

# The Feasibility Study and Implementation Support on the CALA East-West National Road Project

FINAL REPORT  
**Summary**

November 2006

ALMEC Corporation  
Nippon Koei Co., Ltd.

CALA East-West



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## PREFACE

In response to the request from the Government of the Philippines, the Government of Japan decided to conduct the Feasibility Study and Implementation Support on the Cavite-Laguna (CALA) East-West National Road Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Takashi Shoyama of ALMEC Corporation and consisted of ALMEC Corporation and Nippon Koei Co., Ltd. to the Philippines from January 2005 to September 2006. In addition, during the same period, JICA set up an advisory committee headed by Mr. Hiroyuki Ogino of the Ministry of Land, Infrastructure and Transport which examined the study from both specialist and technical perspectives.

The team conducted the study in collaboration with the Filipino counterpart team including field surveys, traffic demand forecast and feasibility studies on the selected priority projects. An extensive consultation process was established with the various stakeholders both in the national and local levels and in the public and private sectors, which contributed to the proposed priority projects' wide acceptance among the affected stakeholders. Upon returning to Japan, the team duly finalized the study and delivered this report.

I hope that this report will contribute to the development of urban transport in the Cavite and Laguna provinces and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the concerned officials of the Government of the Philippines for the valuable assistance extended to the team.

November 2006

MATSUOKA Karuhisa  
Vice President  
Japan International Cooperation Agency

November 2006

MATSUOKA Kazuhisa  
Vice President  
Japan International Cooperation Agency  
Tokyo

## **Letter of Transmittal**

Dear Sir,

We are pleased to formally submit herewith the final report of the Feasibility Study and Implementation Support on the Cavite-Laguna (CALA) East-West National Road Project.

This report compiles the result of the study which was undertaken both in the Philippines and Japan from January 2005 to September 2006 by the Team, organized by ALMEC Corporation.

We owe a lot to many people for the accomplishment of this report. First, we would like to express our sincere appreciation and deep gratitude to all those who extended their extensive assistance and cooperation to the Team, in particular the Department of Public Works and Highways as well as the concerned local government units in Cavite and Laguna.

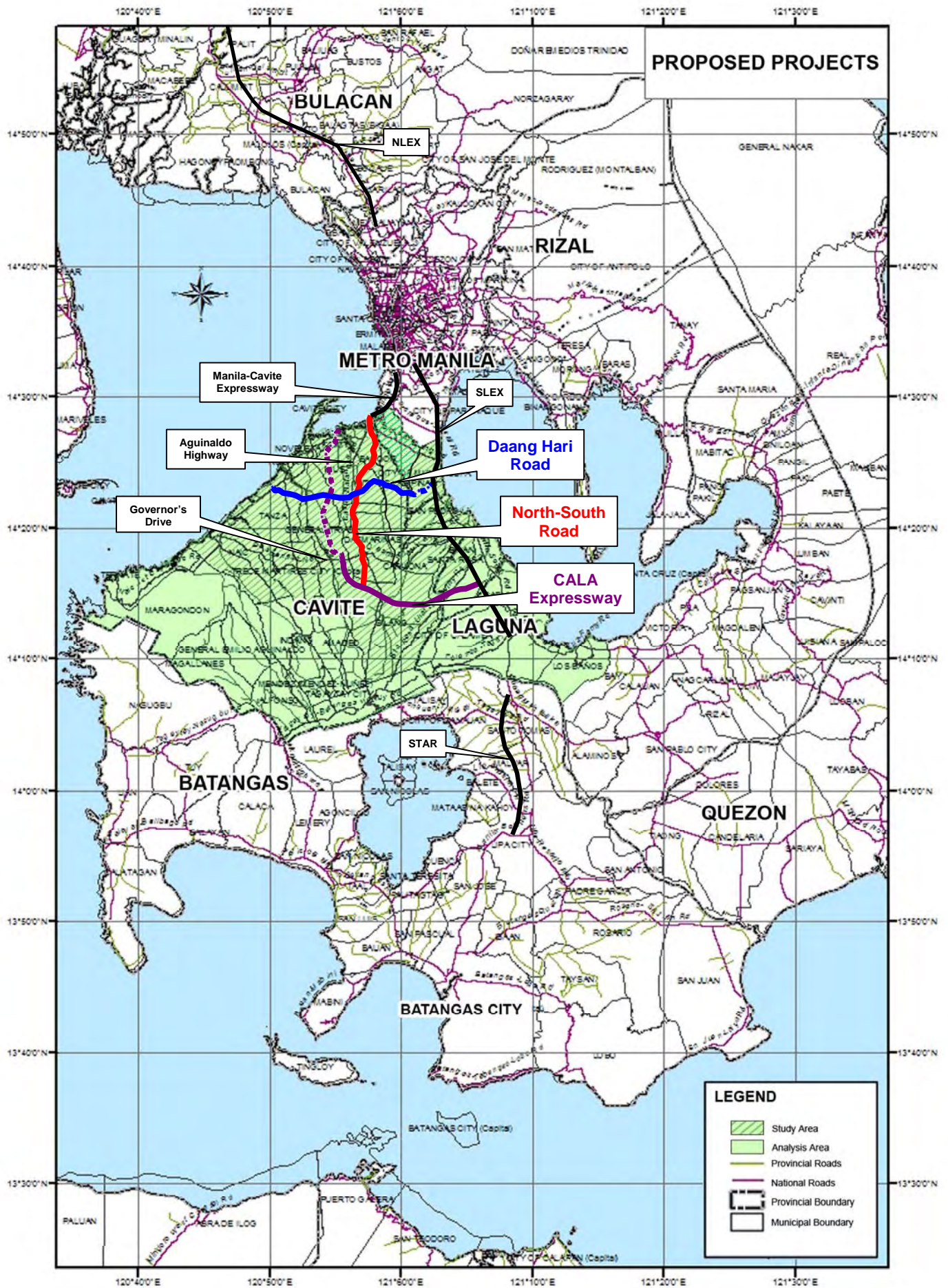
We also acknowledge the officials of your agency, the JICA Advisory Committee and the Embassy of Japan in the Philippines for their support and valuable advice during the course of the Study.

We wish the report would contribute to the promotion and sustainable development of urban transportation development of the CALA Region.

Very Truly Yours,

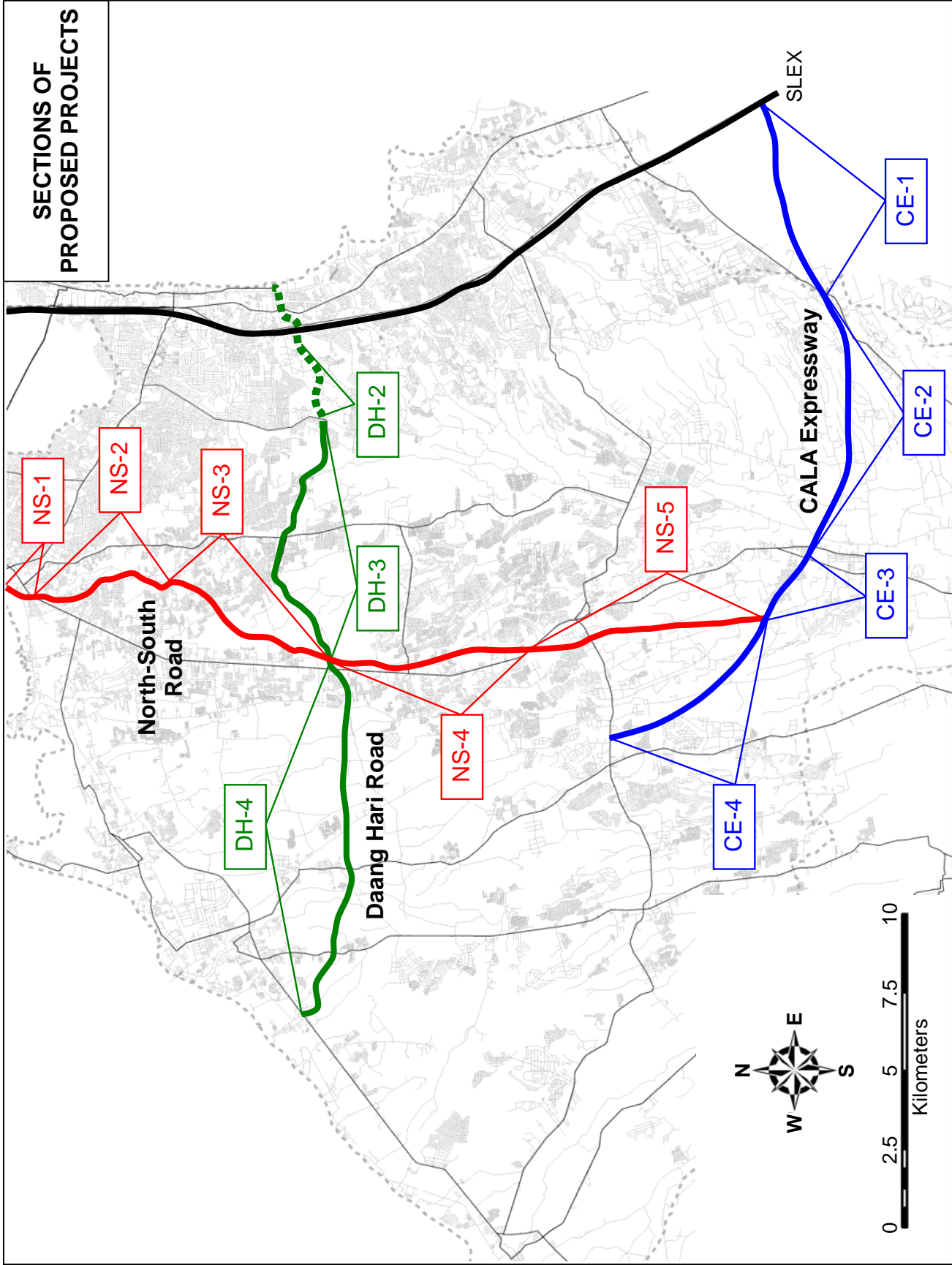
SHOYAMA Takashi  
Team Leader  
The Study Team for the Feasibility Study and Implementation Support  
on the Cavite-Laguna (CALA) East-West National Road Project







**SECTIONS OF  
PROPOSED PROJECTS**



**FEASIBILITY STUDY AND IMPLEMENTATION SUPPORT ON THE  
CAVITE-LAGUNA EAST-WEST NATIONAL ROAD PROJECT**

**FINAL REPORT**

**SUMMARY**

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## **ABBREVIATIONS AND ACRONYMS**

ADB	Asian Development Bank
B/C	Benefit/Cost Ratio
Blvd	Boulevard
BOD	Biological Oxygen Demand
BOT	Build-Operate-Transfer
CALA EW	CALA East-West Highway (Project)
CALA	Cavite-Laguna
CALABARZON	Cavite, Laguna, Batangas, Rizal and Quezon
CBD	Central Business District
CDF	Country-wide Development Fund
CLUP	Comprehensive Land Use Plan
CO	Carbon Monoxide
CRC	Coastal Road Corporation
DB	Decibels
DENR	Department of Environment and Natural Resources
DENR-EMB	DENR – Environmental Management Board
DILG	Department of Interior and Local Government
DOF	Department of Finance
DOJ	Department of Justice
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
EMMP	Environmental Management and Monitoring Plan
ESC	Environmental and Social Consideration
F/S	Feasibility Study
FGD's	Focus Group Discussions
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GOP	Government of the Philippines
Ha	Hectare
HLURB	Housing and Land Use Regulatory Board
HOV	High Occupancy Vehicle
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KIIs	Key Informant Interview
Km	Kilometer
Km/h	kilometer per hour
LGUs	Local Government Units
LRT	Light Rail Transit
MMDA	Metro Manila Development Authority
MMUTIS	Metro Manila Urban Transportation Integration Study
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MTPIP of DPWH	Medium Term Public Investment
NAMRIA	National Mapping and Resource Information Authority
NCR	National Capital Region
NDC	National Development Company

NEDA	National Economic Development Authority
NEDA-ICC	National Economic Development Authority-Investment and Coordination Committee
NGOs	Non-Government Organizations
NLEX	North Luzon Expressway
NO <sub>x</sub>	Nitrogen Oxide
NPV	Net Present Value
NSCB	National Statistical Coordination Board
NSO	National Statistics Office
OD	Origin Destination
ODA	Official Development Assistance
PCU	Passenger Car Unit
PEA	Public Estate Authority
PEZA	Philippine Economic Zone Authority
PIC	Philippine Infrastructure Company
PNCC	Philippine National Construction Corporation
PNR	Philippine National Railways
PPP	Public-Private Partnerships
R1	Radial Road (number)
RIS	Resident Interview Survey
ROW	Right of Way
SLE	South Luzon Expressway
SLEX	South Luzon Expressway
SOE	State-owned Enterprise
SO <sub>x</sub>	Sulfur (Di) oxide Concentration
SSH	South Superhighway
STAR	Southern Tagalog Arterial Road
STM	Stakeholders Meeting
TOR	Terms of Reference
TRB	Toll Regulatory Board
TSP	Total Suspended Particulates
TWG	Technical Working Group
µg	Microgram
v/c	volume/capacity
W/R	The ratio of employment at workplace/ at residence
WB	World Bank



# **EXECUTIVE SUMMARY**

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## **EXECUTIVE SUMMARY**

### **Background and Objectives of the Study**

The study area includes most of Cavite Province and a part of Laguna Province and Metro Manila (CALA Region). The increasingly deteriorating traffic conditions of the CALA area is being addressed by the Government of the Philippines in coordination with international donor agencies such as JICA and the World Bank. This Study aims to alleviate the traffic congestion in the CALA area; to improve the living environment of local residents; to promote dispersion of urban function of Metro Manila; as well as to further encourage the improvement of investment environment in the area given its strategic location vis-à-vis the international port in Batangas City. Based on these priority aims, the Study will be implemented with the following objectives:

- (1) Review of CALA regional traffic network development scenario;
- (2) Examination of the feasibility of CALA East-West road and related projects and preparation of project implementation plan; and
- (3) Capacity development for staff of counterpart agency and other related agencies.

### **Development Scenario of the Study Area**

In view of the past related studies, existing plans such as PFPs and the current conditions of the study area, three scenarios were first prepared and compared in terms of social/economic activities and transport demand. These were:

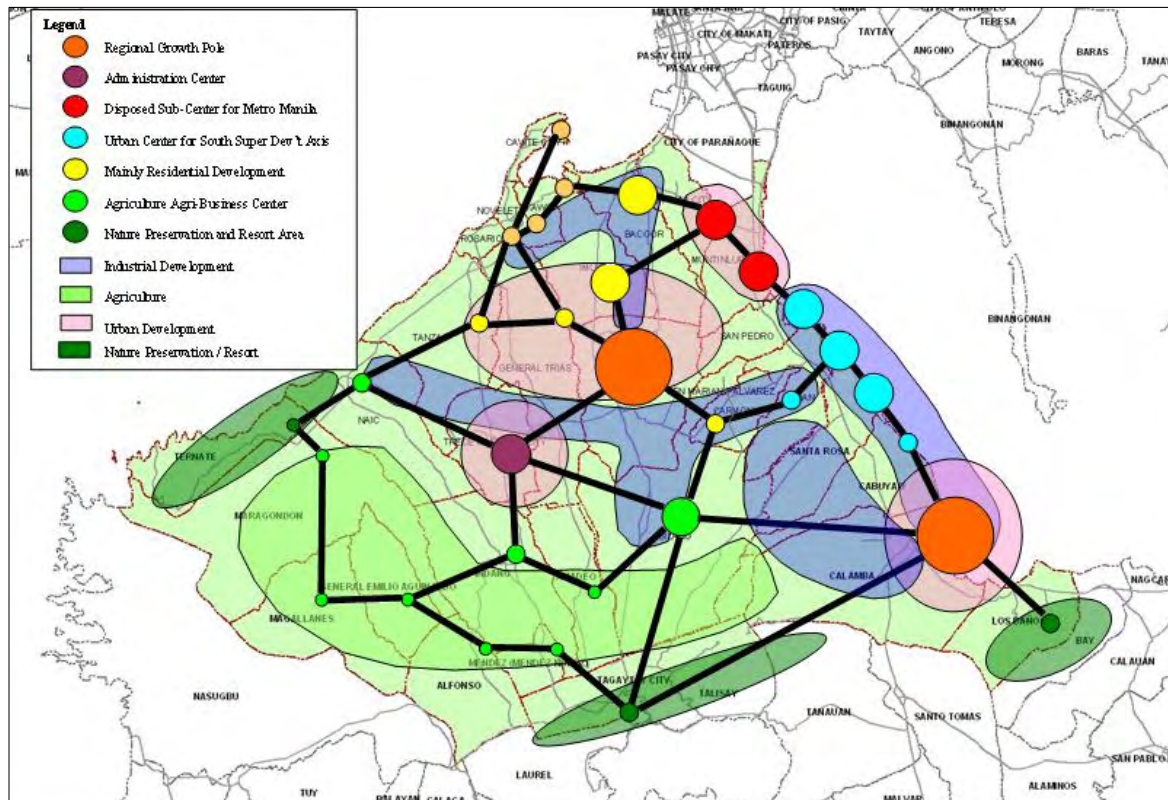
Scenario 1: Metro Manila Dependency Development (Trend)

Scenario 2: Urban Core Development

Scenario 3: Industrialization-Driven Development

The foreseen regional development vision is the interplay of various growth components which are basically found in the above three scenarios mentioned. Several sectors are regarded to contribute in the symphonic development of the area rather than just one or two particular sectors leading growth in the study area. Thus, elements of scenarios 1 to 3 are combined to formulate this future vision of regional growth of the CALA Region. The future regional development of the CALA Region in terms of spatial development is envisioned as shown in Figure ES-1:

**Figure ES-1 Holistic Development (Scenario 4)**



**Regional Transport Network Alternatives**

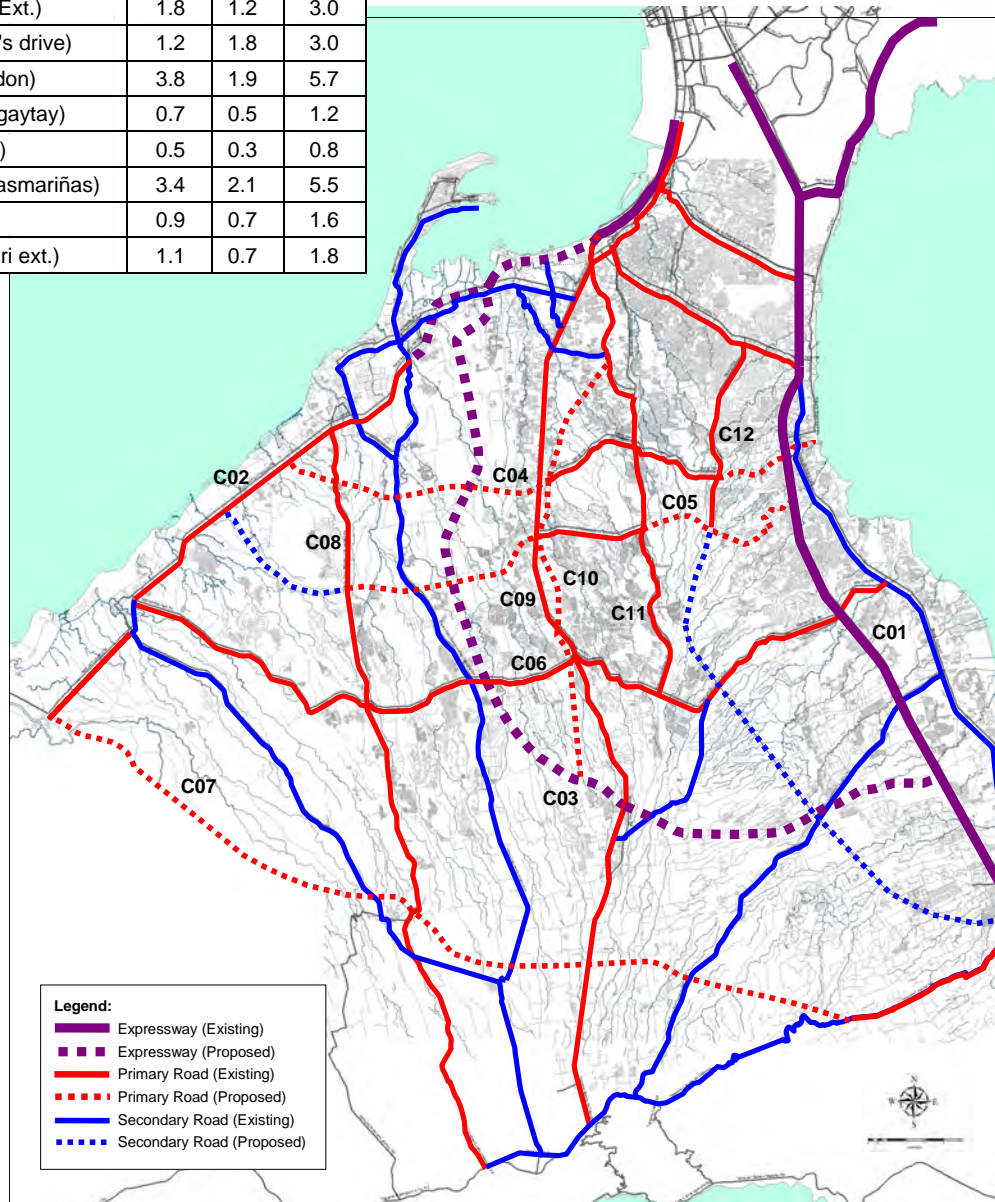
The alternative network scenarios have been prepared for the selected regional development scenario based on the physical and socioeconomic conditions so as to quantitatively analyze the advantages and disadvantages of each alternative scenario. Those were:

- Existing Network Zero-option (Alternative 0)
- Arterial Grid-Pattern Economic Road Structures and Balanced Development (Alternative 1)
- Metro Manila – Laguna Transport Corridor Enhancement (Two North-South Axis) (Alternative 2)
- East-West and North-South Axis Scenario (Strategic Industrialization and Urbanization in the region) (Alternative 3)

The alternatives above were compared with each other in terms of projected traffic volume, cost, magnitude of relocation, economic viability, and other social/environmental factors. After a series of consultations during the stakeholder meetings, Alternative 3 has been selected. The road project components included in this alternative are shown in Figure ES-2:

**Figure ES-2 Road Project Components in the Selected Road Network Alternative**

		Cost Estimates (Billion Pesos)		
		Const.	ROW	Total
C01	South Luzon Expressway	4.9	0.0	4.9
C02	West Coastal Road	2.2	0.7	2.9
C03	CALA Expressway	10.6	4.4	15.0
C04	E/W 1 (Daang Hari Ext.)	2.5	2.1	4.6
C05	E/W 2 (Calibuyo Ext.)	1.8	1.2	3.0
C06	E/W 3 (Governor's drive)	1.2	1.8	3.0
C07	E/W 4 (Maragondon)	3.8	1.9	5.7
C08	N/S 1 (Tanza-Tagaytay)	0.7	0.5	1.2
C09	N/S 2 (Aguinaldo)	0.5	0.3	0.8
C10	N/S 3 (Bacoor-Dasmariñas)	3.4	2.1	5.5
C11	N/S 4 (Molino)	0.9	0.7	1.6
C12	N/S 5 (Daang Hari ext.)	1.1	0.7	1.8



Note: Estimated preliminarily using unit costs per km.

### **Road Projects Selected for FS**

In order to guarantee transport levels of service ideal to the Region, all 12 roads listed above are necessary to be implemented by 2020. However, due to the present financial difficulties of the Government, it is unrealistic to assume all these roads will be completed by 2020. Hence, the minimum requirement was sought to ensure, at least, the present

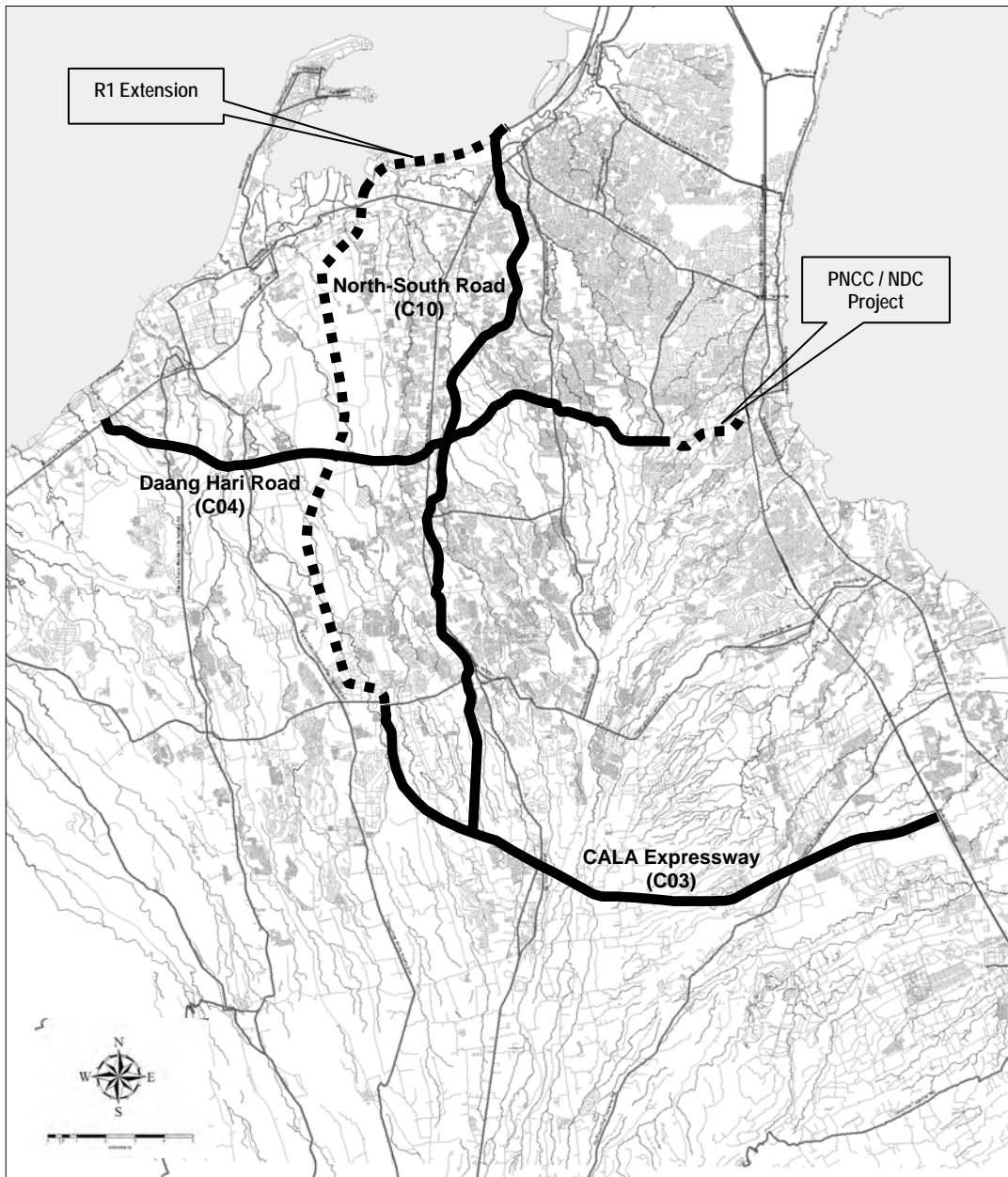
levels of service of road traffic by 2020. After a series of traffic analyses, three (3) road projects were identified, as follows:

- (1) North-South Road (C10)
- (2) Daang Hari Road (C04)
- (3) CALA Expressway (C03)

Though not satisfactory yet, the forecast traffic situation in 2020 could be maintained at the current levels of service.

Note that a part of these three roads was excluded from the JICA FS due to the recent changes in implementation framework as shown below.

**Figure ES-3 Target Roads for JICA's Feasibility Study**

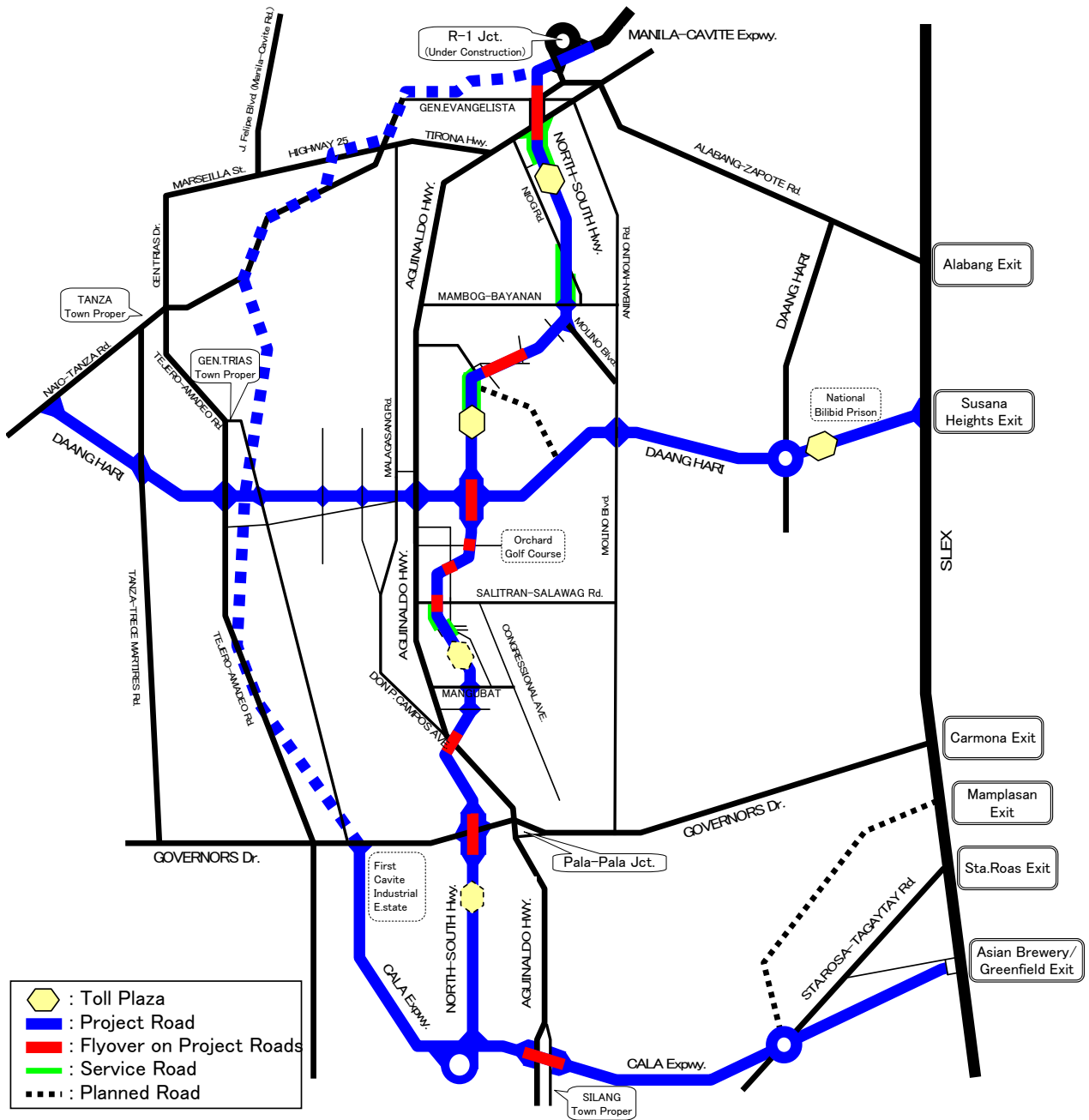




## Outline of the Project Roads

The main features of the project roads and related existing road network is shown in Figure ES-4.

**Figure ES-4 Outline of the Project Roads and Related Existing Road Network**



## North-South Road (NS)

The North-South Road (NS Road) will be linked with the existing Manila-Cavite Coastal Road and after running south, it will be connected with the proposed CALA Expressway (CE) at the southern end at Silang. Total length is 27.8 km, which is the longest among the proposed three routes. The design speed is established at 60 km/hr. This road will be a toll road using a PPP scheme (in the south of Daang Hari Road, toll road is still an option).

## Daang Hari Road (DH)

The Daang Hari Road (DH) will start from the border between Muntinlupa City (National Capital Region) and the municipality of Imus, Cavite, where it will be connected with the existing Daang Hari Road which is at present under construction. The DH Road will end at the Coastal Road in the Municipality of Tanza. The proposed design speed is 60 km/hr, and the total length of DH is 21.0 km.

## CALA Expressway (CE)

The proposed CALA Expressway (CE) starts at the Asia Brewery Inc. / Greenfield interchange on South Luzon Expressway (SLEX) in Santa Rosa, Laguna, and will be connected with Governor's Drive at the west of First Cavite Industrial Estate (FCIE), Dasmariñas. Total length is 22.7 km. Since the design speed of CE is 100 km/hr, horizontal and vertical curve radius shall be larger, as compared to the ones of the other two routes whose design speed is 60 km/hr.

**Table ES-1 Estimated Project Cost**

Unit: Million Pesos

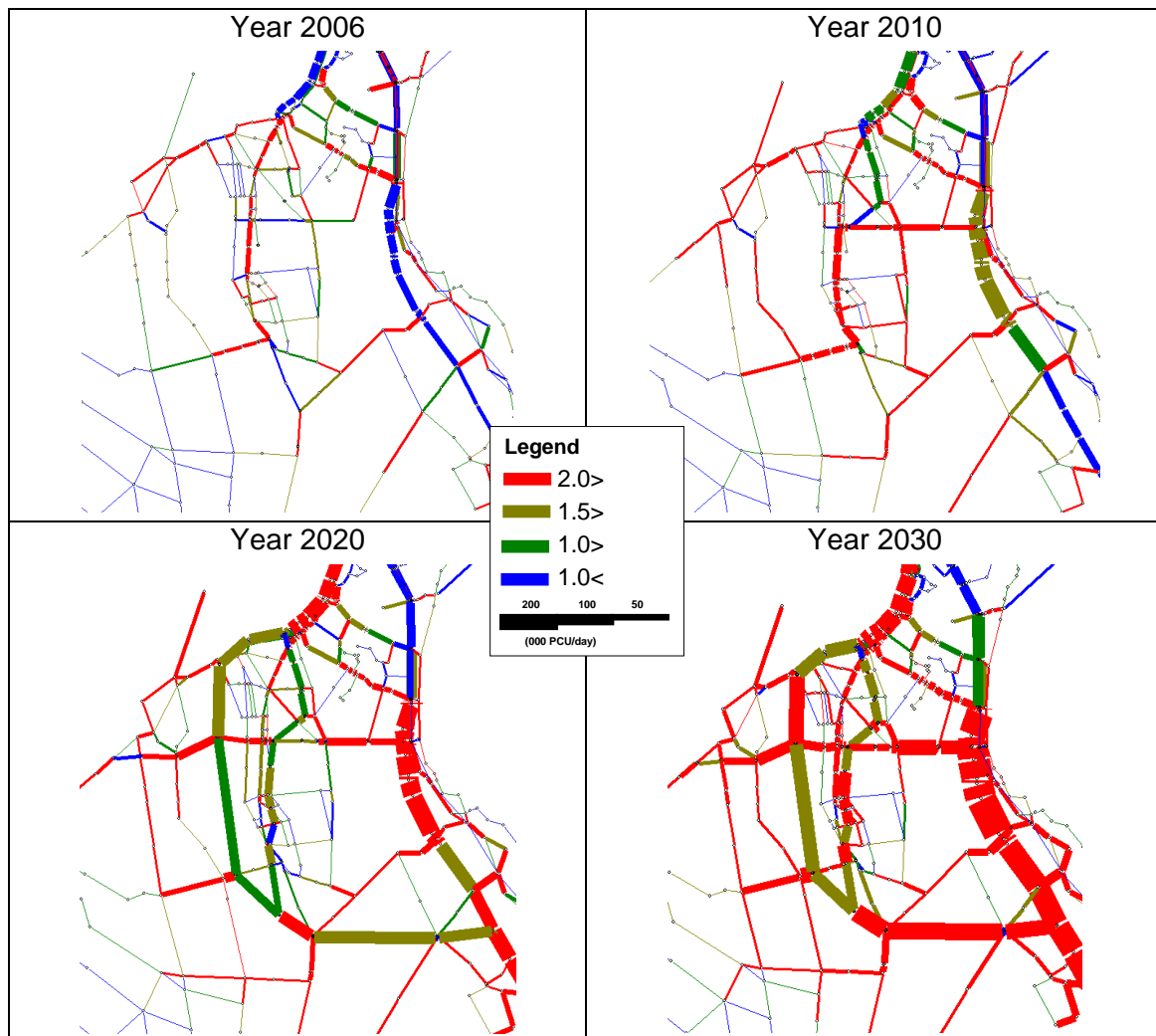
	Construction Cost (CC)	Engineering Service Cost (ESC)	Land Acquisition and Resettlement Cost (LARC)	Project Administration Cost (PAC)	Grand Total (Base Case)
NS1	1,595	191	107	54	1,947
NS2	456	55		15	526
NS3	1,968	236	444	77	2,725
Subtotal (NS1-NS3)	4,019	482	551	146	5,198
NS4	3,325	399	410	119	4,253
NS5	3,464	415	408	123	4,410
Total (NS1-NS5)	10,808	1,296	1,369	388	13,861
DH3	580	70		18	668
DH4	1,755	211	419	69	2,454
Total (DH)	2,335	281	419	87	3,122
CE1	450	54	85	17	606
CE2	4,841	580	284	163	5,868
CE3	1,614	194	47	53	1,908
CE4	983	119	346	42	1,490
Total (CE)	7,888	947	762	275	9,872
Grand Total	21,031	2,524	2,550	750	26,855

## **Demand Forecast and Economic/Financial Analysis**

The toll rate of NS Road was set at a flat rate of ₱18 (for car) at each toll gate based on the current toll rate of existing expressways, user benefit and the interrelationship between economic and financial returns.

The projected traffic flow is shown below. By 2020, the road network will be marginally sustainable. However, new roads should be added after then.

**Figure ES-5 Traffic Distribution (Base Case)**



Economic viability is very high for all the proposed projects. NS Road shows an EIRR of about 23-24% as a whole, and an EIRR of more than 35% for the northern sections. Daang Hari Road and CALA Expressway also show very high EIRRs.

NS Road also shows high financial performance. Its project FIRR always exceeds the 12% threshold in real terms except for the southernmost section. As a whole, the NS Road project seems highly profitable.

## **Environmental and Social Considerations**

As a part of “Implementation Support,” a full-scale EIA was conducted following the official EIS procedure of the Philippine Government and the JICA’s Guidelines on Environmental and Social Considerations. These activities included the following:

- (1) Initial Environmental Examination and Scoping
- (2) Study on present environmental conditions
- (3) Environmental impact forecasts and estimates
- (4) Evaluation of environmental impacts on optimum route alignments
- (5) Examination of environmental mitigation measures and social consideration measures
- (6) Preparation of environmental management and monitoring plan (EMMP)
- (7) Preparation of draft Environmental Impact Statement
- (8) Preparation of Preliminary Resettlement Action Plan (Pre-RAP)

In parallel to these activities, consensus building process was rigorously pursued in close coordination with DPWH, DENR, LGUs, and related NGOs, POs, and residents. Such consensus building process was documented in the eight (8) stakeholder meetings, numerous LGU consultations and focus group discussions conducted during the course of the study. Each LGU, through its respective provincial/city/municipal councils, issued a resolution which endorses the proposed project and reserves ROW needed for the project.

The record of all these EIA activities may be accessed through the project website ([www.cala-ew.info](http://www.cala-ew.info)). So far, no serious problem is seen regarding the project.

The following shall be conducted to adequately implement the EIS after the JICA Study.

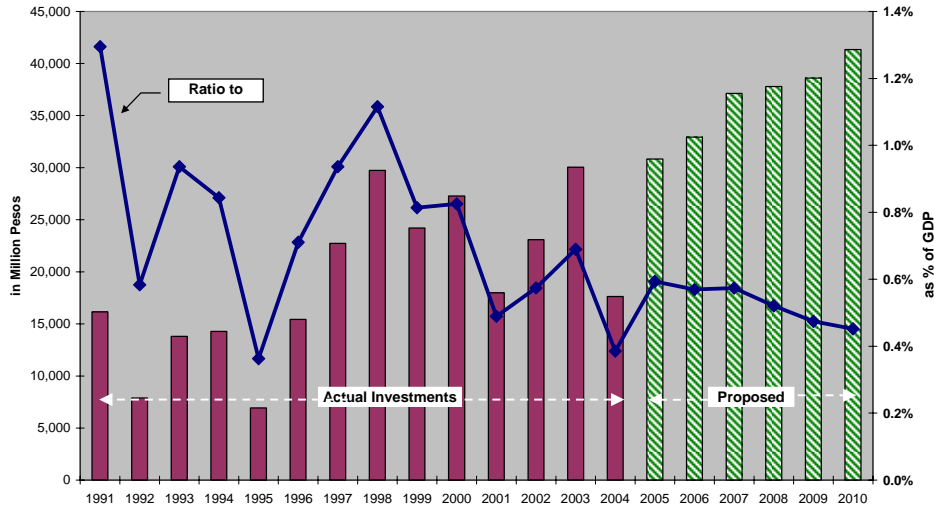
- In the preparation of the Environmental Management and Monitoring Plan (EMMP) during the Detailed Design (D/D) stage, the conduct of new and/or supplementary baseline study for some environmental and social parameters, subject to monitoring during both construction and operational stages of the project, would be necessary at the adequate locations based on detailed monitoring plan.
- The environmental and social impact mitigation/enhancement measures proposed in the EIS shall be confirmed if those are integrated in the detailed design, construction supervision management plan and operational plan to secure the implementation of the proposed measures as well as responsible bodies for each measures.

## **Financial Constraints and Opportunities**

The figure below illustrates the level of investments on roads in the past 14 years and the prospects to year 2010. In terms of road investments as a ratio of GDP; the trend has been on a downward trend – from a peak of 1.3% in 1991 to 0.6% in 2005. This has

forced a deferment in the implementation of many vital road projects; with new big-ticket projects (like the CALA target roads) unable to be accommodated earlier than 2008.

**Figure ES-6 DPWH Historical and Prospective Investments in Roads**



ODA sources to finance road projects are still available, but availments had slowed down due to the lack of counterpart peso funds.

Private-financed infrastructure offered promise from 1992 onwards. But after the 1997 Asian financial crisis, the outlook also dimmed – with three concluded toll road projects (Skyway, Star Expressway, and R-1 Expressway) unable to get financing for their respective next phases.

To wriggle out of such a bleak prospect and to arrest the country’s declining global competitiveness ranking, the government opted to tap the domestic bond market without exceeding the self-imposed limits on the national budget. The strategy called for the National Development Company to float bonds (to the tune of Php20 billion/year) that would be channeled through the Philippine Infrastructure Corporation (PIC), which in turn, shall invest the proceeds into financially-viable infrastructure projects. A secondary benefit of such a strategy is to regain private sector confidence (which has been badly shaken by the NAIA 3 fiasco) in financing Philippine infrastructure. To be eligible for this new source of financing, as much of the CALA target roads as possible have to be transformed into toll roads. The JICA Study Team determined that NS-1 to NS-3 could be implemented under such a scheme.

**Implementation Scenarios**

The financing opportunities offered by PIC and IBRD create three implementation possibilities for DPWH and the CALA target roads. Differentiated as to timing, risks and probable outcomes, the three implementation scenarios are:

- Track A – tender the concession for North-South Road following the BOT Law and along the lines, but learning from the mistakes, of Star Expressway. The winning



bidder shall then form a special project company (SPC) that will be granted a Toll Concession Agreement (TCA) by TRB, conduct detailed engineering, secure financing, build the roads, operate and maintain the toll roads for a prescribed period before turnover to government. Under this scheme, the participation of PIC is residual; the amount and form of its contribution shall come out of the bidding.

- Track B – same procedure as Track A, but without the participation of PIC. DPWH shall then fund the acquisition of right-of-way from its annual budget, and neither can the SPC expect supplementary funding from PIC.
- Track C – envisages a more aggressive role for PIC, who will immediately form a SPC that shall be granted a TCA and finance ROW acquisition concurrently with the conduct of detailed engineering. It will be followed by a privatization tender for the SPC together with its TCA.

Of the three, Track A and C offers the earliest possibility for completing NS-1 – about the 1st Q2011 - but with higher risk of delay for Track A. The best that could be expected from Track B is 4thQ2011, premised on overcoming two high-risk propositions: DPWH is able to finance and acquire ROW from its own budget in 2008, and concessionaire achieves financial closure on time. Track C avoids most of the pitfalls that befell previous BOT/PSP projects in the Philippines, but relies for success on an entity bereft of track record in undertaking such a complex enterprise. A common thread across the three scenarios is NEDA-ICC evaluation and approval. This may take 4 to 6 months - from preparation of documents by DPWH to final imprimatur from NEDA-ICC. However, tendering for North-South Road can be expected to commence only after the May 2007 elections.

### **Implementation Support**

Regardless of implementation track, DPWH has to designate and constitute a Project Management unit under the PMO for foreign-assisted projects - with personnel drawn from the PMO pool. Some road segments or tasks may be assigned and executed by the District Engineering Office of the DPWH. DPWH would also need outside technical assistance (possibly, to be provided by IBRD not later than January 2007) to achieve the following timetable for executing Stage 1 of North-South Road:

- 1st semester 2007 – preparation of bid and other supporting documents for NEDA-ICC evaluation;
- 2nd semester 2008 – prequalification, bid and award of concession

Learning from past toll roads, the concession agreement should contain the following features:

- A fixed toll fee, as determined from the feasibility study, but in no case higher than the highest toll rate prevailing in other expressways. This is meant to avoid the bad experience with Star Expressway.

- An endogenous concession period, instead of fixed at 25-years as in existing toll road concessions. In this manner, the concession period is shortened if traffic and revenues are higher than forecasted; or lengthened, if revenues get anemic.
- Rights to the implementation of NS2 and NS3 will have an expiry period, reckoned from the completion of NS1. In this manner, the conundrum that hit R-1, Star, and Skyway will be avoided.
- Costs of ROW, or part of it, shall be incorporated in the project cost to be covered by the toll fee. Start date of construction shall be reckoned from free possession of land, or completion of design, whichever is later.

The selection of the winning private bidder should be on the basis of minimum government exposure (from either NDC-PIC or DPWH) in the toll road venture. Aside from the cost of ROW, PIC may invest in the project company if so required by the winning bid. Financial capability shall be a key qualifying criterion. If no financing is secured within 3 months of completion of DE or after possession of ROW is conveyed, the PIC shall be granted the right to step in, invest, or takeover the project, in addition to cancellation of performance bond and surrender of the DE documents. The bidding consortium must include a design firm as one of its members, and the cost and schedule for DE shall be stipulated in the bid. The output shall become the property of DPWH in the event of failure to proceed to construction, with a waiver for its use by the successor toll concessionaire. Start date of construction will be reckoned from completion/approval of the detailed design by DPWH (rather than TRB).

### **Conclusion**

The road transportation network of Cavite and Laguna has failed to catch up with the region's rapid growth, thus resulting in increasing traffic congestion. Since this growth has been closely intertwined with Metro Manila, the congestion is more severe on roads that link the provinces to the national capital. This north-south pattern is likely to continue over the medium term – with congestion getting worse before it gets better.

Beyond the medium-term horizon, the high growth rate can be sustained (and influenced) by shifting the orientation of commuting trips inward and east-west, i.e., within the CALA region. Two new arterial roads need to be built over the next 10 years: (a) a North-South Expressway that connects with R-1 Expressway on the north, intersects Daang Hari midway and moves farther south of Governor's Drive; (b) an east-west arterial anchored on extending Daang Hari eastward (labeled as DH-2) to connect to SLEX and westward (DH -4). Both arterials have been found to be economically and technically feasible – with EIRR exceeding 80% for stage 1 of the North-South Road, and 60% for DH-4.

In some short sections of the foregoing roads, the level of service had to be scaled down due to right-of-way constraints. These constraints may worsen, if implementation gets delayed farther – thus the need to accelerate implementation and to reserve immediately the right-of-way of these future roads.

In order to realize the projects sooner, public sector resources need to be leveraged with private sector investments. The aggregate cost for all the road segments ( NS + DH + CE) is ₱26.9 billion. Stage 1 of North-South Road is estimated to require ₱5.2 billion, and stage 2 another ₱8.7 billion. If dependent on DPWH resources only, completion would be delayed by 3 years, at least. The North-South Road can be built on a 'two-in-one' PPP model that combines public and private resources - Stage 1 relying principally on private funds and Stage 2 tapping ODA and public funds. The full cost of DH2 is already being lined up for a BTO scheme by PIC and PNCC, and need not impinge on DPWH budget.

DH3 and DH4 is estimated to need ₱3.1 billion, and has to be put in the DPWH capital program beginning 2008. Right-of-way cost for North-South Road is ₱1.4 billion and ₱419 million for DH3 and DH4. The ROW cost can be reduced if private property developers can be persuaded to convey at book or acquisition value, if not donate for one peso.

The CALA Expressway also showed a high economic feasibility. Its E-IRR accounted for 34-35% for the four (4) sections of CE-1 to CE-4. If CE-5 and CE-6 are constructed as the extension of R-1 Expressway, the entire CALA Expressway will function as an alternative of SLEX, and its economic and social value will be enormous.

### **Recommendations**

The Study Team recommends the following:

- Designation of a Project Steward within DPWH to keep the momentum going for the CALA target roads, and to bridge the gap between study completion and implementation;
- During the detailed design stage, to confirm the environmental and social impact mitigation measures proposed in the EIS and to identify the responsibilities for implementation.
- Decide on which of the three implementation tracks to pursue, and accordingly resolve the pending Memorandum of Understanding with NDC-PIC;
- Bid out stage 1 of North-South Road, on or before June 2007, and secure NEDA-ICC clearance before then;
- For the LGUs, to implement small scale traffic improvement measures on existing corridors, in order to alleviate congestion while new roads are not yet completed;
- Tweak the existing public transport system - consisting of buses, jeepneys, and tricycles – to improve efficiency and slow down modal shift to car use in commuting trips;
- Conduct further study on the 2nd SLEX link of the CALA arterial roads (the eventual alignment of CE-1), since consensus among stakeholders has so far been elusive.