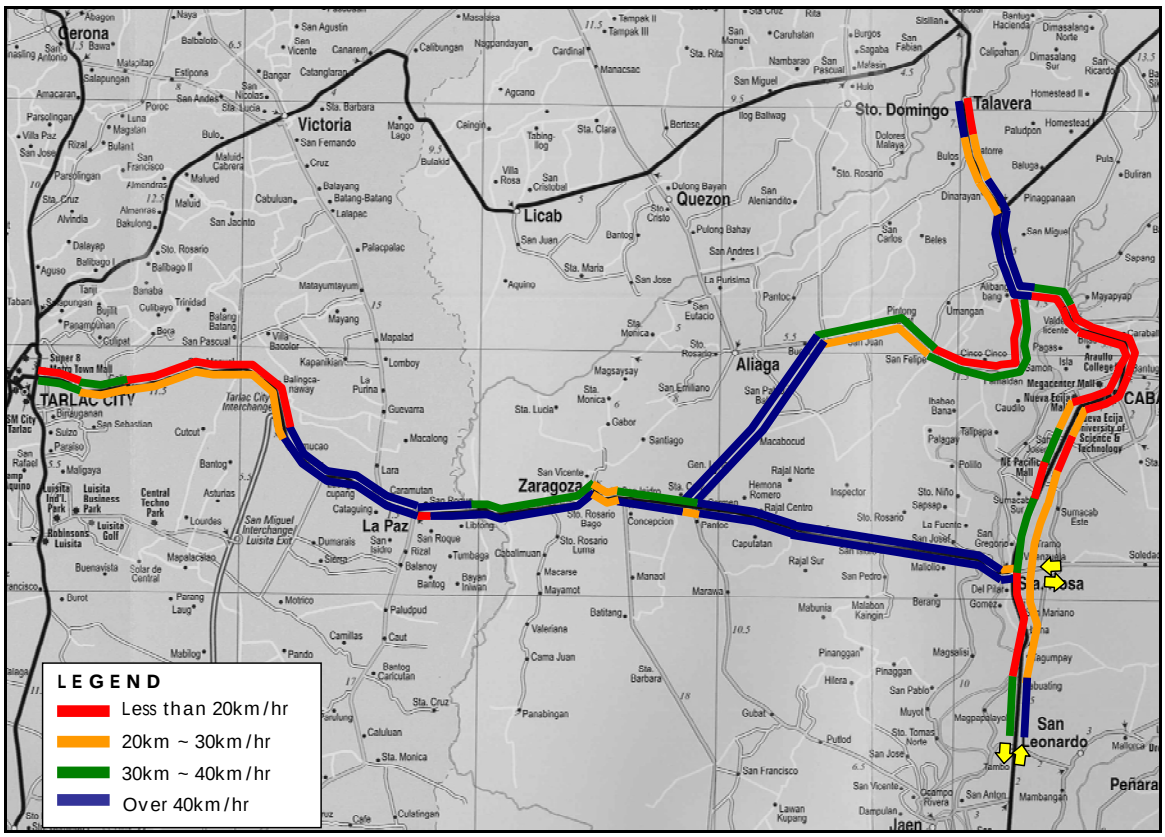
The study entitled 'Feasibility Study of the Proposed Central Luzon Expressway', 2010, carried out a travel time survey. The raw data used to plot travel speed shown in **Figure 4.1.5-1** were taken from the said study. The following were observed from the figure:

Tarlac – Sta. Rosa Road
This road is relatively congested free except at the center of towns of La Paz, Zaragosa and its approach to Tarlac. Travel time to traverse the 39.9 km road is about 60 minutes. See **Figure 4.1.5-2**.

Tarlac - Carmen – Cabanatuan Road (via Aliaga)
This route is also free of traffic congestion except of its approach to Tarlac and Pan Philippine Highway (Cabanatuan side). Average travel time is about 69 minutes to cross the 46 km route. See **Figure 4.1.5-2**.

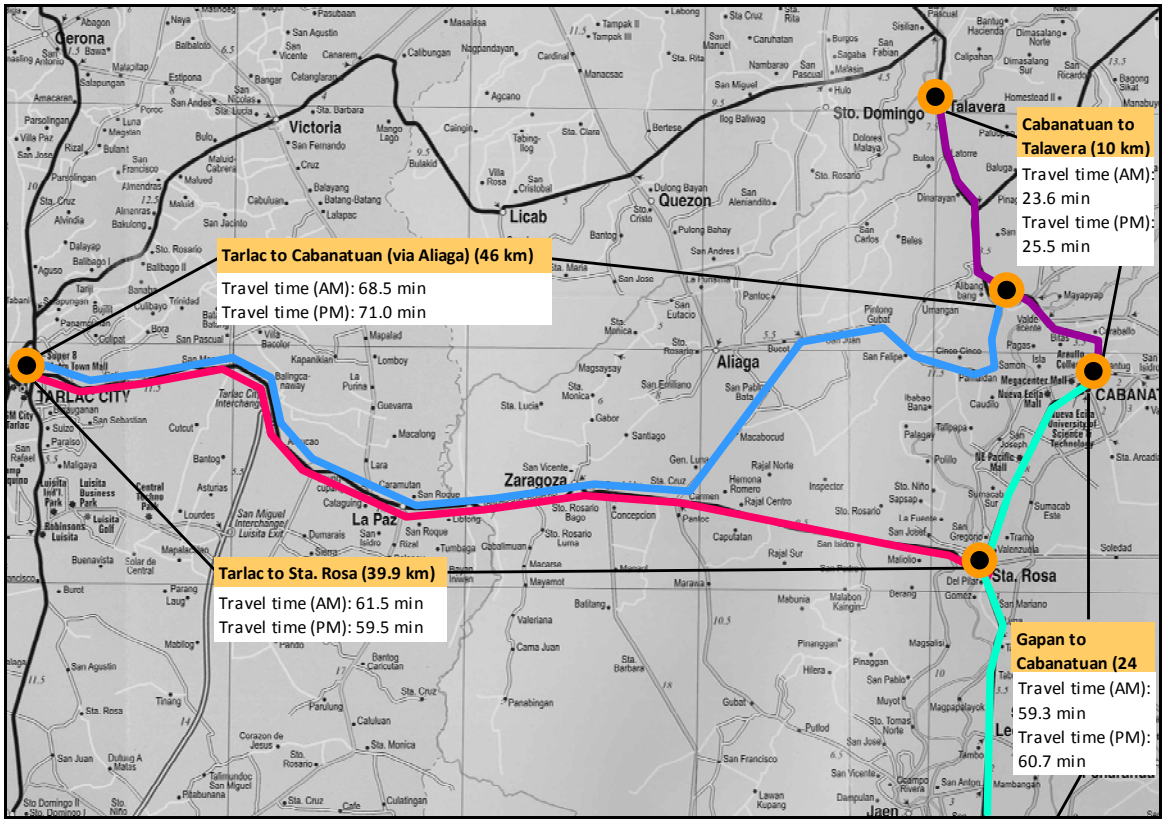
Gapan - Cabanatuan – Talavera (Pan Philippine Highway)
Traffic congestion is severe from Sta. Rosa all the way to Carmen – Cabanatuan Road. Traffic congestion is particularly heavy inside Cabanatuan City where local and through traffic merges. At the center of Cabanatuan City, most of the traffic is composed of jeepneys which served local traffic. Average travel time from Gapan to Cabanatuan reaches about 60 minutes for merely 24 km road. Likewise, average travel time from Cabanatuan to Talavera (10 km) is about 24 minutes. See **Figure 4.1.5-2**.

Pan Philippine Highway (NLEX Sta. Rosa Exit to San Jose)
Travel speed of motorists along Pan Philippine Highway from Sta. Rosa Exit of NLEX until San Jose is shown in **Figure 4.1.5-3**. Traffic congestion is observed to be serious at the town centers of Ildefonso, Sta. Rosa, Cabanatuan, Talavera, Sto. Domingo and San Jose.



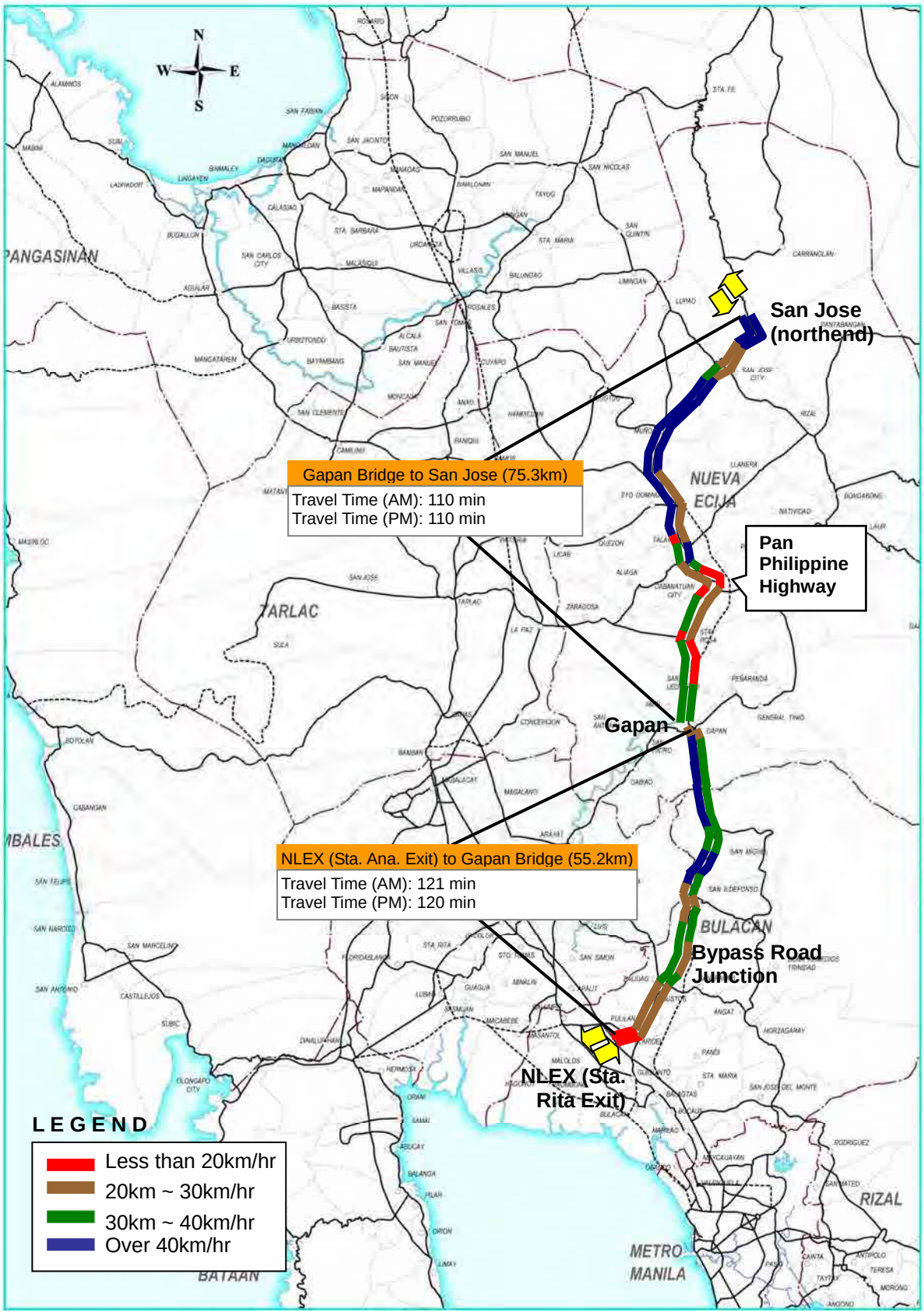
Note: Raw data is taken from Feasibility Study of the Proposed Central Luzon Expressway, DPWH (2010)

FIGURE 4.1.5-1 TRAVEL SPEED (AFTERNOON PEAK)



Note: Raw data is taken from Feasibility Study of the Proposed Central Luzon Expressway, DPWH (2010)

FIGURE 4.1.5-2 TRAVEL TIME (AM AND PM)



Source: The Study of Master Plan on High Standard Highway Network Development (JICA, 2010)

FIGURE 4.1.5-3 TRAVEL SPEED ALONG PAN PHILIPPINE HIGHWAY