



Technical Assistance Consultant's Report

Transport and Logistics in the Greater Mekong Subregion

Final Report

Asian Development Bank

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ABBREVIATIONS

ADB	–	Asian Development Bank
AH1		Asian Highway 1
ALTID	–	Asian Land Transport Infrastructure Development (project)
ASEAN	–	Association of Southeast Asian Nations
BCP	–	border crossing point
BOT	–	build–operate–transfer
CAREC	–	Central Asia Regional Economic Cooperation
CBEZ	–	cross-border economic zone
CBF	–	cross-border facility
CBTA	–	Cross-Border Transport Agreement
CFS	–	container freight station
CIQS	–	customs, immigration, quarantine, security
CMIT		Cang Quoc Te Cai Mep
COMESA	–	Common Market for Eastern and Southern Africa
COMTRADE	–	United Nations Commodity Trade Statistics Database
DOH	–	Department of Highways
ECF-4	–	Fourth Economic Corridor Forum
ECOWAS	–	Economic Community of West African States
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
EPZ	–	export processing zone
EWC	–	East–West Corridor
EU	–	European Union
FCL	–	full container load
FDI	–	foreign direct investment
FOB	–	free on board
FTA	–	free trade agreement
FTZ	–	free trade zone
GDP	–	gross domestic product
GMS	–	Greater Mekong Subregion
GMS-TSS	–	GMS Transport Sector Strategy Study
HCMC	–	Ho Chi Minh City
IAR	–	initial assessment report
ICD	–	inland clearance (container) depot
IEE	–	initial environmental examination
IFI	–	international financial institution
IMT–GT	–	Indonesia Malaysia Thailand–Growth Triangle
IWT	–	inland waterway transport
JICA	–	Japan International Cooperation Agency

JIT	–	just-in-time
KPI	–	key performance indicator
MITT	–	Myanmar International Terminal Thilawa
MOM	–	minutes of meeting
MPWT	–	Ministry of Public Works and Transport
NAFTA	–	North American Free Trade Agreement
NEC	–	Northeastern Corridor
NEDA	–	Neighboring Countries Economic Development Cooperation Agency
NSC	–	North–South Corridor
ODA	–	official development assistance
O&M	–	operation and maintenance
PBC	–	performance-based contract
Lao PDR	–	Lao People’s Democratic Republic
PPP	–	public–private partnership
PPTA	–	Project Preparation Technical Assistance
PRC	–	People’s Republic of China
RSA	–	Road Safety Audit
RIF	–	regional investment framework
ROW	–	right-of-way
SASEC	–	South Asia Subregional Economic Cooperation
SCC	–	Southern Coastal Corridor
SEZ	–	special economic zone
SMEs	–	small and medium-sized enterprises
SPCT	–	Saigon Premier Container Terminal
SRT	–	State Railway of Thailand
TAR	–	Trans Asian Railway (network)
TEN-T	–	Trans European Network-Transport
TEU	–	twenty feet equivalent (container size)
TCIT	–	<??>
TIR	–	Transport Internationaux Regulations
TOR	–	terms of reference
UNECE	–	United Nations Economic Commission for Europe
UNESCAP	–	United Nations Economic and Social Commission for Asia and the Pacific
VGf	–	viability gap funding
VOC	–	vehicle operating costs

NOTES

In this publication, "\$" refers to US dollars; "ton" refers to metric ton.

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I. INTRODUCTION

A. Background

1. The concept of a Greater Mekong Subregion (GMS) Economic Cooperation Program was initially formulated in 1992. Throughout the intervening 20 years, investments in the transport sector have primarily promoted regional integration, improved connectivity, and to a lesser extent, the direct facilitation of trade among GMS member countries. To a large extent, this remains the case until the present time. In 1995, for the first time under the GMS program, the Asian Development Bank (ADB) formulated a Transport Master Plan that identified priority transport infrastructure investments. In 1998, this Transport Master Plan was updated incorporating the economic corridor concept identifying three main (economic) corridors: North–South, East–West, and Southern. In 2003, the Transport Master Plan was further upgraded when GMS countries agreed to include the GMS Cross-Border Transport Agreement (CBTA)¹ initiative.

2. The 1995 Transport Master Plan served the GMS member countries well for the ensuing 5–7 years, but by 2002, it became clear to GMS political leaders and transport ministers that stronger transport systems and logistics were necessary to increase GMS cooperation and improve economic linkages with other countries and regions. In response to this need, ADB provided in 2004 a technical assistance funding for the GMS Transport Sector Strategy Study, referred to as the GMS-TSS. This was a comprehensive study that developed a GMS transport sector strategy for the period 2006–2015 and designed to (i) identify and prioritize investment and technical assistance projects, (ii) formulate action plans to implement the GMS-TSS, and (iii) redefine and update the GMS corridors.

From the basic three original corridors identified in 1998, the GMS-TSS expanded these to nine corridors,² as listed below and shown in Figure 1.

i.	North–South Corridor (NSC):	Kunming to Bangkok
ii.	Eastern Corridor (EC):	Kunming to Ca Mau
iii.	East–West Corridor (EWC):	Mawlamyine to Da Nang
iv.	Southern Corridor (SC):	Dawei to Quy Nhon/Vung Tau
v.	Southern Coastal Corridor (SCC):	Bangkok to Nam Can
vi.	Central Corridor (CC):	Kunming to Sihanoukville/Sattahip ³
vii.	Northern Corridor (NC):	Fangcheng to Tamu
viii.	Western Corridor ⁴ (WC):	Tamu to Mawlamyine
ix.	Northeastern Corridor ⁵ (NEC):	Thanh Hoa to Bangkok/Laem Chabang

¹ This is a multilateral legal instrument among GMS countries to allow easier (seamless) movement of people, goods, and vehicles across borders of GMS member countries.

² There is a lack of consistency within ADB references as to GMS corridors being referred to as “corridors” or as “economic corridors,” or sometimes a mixture of both nomenclatures. For this report all are referred to as “corridors.”

³ The terminus of the Thailand sub-corridor of the Central Corridor, as indicated in ADB documents, is at the Thai naval base port of Sattahip.

⁴ In some ADB documents, the Western Corridor is still referred to as the Northwest Corridor; in this report, the Western Corridor designation will be used, which is believed to be the current designation.

⁵ The location of the Northeastern Corridor, as indicated in ADB references, has varied over time and was originally connected to the People’s Republic of China.

Figure 1 Greater Mekong Subregion Corridors



Source: Asian Development Bank.

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3. One of the main objectives of the GMS-TSS is to support increased trade among GMS countries. ADB's support for trade facilitation has continued through the years and has been augmented by Project 44174-012: "Support for Implementing Action Plan for Transport and Trade Facilitation in the GMS," which is a cluster technical assistance (TA).⁶ This TA project is designed to have 10 outputs encompassing trade facilitation, transport facilitation, capacity development, and legal and/or regulatory development. In early 2012, as part of this cluster TA, ADB prepared an initial assessment report (IAR) of road transport infrastructure and the associated transport and logistics services for enhancing trade facilitation in the GMS countries (ADB 2012) (hereafter referred to as the IAR). The IAR was presented at the Fourth Economic Corridor Forum (ECF-4) for GMS countries in Mandalay, Myanmar in June 2012.⁷

4. The ECF-4, which aimed to facilitate the transformation of GMS transport corridors into economic corridors and enhance trade facilitation in the GMS, further elaborated the strategic direction of the GMS transport corridor development by widening and deepening the corridors through

- (i) their realignment and/or expansion that is linked to GMS trade flows,,
- (ii) developing economic and/or urban centers in and around the corridors,
- (iii) promoting the economic viability of corridor development by strengthening links with maritime gateways and trade, and
- (iv) enhancing the connectivity of rural areas to the corridors and their urban growth nodes.

5. Subsequently, ADB has determined that a follow-on report, or a second phase of the IAR, was required, hereafter referred to as the Follow-On Study.⁸ This Follow-On Study is designed to expand on the initial IAR findings and to contribute to the ongoing formulation of the Regional Investment Framework (RIF), which will include developing an investment program for implementing the new GMS Strategic Framework, 2012–2022 (or the new SF) (ADB 2011). Progress in the formulation of the RIF was presented and discussed at the ministerial level during ECF-4 where attention was drawn to issues constraining economic corridor development and to proposed actions to address these under the new SF.

6. The new SF established a number of sector and multi-sector priorities. Two of the key priorities are (i) developing the major GMS corridors as economic corridors; and (ii) strengthening transport linkages, particularly roads and railways. The new SF envisions that transport will remain at the forefront of the GMS program for the next decade, and will be guided by the 2006–2015 transport strategy (ADB 2007). This strategy focuses on the development of priority road transport corridors, the reduction of nonphysical barriers to transport and trade, and the eventual transformation of the road corridors into economic corridors. It also recommends broadening the scope of transport systems in the GMS to include not only roads but also railways and other modes of transport (water and air). The program results framework of the new SF for the transport sector is summarized in Figure 2.

⁶ Project No. 44174-01, amounting to \$5.70 million, was provided by a grant for the Government of Australia, envisaged to comprise three subprojects: \$2 million (2010–12) and the second and third subprojects for \$1.85 million each for the years 2012–2014 and 2014–2016.

⁷ The theme of the ECF-4 was "Towards Implementing the New GMS Strategic Framework (2012–2022): Expanding, Widening and Deepening Economic Corridors in the GMS."

⁸ TA-7851 REG: Support for Implementing the Action Plan for Transport and Trade Facilitation in the Greater Mekong Subregion (Subproject 1)—Follow-On Study—Transport and Logistics Assessment (Project No. 44174-022).

Figure 2 Program Results Framework for the Greater Mekong Subregion Transport Sector

Regional Impacts	Increased economic growth, reduced poverty, and environmental sustainability across the GMS countries
 Sector Outcomes	Increased cross-border flows: investment, traffic, labor migration, with reduced human trafficking
 Sector Outputs	Economic corridors established All GMS countries connected to a GMS rail network
 GMS Interventions	Promotion of development of economic corridors and trade facilitation institutions Subregional transport infrastructure and system planning
 GMS Bodies	Subregional Transport Forum

GMS = Greater Mekong Subregion.
Source: Author.

B. Objectives

7. The overall objectives of this Follow-On Study⁹ are (i) to undertake further detailed and in-depth transport and logistics assessments for trade facilitation in the GMS based on the findings of the IAR, and (ii) to identify and/or refine GMS corridors in line with the strategic direction for GMS corridor development.

8. To fulfill these objectives, this TA project needed to undertake the following key tasks:

- (i) a detailed review of the IAR and assess the 8 GMS Key Trade Routes previously identified;
- (ii) a review of relevant studies and/or reports on trade facilitation, the connectivity of major port gateways and rural areas, and urban and/or economic centers being developed along GMS corridors and along other major land routes in GMS countries;

⁹ The Follow-On Study was carried out by the following consultants: Robert M. Anderson, transport infrastructure specialist (team leader); Anthony N. Bayley, trade facilitation specialist; Sudhisakdi Manibhandu, transport economist and private sector specialist; Thana Kamtorpitak, transport engineer; and Panisara Suebchaiwang, research assistant.

- (iii) establish an *integrated approach* to the development of key trade routes along GMS corridors to enhance maritime trade, improve rural connectivity, support domestic and international agriculture trade flows, and to develop urban economic centers;
- (iv) undertake a series of rapid-assessment site visits to certain sections along the identified key trade routes of GMS corridors to gather initial traffic, engineering, transport logistics, economic, and financial information and to carry out interviews and spot consultations with responsible officials and concerned stakeholders;
- (v) identify potential transport investment projects in the context of the *integrated approach* that, when implemented, will facilitate in transforming transport corridors into economic corridors and will integrate the potential projects into overall plans for the development of urban and economic cluster areas along corridors; and
- (vi) prepare a prioritized summary of identified transport projects to include present project status, budget costs, a brief description of probable project impact and outcomes, an assessment of relative economic viability, and an assessment of probable private sector involvement and/or public–private partnerships (PPP). The potential for an ADB participation in project implementation and financing was also to be assessed.

9. As part of the assignment, the trade facilitation specialist and the transport infrastructure specialist (team leader) were invited to join the 16th GMS Transport Forum and present the findings of the IAR.¹⁰

¹⁰ Sixteenth Meeting of the GMS Subregional Transport Forum, Nay Phi Taw, Myanmar, 24–25 October 2012.

II. REVIEW OF THE INITIAL ASSESSMENT REPORT AND RELEVANT STUDIES

A. The Initial Assessment Report

10. The Initial Assessment Report (IAR) was reviewed by members of the Follow-On Study team. The basic results of the IAR and the terms of reference of each individual consultant were used as the starting point of this follow-on work. Since two key members of the present team—the transport infrastructure and trade facilitation specialists—also participated in the IAR, this was a relatively straightforward exercise.

B. Relevant Studies

11. Among the key new reports that have been reviewed for this follow-on report are as follows:

- (i) Trade and Trade Facilitation in the Greater Mekong Subregion (ADB 2012);
- (ii) Myanmar in Transition, Opportunities, and Challenges (ADB 2012);
- (iii) Assessment of Public–Private Partnerships in Cambodia (ADB July 2012);
- (iv) Private Sector Views on Road Transport along the North–South Economic Corridor (GMS Business Forum, draft 22 June 2012);
- (v) RIF Update: Towards Spatial Planning in GMS Economic Corridors, SOM–RIF Meeting, Nanning, People’s Republic of China, 8 November 2012;
- (vi) (vi) Public–Private Partnership Operational Plan, 2012–2020 (ADB 2012); and
- (vii) Transport Efficiency Through Logistics Development (ADB 2012).

12. A complete list of these reports is found in the References.

C. Presentations

13. Since the completion of the IAR, two key forums have taken place. The Fourth Economic Corridor Forum (ECF-4) for GMS countries was held in Mandalay, Myanmar in June 2012, and the Sixteenth Meeting of the GMS Subregional Transport Forum was held in Nay Pyi Daw, Myanmar in October 2012. Members of the consultant team attended both forums, and to the extent possible, the information gleaned from these two forums has been incorporated into this report.

III. TRADE DEMAND, ROUTES, AND POTENTIAL TRADE FLOWS ASSESSMENT

14. This chapter examines the overall and specific trade “demand” of each of the GMS countries and from that identifies the primary trade routes on a national basis, including quantifying the likely flows along the corridors.¹¹ The second section in this chapter examines possible changes in trading patterns that could potentially impact upon future traffic flows or routings, while the final section examines the role of the GMS corridors in the movement of the projected international trade in order to identify the key trade-related sections of the present network, and to detect any potential missing linkages. This leads toward identifying the key GMS trade routes.

15. The transport component of the GMS Strategic Framework is designed to promote the development of the priority transport corridors, which are considered most critical in linking the subregion and promoting trade and investment. This connectivity strategy is multi-dimensional— involving geopolitical, strategic, tourism, pro-poor, and security aspects, among others, as well as purely trade development. Thus, it should be recognized that in assessing the importance of various GMS and any non-GMS routes, this assessment is only addressing the issue unidimensionally—or the likely priorities that will facilitate the movement of international trade—and these priorities may differ when being assessed from other perspectives. The possible priorities in corridor development are evaluated based on overall expected trade demand and includes both intra-GMS trade and third-country trade, because the transport infrastructure is a common resource used in trade movements irrespective of its external origin or destination.

16. While both formal and informal trade move across the GMS borders, when it comes to the more substantial formal trade flows recorded in national trade statistics, the routing patterns of such traffic are not random in nature. Generally, they follow a logical pattern based on service offerings—a blend of cost, time, and reliability—as well as use of the optimal transport mode. Detailed traffic data from the various GMS borders, including sea ports (in terms of tonnage) and numbers of vehicles, rail wagons, containers, and others moving, would provide an accurate profile on how trade is moving around the subregion, for planning purposes. Unfortunately, a comprehensive database of such traffic information does not presently exist. Despite the absence of such data, it is still possible to speculate on the likely trade logistical patterns by using trade statistics to identify the main traffic streams and directions.

A. Trade Demand and Key Transport Routes by Country

17. In this section, the international trade of each country is profiled alphabetically to identify the overall trade “demand” on their national transport infrastructure, with particular emphasis on intra-GMS trade. Trade in the six GMS countries, in terms of both value and estimated tonnage, has been based initially on modeled COMTRADE 2009 data undertaken in the ADB TA on Promoting Regional Infrastructure Development approved in June 2010 and shown in Table 1.

Table 1 Greater Mekong Subregion Trade, by Value and Weight,^a 2009

Country	Exports (in \$)	Weight (tons)	% Total exports by value	Imports \$	Weight (tons)	% Total imports by value
Cambodia	4,573,596,671	14,397,008	100	4,871,957,343	4,868,785	100
Lao PDR	411,767	108	0.01	331,781	1226	0.01

¹¹ The Fourth GMS Economic Corridors Forum (ECF-4) emphasized” the importance of adopting demand-driven approaches (in corridor development), since supply-driven initiatives had not worked well in the past.

Myanmar	–	–	–	–	–	–
PRC	54,095,078	26,203	1.18	1,377,885,917	376,050	28.28
Thailand	77,730,039	546,571	1.70	1,580,541,170	3,314,632	32.44
Viet Nam	214,284,000	148,712	4.69	1,531,599,666	1,576,238	31.44
% GMS			7.58			92.17
Lao PDR	1,109,049,985	1,668,002	100	2,430,580,517	1,963,381	100
Cambodia	331,780	1226	0.03	411,767	108	0.02
Myanmar	–	–	–	–	–	–
PRC	367,319,183	496,529	33.12	376,649,989	92,548	15.50
Thailand	462,708,022	1,112,730	41.72	1,642,617,678	1,781,593	67.58
Viet Nam	278,691,000	337,423	25.12	160,342,217	232,145	6.60
% GMS			99.89			89.70
Myanmar	5,876,644,044	9,933,104	100	6,260,782,308	5,252,963	100
Cambodia	–	–	–	–	–	–
Lao PDR	–	–	–	–	–	–
PRC	646,122,186	2,298,028	11.00	2,261,242,729	1,254,809	36.12
Thailand	2,781,573,575	9,131,371	47.33	1,554,666,443	2,495,124	24.83
Viet Nam	–	–	–	–	–	–
% GMS			58.33			60.95
PRC	1,201,646,758,080	1,158,153,692	100	1,005,555,225,206	1,175,372,332	100
Cambodia	1,377,885,917	376,050	0.11	54,095,078	26,203	0.01
Lao PDR	776,649,989	92,548	0.06	367,319,183	496,529	0.04
Myanmar	2,261,242,729	1,254,809	0.20	646,122,186	2,298,028	0.06
Thailand	17,028,921,054	5,853,776	1.42	16,123,831,401	14,333,725	1.60
Viet Nam	15,973,552,000	9,156,107	1.33	4,850,109,958	18,495,257	0.48
% GMS			2.93			2.10
Thailand	152,497,202,591	102,695,182	100	133,769,638,813	134,264,584	100
Cambodia	1,580,541,170	3,314,632	1.04	77,730,039	546,781	0.06
Lao PDR	1,642,617,678	1,781,593	1.08	462,708,022	1,112,730	0.35
Myanmar	1,544,666,443	2,495,124	1.01	2,781,573,575	9,131,371	2.08
PRC	16,123,831,401	14,333,725	10.57	17,028,921,054	5,853,776	12.73
Viet Nam	4,678,330,690	7,632,428	3.07	1,385,390,294	1,749,038	1.04
% GMS			16.77			16.26
Viet Nam	62,685,129,696	55,503,413	100	30,302,407,903	17,619,186	100
Cambodia	1,531,599,666	1,576,238	2.44	214,284,000	148,712	0.71
Lao PDR	160,342,217	232,145	0.26	278,691,000	337,423	0.92
Myanmar	–	–	–	–	–	–
PRC	4,850,109,958	18,495,257	7.73	15,973,552,000	9,156,107	52.71
Thailand	1,385,390,294	1,749,038	2.21	4,678,330,690	7,632,426	15.44
% GMS			12.64			69.78

^a Weight is estimated.

– = no data, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic, Myanmar = Republic of the Union of Myanmar, PRC = People's Republic of China.

Source: COMTRADE data from ADB (2010c).

18. An analysis of Cambodian trade suggests that the most important road route is likely to be the southern sub-corridor of the Southern Corridor (Asian Highway 1 or AH1) westward through Poipet into Thailand and eastward through Bavet into Viet Nam. In addition, the southern end of the Central Corridor between Phnom Penh and Sihanoukville (AH11) is considered to be important, especially for third-country trade. The Mekong waterway link between Ho Chi Minh City (Saigon Port) is also significant, especially for lower-value bulk traffics. Trade movement along the Southern Coastal Corridor, the northern sub-corridor of the Southern Corridor through Siem Reap, and the Central Corridor north of Phnom Penh are all considered to handle only limited amounts of international freight traffic and therefore be less of a development priority.

19. The initial assessment of the Lao People's Democratic Republic (Lao PDR) trade suggests that the key route is the Central Corridor western link between Vientiane and Bangkok (AH12), with much lower volumes on the same corridor north to the Chinese border. The North–East Corridor, the East–West Corridor, and the Central Corridor east and south of Vientiane are likely to only handle relatively small volumes of trade in comparison. The Route 12 between That Hek–Ha Tinh in Viet Nam could be a growing trade corridor, but is still minor compared to the Central Corridor.

20. The key transport routes for trade in Myanmar are expected to be the main road and rail link between Mandalay and Yangon (AH1), which includes part of the Western Corridor feeding to and from Yangon Port. It is noted that the road section between Meiktila and Mandalay by road, and the rail links between Thazi and Mandalay, are not on GMS corridors, but could be important in trade terms nationally. The next most important route for trade is likely to be the road connection with Thailand through the Myawaddy–Mae Sot border crossing. The Northern Corridor between Mandalay and the People's Republic of China (PRC) border at Muse is also reasonably heavily trafficked. The northwestern part of the Western Corridor link beyond Meiktila, the Northern Corridor west of Mandalay and the North–South Corridor link through Tachileik and Mongla, appear unlikely to be handling large volumes of international trade traffic.

21. No detailed analysis was undertaken of overall trade for the PRC because only Yunnan Province and Guangxi Zhuang Autonomous Region are included within the GMS initiative and data by province is not readily available or reliable. Neither area is considered to be a significant trade generator when compared to the eastern seaboard or the Pearl River Delta industrial conurbations. Most of these areas consist of mountainous terrain. The low volumes of trade crossing between these GMS areas and Viet Nam, Lao PDR, and Myanmar relative to the total trade between these countries tend to confirm this perception. The key trade corridor in the GMS area of the PRC is expected to be the internal sections of the Northern Corridor between Kunming and Nanning and connecting southward to Fangcheng port. However, more research is needed to establish how trade-oriented these two areas of the PRC are, and identify the origins and destinations of such traffic in a GMS context. The Northern and North–South corridors have been identified as important land routes, especially for fruit and vegetable traffic between Kunming and Myanmar, and between Kunming and Thailand.

22. Thailand is the largest individual trading partner in the GMS area, but most trade is carried using the maritime mode, with comparatively small volumes being carried by road, rail, and air. Hence, the key trade routes consist of connections between the two main ports and the hinterland. However, the North–South Corridor linking the ports with Chiang Mai and Chiang Rai and the Central Corridor connecting with eastern Thailand and Lao PDR would also be expected to be important trade corridors. The North–South Corridor transiting Lao PDR represents the direct link between northern Thailand and Yunnan and there are indications that traffic on this route is growing fast.

23. International trading activity in Viet Nam tends to be concentrated around the Mekong Delta in the South and the Red River Delta in the north. The overall trade profile suggests maritime trade will dominate, especially through Saigon Port in the south and to a lesser extent Hai Phong in the north, in addition to the coal shipments out of Ha Long. The most important trade corridor in the south is the Eastern Corridor north and south of Ho Chi Minh City feeding traffic to and from Saigon Port, and the Southern Corridor AH1 connecting to Cambodia. In the north, the most important link is the Ha Noi–Hai Phong extension of the Eastern Corridor. The next important corridors are the road and/or rail links between Ha Noi and the PRC through Lao Cai and the Lang Son road links, but these would be expected to contain much less trade traffic.

The Eastern Corridor between Ha Noi and Ho Chi Minh City is a critically important domestic freight corridor, but probably carries only limited amounts of international trade outside the northern and southern delta areas. The East–West, Southern Coastal, and northern arm of the Southern Corridor are not considered to be significant trade routes.

24. Among the five GMS countries, intra-GMS trade amounts to approximately 30 million tons per annum. It is estimated that 22 million tons or approximately 70% moves between countries using the maritime mode, with inland collection or delivery by road or rail. Approximately 8 million tons move by road through the land borders with the main connections being as follows:

- Cambodia–Thailand (Poipet–Aranyaprathet),
- Cambodia–Viet Nam (Bavet–Moc Bai),
- Lao PDR–Thailand (Vientiane–Nong Khai), and
- Myanmar–Thailand (Myawaddy–Mae Sot and Tachilek–Mae Sai).

25. If trade with the PRC is added, this could mean an additional 60 million tons in total trade to and from GMS countries, but it is estimated that only about 2.5 million relates to the GMS region. This would mostly move through the land borders and the main connections are likely to be as follows:

- Myanmar–PRC (Muse–Ruili),
- Thailand/Lao PDR–PRC (Boten–Mohan), and
- PRC–Viet Nam (Hekou–Lao Cai and Pingxian–Lang Son).

B. Potential Impact of Future Changes in Trading Patterns

26. This section discusses the potential changes in future trade demand and its implications on modal transport patterns used for both external and intra-GMS trade movements. The subregion has experienced impressive trade growth over the last decade, which if continued will create increasing demands on the national transport infrastructure, especially along parts of primary trade corridors, particularly on road networks closer to the seaports. A key issue is whether this growth in trade is inexorable or whether there may be a gradual “leveling out” in the growth rate resulting from changes in both the internal and external environments.

27. The GMS area is a dynamic region and improvements in transport infrastructure take several years to implement. Hence, it is important to identify issues in advance that could potentially affect future trade routings. Probably the major subregional change will be the introduction of the ASEAN Economic Community due to be launched in 2015. This development is intended to promote intra-GMS trade by means of simplified trading and border procedures. At this stage, its likely impact is unknown, but it would be expected to generate increased land transit traffic movements among member states using existing routes, rather than impacting on one particular route in favor of another. Despite this trend, the maritime mode is likely to remain dominant in trading among the GMS countries, not only for third-country traffic but in many cases also for intra-GMS trade.

28. While there is general agreement that Asia is likely to be the primary growth area of the 21st century, there is increasing evidence emerging that previous predictions of continued growth at recent historical levels may not be sustainable. To a greater or lesser extent, the GMS

countries consist of export economies and the economic problems in Europe, and currently to a lesser extent in the United States (US), are already constraining export demand from the region. Deleveraging, both nationally and by consumers, in these developed markets is likely to continue in the short to medium term (over the next 5 years) and this will have an adverse impact on emerging and developing economies, especially on export-oriented economies such as the GMS countries as the developed markets continue to be their major export markets. While to a certain extent this may be partially offset by stimulating growth in their domestic markets, such remedial strategies take time to implement and are considered unlikely to generate significant additional intra-GMS export trade, mainly due to the synergies in their export products.

29. During 2012, there have been moves to increase the minimum wage in several Southeast Asian countries. While this may have both appreciable poverty alleviation and political benefits, industrialists are expressing increasing concern at the potential erosion of a key factor—cheap labor—that has been a core driver in the growth of exports within the subregion. The resulting overall increase in labor charges is occurring at a time when labor costs are relatively static, or even falling, in many developed countries. Thus, the historical manufacturing and production cost differentials, which have been in part responsible for the impressive trade growth, may now be narrowing. This is not to suggest that the subregion will become uncompetitive, but more on suggesting that competition for producing certain types of manufactured products may be increasing. Industries, such as clothing and shoe manufacturing, rely on low labor costs and already face increasing competition from South Asia. An additional concern is the gradual increase in social costs in some of the GMS countries arising partly from demographic changes with an aging population and smaller workforce to support it, such as in the PRC. This may not only push up labor costs, but constrain spending on consumer products, which represent a significant proportion of the subregion's higher-value exports. As labor costs rise, increased emphasis is likely to be on productivity and quality control to retain competitiveness. Even within the subregion, there are appreciable differences in these parameters that will affect the level of foreign direct investment (FDI) in particular countries. Competition for FDI among GMS countries is expected to intensify in the short to medium term.

30. Previous studies, such as ADB's Asia 2050 study (ADB 2011e), have highlighted the potential growth of the "middle class" in the Asian region with its increased spending power. Indeed, by 2050, the majority of the world's middle class will be based in the Asian region. This situation is predicted to be a major stimulus to overall trade demand and if this were widespread throughout the GMS area, it could lead to significantly increased intra-GMS trade. However, the rate at which this wealth and/or spending power permeates each country's society is likely to vary significantly. There are already indications that this permeation process may be slower than originally expected and this could potentially constrain demand growth within the subregion.

31. The changes in multinational manufacturing patterns could also impact on a number of the GMS economies. The 2012 tsunami in Japan, in particular, stimulated multinationals to consider adjustments in their production strategy. A good example was in the auto sector whereby production was affected globally because certain key parts were only produced at a single location in Japan. This has led multinationals to reexamine the security of their supply chains, and in some cases, to place more emphasis on the multi-sourcing of a product rather than to rely on a single source. This trend toward a more diverse sourcing and production could have some impact on the region's exports, but it is too early to assess nationally at this stage.

32. The effect of increasing wage costs and global competition is likely to focus more attention on minimizing trade logistics costs. Inland transport costs in the subregion generally remain relatively high due to a combination of low transport efficiency and trade traffic imbalances, in addition to general trade and transport facilitation constraints. This situation is expected to put increased pressure on export-related manufacturing and processing firms to locate closer to the ports, rather than be dispersed over a wider hinterland. The trend, where industrial development is concentrated in major conurbations, particularly close to seaports, is expected to continue with labor gravitating toward these centers of demand rather than production moving to areas where labor may be cheaper, but transport costs higher. This suggests that within the GMS transport corridors, only certain sections may have the potential to become viable economic corridors, rather than the corridor in its totality.

33. There is indirect relationship between growth in trade value and tonnage terms. Growth in trade value usually grows faster than tonnage, but slower growth in trade in value terms will inevitably be reflected in lower tonnage growth, assuming the profile of commodities being traded broadly remains constant. Changes in the major commodities being traded would have a major impact on traffic volumes, particularly on items such as petroleum and coal, which represent a significant element of overall trade in the region, both externally and intra-GMS. The economic environment of the construction sector will also impact on the levels of intra-GMS trade, given the prominence of cement and steel in subregional trade. At this stage, there is no evidence to suggest major changes in commodity profiles, other than potentially Viet Nam, which may become more of an oil product distributor to other GMS countries given its numerous refineries coming on stream. There is also the potential for increased mineral exports from the Lao PDR and Myanmar, as they open up to the global market.

34. The above overview suggests that the growth rates experienced in recent years are probably not inexorable and the downside risk of slower growth in tonnage terms is appreciable. The exception is likely to be Myanmar, where conditions are expected to change markedly with the lifting of sanctions; hence, reliance on historical performance in recent years would be inappropriate. Nonetheless, even with lower growth, the overall intra-GMS trade is expected to perhaps double every 10 years, compared with the 3–4 year cycle in recent years. This will place additional pressures on international transport services and to the transport infrastructure in particular.

35. In 2009, GMS countries—excluding the PRC—generated approximately 450 million tons of trade per annum. Of this volume, an estimated 420 million tons needed to be conveyed by maritime transport because it was trade outside the region and had no modal alternative. Assuming a doubling of volume in 10 years, this means that the tonnage to be carried by the trade logistics system will surpass 1 billion tons early in the next decade. Even if intra-GMS trade were to grow faster than this external trade, non-GMS trade would still only represent around 80%–85% of overall trade tonnage by 2020. Thus, maritime transport will remain the primary transport mode, irrespective of any more rapid projected growth within intra-GMS trade.

36. Intra-GMS trade was estimated (in previous section) currently at around 30 million tons per year, excluding the PRC, in addition to some 2.5 million tons among GMS countries and the two GMS regions of the PRC. The overall growth rate is likely to be influenced by events in Myanmar, as well as possible changes in mining and fuel shipments. However, given that intra-GMS tonnage only represents around 10% of total tonnage and 70% of that moves by sea, the dominance of maritime transport is unlikely to be contested even for intra-GMS traffic.

37. It is important to note that trade growth in the maritime sector is more easily accommodated, given that it operates in a global market and thus is more responsive to supply and demand factors. Increases in traffic can be addressed by the early provision of more or larger vessels, or alternatively through reduction by relocating vessels to other markets or temporary lay-up. However, in the case of road transport, even a relatively small increase in trade volume can have a significant impact on the use of the transport infrastructure, in a way not so visible in the maritime mode. Thus, merely because of possible lower growth in intra-GMS trade than that experienced in recent years and the dominance of maritime transport does not imply that there is no need to improve surface transport connectivity. Most maritime transport uses the road infrastructure as part of its trade logistics, and although surface transport between GMS countries may be a minor part of the overall trade, nonetheless, they are critical to trade performance within the subregion.

38. A key modal issue is whether rail is likely to emerge as a significant competitor in the foreseeable future. The importance of railways in trade logistics is unlikely to rise in the short to medium term due to poor international connectivity, limited coverage, and other constraints. Areas where rail could compete are only in the long distance, over 350 kilometers (km), and in the transport of goods in trainload proportion, such as fuel, coal, minerals, cereals, fertilizer, cement and others, and even block trains of containers. However, rail is unlikely to be competitive in much longer distance journeys, if there is a maritime alternative. The mode could become more important in bilateral movements between Thailand and the Malaysian ports, and among the Lao PDR, Viet Nam, and the PRC for bulk mineral movements. A more likely role may be in the collection and distribution of certain types of “bulk” trade to and from the seaports. Thus, the rail’s primary potential may be more in the domestic rather than international transport market.

39. It is clear the major changes in trade in the GMS will mainly relate to developments in Myanmar. The gradual removal of sanctions, if sustained, would be expected to generate a significant increase in trade with that country. Currently, in its constrained situation, the country is highly dependent on trade with its immediate neighbors, especially Thailand and the PRC. A less restricted trade environment would be anticipated to result in an increase in the diversity of its trading links. While trade with these two GMS countries will continue to grow, non-intra-GMS trade would be expected to grow much faster in the short to medium term, thus suggesting that most of the trade growth would be accommodated by the maritime mode. This, in turn, indicates increased pressure on maritime infrastructure and connectivity to port hinterlands within the country. Despite this, Myanmar’s intra-GMS trade will increase appreciably especially with neighboring Thailand and the PRC. It is estimated that, currently, around a third of its trade with Thailand passes through its road border posts (or across the river due to damage to the bridge at Mae Sot) and this trade expansion will place additional pressure on the efficiency of the cross-border road linkages. The trade increase with the PRC may be less dramatic, as the removal of sanctions will probably have less impact on the PRC–Myanmar trade.

40. Thailand is the largest among the GMS countries in terms of external trading. There is no indication that its current reliance on external GMS trade, relative to intra-GMS trade, will change significantly. Trade with other GMS countries, excluding the PRC, accounts for only about 5%–8% of its overall trade in value and tonnage terms, thus, maritime connectivity to its primary external markets would be expected to continue unabated. Any increase in trade with Myanmar would not be of sufficient magnitude to appreciably change the overall balance between intra-GMS and external GMS trade, and therefore, the static overall modal balance. However, it is clear that traffic through the land borders will increase, especially with Myanmar if the routes were improved, and with both Cambodia and the Lao PDR, assuming their

economies continue to grow. Expansion in its trade with the PRC and Viet Nam are likely to remain predominantly carried by sea.

41. In Thailand, there is concern about the rising labor costs versus its competitors in Southeast Asia in the medium to longer term. Increases in the minimum daily wages and other related costs are creating pressures on export industries to downsize or relocate away from the current industrial concentrations. The latter could lead to either moving production further inland in search of cheaper labor, such as is occurring in the PRC, or alternatively, attracting additional lower-cost labor from inland to gravitate toward the major seaboard production areas. To date, the latter strategy of labor mobility has prevailed suggesting that the transfer of export production processing zones inland toward the north, east, or south of the country is likely to be a slow, gradual process. This trend suggests that minimizing trade logistics costs is considered more important than labor costs and stresses the importance of keeping industry close to the gateway ports. The current concentration of trade demand around Metropolitan Bangkok and the Eastern Seaboard is, therefore, not expected to change in the near future.

42. Viet Nam is in a similar trading position in that only 5%–8% of its trade is with other GMS countries, excluding the PRC. Thus, maritime trade will continue to be dominant. The inclusion of its bilateral trade with the PRC is unlikely to change this due to the dominance of coal exports and steel and fertilizer imports, almost all of which are shipped. As Viet Nam develops, its potential for increased imports from the PRC is good, responding to the anticipated increase in individual spending power, although unfortunately, the two GMS areas of the PRC do not appear to be likely primary sources for such products. As a result, expansion of the PRC–Viet Nam trade will continue to be dominated by maritime traffic. The concentration of trade activity in the south versus the north is expected to continue despite recent, more rapid industrial expansion in the Red River Delta area. The growth of the Saigon Port complex, which will be able to handle larger container ships, will potentially mean further improvements in maritime connectivity using “mother ship” calls as opposed to feeder vessels. This will also increase its attractiveness, not only as a manufacturing center in Viet Nam, but also as a gateway to Cambodia.

43. As to the PRC, the key issues are likely to be whether the country is interested in using Hai Phong port as opposed to transiting longer distances to its own ports. At this stage, high growth on the Kunming–Hai Phong route appears questionable due to the limitations of Hai Phong—it only has feeder port status. The PRC has been investing in strategic road and rail linkages with the Lao PDR and Myanmar, but the debate is likely to be whether this will generate significant volumes of new trade or be used to carry existing levels of trade more efficiently.

44. The Lao PDR is likely to remain the most dependent on trade with its neighbors, partly reflecting its landlocked location, with higher trade logistics costs and partly due to its relatively small market size. There is no evidence at this stage to indicate that the wealth generation in the short to medium term will be sufficient to significantly increase imports, or that its exports will expand, other than perhaps in the mining sector. Mining expansion may be constrained by access to the global market, such as through Viet Nam, by the high logistics costs and the volatility of mineral prices, especially copper.

45. Cambodia is in a similar position, with little evidence of any changes in its trade environment. Its reliance on imports from Viet Nam and Thailand is expected to continue, particularly of fuel and construction materials, the same as its dependence on external markets for its exports. The export garment industry is reliant on preferential arrangements with the

European Union and the US and this may come under increasing pressure with the economic difficulties in those regions. The only other significant change is the increased importance of Viet Nam as a transit country due to the development of Saigon Port as a major competitor to Sihanoukville.

46. The overall assessment is forecast to be as follows:

- Annual growth rates for trade tonnage in the GMS countries is more likely to decrease below current levels than increase in the short to medium term, especially for exports, due to internal and external market factors.
- The balance between intra-GMS and external GMS trade in most countries is unlikely to change significantly, which means that the maritime mode will continue to dominate.
- Developments in Myanmar will generate more trade, but this is more likely to be trade with non-GMS countries if it follows the trade pattern seen in the other GMS countries.
- Despite the dominance of maritime traffic, road will continue to be important in bilateral GMS trade, albeit a minor segment of overall trade. However, even a relatively small increase in tonnage can have a major impact on international road traffic due to the small-load sizes. This suggests that a priority road infrastructure investment will be needed on key sections of the GMS corridors that pass through busy borders and are close to major seaport conurbations.

C. Profile of Greater Mekong Subregion Corridors in Trade Facilitation

47. This section assesses each of the GMS corridors from a transport and logistics provider perspective to help identify the primary trade demand and pinpoint the potential constraints that represent barriers to either trade or transport performance. The assessment concentrates mainly on the "hard" infrastructure aspects of the trade routes used by the international transport and logistics operators.

1. North–South Corridor

48. From a trade facilitation perspective, this is probably the most important trade route with the heaviest demand. The key section is at the southern end as it gets closer to Bangkok and links in with the eastern ring road connecting through to Laem Chabang. As the route moves further north beyond Tak, trade volumes decline. The central section of the corridor—the eastern loop between Thailand and the PRC passing through the Lao PDR—is considered more important than the western link, which involves more transshipment and problems in transiting through Myanmar. The link between Mohan and Kunming has trade, but given the reliance on border market trading, most southbound "trade" traffic from Kunming is, in reality, a domestic movement to the border area.

49. The main constraints on this corridor lie at the middle section between Chiang Rai in Thailand and Boten in northern Lao PDR. The Thailand section between Chiang Rai and the border at Chiang Khong is still under construction as of 2012, thus lowering average driving speeds. However, the major problem is the river crossing at Chiang Kong, Thailand to Houayxay, Lao PDR across the Mekong River. Trade movements are via ferries or are transshipped or loaded onto river transport. The \$47 million Fourth Mekong Friendship Bridge is under construction and when completed in 2014, it will remove the last remaining obstacle to road transporters. At that stage, the Mohan border is expected to become an important transshipment center for the PRC and Thai vehicles, either cross-docking or via the border market system with intermediate storage.

50. However, it is important to note the trade traffic on the northern and central sections are expected to be light compared to the southern end. This is because of the heavier import and export demand relating to Thailand's non-GMS trade being around the Bangkok conurbation and along the corridor to the north of the city, and the role of Bangkok and Laem Chabang as gateway ports. In addition, the majority of Thailand's bilateral trade with the PRC is expected to continue to use the maritime route, mainly because the areas of demand are along the seaboard in both countries. Completion of the corridor through the Lao PDR would be expected to generate new demand, particularly relating to cross-border trade, but major long-distance road traffic flows between Bangkok and Kunming are not expected due to the high costs, other than premium traffic, such as fresh fruit and vegetables, which can withstand such higher transport costs. Some transfer of traffic from inland waterway transport to the road mode is likely, once the bridge is completed and transport becomes more efficient through the Lao PDR.

2. Eastern Corridor

51. Trade activity on this corridor is concentrated in the south in the environs of Ho Chi Minh City and in the north radiating out from Ha Noi. The link between Ha Noi and Ho Chi Minh City AH1 is important domestically, but trade activity tends to be concentrated around the two deltas rather than moving between them. The most important link in the north is between Ha Noi and Hai Phong, which handles external trade passing through the port. The next important link is between Ha Noi and Lao Cai, which is being developed by ADB. This is considered to be important in the context of bilateral trade with transshipment at the PRC border at Hekou. This link is also a rail corridor, though the line on the PRC side has yet to be reopened and the link between the border and Ha Noi is used mainly for apatite cargo (a mineral used in the manufacture of fertilizer). In addition, there is the northeastern spur between Ha Noi and Nanning, freight volumes on this route are significantly less than through Lao Cai. All three spurs link out from Ha Noi and are currently being developed and on completion, this should eliminate any hard infrastructure constraints.

52. A key consideration is the potential to route Kunming traffic through Hai Phong port. This logistics strategy was included in the development of the Lao Cai–Ha Noi motorway link, but did include other traffic flows. The possibility that Chinese exporters and importers will use Hai Phong appears weak. There are several key reasons for this.

- (i) Firstly, the PRC sells its exports based predominantly on ex-border warehouse or more commonly through the free on board (FOB) Chinese port. If the exporter were to use Hai Phong port, that exporter would have to persuade the overseas importer to take delivery at the Hekou border or sell at ex-Hai Phong accepting the transit cost across Viet Nam. Neither possibility looks easy and is not compatible with PRC policies at other land borders.
- (ii) Secondly, Hai Phong suffers from draft problems, which indicates that it will remain a feeder service port for the foreseeable future. This places it at a disadvantage compared to Shenzhen and Hong Kong ports. Indeed, many of the feeder ships calling at Hai Phong hub are out of these ports.
- (iii) Thirdly, the extra facilitation costs of transiting through another country compared with a domestic movement within the PRC suggest that any distance advantages would be neutralized by these extra costs. The conclusion is there may be limited traffic, but possibly not the major flows suggested by previous assessments.

53. It can be argued from a transport and logistics perspective that the lack of through-transport through the PRC borders is a potential barrier to trade. This system of selling from border warehouses or ex-transport vehicles at the border entails overall transport inefficiencies. This trading approach is used at all PRC land borders with restrictions on access by foreign vehicles beyond these designated border markets. Chinese vehicles do transit into neighboring countries, though usually on a restricted basis. However, it can also be argued that traders prefer this system as they do not have to concern themselves with internal transport and border costs within the PRC, thus making it easier to trade. There appears limited pressure from traders to change the system within the foreseeable future.

3. East–West Corridor

54. This is not considered to be an important corridor from a trade logistics perspective, except at the western end linking Thailand with Myanmar. Current trade has been restricted by sanctions and difficult economic conditions in Myanmar, and by complex logistics involving significant use of non-transparent approaches. The damage to the bridge between Mae Sot and Myawaddy resulted in the imposition of a 12-ton weight limit, thus excluding heavy transport crossing. Most traffic passes through the 25 river ports and/or quays and is reloaded onto local transport for distribution within Myanmar.

55. The present major constraint is the damaged bridge, combined with the lack of a through-transport agreement. At the time of the study, it was difficult to obtain reliable and consistent rates and, therefore, much of the traffic is considered to change ownership at the border by using ex-border trading terms. There are also significant issues over whether the trade is formal or informal. The “soft” infrastructure of border processing and transport agreements in Myanmar will need to be addressed as a priority as the country opens up to external markets, particularly as trade with Thailand is expected to expand rapidly. Addressing these nontariff barriers is expected to facilitate this bilateral trade.

56. The main hard infrastructure issue, other than the bridge, is the road network inside Myanmar. Although Thailand funded the first 17 (kilometers) km, this road is in a poor state and needs rehabilitation, as does the Asian Highway 1 or AH1, all the way to its connection with the main north–south road at Payagyi. Part of this road uses one-direction traffic for one day, and then the reverse direction for the next day, thus increasing transport costs. The important trade corridor is from the border to Yangon, rather than the current routing to Mawlamyine, which has negligible trade potential. The road from the border to Kawkaik and the bridge repairs will be funded by the Government of Thailand, but this still means that the poor road between Kawkaik and Payagyi will continue to be a constraint. From a trade facilitation perspective, this is considered to be the priority hard infrastructure development on this corridor. While the hilly section of the road between Tak and Mae Sot is only a two-lane road, this should not be a major constraint as the average driving speeds are restricted over this section anyway due to the nature of the terrain.

57. At the west of Phitsanulok, the route carries limited volumes of trade with low traffic levels through the border crossings. The major reasons are due to the low demand with no significant centers of demand and/or conurbations, and because Da Nang is only a small port with limited maritime connectivity and thus is not a gateway port to this corridor. While there are developments taking place to establish border special trade zones, it is considered unlikely that this part of the corridor will develop into an important trade route, given its current and potential future demand profile. Even with the resolution of any outstanding “soft” infrastructure issues, it would not be expected to have any real impact on trade volumes.

4. Southern Corridor

58. This is an important trade corridor between Bangkok and Ho Chi Minh–Vung Tau. The major trade flows are expected to be between Bangkok and the entry to Highway 359, which is being upgraded by ADB, and the connecting link roads down to Laem Chabang. This is because it forms part of the eastern seaboard and has significant numbers of export industries. From Highway 359 eastward, the trade volume drops significantly and is restricted to bilateral trade passing through the Aranyaprathet–Poipet, mainly destined for Phnom Penh. The link between Phnom Penh and Ho Chi Minh City through Bavet–Moc Bai is becoming increasingly important as Saigon Port develops. The heaviest volumes in the Viet Nam section are around Ho Chi Minh City, and in the future, the new container areas out toward Vung Tau.

59. This route has significant “soft” infrastructure issues, especially the transport arrangements that result in transshipment at the land borders. From June 2012, Thailand’s transport will be allowed into Cambodia and vice versa but on a restricted basis (40 permits only, including buses). Viet Nam’s transport can enter Cambodia and vice versa with the number of permits being gradually increased to 500. It is clear that in the short term, there will be insufficient permits to cover the trade growth and border transshipment will continue, particularly at the Aranyaprathet–Poipet border. It is unlikely that Thailand’s vehicles will transit all the way through to Viet Nam and vice versa as Thai trucks are right-hand drive and both Cambodian and Lao PDR trucks are left-hand drive. There are indications that competition for services between Aranyaprathet and Phnom Penh may be limited due to arrangements between the main operators.

60. The hard infrastructure is less of a constraint. The major problem is the road to the east of Phnom Penh to Neak Luong, and the bridge over the Mekong River at that point. The road is being upgraded by ADB and the bridge is already under construction, with the assistance of the Government of Japan. Thus, the road infrastructure constraints are being addressed and theoretically should be resolved soon. This would be expected to result in more trade on the Phnom Penh to Saigon Port route, particularly as the port further develops and starts to handle more mainline vessels. The need for more permits confirms that demand on this route is high. There is congestion through Phnom Penh with proposals for a ring road, although trade moving along the corridor tends to be to or from the city, rather than just passing through. There is unlikely to be significant road freight traffic from Thailand to Ho Chi Minh City as most trade uses the maritime connection. Development of the bypass may be important domestically, but its significance in trade development is more difficult to assess.

61. There is already heavy congestion at the Aranyaprathet–Poipet border, which will become a more serious issue as bilateral trade expands. The basic problem is the mixing of passenger and freight traffic and the high volumes of passenger traffic to the casinos, together with their positioning. There is a clear need to separate the two traffic streams by means of a separate freight crossing—a similar strategy to the one adopted by Thailand for its border crossings with Myanmar. This is considered the priority development on this corridor, from a trade facilitation perspective.

62. The western section between Bangkok and Kanchanaburi would be expected to handle some volumes of Thailand’s trade, but west of Kanchanaburi, the volumes become negligible. The key issue is whether Dawei Port will generate major trade flows acting as a westerly gateway port. Indications are that Dawei will principally be a heavy industry port and is unlikely to attract container traffic. The speculative nature of the area’s development has constrained

Dawei's development, though more recently, the Government of Thailand is indicating financial support, particularly in developing the road link between Kanchanaburi and Dawei. The northern sub-corridor of the Southern Corridor through Siem Reap in Cambodia to Cuy Nhon in Viet Nam is not considered to be handling significant trade flows and Quy Nhon does not possess the potential to become a gateway port.

5. Southern Coastal Corridor

63. The Southern Coastal Corridor is not considered to be trade corridor other than at the western end along the Thailand seaboard. The only significant restriction at the moment is the poor connectivity into Laem Chabang Port, which has been expanding faster than the capacity of the supporting road network in the immediate vicinity of the port.

6. Central Corridor

64. The Central Corridor runs south from the PRC border to Vientiane and then splits into an eastern arm running south into Cambodia and a western arm into Thailand. The section north of Vientiane is not a major trade corridor, mainly due to the limited bilateral trade between the Lao PDR and the PRC. The main trade corridor is the western arm, although possibly not with the current alignment. Indications are that a high percentage of trade is done between Bangkok and Vientiane, including external trade as importers prefer to use Bangkok Port as a gateway rather than Laem Chabang, or use the Lat Krabang inland clearance (container) depot (ICD). The reasons for this trend is not entirely clear, but it probably relates to a combination of factors where much of the traffic originates in the Bangkok Metropolitan area and the availability of lower transport rates. Thus, the primary trade route is probably Vientian–Nakhon Ratchasima–Bangkok.

65. On this corridor, the main issues relate to the Nong Khai–Thanaleng (Vientiane) crossing. Under the Cross-Border Transport Agreement (CBTA), Thailand's vehicles can enter the Lao PDR, although there is a difference in axle load limits. Trucks from Thailand cross the border and undergo preliminary checks before being allowed to deliver directly, following border clearance, although most have to proceed to the nearby Thanaleng customs-controlled warehouses, which act as an ICD. The goods are either unloaded for clearance and later delivered by Lao PDR trucks or mostly are cleared there for delivery and then return to Thailand empty. The road connection is good, but the parallel rail connection is only used for passenger traffic. There appears to be major problems with congestion on the Lao PDR side of the border resulting in significant congestion and the use of nonstandard border controls. These will need to be addressed.

66. The eastern arm has low levels of trade mainly because trade between Cambodia and the Lao PDR is small. This arm only becomes a significant trade corridor south of Phnom Penh with the connection through to Sihanoukville. Unfortunately, this port is only served by feeder vessels and, therefore, is facing increased competition from the Southern Corridor. Forwarders are indicating that from Phnom Penh, it is cheaper to use the Saigon port than Sihanoukville.

7. Northern Corridor

67. The Northern Corridor is only considered to be a trade corridor east of Kunming, particularly on the Kunming–Nanning section. International trade moves along this multimodal corridor, but most continue on eastward to the gateway ports of Shenzhen and Hong Kong, China. Fangcheng is predominantly a heavy-industry bulk port and, therefore, the rail

connection is important, but handles little general and container cargo. There are no “hard” or “soft” infrastructure issues on this section as the roads are good and there are no international border crossings.

68. The western section connecting Kunming with the northern part of Myanmar is understood to handle appreciable amounts of bilateral trade. These are mainly tropical fruits and vegetables that are northbound, and temperate fruits and vegetables that are southbound, plus construction materials and hardware. The connection through to India through Muse is unlikely to become an important trade route between the PRC and India, mainly because Kunming is not a major export generator or import consumer and the northeast states of India are still over 2,000 km from any significant center of demand (Kolkata). This is seen more as a strategic link, rather than an important trade corridor.

8. Western Corridor

69. The Western Corridor is considered to be an important trade corridor for Myanmar, but possibly not with the current alignment. The important trade corridor is between Yangon–Naypyidaw–Mandalay, with Yangon and Thilawa ports acting as gateways. The road link between Payagyi and Mawlamyine has been addressed as part of the East–West Corridor (see section on Profile of Greater Mekong Subregion Corridors in Trade Facilitation). The main road between Yangon and Mandalay, referred to as NR1, is generally in fair condition and lightly trafficked. Most hard infrastructure issues are likely to be at the southern end in and around Yangon and the connection to the port at Thilawa. If current policies continue and sanctions are lifted, it is likely that more port development will be a priority and this will require the involvement of both the public and private sectors. In addition, there could be a need for supporting container freight stations and inland clearance depots.

70. The section of the corridor between Meiktila and the Indian border at Tamu is unlikely to be a major trade corridor for the same reasons as those given relating to the Northern Corridor. This section of the corridor passes through very difficult terrain and is subject to severe flooding and erosions. Transporters charge high rates for this section because of the risks. As indicated, this is considered to be more of a strategic link rather than a trade corridor. This central section of the corridor is multimodal due to the rail line between Yangon and Mandalay. This road is mainly double-tracked, but due to its poor condition it is understood there are speed restrictions. The role of rail in the development of trade within Myanmar will depend on its port connectivity, improved reliability, and where “block” train operations can be viable.

71. Generally, trade clearance arrangements are not of international standards and are nontransparent at this stage. The “soft” infrastructure issues center around the need to modernize clearance procedures in line with the recommendations of the Revised Kyoto Convention and to increase automation among border agencies at the ports.

9. Northeastern Corridor

72. The Northeastern Corridor is not considered to be a trade corridor and in reality is not even a transport corridor at this stage. It is more a theoretical road link between locations with low or negligible trade demand. To the transport and logistics community, it appears illogical, especially as there is the major gap between Luang Prabang and the junction with NR 1C near Meung Hiem, and between Loei in Thailand and the Lao PDR border.

10. Other Trade Linkages

73. The only other possible trade corridor that is not allied to a GMS corridor is the link between Bangkok and Pakse in the Lao PDR via Nakhon Ratchasima and Ubon Ratchathani. There are indications that the Pakse area of southern Lao PDR could generate increased trade activity, albeit at a relatively low level compared with some other routes due to Lao PDR's overall low trade activity compared to other countries.

11. Key Trade Routes

74. The primary trade logistics routes in the GMS are considered to be as follows:

- **Trade Route 1:** *North–South Corridor, via Lao PDR (AH2/AH3), especially close toward the southern end near Bangkok–Laem Chabang.*
- **Trade Route 2:** *Southern Corridor between Bangkok and Ho Chi Minh City via AH1, especially on those sections in Thailand and Viet Nam.*
- **Trade Route 3:** *Central Corridor between Bangkok and Vientiane via AH2.*
- **Trade Route 4:** *Yangon–Mandalay route (AH1), incorporating the Payagyi–Meiktila section of the Western Corridor.*
- **Trade Route 5:** *Bangkok–Payagyi via Mae Sot–Myawaddy using the combination of North–South and East–West corridors (AH1).*
- **Trade Route 6:** *Northern Corridor between Kunming and Nanning, and between Kunming and Mandalay.*
- **Trade Route 7:** *Eastern Corridor between Kunming and Hai Phong via AH14.*
- **Trade Route 8:** *Central Corridor between Phnom Penh and Sihanoukville via AH11.*

IV. PROPOSALS TO REFINE THE GREATER MEKONG SUBREGION CORRIDORS

76. The Fourth Economic Corridors Forum (ECF-4) held in Mandalay, Myanmar in June 2012 explored ways to effectively implement the new GMS Strategic Framework, 2012–2022. The ECF-4 proposed that the way forward was to “widen and deepen” the corridors by

- (i) linking their realignment and/or expansion to Greater Mekong Subregion (GMS) trade flows,
- (ii) developing economic and/or urban centers in and around the corridors,
- (iii) promoting the economic viability of corridor development through strengthening links with maritime gateways and trade. and
- (iv) enhancing connectivity of rural areas with the corridors and their urban growth nodes.

This chapter addresses (i) and (iii), which predominantly relate to the alignment of corridors, whereas (ii) and (iv) relate more to the integration that will then enable the current corridors to evolve into economic corridors through the widening and deepening process. Proposals relating to this latter transition process are addressed in Chapter V.

77. The Strategic Framework, 2012–2022 recognizes the changing economic environment in the GMS subregion with the shift in economic activity toward Asia. In the last decade, there has been increased emphasis on globalization and the development of export economies within the GMS, although the current economic setbacks in Europe and the US suggest this accent on external trade may need to be tempered by the promotion of higher trade growth within the subregion to offset the anticipated downturn in trade growth with developed countries. Intra-GMS trade, while still small compared to trade with the rest of the world, has been growing faster in recent years than the external trade. This places increased pressure on effective internal regional “connectivity” to ensure that the subregion’s export goods remain competitive in both the global and the fast-expanding subregional markets.

78. Trade is about both exports and imports. Combined with these trends in exports, there is growing wealth in the Asian region as a whole, as well as within GMS. While growth rates as expressed in gross domestic product (GDP) are expected to decline slightly in the short term compared to recent years, nonetheless they will continue to exceed those of most developed countries. Higher levels of industrialization and domestic consumption will fuel the demand for imports of raw materials and goods in general. Higher GDP should result in an ever growing Asian middle class with more spending power, which will in turn generate expanding import demand, particularly of consumer goods. While there are differing views as to the speed at which such national wealth will permeate through into this major demographic group, there is no doubt there will be a significant expansion in consumer demand, much of which will be import-based. This trend is already well established in many of the GMS countries with high growth in imports as well as of exports.

79. The importance of port connectivity in particular was cited at the ECF-4, with not only approximately 90% of overall trade by weight passing through the subregion’s ports, but also up to three-quarters of intra-GMS trade. This clearly suggests, from a trade facilitation perspective, that effective connectivity with the major ports is a key issue when reviewing corridor alignments, followed by connectivity between the major centers of production in each country with centers of demand in the other GMS countries.

80. It is recognized that the GMS corridors have historically been predominantly planned using a “community-based” framework. Under this concept, each country submits its own proposals for routes to be included, almost in isolation from the collective needs (Appendix D).

This common type of approach to corridor development, which emphasizes on geopolitical aspects, sometimes tends to be more difficult when making changes in corridor alignments due to the inherent bureaucratic consultation and confirmation process. Experience in other regions suggests there are risks that corridor alignments based on this approach tend to become “static” and sometimes fail to reflect changes in their environment, especially those related to changes in “demand” routing. The Asian Highway (AH) network is a good example of a network and/or corridor system that is considered to be geopolitically oriented with limited reference to demand and, therefore, relatively static and difficult to adjust. Fortunately, the GMS corridors, while initially using similar development concepts, have a history of evolution that suggests changes in alignment should be possible provided there is a transparent logic for such adjustments or realignments.

A. Background

81. The GMS economic program was inaugurated with a Ministerial Conference held in Manila, Philippines in October 1992, which focused on subregional development, as opposed to traditional, country-specific development programs. In relation to transport, prior to that meeting, a study team from ADB had visited each country to identify potential road projects and from this seven “road projects of the first phase” evolved, following government consultations. The alignments of these seven initial roads are shown in Figure 3.

Figure 3 Road Projects Proposed at the First Greater Mekong Subregion Ministerial Conference, 1992

82. Prior to the Second Ministerial Conference in 1993, ADB consulted with each country and agreed upon five principles on project selection, prioritization, and design. These principles were (i) priority should be given to improvements in existing facilities over construction of new ones; (ii) projects need not involve all six countries, but priority should be given to projects already agreed between countries; (iii) attention should be given to the trade generation potential of the projects; (iv) projects should be implemented in sections; and (v) criteria should be established for project selection. The first four selection parameters appear equally relevant 9 years later during this corridor review. No specific record of the outputs of (v) could be identified.

83. Five priority projects were selected and nine road projects called “road projects for the second phase” were identified. At the second conference, 33 transport projects were discussed, including eight road projects. These were reevaluated and agreed at the third conference, and at the fourth conference, an additional road project was added. These nine routes represented transport corridors and are shown in Figure 4. It can be seen that between the first conference in 1992 and the Fourth Ministerial Conference in September 1994 that a number of new routes had been added while others had disappeared, which only means that corridor selection was evolving.

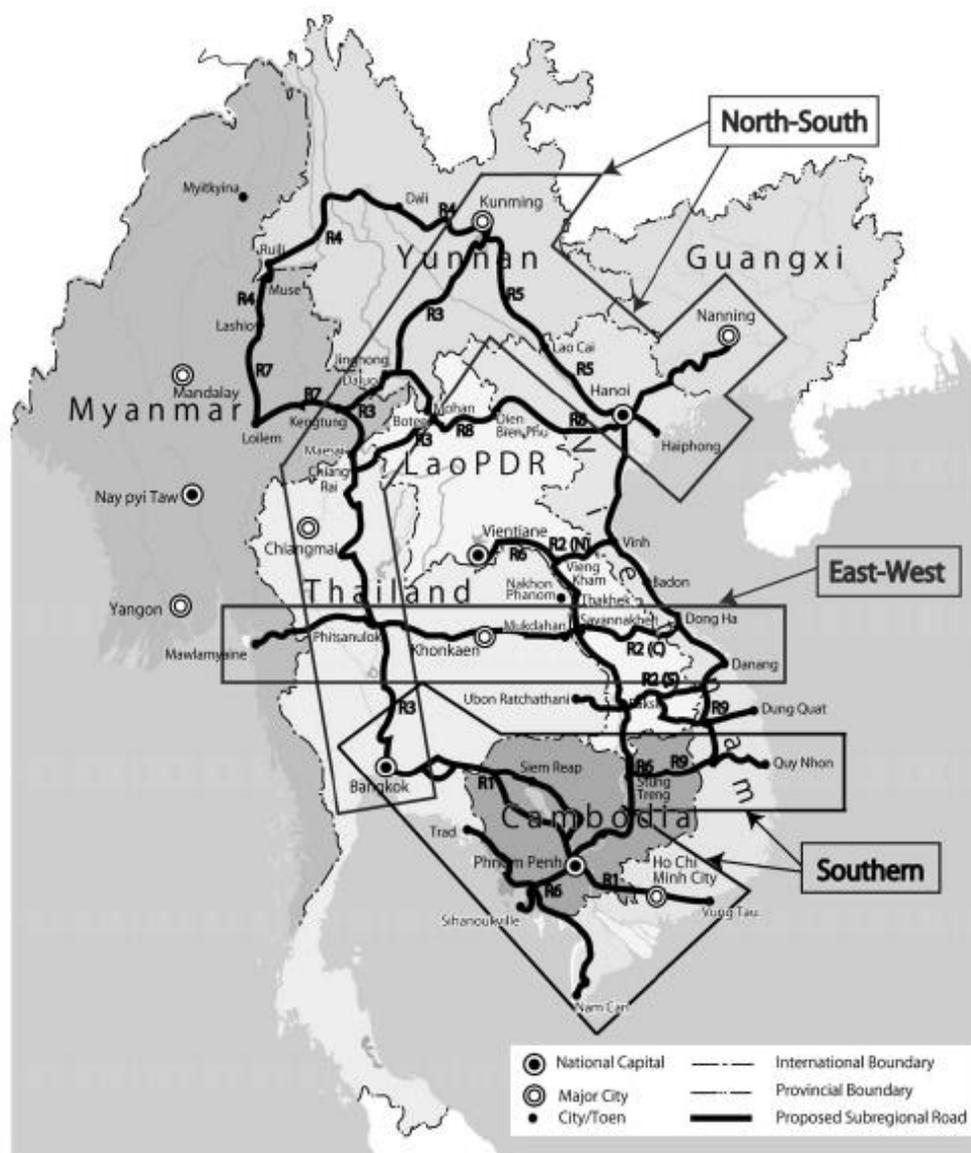
Figure 4 Transport Corridors Submitted to the 4th Ministerial Conference, 1994



Source: Ishida, Masami and Isono, Ikumo (2012).

84. Faced with implementation problems arising from the Asian currency crisis in 1998, ADB proposed the transition from transport to economic corridors as an approach to reinvigorate the initiative. This concept was presented as a “connector to link production, trade, and infrastructure within a specific geographical framework.” Originally, five economic corridors were suggested at the Eighth Ministerial Conference in 1999, but at the Ninth Ministerial Conference, the routing of these economic corridors was concentrated and presented as three routes—North–South, East–West, and Southern. These routes covered most of the original transport corridors with the new configuration shown in Figure 5. This formed the flagship initiative called “Ten-Year GMS Strategic Framework” that was endorsed by the GMS Summit in Phnom Penh in 2002. The North–South and the Southern corridors contained sub-corridors yet they did consist solely of a single route alignment. The Southern Corridor was an umbrella for all of the transport corridors located in the southern part of the subregion.

Figure 5 Three Economic Corridors, 2002



Source: Ishida, Masami and Isono, Ikumo (2012).

86. While there have been a series of changes during the initial development period, the corridors have remained relatively static since 2006. Unfortunately, there appears some confusion as the corridor strategies and action plans undertaken in 2009 and 2010 were based on the 2002 trio of economic corridors, rather than on the nine corridors agreed later in 2006. This may not be critical given that the coverage was broadly similar, but may be confusing to external parties. In addition, it is apparent that there are a number of versions of the GMS corridor map in circulation, albeit with minor variations.

87. This tracking of the corridor development clearly demonstrates that the GMS corridors are not static and have evolved in response to changes in the economic and transport environment in the subregion. Substantial economic changes both globally and regionally over the past decade, and the opening up of Myanmar, sufficiently warrant possible realignments or the inclusion of new linkages to conform to the objectives of the Strategic Framework, 2012–2022. This review should be undertaken prior to finalizing the Regional Investment Framework in 2013.

1. Planning Logic in the Strategic Framework, 2012–2022

88. The GMS Strategic Framework, 2012–2022 cites the key drivers to changing strategy—growth, connectivity, and competitiveness. It recognizes that the export orientation in many of the countries has resulted in growth along the seaboards, thus leaving the interior lagging behind. This trend toward spatial concentration is expected to continue, as shown in countries like Thailand where labor continues to be drawn to the coastal developments, rather than industrial development moving inland to the labor resource. This tendency can lead to growing inequality, but can partly be offset by infrastructure developments that can potentially equalize living standards, thus countering this migratory effect. At the same time, infrastructure developments face increasing fiscal constraints as growth slows, making prioritization and selectivity ever more important.

89. The Strategic Framework (SF) highlights the importance of the strategies and action plans for the three economic corridors (but in effect, the nine corridors), which are focused on relatively fewer high-profile initiatives than previous plans. The stated need to plan investments aimed at strengthening urban development, upgrading logistics, and improving the network of feeder and rural roads reflects the pressure to widen and deepen the existing corridors so they become economic corridors in reality rather than solely in name.

90. The SF document also emphasizes the need for a multimodal approach by incorporating development of the rail network, particularly with regard to software issues. However, surprisingly, it is noted that the framework makes no specific mention of either the maritime mode or ports, despite its key role in the subregion's trade. This potential caveat has since been recognized as important in the ECF-4 meeting.

91. The overarching nature of the Strategic Framework, 2012–2022 provides limited specific guidance as to whether or not corridor alignments should or should not be changed, other than reflecting that there is a changing environment and, hence, suggesting that adjustments might be needed in response to this situation. It implies that the three corridor strategy and action plans represent the way forward to implementing the new framework.

2. Strategy and Action Plan for the North–South Economic Corridor

92. The study, *Towards Sustainable and Balanced Development: A Strategy and Action Plan for the GMS North–South Economic Corridor*, was undertaken in 2009. It covered the existing North–South Corridor between Bangkok and Kunming, although with an alternative routing option within Thailand, and the northern end of the Eastern Corridor between Kunming and Ha Noi, and Nanning and Ha Noi.

93. The strategy focused on the need to develop an efficient multimodal transport and logistics system for the corridor. The emphasis was principally on improvements in the software aspects of transport, but cited the importance of geographic and commercial nodes, including gateway (ports), border, and interchange nodes with Bangkok, Ha Noi, Kunming, and Nanning as the key demand drivers.

94. The action plan proposed 5 road projects on the North–South Corridor, 8 projects on the western arm of the Eastern Corridor (between Kunming and Hai Phong), and 3 projects on the eastern arm of the Eastern Corridor (between Ha Noi and Nanning). In addition, there were five rail projects on the western arm of the Eastern Corridor of the North–South Corridor and one on the eastern arm of the Eastern Corridor. There were also proposals to develop the river port at Chiang Saen and the seaport at Laem Chabang.

3. Strategy and Action Plan for the East–West Economic Corridor

95. The study, *Strategy and Action Plan for the East–West Economic Corridor*, was undertaken in 2010 and covered the existing corridor alignment. The study noted that the “major infrastructure components have now been completed,” including the Second Friendship Bridge between Savannakhet and Mukdahan, the new Lao Bao checkpoint, four lane improvements in Thailand, and the construction of the Hai Van tunnel. It highlighted the problems adversely affecting corridor performance, including the lack of gateway ports in opening up “windows of trade” opportunities, with trade currently moving mainly on a north–south axis. The strategy was broadly to follow the principles established at the Third GMS Summit held in Vientiane in 2008 and its resulting action plan. It proposed 5 road improvement projects, 2 rail projects, 2 port projects, and 1 airport project.

4. Strategy and Action Plan for the Southern Economic Corridor

96. The study, *Sharing Growth and Prosperity: Strategy and Action Plan for the Southern Economic Corridor*, was also undertaken in 2010. It covered both arms (sub-corridors) of the Southern Corridor, the Southern Coastal Corridor, and the southern part of the Central Corridor. In reality, this is a strategy and action plan for the corridors in the southern part of the subregion, rather than for the designated Southern Corridor. It also included a corridor link between Siem Reap and Phnom Penh not shown on current corridor maps.

97. The strategy stressed the need for specific strengthening of infrastructure and connectivity by implementing measures to address missing links, connecting rural areas to corridor roads, developing multimodal links, and improvements in border facilities. The completion of the Mekong Bridge at Neak Loung was cited as a priority. The action plan included 2 road projects in the southern arm of the Southern Corridor, 3 in the northern arm, and 3 in the Southern Coastal Corridor. In addition, there were 2 rail projects in Cambodia, 3 river and port projects (including duplication of the Laem Chabang proposal in the North–South

corridor strategy), and 2 airport development projects in Cambodia. The overall development cost was estimated at \$1.62 billion.

5. Strategy and Action Plans for Other Economic Corridors

98. There have been no strategic or action plans for the Western, Northern, Eastern (other than the northern and southern section addressed in other plans), or Northeastern Corridors. This situation tends to acknowledge that some corridors are potentially recognized as more important or significant than others. This suggests an underlying corridor prioritization approach, which could be more transparent by having categories of corridor, rather than the current “one-size-fits-all” approach to corridor planning.

B. Corridor Realignment Logic

99. In considering realignment, it should be recognized that there are a variety of versions of the GMS Economic Corridor map in circulation. These include the trio of economic corridors used in the strategy and action plans based on the 2002 version shown in Figure 5 and variations of the nine corridors shown in Figure 6. For consistency, all proposed adjustments or realignments are based on the corridors shown in Map ref 11-2917a AV provided by ADB for the Initial Assessment Report (IAR) and shown in this report as Figure 1.

100. The ECF-4 proposed that the refinement or promotion of the GMS corridors should be based on “linking their realignment/expansion to GMS trade flows and promoting the economic viability of corridor development through strengthening links with maritime gateways and trade.” These guidelines suggest trade volumes and port connectivity are critical parameters in reexamining the GMS corridors. Chapter III and Appendix B contain an assessment of trade demands, routes, and potential trade flows.

101. The trade routes identified in the previous chapter have been used as the initial guidelines in conformity with the ECF-4 recommendation. These represent the sections of corridor carrying (or expected to be carrying) the majority of intra-subregional trade and/or connecting with the ports handling the external trade. As to the second parameter of “promoting the economic viability of corridor development through strengthening links with maritime gateways and trade,” the GMS has both primary and secondary ports.

102. A primary port, in a trade logistics context, is one that is included within the container schedules of the main shipping lines, with direct calls using either a “mother ship” or feeder vessel at least weekly. A secondary port is one served only by feeder vessels on an infrequent or less than once a week basis. GMS has only two ports handling “mother ships” on a regular basis—Ho Chi Minh City and Laem Chabang. In addition, there are regular feeder services connecting other primary ports—Bangkok, Fangcheng, Hai Phong, Sihanoukville, and Yangon. The secondary ports are mainly in Viet Nam and include Da Nang, but these ports only handle small volumes of container cargo. Yangon is the outstanding primary port that is not on a GMS corridor, and also its satellite container port is at Thilawa.

103. Another important issue in corridor definition is connectivity to neighboring countries or regions—whether they should be included or excluded from the corridor network. The Northern and Western corridors both meet at the Myanmar–Indian border at Tamu, which handles minimal amounts of international trade. Conversely, the southern link of the North–South Corridor to the Thai–Malaysian border is shown as a dotted line and denoted as a “possible extension.” This link connects with the busiest land border in the whole GMS region at Sadeo. In

Yunnan, “potential extensions” are shown running northward into the PRC and northeast from Nanning, also into the PRC. These routes are principally domestic routes with negligible volumes of external trade. It can be seen there is a clear inconsistency between how these linkages are addressed and presented.

104. Considered the main inconsistency probably relates to the linkage between Myanmar and India through Tamu, which is currently on both the Western Corridor and the Northern Corridor. From a transport and trade planning perspective, this is not a logical economic corridor, as in its eastern extension it travels through sparsely populated mountainous areas with none of the “resources” necessary to “widen and deepen” to transform it from a transport to an economic corridor. More significantly, it does not connect areas of appreciable supply to areas of demand. The North–East Indian states are similarly sparsely populated and agrarian in nature, particularly specializing in tea production. The nearest major center of demand in India is Kolkata, which is almost 2,000 km from Tamu.

105. The viability of road transport between Kunming and Kolkata or even between central Myanmar (Mandalay) to Kolkata appears highly questionable commercially. It is fully accepted that this is geopolitically and strategically an important link, thus funding was provided by the Government of India to upgrade sections of this road passing through difficult terrain in Myanmar running south from Tamu. However, providing supply in the form of infrastructure does not create trade and traffic demand, as seen from the limited growth along the East–West Corridor despite the major investment in road infrastructure. Current proposals for this link are largely based on India and the PRC being the Asian economic superpowers and therefore, theoretically, there “ought” to be demand. Such logic is not based on analysis of the trade demand, which is mainly between the seaboards of both countries. Investment in roads (and railways) on this route are considered to contain significant investment and environmental risks, as well as interfacing with security issues in the border areas in both countries.

106. There must be an element of latent demand so that improvements in the transport infrastructure can enable its transition from its latent status into physical trade flows. At this stage, there is no evidence of such latent demand on this linkage. It is therefore proposed that the connection to India should be identified as a “possible extension,” similar to the status of the connection between Thailand and Malaysia. It is considered that, initially, the corridor focus for GMS should be on internal connectivity within the subregion and to their ports, rather than external land connectivity. Higher priority infrastructure improvements appear to be needed in Myanmar in the short to medium term as opposed to heavy investment on difficult routes with questionable traffic flows. In the event of its retention using political rather than trade demand criteria as done previously in GMS planning, then a single alignment should be agreed.¹² This should be Mandalay–Tamu.

An examination of the GMS corridors clearly indicates that not all have the potential to undertake the transition from transport corridors to economic corridors. The existing maps visually suggest, as does the ADB/GMS nomenclature used, that all GMS corridors are equal. The reality is that they all differ significantly in terms of importance and traffic volumes. This adversely impacts on the creditability of the overall initiative from a private sector user perception. Also, it is much more difficult to identify priorities and to focus investment on “subregional” as opposed to purely domestic needs. In ADB, initiatives involving the

¹² One option may be to include this linkage in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) initiative, rather than within the GMS initiative as this is about connectivity within the BIMSTEC subregion.

development of regional infrastructure are classified as “national projects with regional implications,” thus recognizing the intrinsic duality of many infrastructure projects, specifically transport corridors, as both a national and a regional entity (Srivastava 2012).

107. One possible approach to accepting the differences in corridor importance and functionalities could be to introduce a form of grading or classification system. This would provide a measure of differentiation between the key and non-key corridors based on existing or projected trade and traffic demand. The GMS Strategic Framework, 2012–2022 is based on a three economic corridor “flagship program.” This approach tends to already suggest a subliminal acceptance of a degree of grading among corridors of importance and the need to focus on relatively fewer, high-profile initiatives.

108. An important conclusion from the corridor development analysis in Appendix D was that the larger an overall corridor initiative becomes, the greater the risk that it could lose focus as it becomes a “transport network,” like the Asian Highway or Trans-Asian Railway. There is a danger that through institutional “empire building,” the expansion creates an initiative that becomes unwieldy and where prioritization becomes increasingly politically based rather than needs-based. Under other regional initiatives, additional linkages have been added without any clear logic for doing so, other than making the network larger. It is important, therefore, that if links are added, or deleted, there should be a transparent logic for doing so with an audit trail back to the overall program strategy.

109. The negative impact of overexpansion clearly suggests that the existing GMS corridor network should not be increased in size, as it is already verging on being a “mini” network. For example, Myanmar is proposing an additional east–west corridor between Mandalay and Hanoi through the Lao PDR, using an alignment with no clear trade logic or conformity with GMS corridor selection criteria. There should also be a relationship between road or rail infrastructure density and traffic such that those areas with the highest volumes of traffic and trade should have a higher proportion of economic corridor lengths. For example, in the initial proposals shown in Figure 3, the Lao PDR had a significantly greater corridor density than Thailand, whereas the traffic levels in Thailand are far higher. This demonstrates one of the major constraints of developing corridors using the “community-based” approach as political pressures can often negate the demand needs.

110. At this stage, the GMS Economic Corridors represent more *a goal* than *a reality* and this follow-on TA project is designed to assist in facilitating the transition process—from the current situation of transport corridors to actual economic corridors. It should be noted none of the corridors has the ability to become an economic corridor in totality, given the topography and profile of the economic resources along the routes. The reality is that almost all corridors have sections that are already economic sections and these could potentially be widened, deepened, and lengthened by enhancing the access to resources in adjacent areas through improvements in “lateral” connectivity (addressed in Chapter V). However, along large sections of many corridors, the potential to develop further economic sections is small. Thus, the economic corridor concept in GMS is more of linking centers of production with concentrations of demand over longer distances through international borders. This suggests a more holistic approach to considering the potential of the economic corridor as a whole rather than solely on key sections. Nonetheless, it is clear that some corridors have a greater potential, or the necessary critical mass, to become economic corridors than others.

111. While there is an underlying need to simplify the corridors to provide a clearer focus, it is equally recognized that the community development approach used to establish the existing

nine corridors and their alignment means that eliminating these corridors, or sections of the corridors could meet opposition at the national level. Despite GMS being a subregional program, each country will always tend to regard its interest primarily on a national dimension rather than at a subregional level, viewing them as “national projects with regional implications” but with more emphasis on the “national” aspect. This is understandable as they are the most likely funders of the infrastructure developments through budget support or sovereign loans. This situation makes it even more important to have a clear logic when proposing any changes in the existing corridors.

112. One idea could be to have a more realistic approach of having two types of corridors. The first group would be economic corridors. These would represent the core arteries of the GMS “mini-network” carrying the highest volumes of GMS trade and containing the major concentrations of demand and/or resources, thus having the capability of generating additional concentrations of economic activity, either along their corridors or through their immediate catchment areas. All other corridors should, at this stage, be classified as transport corridors focused on enhancing connectivity until there are clear signs as to their ability to make the economic transition within a given time period.

113. This conceptual approach avoids the inevitable disappointment of failing to make these other corridors “wider and deeper” along an appreciable proportion of their length because the necessary resources for such a transition process are not present. This would enable more concentration in implementing the economic corridor concept on those linkages where the potential for success is likely to be greatest. In essence, the development focus in economic corridors where infrastructure is largely in place would be on the “widening and deepening” process. In transport corridors where infrastructure is still incomplete, the focus would be more on enhancing connectivity.

114. The above suggestions may potentially be considered radical given the current situation, although it would closely reflect reality and would be better accepted by the transport and trading community. It would also address the apparent disconnection between the three economic corridors of the Strategic Framework and the nine economic corridors in current maps. The move back from an economic to a transport corridor could possibly be seen negatively institutionally as being a retrogressive step. However, it is clear that the renaming of the corridors in 1998 in itself has not changed the nature or performance of the links nor made them more or less of an economic corridor. In reality, they largely remain transport corridors and the economic connotation on some of the minor corridors denigrates the overall economic corridor concept.

115. Another issue that should be addressed when considering any realignment is to eliminate any duplication. The corridors, whether economic or transport, remain “connectors to link production, trade and infrastructure within a specific geographical framework” as originally agreed in the GMS program. Within the corridors, there will be a variety of transport nodes located at centers of population (demand), industrial or agricultural concentrations (supply), as well as at border crossings and key road or rail junctions. The corridors, whether a transport corridor or the base of an economic corridor, seek to connect these nodes in a logical sequence. There is corridor duplication around the Laem Chabang, Bangkok and Da Nang, Viet Nam. It is recommended this be eliminated by having “connector” nodes, such that any one route section is included in only one corridor and any interfacing corridor finishes at the connector node to the designated corridor. In practice, there are always important transport nodes at these junctions, even if they are not as well-known as those where the corridor finishes under the existing alignments.

116. The following subsections discuss each existing corridor in terms of its current alignment, trade activity, and functionality in a GMS context and any proposed changes is explained. The review is based on the current nine corridors shown in Figure 5. In general, the main trade corridors in the GMS are oriented from north to south, which aligns with the overall topography. The exception is the Southern Corridor, which runs east–west below the mountain ranges to the north. The proposed realignments are principally based on the ECF-4 requirements to (i) link realignment and/or expansion of corridors to GMS trade flows, and (ii) promote the economic viability of corridor development by strengthening the links with maritime gateways and trade, in addition to incorporating the other issues discussed above.

1. North–South Corridor

Current alignment: *Bangkok–Chiang Rai–Chiang Khong–Houayxay–Boten–Mohan–Xiaomengyang–Kunming*

Western link through the Republic of the Union of Myanmar: *Chiang Rai–Mae Sai–Tachileik–Kengtung–Mong La–Xiaomengyang.*

117. This is a major GMS trade route with heavy concentration of trade activity at the southern end around Bangkok, combined with significant bidirectional movements of agricultural produce and other trade between Thailand and Yunnan transiting through the Lao PDR. The international road transporters mainly use the eastern arm of the corridor between Chiang Mai and Boten, rather than the western link through Myanmar. The completion of the Mekong Bridge between Chiang Khong and Houayxay in 2013 is likely to further increase the attraction of this eastern link.

118. There are three key issues on this corridor. First, since this is a prime GMS corridor, perhaps the logical southern terminus should be Laem Chabang, rather than including the key Bangkok–Laem Chabang link on the less important Northeastern and Southern Coastal corridors. The traffic between Thailand and Yunnan mainly terminates at the southern end in Bangkok, but the main trade-related traffic moving along the southern half of the section in Thailand is a third-country trade linked with Laem Chabang. The second issue is the status of the western link, which is lightly trafficked. This connection is used principally for bilateral trade between northern Thailand and Shan State in Myanmar, and similarly for bilateral trade between the PRC and Shan State. Volumes are relatively low due to the limited “catchment” area within Myanmar and security concerns. The main road traffic between the PRC and Myanmar is moving via the Northern Corridor. Logic would suggest this western link should be denoted either as a potential corridor (dotted line) or probably more realistically as a transport, as opposed to an economic corridor as the emphasis is on improving the connectivity across Shan State at this stage, rather than any “widening and deepening.” The third issue is whether there should be a single route through central Thailand via Tak as shown in Figure 1 or showing an alternate route through Phitsanulok as included in some GMS project maps. It is recommended that a single alignment through Tak is confirmed as the sole routing.

119. This corridor probably has the highest potential as an economic corridor, given the number of urban and industrial centers on or adjacent to the route, especially in Thailand. The “widening and deepening” could incorporate other centers such as Phitsanulok and Chiang Mai, and potential border zone developments at Boten and Houayxay. It can be seen that the recommended changes of alignment along this corridor are relatively minimal, but would more logically reflect the situation during the Regional Investment Framework, 2012–2022 development period.

2. East–West Corridor

Current alignment: *Mawlamyine–Myawaddy–Mae Sot–Tak–Phitsanulok–Mukdahan–Savannakhet–Dansavanh–Lao Bao–Dong Ha–Da Nang*

120. The GMS initiative has placed great importance on this corridor, partly because it connects four member countries and bisects the subregion. Unfortunately, there is concern that this corridor has not achieved its real potential, as reflected in a number of studies. In reality, this link predominantly traverses agricultural areas, as well as jungle and mountainous regions at either end, where there is limited potential for economic development. In simple terms, this route lacks “demand” and the overall volume of traffic moving clearly reflects this situation. In addition, Da Nang at the eastern end is only a secondary port, again reflecting the lack of traffic in its catchment area.

121. A significant increase in traffic at the western end of the corridor between Thailand and Myanmar is anticipated. There is evidence of latent demand resulting from the prior trade restrictions, which suggests current volumes should now expand relatively rapidly, thus the proposed investment in roads at and leading to the Myanmar border. Currently, the western end of the corridor is at Mawlamyine, a large urban settlement but not a significant port. This is considered to be a transport or connector node. It is therefore proposed the East–West Corridor should follow the alignment of the Asian Highway 1 (AH1) to Payagyi, where it connects with a realigned Western Corridor. Payagyi is a transport node, as well as a logical corridor connector node. At the eastern end, the corridor is also proposed to terminate at Dong Ha, which acts as a connector node with the Eastern Corridor. This eliminates the current corridor duplication between Dong Ha and Da Nang in favor of the “busier” corridor.

122. Given the low potential to develop this route as an economic corridor due to the combined constraints of terrain, lack of resources, and demand alongside the corridor, theoretically, this route should be reclassified as a transport corridor. This is underlined by the fact that the development priority at the western end is connectivity, through reconstructing the Myawaddy–Payagyi link. There may be potential to develop an economic zone adjacent to Myawaddy township, principally to trade with Thailand based on lower labor rates. However, there is little potential for commercial development between Myawaddy and Payagyi, thus the overall potential for economic development is unlikely to change appreciably.

123. The proposed realignments at the end of the corridor are not considered to be particularly contentious. However, it is recognized that the issue of reclassifying the corridor as a transport corridor based on the significant expenditure in recent years to improve the road infrastructure may be more difficult to accept. There is widespread recognition that this is and will continue to be a relatively low volume trade route, except possibly at the western end.

3. Southern Corridor

Current Alignment: *Dawei–Kanchanaburi–Bangkok–Aranyaprathet–Poipet–Phnom Penh–Bavet–Moc Bia–Ho Chi Minh City–Vung Tau*

Northern arm: *Poipet–Siem Reap–Banlung–Peiku–Quy Nhon*

124. This is considered one of the most important GMS corridors, with good potential to be developed as an economic corridor through the “widening and deepening” process. However, there are major differences between the main corridor (southern sub-corridor) and the northern sub-corridor, which mainly passes through agricultural and mountainous and/or jungle terrain to a secondary port at Quy Nhon. This link has a similar profile to the East–West Corridor, but with even lower trade volumes and economic potential.

125. Despite the success of Dawei as a heavy industrial port, it is clear the western end, including Kanchanaburi and Nakhon Pathom through Bangkok to Chachoengsao, will be a major economic section of this corridor. One issue is whether the recent 73 km section of road between Phanom Sarakham and Sa Kaeo with its four-lane highway should now become the official corridor alignment instead of the current AH1 route “looping” to the north. No changes are proposed in either Cambodia’s or Viet Nam’s sections of the southern arm. It could be argued that Vung Tau is not a gateway port and, therefore, the route should terminate in Ho Chi Minh City (HCMC). However, Vung Tau is adjacent to the new deep seaport developments at Cai Mep–Thi Vai via the NQ51 link road and, therefore, the existing alignment should be retained.

126. As indicated, the northern arm (sub-corridor) is often moving through difficult terrain, and east of Siem Reap, not only is there limited trade demand but in reality there is no road. It is understood that the potential for a through route, as drawn on GMS maps, is most unlikely to be constructed or attract donor support. A more logical move would be further development of the Sisophon–Siem Reap–Kompong Thom–Skun link, where it would link into the realigned Central Eastern Corridor. In effect, this would be a northern loop off the Southern Corridor and align closer to the infrastructure development plans of the Government of Cambodia. The focus during the strategy period should be on enhancing this connectivity, rather than any “widening and deepening” of this link. This would suggest that if this arm is agreed, it should be classified as a transport corridor.

4. Eastern Corridor

Current alignment: *Ca Mau–Ho Chi Minh City–Da Nang–Vinh–Ha Noi–Lao Cai–Hekou–Kunming*

Extensions: *Ha Noi–Hai Phong, Hanoi–Lang Son–Pingxiang–Nanning, Hai Phong–Ha Long–Mong Cai–Domngxing–Fangcheng*

127. This is also an important corridor with potential as an economic corridor, given the large numbers of conurbations along the coast of Viet Nam between HCMC and Ha Noi. While trade logistics activity tends to be concentrated predominantly around HCMC and the Ha Noi–Hai Phong link, the AH1 coastal road has substantial volumes of domestic traffic given the country’s topography, which concentrates traffic along this coastal route.

128. The issues on this corridor relate to the termini and the alternate alignments radiating out from Ha Noi. From a trade and economic perspective, the logic for extending this corridor southward beyond HCMC is considered weak. The areas south of Can Tho are principally

agricultural or seafood-producing areas with limited industrial or trade potential. It is assumed that the corridor presently extends all the way to Ca Mau either to connect with the Southern Coastal Corridor or more likely because it is the NQ A1, which is the main road in Viet Nam. There is no specific necessity to link up GMS corridors *per se*, and even if there were, with the planned road between HCMC and Rach Gia, this would be a more logical connector section. It is recommended by this report that the Eastern Corridor should terminate at HCMC and any southern extension be incorporated into a realigned Southern Coastal Corridor.

129. The northern end of the Eastern Corridor is shown differently in the various maps. All alignments show the northerly extension from Ha Noi to Kunming through Lao Cai and Hekou. With the reopening of the rail link, this will be the only multimodal economic corridor along its entire length. There are three other spurs radiating out from Ha Noi. First, there is the northeasterly link to Nanning through the Lang Son border crossing. This is not a key trade corridor compared to the Kunming link, but provides better access between northern Viet Nam and the more populated centers of supply and demand within the PRC. The second spur is the domestic link between Hanoi and Hai Phong, its gateway port. Clearly, this is important from a trade perspective and is already an economic corridor.

130. Some maps show a third spur, a coastal link between Hai Phong and Fangcheng along the coast and through Mong Cai. ADB has been funding the development of the road between Ha Long and Mong Cai, which has high tourist potential. However, the Ha Long to Hai Phong link shown on some maps is not a direct link, as it would involve a combination of the CL5/10/18. This is not a busy trade link connecting two gateway ports. It is recommended that this coastal road should not form part of the GMS corridor network and the alignments should not therefore be as shown in Figure 1.

131. Given the three routes at the northern end of this corridor, designating the Ha Noi–Nanning link Eastern Corridor Extension A and the Ha Noi–Hai Phong Eastern Corridor Extension B, or even vice versa may be considered. This will clarify the issue on which route is being developed when discussing the development of the Eastern Economic Corridor.

5. Central Corridor

Boten–Louang Phrabang–Vientiane–Nong Khai–Nakon Ratchasima–Sattahip.

Eastern arm: *Vientiane–Pakse–Stung Treng–Phnom Penh–Kaaong–Preah Sihanouk*

132. The situation on the Central Corridor is similar to the Southern Corridor: both divides into two arms where one dominant arm has economic potential and another arm with low potential. The dominant corridor is between Sattahip in the south via Vientiane, to Boten in the north where it links with the North–South Corridor. This is a relatively busy trade route between Vientiane and Bangkok–Laem Chabang, which acts as a gateway port to landlocked Lao PDR. North from Vientiane to Boten is the main route to the PRC, and this link road through Louang Phrabang may be more difficult to develop economically due to the difficult terrain.

133. The first issue is the alignment at the southern end. Recent surveys indicate that the primary route for trade traffic to and from Vientiane is through Bangkok rather than Laem Chabang. This is due to the dominance of bilateral trade, plus some third-country trade probably being routed through Lad Krabang ICD. This would suggest that the corridor should terminate at Bangkok, rather than at either Sattahip or Laem Chabang. The logical alignment would be the AH12 from Vientiane to the Hin Kong Junction where it meets the AH1 North–South Corridor.

134. The next issue is the status of the eastern arm from Vientiane to Sihanoukville via Phnom Penh. This route transits along the eastern bank of the Mekong until it crosses over the river at Kambong Cham and on to Phnom Penh on the alignment of AH11. This 1,240 km section between Vientiane and Kampong Cham is only Asian Highway Class III and represents 78% of this eastern arm. Trade volume passing through the border between the Lao PDR and Cambodia is very low (as is bilateral trade in general). This suggests that the potential to develop this corridor as an economic corridor is minimal, other than at the southern end, and that the development emphasis should be on enhancing connectivity through road improvements that will raise it to, at least, an Asian Highway Class II link. Consequently, the eastern arm should become the Eastern Central Transport Corridor, thus also eliminating the confusing situation of having two central corridors.

6. Northern Corridor

Fangcheng–Nanning–Kunming–Ruili–Muse–Mandalay–Kalewa–Tamu

135. The northern corridor is an important transport link especially between Kunming and Nanning and through to Fangcheng port. The volume of international trade that flows through this route is unknown, but like the Eastern Corridor, flows are likely to be dominated by large volumes of domestic traffic. The road between Kunming and Mandalay is an important bilateral trade link with approximately 1,000 trucks per day passing through the PRC–Myanmar border. The roads in the PRC are largely developed with modern expressways, but in Myanmar, it declines to only Asian Highway Class III and the route passes through difficult mountainous terrain. It is noted that the alignment between Kunming and Nanning has recently changed to a more southerly routing due to the recent opening of another section of the G80 Guangkun Expressway.

136. The key issue on this corridor is the location of the western terminus. Currently, the road continues westward from Mandalay toward the Indian border at Tamu. This section of road again passes through difficult terrain with asphalt roads as far as Monywa from Mandalay, and the Government of India is funding the improvements from Tamu to Kalewa. There is an undeveloped road section of approximately 200 km between Monywa and Kalewa. However, as indicated earlier, its potential as an important trade route is considered low as there is lack of demand from either side of the border between two basically rural areas. The two options, therefore, are (i) to reclassify the route as a possible extension, or (ii) to reclassify it as a transport corridor. To retain its designation as an economic corridor is illogical, and would tend to devalue the GMS initiative to the trade and transport community. Although this connection has major geopolitical and strategic importance, the likely returns from road investments is unclear.

7. Western Corridor

Mawlamyine–Payangyi–Meiktila–Ganggaw–Tamu

137. The Western Corridor is considered to be critical to the future development of Myanmar as it travels north–south through the center of the country. However, the current alignment is illogical and should be changed to reflect the transition taking place within the country and its links to neighbors. The first and key issue is connectivity to the port and largest city, Yangon. It is clear that economic development in Myanmar will continue to be highly concentrated around Yangon in the short term but gradually disseminate probably northward along the main road toward the north, eventually in the long term to link in with economic development spreading

southward from Mandalay—the second largest commercial city. The logical route for the Western Corridor is, therefore, from Yangon to Mandalay. This would be a multimodal corridor incorporating the new highway dedicated to passenger traffic, the “old road” AH1 for freight vehicles, and the rail line.

138. Yangon is the country’s main port, but it is a traditional city port as all the quays are in the center of the city. The relevant authorities indicate that the “Strand” area should be redeveloped for leisure and other amenities, with the port operations being moved south to Thilawa. Current developments at Thilawa, where a 9-meter water draft is available, have concentrated on bulk traffic and cars with only small volumes of container traffic being transferred downstream. On the assumption that the government will “force” container operations out of the city to the new developments at Thilawa, it is suggested that Thilawa should be the southern terminus of the Western Corridor.

139. Currently, the Western Corridor turns off toward India at Meiktila before linking in to the Northern Corridor at Kalewa. It is proposed that this complex route through Yanangyat, Pakokku, and Gangawi be eliminated from the alignment as this would be a difficult and costly route to develop with low traffic volumes. If the link to Tamu is to be retained, the more logical alignment would be through Mandalay and an extension of the Northern Corridor.

140. The interface between this corridor and the East–West Corridor would now be at the Payagyi transport node rather than at Mawlamyine, as at present. This alignment is more logical—with Yangon aligned into the Western Corridor. Trade flows on the realigned Western Corridor would be expected to significantly exceed those on the East–West Corridor.

8. Southern Coastal Corridor

Nam Can–Ha Tien–Kampot–Koh Kong–Hat Lek–Rayong–Sattahip–Bangkok

141. The Southern Coastal Corridor is a light-traffic route along its entire length except for the western end that transits through the eastern seaboard industrial area between Rayong and Bangkok. However, this section only represents a small percentage of the overall corridor length. The major proportion of this route consists of coastal roads with limited economic potential, although with significant tourist prospects. The focus of this corridor is, therefore, on enhanced connectivity with small potential for any “widening and deepening.” It is suggested that this corridor be reclassified as a transport corridor.

142. The key issues in this corridor relate to the positioning of the termini. Currently, the corridor at the western end is in Bangkok and this minor corridor includes the important Bangkok–Laem Chabang link. It is proposed that the corridor terminates at Laem Chabang and that the North–South economic corridor incorporates the Bangkok link. At the southern end, the corridor ends at Nam Can, which has virtually no trade traffic being a dead end. It is proposed that the Southern Coastal Corridor has HCMC as its southern terminus, incorporating sections of the southern end of the Eastern Corridor. The logical routing would be Ha Tien–Rach Gia–Vinh Long–Tan An–HCMC. Although this would exclude corridor developments between Rach Gia and Nam Can, and between Ca Mau and Can Tho, it is considered that these routes are principally domestic connections with very limited trade connectivity. This proposal would simplify the overall alignments in southern Viet Nam, which are considered unduly complex.

9. Northeastern Corridor

Bangkok–Phetchabun–Kenethao–Louangphrabang–Xam–Nua–Than Hoa

143. This is probably the most contentious corridor because there are sections that do not physically exist, particularly the link between Thailand and the Lao PDR. It is a largely theoretical corridor and appears to be mainly linked to enhanced internal connectivity within the Lao PDR. Road work is ongoing at Section 11 between Louang Phrabang and Kenethao, but this does not extend over into Thailand. There is also work on the Section 12 link between Xam–Nua and Kham, and preliminary discussions on Section 13—the missing link between Louang Phrabang and Xam–Nua. There are also indications that the Lao PDR would like to change the alignment at the eastern end to a more northerly alignment through Pahang to link in with Highway 6 in Viet Nam, which is the Ha Noi–Dien Bien Phu road.

144. The inclusion of this corridor is debatable as it has no through-connectivity, almost no trade or traffic, and has negligible economic development potential. It falls outside of almost all the initial criteria set for corridor selection. It is also clear that Thailand and Viet Nam have no real commitment to this long distance link. Thus, it is suggested that this corridor be scrapped, though this should not in any way preclude its continued development where appropriate on a national basis. Closing this corridor would have no repercussions on the potential development of the GMS initiative or the movements of intra-subregional trade and would demonstrate the ability of the initiative to respond to trade and transport reality.

145. However, it is recognized that with ongoing funds and commitment by donors, including ADB under the GMS initiative, this might be too radical a step and be politically difficult for several parties, irrespective of the logic indicated above. It is evident this route will never be an economic corridor and therefore it is proposed that if it were to be retained, for political reasons only, it should be reclassified as a transport corridor and perhaps even be regarded as a “possible extension.”

10. Other Potential Linkages

146. At the 16th GMS Subregional Transport Forum held in Naypyidaw, the delegates of Myanmar again raised the issue of a Mandalay–Ha Noi corridor crossing through northern Lao PDR, acting as a parallel corridor between the East–West and Northern corridors. This is similar to the Indian connection, yet this would be costly to construct as it lacks the potential for significant volumes of trade traffic to justify such a link. Such a route may be considered relevant in a geopolitical context, but falls outside the parameters of the GMS corridor development program.

147. It is noted that two new routes are showing growing potential. First is the Bangkok–Ubon Rachathani–Chongmek–Pakse route, which is seeing more traffic due to the developments around Pakse in Salavan and Champasak provinces. The second is the Bangkok–Udon Thani–Sakon Nakhon–Nakhon Phanom–That Hek–Ha Tinh route, which is increasingly being used by transporters transiting between Bangkok and Hanoi, rather than using the East–West corridor. At the current time, the volumes are not considered sufficient to justify additional corridors, particularly at a time when the focus is changing to “widening and deepening” of economic corridors and improving connectivity of existing transport corridors. Additional corridors will lead to increasing the overall size of the network and an increasing risk of loss of focus. Nonetheless, it will be important to assess how these links progress in the short to medium term.

C. Summary

148. It is important that the GMS corridors reflect the constant changes in the economic, trade, and transport environments. The Southeast Asia region has been undergoing a period of dramatic growth, largely fuelled by the emphasis on becoming vibrant export economies. Indications are that during the period of the Strategic Framework, 2012–2022 this situation will change, with reduced emphasis on trade with developing countries in favor of more intra-regional trade. However, this is expected to be a gradual process and maritime trade will continue to dominate, which means that efficient connectivity with the ports will be critical, even for landlocked countries. Trade growth is important to the economic development of the subregion and the corridors have to act as effective conduits to facilitate the movements of such traffic. The suggested adjustments to the GMS corridor alignments are shown in Table 2 and Figures 7 and 8 and reflect this objective.

Table 2 Suggested Changes to the Greater Mekong Subregion Corridor Alignments

Economic Corridors	Alignment	Proposed Changes
North–South	Laem Chabang–Bangkok–Tak–Chang Rai –Chiang Kong–Houayxay–Boten–Mohan–Kunming	(i) Extension to Laem Chabang (ii) Western link through Myanmar to transport corridor link (iii) No alternative routing through Phitsanulok
• Southern	Dawai–Kanchanaburi–Bangkok–Aranyaprathet–Poipet–Phnom Penh–Bavet–Moc Bia–Ho Chi Minh City–Vung Tau	(i) Northern arm moved to transport corridor link
• Eastern	Ho Chi Minh City–Da Nang–Vinh–Ha Noi– Lao Cai–Hekou–Kunming	(i) Extension south of Ho Chi Minh City added to Southern Coastal Corridor
• Eastern Extension A	Ha Noi–Lang Son–Pingxiang–Nanning	(ii) No change
• Eastern Extension B	Ha Noi–Hai Phong	(iii) No change but with no coastal alignment
• Central	Boten–Louang Phrabang–Vientiane–Nong Khai–Nakon Ratchasima–Hin Kong Junction (Bangkok)	(i) Southern link with Northern Corridor at ring road to avoid duplication (ii) Eastern arm reclassified
• Northern	Fangcheng–Nanning–Kunming–Ruili–Muse–Mandalay	(i) No extension east of Mandalay
• Western	Thilawa–Yangon–Payangyi–Meiktila–Mandalay	(i) New alignment to incorporate Yangon and its port (ii) Connection with Mandalay (iii) No Indian connection
• Transport Corridors	Alignment	Proposed Changes
• East–West	Payagyi–Myawaddy–Mae Sot–Tak–Phitsanulok–Mukdahan–Savannakhet–Dansavanh–Lao Bao–Dong Ha	(i) Reclassified as a transport corridor (ii) Western end extended to Payagyi (iii) Eastern end moved to Dong Ha from Da Nang
• Southeast	Poipet–Siem Reap–Kompong Thom–Skun	(i) New corridor covering the realigned northern arm of existing southern corridor
• Central Eastern	Vientiane–Pakse–Stung Treng–Phnom Penh–Kaaong–Preah Sihanouk	(i) Reclassified but no change in alignment
• Southern Coastal	Ho Chi Minh City–Rach Gia–Ha Tien–Kampot–Koh Kong–Hat Lek–Rayong–	(i) Western terminus changes to Laem Chabang to avoid

	Sattahip–Laem Chabang	duplication (ii) Eastern terminus changes to Ho Chi Minh City to align with trade and economic activity
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Source: Authors

149. The GMS initiative is not solely an institutional mechanism among governments and donors, but is as importantly dependent on support from private sector stakeholders, especially the trade and transport communities. These parties use the GMS corridors on a daily basis. It is therefore critical that the initiative is credible by reflecting reality. Unfortunately, there is evidence that such stakeholders regard the current situation of having nine economic corridors as highly questionable. In addition, it is clear some of the existing corridors have very limited potential to be transformed into economic corridors whereas others are already engaged in the process. Given the lack of funding, it is vital that the Regional Investment Framework concentrates on those developments that represent the best chances of successful implementation in meeting the goals of the Strategic Plan. The suggestion of having two types of corridor—economic corridors to be developed by “widening and deepening” and transport corridors to focus on enhanced connectivity—more closely reflects the market environment.

150. The suggested changes in alignment are designed to connect centers of supply and demand, eliminate duplication, and simplify the network in order to ensure clearer development focus and assist in identifying priority investments. Where links have been excluded, this is because they do not meet the agreed criteria of linking alignments to GMS trade flows or strengthening links with maritime gateways and trade. In essence, these excluded links are not trade connections, though may be important in a domestic context and, therefore, be best suited to national development programs.

Figure 7 Proposed Greater Mekong Subregion Economic Corridors



Figure 8 Proposed Greater Mekong Subregion Transport Corridors



Source: ADB.

V. INTEGRATED APPROACH TO THE DEVELOPMENT OF TRADE ROUTES

151. The Fourth Economic Corridors Forum (ECF-4) proposed the way forward through “widening and deepening” the corridors by

- (i) linking their realignment and/or expansion to GMS trade flows,
- (ii) developing economic and/or urban centers in and around the corridors,
- (iii) promoting the economic viability of corridor development by strengthening the links with maritime gateways and trade, and
- (iv) enhancing the connectivity of rural areas with the corridors and their urban growth nodes.

This chapter focuses on (ii) and (iv), which are considered to be core issues in transforming the existing transport corridors into becoming actual GMS economic corridors.

152. In discussing the integrated approach to corridor development, reference is made to the *Regional Corridors Development: A Framework* (Srivastava 2012) that was presented to the ECF-4. The concept of the “widening and deepening” approach was adopted by that forum, thus to a major extent reflects acknowledgement of the proposals in that paper. This chapter discusses and expands the concept in the paper, including its specific implications in addressing (i) and (iv) above as a means of ensuring the resilience of the residual economic corridors suggested in the previous chapter.

153. Appendix D: Corridors as a Regional Transport Infrastructure Development Mechanism examines some of the transport planning concepts that have been adopted using regional corridors approaches, and that are currently being applied worldwide. It assesses their validity as an effective mechanism for identifying infrastructure development needs from a trade-related perspective while looking at the different types of corridor and the relationship among them, highlighting some of the caveats in their use as an effective planning mechanism. A key conclusion was that the concept of “community-based” corridors—selected on a national basis by governments—tends to compromise the regional development dimension and can potentially result in a “static” corridor network that fails to recognize the needs of users and the ability to adjust to the changes in the market environment. The geopolitical emphasis tends to override the selection criteria based on trade and traffic demand. Another conclusion was that the greater the size of the network, the greater the risk of losing focus and the inherent difficulty in identifying priority projects. The GMS corridors reflect some of these concerns, and the logic of all corridors being classified as economic corridors through the “one-size-fits-all” approach is unrealistic, as discussed in previous chapter.

154. The concept of economic corridors represents an advanced stage in integrated regional planning whereby a transport corridor undergoes systematic infrastructure improvements in a well-defined area linked with production, trade, and other development opportunities. While a transport corridor physically links territories or a region along a designated route, providing transport and other logistics services to promote trade among the cities and countries along that corridor, an economic corridor represents the logical progression of linking transport development with complementary investment in economic activities over territories or a subregion. The purpose of an economic corridor is to generate investment, employment, and

higher income with infrastructure development, not only in the large cities, but also in smaller towns and rural areas along the corridor. In essence, instead of being a single route, the corridor also encompasses an economic zone running in parallel with the road or rail artery that directly feeds into or from that artery. Thus, economic zones tend to be elliptical in shape with the economic activity radiating from the center and "stretched out" along the corridor because of the economic benefits of connectivity that the corridor brings.

155. The development of an economic corridor is expected to extend the benefits of improved transport links to remote, landlocked countries or locations within a geographic area, and within smaller economic zones along the way. It is not simply a connection between point A and point B because its impact should go beyond the main route and extend to the areas that can be accessed, or areas whose access to major economic centers could be improved, through the connection between points A and B. Developing an economic corridor involves systematic and coordinated planning, as well as policy and institutional changes in support of the physical infrastructure to facilitate the movement of trade, goods, and people throughout the corridor.

156. An overarching goal in the transformation process is ensuring that the benefits to the participating countries at the national level are spread down to the subregional level on a sustainable basis. Hence, the institutional arrangements for an economic corridor must adequately address both issues on physical or "hard" infrastructure and "soft" infrastructure to ensure the smooth and cost-effective flow of traffic across adjoining countries, and the efficiency of investments in physical infrastructure.

157. As transport corridors develop into economic corridors, sequencing the development of these hard and soft infrastructure investments becomes more important. After construction of the physical infrastructure, development of complementary soft infrastructure may become more important than further investments in transport hardware, assuming that spending on operations and maintenance is maintained or even increased. For example, once a two-lane highway has been built, streamlining customs facilities and performance may boost trade and the economic environment more than widening the road to four lanes.

158. The Asian Development Bank (ADB) commenced the nominal transition of its transport corridor approach to economic corridors with the GMS program in 1998. These corridors must be within a well-defined geographic area where infrastructure development was linked with the development of production and trade potential through systematic interventions based on a clear economic rationale. The purpose of the reclassification was to promote economic cooperation between contiguous regions or countries and composed of several components, as follows:

- (i) a defined space or location;
- (ii) physical infrastructure, including a central transport system;
- (iii) nodal points, such as industrial estates or border towns around which economic production and service activities were clustered; and
- (iv) policies, programs, institutions, and agreements that would facilitate cooperation and allow the clustered economic activities to draw strength from each other through scale economies, externalities, and public goods.

159. Implicit, therefore, in the economic corridor concept is a direct linkage between transport infrastructure projects and transport and trade facilitation projects on the one hand, and increased production of goods and services and domestic and/or foreign private sector

investment on the other hand. In simple terms, the economic corridor approach recognizes that development entails infrastructure to be integrated with other economic opportunities, suggesting the need for not only transport infrastructure and trade supporting hardware, such as dry ports and/or inland clearance depots (ICDs), but also investment in production allied to the generation of trade demand.

160. Economic corridors should be a useful regional infrastructure planning mechanism being theoretically based on trade and transport demand, as they not only link economic clusters but are also intended to be self-generating by attracting investment and consequent production inputs and outputs. However, in practice, it is arguable as to whether the transition from transport corridors to economic corridors under the various ADB-related initiatives is a reality, a goal, or a misuse of terminology. The inference of an economic corridor, as opposed to a transport corridor, is that the corridor is able to attract extra investment in economic activities, such that it generates additional demand that contributes to the increased viability of the corridor.

161. As indicated in the previous chapter, it is clear that some of the GMS economic corridors remain in reality as transport corridors, but have been renamed as economic corridors to highlight the potential end-goal. The GMS subregion is so diverse that a single solution is unlikely, i.e., that all transport corridors are capable of the transition from transport to economic corridors simultaneously. Many of these routes link across jungles and mountain ranges with minimal population and, therefore, the concept of growing economic clusters alongside the corridor is unrealistic. The fact that all of the transport corridors were reclassified at the same time compromises the original planning concept of the transition being an evolutionary process.

162. In the selection of economic corridors, there appears to have been no transparent selection criteria, despite the programs setting out their visions of what constitutes an economic corridor. Subsequent evaluation reports on the GMS initiative, for example, acknowledge that the transition process from transport to economic corridors is proceeding slowly in its implementation. This assessment is considered realistic and the question arises as to whether these corridors should have been subject to a phased transition, rather than reclassifying them all at the same time, based on a concept that did not reflect reality. In classifying all corridors in the same way, a major challenge is likely to be the responsibility and funding for the transport infrastructure and the industry and/or production developments along the corridor; the latter inevitably lie with different parties with differing timescales.

A. Potential Requirements of Economic Corridors

163. It is important to reassess the concept of economic corridors in relation to the GMS corridors, to confirm the logic used in the previous chapter in selecting which corridors should remain economic corridors, and to examine what is needed to promote their realization as economic corridors. Development of economic corridors requires the integration of activities and resources on either side of a transport corridor of sufficient magnitude to enable it to reach a “critical mass” such that it becomes a sustainable economic corridor.

164. The essential structural components of an economic corridor are its outer nodes or urban centers and the transport connectivity between them, combined with smaller nodes on or adjacent to the corridor feeding it. In the GMS, it appears that viability, to a major extent, is dependent on the overall link having at least two substantive centers of economic activity, ideally at or near either end of the economic corridor, generating the movement of goods to satisfy demand and supply needs. These movements need not necessarily be *end-to-end*, but

could also be *to and from the centers* to other smaller concentrations of economic activity along or adjacent to that route. Thus, a route that has other large concentrations of economic activity on the corridor will tend to have a greater chance of becoming a sustainable economic corridor.

165. For example, the Southern Corridor connects Bangkok and Ho Chi Minh City (HCMC), which are two major economic concentrations, but is strengthened by having Phnom Penh between them. Similarly, the Eastern Corridor between HCMC and Kunming has Ha Long and Ha Noi between them, both of which generate significant traffic and trade. The Northern Corridor differs in that the main traffic concentration is between two economic conurbations—Kunming and Nanning—that are relatively close together, but with smaller concentrations at the ends at Mandalay and Fangcheng. However, if economic corridors lack the two primary economic concentrations and supporting nodes of economic activity, they are considered to probably fail to reach the level of “critical mass” to be sustainable. For example, the East–West Corridor lacks any primary concentration of economic activity and is reliant on secondary nodes, such as Tak, Phitsanulok, Khon Kaen, and Da Nang. As a result, it lacks the supply and/or demand parameters and the result is low traffic and is unlikely to be sustainable as an economic corridor.

166. A second factor is the nature of the terrain and resulting type and scale of economic activity feeding to or from the corridor. In the GMS subregion, almost all the corridors pass through some areas of mountainous terrain with jungle vegetation. Clearly, apart from some logging and possible mining activity, these road sections are unlikely to contribute to the economic transition of the corridor. Similarly, on many corridors, the route passes through less developed rural areas dependent on subsistence-type farming, which again will be minimal contributors to the economic transition. Conversely, there are open agricultural areas producing large quantities of staple foods, or plantations, or fish farms, and others that generate products on an industrial scale and requiring transport in volumes from the source of supply to the concentrations of demand located on the corridor. These can be contributors, provided conditions can be developed whereby their logistical costs enable them to be competitive in international trading markets.

167. No corridor, other than perhaps the short distance in Eastern Extension B between Ha Noi and Ha Long, will ever be an economic corridor in its entirety. Thus, it is necessary to consider such corridors holistically so there will be certain sections that will constitute “economic sections” with some level of economic activity, and others that will be “transport or connector sections,” such as road and/or rail sections that pass through remote or difficult terrains. There is no established methodology or formula to balance the percentage of economic or transport sections in the overall link to be able to qualify as an economic corridor. However, what is clear is that the stronger the core economic concentrations are and the more number of supporting nodes, the greater is the length of non-economic performing sections (the transport connecting sections) that is acceptable without compromising the overall viability of that economic corridor. In essence, the strength of demand is still there irrespective of these nonperforming sections. The weaker the economic sections, the more that the transport sections will be compromised. For example, on the East–West Corridor, the strength of the few economic sections is insufficient to offset the negative impact of the non-economic sections, whereas on the Southern Corridor, the magnitude of the Bangkok and HCMC concentrations, supported by Phnom Penh and borders zones, is more than sufficient to offset any non-economic sections.

168. This section of the report has highlighted the critical importance of the core concentrations in establishing viable economic corridors. However, this needs to be strengthened by the supporting nodes and adjacent activity zones to ensure sustainability. As all corridors have sections with minimal economic activity due to the terrain or lack of population

and other resources, it is important to develop approaches to enable these “intermediate” sections—described as neither within a core conurbation or are areas with no significant economic potential—so these can be developed to generate traffic and contribute to the viability of the economic corridor. The ECF-4 proposals to develop economic and/or urban centers in and around the corridors and enhance the connectivity of rural areas with the corridors and their urban growth nodes highlight the need to develop these intermediate sections. This could be done by increasing their contribution to the corridor on the one hand, and obtaining the benefits of the corridor development over a wider spatial area on the other.

B. The Widening and Deepening Process

169. The “widening and deepening” process adopted by ECF-4 represents an integrated approach to extend the influence of the designated economic corridor by “widening” through extending the potential catchment area on either side of the arterial corridor link, and “deepening” by enhancing the overall benefits of using the international corridor to ensure its sustainability. The key issue in “widening” is accessibility and, therefore, is intrinsically linked to road connectivity, or in some cases, rail connectivity. The development of access to and from areas or zones on either side of a corridor is a two-dimensional issue as the demand for enhanced connectivity with the corridor may arise to provide better linkage with existing adjacent developed areas, or conversely, the improvements in access may generate further or “greenfield” developments. Linking existing adjacent economic areas represents a lower risk strategy as is connecting with a known area of supply or demand, whereas access improvement is reliant on latent supply or demand being triggered by developing access. Such reliance on perceived latent demand has a proportionately higher unknown factor indicating a higher investment risk. This situation tends to favor investment in secondary road linkages to adjacent commercial centers, making the “developing economic/urban centers on and around the corridors” approach as a preferred option.

170. A concern in many GMS countries has been the increasing urbanization, particularly the high growth concentration of economic activity around the core conurbations in each corridor. Again, this is a two-dimensional issue as people from smaller cities, towns, and the countryside are moving to the major conurbations in order to find work, but the lack of investment in the smaller towns and cities means there are less employment opportunities and, thus, the need for migration. Based on global evidence, not just in GMS, it would appear such a trend is irreversible and could even accelerate, particularly as agriculture becomes more mechanized, releasing a large labor force that becomes increasingly reliant on finding alternative employment in other economic sectors. Experience in some GMS countries, such as Thailand and Myanmar, suggests that labor is surprisingly mobile in migrating to sources of higher economic activity and this potentially constrains the diffusion of economic activities to the poorer areas of the country.

171. A key in developing economic and/or urban centers or clusters along the GMS corridors is to attempt in part to mitigate this migratory effect by spatial diversification of economic activity though encouraging investment in manufacturing and commercial activities outside the core centers. This must be supported by enhancing connectivity. It is recognized that “demand” tends to be concentrated around these core centers and, therefore, it is often logical for commercial entities to develop the “supply” means close to that demand in order to minimize their supply chain costs. Due to the emphasis on export economies, the tendency has been to establish production close to the ports and this will be difficult to reverse, especially if the economic activity involves reprocessing or assembly activities based on imported components. The supply chain costs need to be minimized to ensure global competitiveness.

172. However, there should be opportunities to spread economic activities nationally if the additional logistic costs can be partly or wholly offset by lower production expenditure, such as availability of cheaper labor, lower raw material costs, or reduced land and building rentals. Many of the special economic zones (SEZs) are designed to provide incentives to offset the higher logistic costs incurred in suboptimal production locations. Improvements in secondary road access to these areas would reduce logistic costs and consequently make such areas more attractive for economic development. In addition, the increasing focus on intra-regional trade to offset the lack of growth in traditional markets can result in a potential redirecting of traffic away from the need for seaport connectivity, albeit quite slowly. Stimulation of domestic economies can promote relocation of new supply centers over a wider area to service a more localized demand.

173. In practice, the core conurbations tend to consist of “larger concentric rings of urbanization with the corridor opening up into a funnel shape as it comes closer to each concentration.” In other words, as the corridor comes closer toward a major urban center, the potential for urban or industrial development is higher as the local demand increases, whereas the farther the corridor is from urban centers, the potential becomes limited as the distance between supply and demand increases supply chain costs. This suggests an elliptical shape of economic potential, which emanates from existing economic concentrations and “stretching out” along the corridor. The enhanced access offered by the corridor means being slightly further away from the urban concentration may not be so disadvantageous. It is expected that the growth of all economic sections will tend to be elliptical and that development along the corridor will vary with the width and length of those elliptical zones.

174. The development of feeder or secondary roads connecting with the corridor can directly contribute to the performance of the economic corridor by generating additional traffic. Road infrastructure investment can lower logistic costs and make production competitive for areas that are slightly off-corridor since their connectivity to areas of demand gets improved. This is particularly important for small and medium-sized enterprises (SMEs), which are the dominant sources of economic activity outside the main conurbations and where logistic costs tend to be more sensitive.

175. The second parameter of “enhancing connectivity of rural areas with the corridors and their urban growth nodes” is more complex because it creates a dilemma as to whether these are national and subregional projects. On the one hand, rural issues are principally about domestic connectivity with their urban centers and should, therefore be addressed by country programs. On the other hand, rural areas can be a significant source of trade and, therefore, can be considered as a “national issue with regional implications.” To separate the two, it is suggested that the GMS initiative may focus on potential connectivity to sources of export production rather than directly to primary sources of supply to that production. For example, concentrating on connectivity to rice processing factories, which may generate exports, rather than connectivity to the actual villages where it is grown; or in the case of seafood, to focus on processing centers rather than on pond areas. In effect, the parameter should concentrate on connectivity to sources of already processed supply, rather than to sources of raw materials. In most cases, this considerably reduces the possible connectivity combinations and could be used as a criterion for deciding whether or not a suggested rural connection should be included for consideration within GMS or remain a national project.

176. Given the size of the overall GMS network and any associated secondary road links, it is not possible to identify specific rural road links that fall within this category. Therefore, it is more logical that when countries propose such rural connections to be included within the GMS

initiative, a screening process should be undertaken to decide whether it as a national project with regional implications and that it meets the industrial-scale activity criterion.

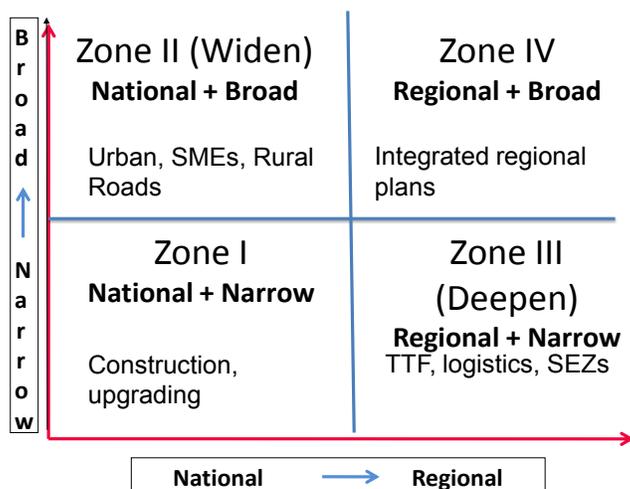
177. As indicated earlier, the potential width of the economic “catchment” zone at either side of the corridor will vary—from almost nothing in the sections where it is principally a transport section to 30 kilometers (km) or more in the major conurbations. While there is a funneling effect of a wider economic zone closer to urban concentrations, ironically, the economic benefits to the corridor could potentially become less, or the corridor become narrower, because of the presence of alternative routes. Conversely, further out in the rural areas, the corridor catchment zone may increase due to the lack of alternative connections. In practice, it is considered unlikely that the catchment zone related to an economic corridor would reach 50 km on either side; in most cases 15–20 km is more likely as greater distances off the arterial routes raise logistical costs to a point that adversely affect competitiveness. This estimate of the potential corridor “widening” limits is provided to guide transport planning only.

178. The ECF-4 also adopted the strategy of developing an economic corridor by “deepening.” Table 3 indicates that a transport corridor is a corridor that physically links an area or region. The “widening” process discussed above represents a strengthening of the transport corridor by attracting more traffic as a transitional process toward transforming it into an economic corridor assuming that the physical infrastructure is already in place as a prerequisite. The focus in an economic corridor is to attract investment and generate activities along the less developed areas or parts of the subregion, than solely the “widening” connectivity process.

179. The framework presented at the ECF-4 reflects the “deepening” process by suggesting a zonal or classification system as shown in Figure 9 (Srivastava 2012). Zone 1 represents the current situation of the selected economic corridors, where physical connectivity is largely complete and the focus is on developing the basic corridor infrastructure. The proposal is now to concentrate on Zone II and Zone III developments in order to achieve Zone IV maturity into viable economic corridors able to attract investment in the less developed sections of the corridor. Zone II is essentially the “widening” process described above, focusing on extending potential catchment areas to generate additional traffic to support the corridor. Zone III is the “deepening” process where the “soft” infrastructure issues that could constrain the performance of the corridor, and the need to support hard infrastructure other than roads or rail lines are addressed.

Figure 9 A Framework of Deepening Process by a Zonal System

A Framework for Corridor Development



SEZs= special economic zones, SMEs = small and medium-sized enterprises, TTF = trade and transport facilitation.
Source: Srivastava (2012).

180. Under Zone III, narrow and regional, development is concerned with strengthening the corridor through extension beyond national boundaries by “diminishing the height and density of the barriers at national boundaries thus increasing trade, combined with enhanced transport and trade facilitation.” The focus of the “narrow” corridor is on moving traffic rapidly at least cost from point to point. However, under the GMS initiative, there is a need to enhance the *regionality* of the economic corridor by promoting development and strengthening logistics facilities and services. This includes the provision of support infrastructure, such as new border posts, dry ports and/or inland clearance depots (ICDs), warehouses, border SEZs, intermodal transport links, and others. In addition to the “soft” infrastructure trade and transport facilitation initiatives, such as implementation of the Cross-Border Transport Agreement (CBTA).

181. The “deepening” is essentially about ensuring that the corridor continues to be more attractive for the movement of intra-regional and external trade. The need for supporting infrastructure is discussed in Appendix C: Assessment of Supporting Infrastructure, Arrangements, and Cross-Border Facilities. This highlights the need for border crossings to be both modern and efficient based on “form follows function” design techniques, with work still needed on some of the proposed economic corridors, such as at Thanalang (Vientiane), Poipet, and Myawaddy. It also proposed the gradual transformation from border posts being clearance centers to checkpoints by moving the clearance activity “inland” away from the congested border interface with passenger traffic. This suggests the need for simple border ICDs where the main freight processing takes place. This strategy should gradually eliminate delays at the border interfaces, particularly the queuing at border security zones.

182. There is also a need for more ICDs to handle freight traffic destined to the centers of economic activity, thus enabling through-transport to transit to a point much closer to the final delivery. A good example is the ICDs around Ha Noi, which are used for traffic coming in by road from the PRC. In addition, there is a need for more inland container depots, such that maritime container traffic can move quickly and efficiently from the ports to inland collection points where they are cleared. This could appreciably improve the efficiency of trade logistics, and reduce congestion in the container yards at the ports.

183. SEZs are designed to encourage investment, especially foreign direct investment, by promoting an environment whereby tenants are able to be more competitive when located within the zone than would otherwise be possible in the surrounding open-market environment. Possible incentives cover a wide spectrum of options, but are commonly related to lower levels of corporate taxation, tax holidays, reduced import duties, export subsidies, exclusion from sales tax on domestic sales, subsidized tenancies, labor cost support, lower energy and/or utility charges, and others. There a variety of others including cross-border economic zones (CBEZ), free trade zones, export processing zones, free zones, industrial parks or estates, free ports, free economic zones, urban enterprise zones, and others.

184. An SEZ can be an effective mechanism in “directing” economic investment away from optimal locations by using the range of incentive options to counter the location disadvantages. Thus, it can help focus on certain types of development by locating along the GMS corridors. However, the key aspect in the development of SEZ, and particularly CBEZ, is identifying the nature of the “demand” for such a facility and the factors likely to support its positioning at that specific location. A common problem with CBEZ in particular in the past has been the perception that merely providing “supply” in the form of a designated physical zone near a border, supported with a fiscal incentive, would create “demand.” It is noted that in some cases, there are proposals to create CBEZ on either side of some GMS borders, which appear both illogical and highly speculative.

185. While ports are not currently integrated into the corridor concept, their role is considered critical to developing economic corridors, particularly as 90% of GMS trade by weight passes through these facilities. Ports are gateways for many of the GMS corridors and their role in driving the transformation from transport to economic corridors should not be underestimated. There are likely to be continuing investment needs at ports in terms of basic infrastructure, such as channels, breakwaters, and quays by the public sector, with superstructure and equipment being provided by the private sector based on concessions or on build–operate–transfer (BOT) arrangements.

186. On the soft infrastructure side, the emphasis should be on transport and trade facilitation. The combination of bilateral arrangements and the CBTA have led to significant improvements in the development of through-transport in the last strategy period. Trucks from Thailand, the PRC, and Viet Nam can enter the Lao PDR without permits; those from Viet Nam and Cambodia can enter each other’s territory on a restricted permit basis; and some vehicles from Viet Nam and the PRC enter each other’s countries on a limited basis. Given the traffic imbalances, unlimited bilateral access will always tend to favor the transporters in the country with the greater flow of exports for a variety of valid, commercial reasons. Nonetheless, there is an ongoing need to gradually eliminate current transport access restrictions, as border transshipment is still a reality in many economic corridors.

187. While the CBTA has been a successful mechanism in transport facilitation, which was its original objective, its extension into trade facilitation development has had less impact and in some cases had been detrimental. Proposals for border infrastructure in particular are encouraging the over-specification of border facilities, resulting in expensive infrastructure to be compliant but which is not required. The development of the CBTA as a trade facilitation instrument may be compromised by the signatory parties—the various ministries of transport, rather than the bodies responsible for trade facilitation activities. It might be possible to separate the CBTA into two constituent parts—one dealing with transport facilitation and the other with trade facilitation—with different signatories.

188. In the World Bank's *Doing Business* index, the ranking of the GMS countries, out of 185 total countries is as follows: Thailand, 18; the PRC, 91; Viet Nam, 99; Cambodia, 133; and the Lao PDR, 163. In the World Bank's *Logistics Performance Index* (LPI) ranking, which includes customs services, out of 155 countries, LPI ranks the PRC at 27, Thailand at 35, Viet Nam at 53, the Lao PDR at 118, Cambodia at 129, and Myanmar at 133. While the rankings themselves in some cases are a concern, a further issue is the scale of the difference between countries, especially at a time when the GMS's focus is on promoting intra-subregional trade. These World Bank tables clearly indicate there is significant scope for improvements in trade facilitation and this will be critical in ensuring that the economic corridors attract more trade movements to help them to reach Zone IV status.

189. While the approaches shown in Table 3 and the framework in Figure 9 presented at ECF-4 are not identical, there is a synergy. Zone 1 broadly equates to the description of a Transport Corridor in Table 9, and there is agreement, as in reality this is where the GMS corridors presently stand. The definition of an economic corridor in Table 3 is compatible with Zone IV, as it presumes the physical linkages and trade facilitation measures are already in place. The difference is that the proposed framework sets a road map for the intermediate stages of the transformation from transport into economic corridors with implementation of Zone II "widening" and Zone III "deepening" activities. The integrated approach is that these zonal development stages need to be undertaken concurrently, rather than consecutively. It is, therefore, important that the Regional Investment Framework, 2012–2022 contains a combination of hard and soft infrastructure designed to further stimulate this transformation process.

C. Identification of Economic Sections of Corridors

190. The previous sections have identified the requirements for developing economic corridors, first, through the realignment to trade flows and enhancement of port connectivity, and second by the widening and deepening process through developing urban centers and rural connectivity to strengthen the economic potential. It has been emphasized that no corridor is likely to be an economic corridor in its entirety (other than possible extensions). In reality, they will consist of a combination of sections that are already developed, others with reasonable potential to transform into economic sections, and others with negligible potential for such a transition, mainly due to the adverse terrain, forestation, or low population density.

191. This section provides an initial indication as to where, within the GMS network, the ECF-4 integrated approach is expected to lead toward developing these economic sections, such that the proportion of a particular corridor is eventually sufficient to justify its "economic corridor" status—probably approximately 20% of the overall corridor length.

192. Each of the GMS economic corridors proposed in Chapter IV is analyzed, which broadly mirror the trade corridors, and the possible size of the economic development elliptical zones are also described, together with initial indications as to the type of development that might be required for the widening and deepening process. This exercise is intended to provide some guidance as to where to focus infrastructure development planning from a GMS corridor perspective and to highlight the potential of sections of the corridor suitable for the transformation process.

193. The emphasis in the assessment on "widening" and "deepening" has been based more on potential urban and industrial development, which tends to be interrelated, rather than on the

rural connectivity aspect. Major stretches of some of the corridors consist of agricultural land, varying from subsistence farming to plantation development. At this stage, it is difficult to separate the types of agricultural activity and determine whether it is on a sufficiently large scale to generate agribusiness leading to trade, other than at macro level. While some assessment of both the rural and urban development aspects has been considered based on probability, confirmation site visits by specialists would be required to verify the situation on the ground. This assessment provides an initial overview of economic development prospects on selected corridors to highlight the issues and challenges ahead in the transformation process.

1. North–South Corridor

194. Economic activity on the North–South Corridor is heavily concentrated at the southern end around the Bangkok metropolis, which has an estimated urban and industrial development radius of approximately 60–70 km. The southern part of the corridor between Laem Chabang and Bangkok is already mainly developed to a depth of approximately 20 km inland from the coast, but still has scope for further industrialization and urbanization by gradual infilling. The northern end of this southern development ellipse at present is probably around Ang Thong, which is approximately 100 km north of Bangkok and the “corridor” development zone width is estimated at 30–40 km wide on each side. This whole area is already developed both in terms of urbanization and industrialization, but this is expected to continue as Bangkok’s influence gradually extends northward. In the medium term, expansion of the ellipse northward to Sing Buri, an additional 40 km, seems increasingly likely through strip development—i.e., most development will initially be adjacent to the highway.

195. Moving northward, the next concentration of activity is around Nakhon Sawan, which probably has an urban and/or industrial development radius of about 10 km. However, this is an important agricultural area with significant agribusiness potential, thus suggesting an ellipse of approximately 100 km along the corridor 50 km wide each side. While the agricultural growing areas are much greater, the produce tends to be brought in to processing centers that are closer to the corridor for logistical purposes.

196. Due to the terrain and rural nature of the agricultural activity, the next center of economic activity on the corridor is Chiang Rai. The economic development ellipse is expected to start just south of Chiang Rai. In the future, the zone is likely to extend all the way to the Lao PDR border when the new highway is complete, a distance of approximately 70 km with a width of up to 10 km each side. This whole northern part of Thailand is expected to develop principally based on its strategic location for trade with the PRC, both agriculturally and industrially. Currently, there is limited activity between Chiang Rai and the border, so such development would be expected to initially be “strip development” along the highway, but with increasing depth over time.

197. The major city of Chiang Mai lies approximately 80 km off to the west of the corridor. While it has an economic development radius of around 20 km, this does not extend through to the corridor due to the separating terrain and, therefore, it is not within the corridor ellipse. The connectivity from Chiang Mai to the North–South Corridor is already of high quality and it provides trade to the corridor, but probably should not be included within the corridor development zone.

198. In the Lao PDR, there appears very little potential for economic development on this corridor. While the road had been upgraded, it passes through hilly terrain with a low population density. The Lao PDR Department of Planning, Ministry of Public Works and Transport (MPWT), indicated that this route is principally seen as a transit corridor between the PRC and

Thailand, rather than for the benefit of the Lao PDR. While there is some activity to be anticipated around the Lao PDR borders with Thailand and the PRC, this is unlikely to extend inland due to the terrain.

199. In the PRC, the corridor passes through long sections of mountainous country. Kunming is also squeezed between mountains, with the result that its development radius is only about 20 km extending south along Dianchee Lake. The only other city of any size is Yuxi, further south, which has a development radius of up to 5 km, again in hilly terrain. It can be seen that the economic development potential of the PRC section is severely constrained due to the mountains extending the whole way from the Lao PDR border to Kunming.

200. The overall length of the North–South Corridor is approximately 2,000 km. Currently, approximately 360 km or 18% is estimated to have already been developed, with another 100 km or 5% expected in the short to medium term. The most likely section for further expansion is between Sing Buri and Nakhon Sawan, incorporating Chai Nat and Uthai Thani, which both lie 10 km to the west of the corridor. In addition, the section between Chiang Rai and the Lao PDR border should develop with the opening of the new highway and the 4th Friendship Bridge. The main rural development potential lies mainly around Nakhon Sawan.

201. It can be seen that the southern end of the corridor is dominant in terms of both actual and potential economic development. The trade and port connectivity parameters have already been addressed and the widening and deepening potential is almost all within Thailand and appears to be a natural expansion process requiring little or no additional stimulation. While the economic development percentage of the corridor is low at below 18%–23%, it should be noted that approximately half of the corridor (1,010 km) through the Lao PDR and the PRC is through mountainous terrain with little or no economic development potential. Thus, the potential economic sections are all within Thailand and about 45% of that section of the corridor lies within an economic development ellipse.

2. Southern Corridor

202. Dawei in Myanmar lies at the western end of the Southern Corridor and is a “greenfield” port and heavy industrial complex under development. It has a relatively small expansion hinterland due to the hills immediately to the east of the proposed industrial area. Over the mountains, the Bangkok-centered economic area spreads as far west as the junction of AH4, which is the primary highway link to southern Thailand. This is a distance of 70 km from central Bangkok. With the development of the proposed Bangkok–Kanchanaburi motorway, it is anticipated that another 50 km of high development potential should appear, though the width of the ellipse will tend to gradually narrow toward Kanchanaburi due to the terrain.

203. To the east of Bangkok, industrial and urban development is almost continuous to Phanom Sarakham, near the beginning of the ADB-assisted Highway Expansion Project (Route 359). This is a distance of approximately 100 km, hence, the Bangkok catchment area on this corridor extends to approximately 170 km west–east. The next potential economic section starts at Sa Kaeo and ends just east of Poipet, approximately 70 km. This section is not developed as yet except around Sa Kaeo, Watthana Nakon, Aranyaprathet, and Poipet, but the recent increases in land prices suggest that this section is being primed for development. However, the width of the development zone is likely to be relatively small, possibly only 5 km on either side, as immediate access to the AH1 is seen as critical. The rural development potential of the sections within Thailand is relatively low, as these are not prime agricultural lands suitable for agribusiness.

204. In Cambodia, there appears limited potential for economic development between Poipet and Phnom Penh as the route passes through small-scale farming areas and the main towns are widely spaced—Sisophon, Battambang, Pursat, and Kampong Chhnang. Any new agribusiness-type activities are likely to be concentrated in these towns. Conversely, to the east of Phnom Penh all the way to the Bavet border station, the Government of Cambodia sees this section to have significant economic development potential. The government's concept is an economic development arc from Ho Chi Minh City (HCMC) through Phnom Penh to Sihanoukville. Given the current situation where Phnom Penh has a catchment radius of only approximately 10 km, and the road to the east passes between the Mekong River and Kandal marshland to the bridge under construction at Neak Luong, it is difficult to envisage linking Phnom Penh and Bavet as a continuous economic section. From Neak Luong to Bavet, the route passes through open agricultural land in the Mekong floodplain with only one provincial town, Svay Tieng. While the road has continuous populated areas on both sides and there are a series of small feeder roads, there is no real depth to these developments. While the concept is of a continuous development, this appears challenging and is more likely to be concentrated at the section ends at Phnom Penh and Bavet, and at Neak Luong. Proposals for a series of SEZs in this area may not be able to provide the needed “spark” to economically develop the area given the low population density.

205. In Viet Nam, the 164 km section from the border to Vung Tau through and around HCMC is already heavily developed. Similar to Bangkok, the urban and industrial catchment radius is estimated to be approximately 60 km, which means that almost all of the Viet Nam section fall within this radius. Clearly, the key development feature will be even further urbanization and industrial development, servicing the new HCMC port areas. The developments between the border at Moc Bai and the city mainly relate to the continuous expansion of HCMC, rather than specifically relating to trade or connectivity with Cambodia. Development of the section between HCMC and Vung Tau is more dependent on the new port at Cai Mep—Thi Vai and Phu My wharves via the NQ51 link road.

206. The Southern Corridor is approximately 1,300 km in length with the new alignment as proposed in this study. The current development ellipses cover approximately 335 km, representing 25% of the overall corridor with another 100 km of potential development making one-third of this corridor as development zones. This high proportion is due to the dominance of Bangkok at the western end and HCMC at the eastern end, with limited development in between. The most likely development focus may be on road enhancement in Cambodia, as there are still significant sections of AH Class III roads. In Cambodia, the Southern Corridor is, in practice, more of a transport corridor and, therefore, the emphasis is probably on improving connectivity, rather than the widening and deepening process. Projects, such as the Phnom Penh bypass, concentrate more on enhanced connectivity rather than urban development *per se*.

3. Eastern Corridor

207. The realigned Eastern Corridor commences in the south at HCMC. As indicated earlier, HCMC has an urban and/or industrial sprawl of approximately 60 km, but this extends along the AH1 corridor as far as Long Khanh, which is 80 km distant. The ellipse narrows gradually between Bien Hoa and Long Khan, whereas at Long Khan it is more of a strip development. Within this elliptical zone there is both urban and industrial development, some of the latter being export-oriented. The development of the Cai Mep—Thi Vai port complex will tend to favor development to the east side of the city, including the area through which the corridor passes.

208. As the corridor moves northward, it passes through mountains and narrow coastal plains with a series of small cities and towns along the route, but there are no major economic sections, especially those likely to generate significant trade. Even the largest city of Da Nang only has a relatively small economic and/or industrial area of approximately 5 km radius, with Vinh and Thanh Hoa having similar small development radii. While Ha Noi is a capital city with a big population, surprisingly it has a much lower urban sprawl with a radius of only approximately 15 km compared to 60 km in HCMC. This reflects the much lower level of commercial activity in the Red River Delta as compared to the Mekong Delta, and the high population density present in Ha Noi.

209. There are some significant urban centers south of Ha Noi as far south as Ninh Binh, which is the southern end of the expressway 80 km from Ha Noi. However, at this stage of development, the corridor passes predominantly through agricultural land interspersed with large towns, such as Phu Ly and Nam Dinh to the east. This is not prime agricultural land in export terms, as most export rice is grown in the south. It could be argued the Ha Noi economic ellipse commences at Ninh Binh, incorporating Nam Dinh and that this represents a future economic sector, given its proximity to Ha Noi and access across to Hai Phong using the cross-delta NQ10 highway.

210. Similarly to the northwest along the corridor, the development influence of Ha Noi extends as far as Viet Tri, a distance of 84 km. This is a mix of rural and urban development, with fields and large towns, but which appear to have potential for both urban and industrial development. This suggests that the Ha Noi ellipse on this corridor is probably 165 km long, and about 50 km wide but with a mix of urban and rural developments. North of Viet Tri the corridor passes through rural areas until Yen Bai where a mountainous section begins. The next 200 km is through mountains to the PRC border with minimal significant economic development prospects.

211. In the PRC, the situation is similar to that of the North–South Corridor in that the route to Kunming is all through mountainous terrain. The Kaihe Expressway commences at the border and travels north to Honghe, followed by the Tongjan expressway across to Yuxi on the North–South Corridor. Between Honghe and Yuxi, there are a series of towns, such as Jianshui and Tonghai, but these are in small valley enclaves split by mountains, so there is little continuous area suitable for significant economic development. As indicated in the North–South Corridor, Kunming has a development radius of only about 20 km and Yuxi about 5 km.

212. The Eastern Corridor is approximately 2,450 km, the longest of the GMS corridors. The existing economic sections cover about 220 km or 9% of the corridor length, but this increases to approximately 300 km or 12% if potential economic development areas are included. This low percentage is due to the large mountainous sections along the corridor northwest of Hanoi, which represent a quarter of the overall corridor length, and also long sections along the South China Sea coast, which have low development prospects. As expected, the economic development potential is concentrated in the Mekong and Red River Delta areas and the development focus will probably be on expanding and in-filling of the economic sections within the existing ellipse, rather than in new development areas.

4. Eastern Corridor–Extension A

213. The Eastern Corridor–Extension A commences in the south at Ha Noi, which has a current development radius of only about 15 km. Low-density economic development extends to just beyond Bac Ninh, including the industrial developments at Hoan Son, a distance of approximately 30 km. There is a small agricultural area beyond Hoan Son, but from Kep the AH1 transits through hills to the PRC border. Lang Son is the only sizeable town and any area suitable for significant economic development is concentrated within a 2-km radius between hills on both sides of the corridor.

214. In the PRC, the Nanyou Expressway runs from the border transiting through the hills with scattered developments near Pingxiang, assumed to be linked with trade to Viet Nam. This small development ellipse is 5 km long, but only 1 km wide due to surrounding hills. The land levels out north of Chongzhou with a mix of various qualities of agricultural land all the way to Nanning. Like Kunming, Nanning has an urban sprawl of only about 10 km radius, despite its 6.6 million population. There seems limited economic development potential on the PRC side of the border other than at Nanning and the agricultural profile suggests that there is unlikely to be major agribusiness to support an economic zone on this section of the corridor.

215. This is a short economic corridor of 260 km where the economic development is concentrated at either end of the link. It is estimated that existing and potential economic sections only extend to approximately 50 km or 20% of its overall length. The development of expressways over the full distance could potentially strengthen the case for further economic development at either end, rather than development in between.

5. Eastern Corridor–Extension B

216. The Eastern Corridor–Extension B is the shortest of the economic corridors and transits between Han Noi and Hai Phong. While the whole of the 110 km corridor is considered to have overall potential to become a continuous economic corridor, currently the main industrial developments extend only about 30 km from Ha Noi and then these are between Hai Duong and Hai Phong. It is estimated that approximately 50% of the overall length can be classified as economic sections at present, but the potential ellipse should probably cover the whole length. The width of the ellipse is only 10 km each side, due to the various waterways and drainage canals.

6. Central Corridor

217. The realigned Central Corridor commences in the south at the Hinkong junction on the Bangkok ring road. The influence of the city extends northeast along the AH2 corridor as far as Pak Chong 60 km northeast of Saraburi, an overall distance of approximately 120 km from central Bangkok. The economic development between the ring road junction at Hinkong, which is the new terminus where it joins the North–South Corridor and Pak Chong, is mainly at a stage of intermittent development, with agricultural as well as urban and manufacturing activities interspersed. The ellipse becomes much narrower outside the Bangkok ring road as development becomes increasingly strip-based along the road. The width of the zone is only 5–10 km on either side of the corridor at this point.

218. From Pak Chong, the road transits through an agricultural area to Nakhon Ratchasima, which has an urban development radius of 5 km. While there are elements of economic activity along the road between the two locations, these are not large and there is no depth. This is not

considered to be a prime agricultural land sufficient to attract major agribusiness activities. North of Nakhon Ratchasima, the corridor passes through poor to moderate agricultural areas, again with no significant economic activity even alongside the highway. Khon Khaen is the junction with the East–West Corridor and is a potentially important agribusiness center, given the rich agricultural areas to the west along the East–West Corridor. However, on this corridor its urban and/or industrial influence does not extend outside the 7 km radius of the ring road. The corridor from Khon Kaen all the way to the Nong Khai border with the Lao PDR is similar to that south of the city with no significant economic activity near or on the highway, other than at Udang Thani, which has a development ellipse of approximately 5 km. Nong Khai is an important economic center, especially of trade across the Mekong River to Vientiane. The development ellipse probably commences 7 km south of the town at the junction where the bypass to the border begins.

219. In the Lao PDR, the urban and industrial development radius of Vientiane is approximately 15 km and is bounded by the ring route from the border at Thanaleng, which arcs around the northwest of the city, known as the “Year 450” Road. All significant economic activity appears to be concentrated within this arc. North of Sikhuet, which is situated at the junction of this ring road and the AH2, the road travels through agricultural areas before passing into the mountainous terrain at Tha Huea. The road between this point and the junction with the North–South Corridor at Nateui just south of the PRC border at Boten transits through narrow valleys and mountainous terrain with negligible potential for economic development. The only significant center of population is Luang Prabang, an important tourist center, but with limited other economic activity.

220. The Central Corridor is approximately 1,200 km in length and economic activity is concentrated at the southern end and to a lesser extent in the center around Vientiane. The overall length of the development ellipses are estimated to be approximately 170 km, representing only 14% of the overall corridor length. However, approximately 550 km or 46% of the corridor is through mountains, and the development ellipses cover 25% of the remaining route.

7. Northern Corridor

221. The western terminus of the realigned Northern Corridor commences in Mandalay. It has a wide development radius of 20–30 km that incorporates conurbations at Sagiang and Amarapura. In the easterly direction, the urban and economic development zone presently does not extend much beyond the city boundary. There is a small economic development ellipse between Anisakan and Pyin U Lwin 70 km from Mandalay, and it could be argued that these two ellipses could eventually be joined in the future. From Pyin U Lwin, the road enters mountainous terrain all the way to the border at Muse, and it clearly has little if any potential for significant economic development.

222. In the PRC, the National 320 road from Ruili continues another 140 km through mountainous terrain to Zhen’an where it meets the southern end of the Hangrui Expressway, which is believed to be still under construction. Indications are that the expressway is completed as far south as Longling, which is near Zhen’an. The expressway continues westward through similar mountainous terrain to Boashan, which is an urban center with a 5 km development radius squeezed in by mountains on all sides. The expressway then continues all the way to Kunming through the mountains, with many tunnels and bridges. It passes through a number of major towns, such as Dali, Xiangyun, Shaqiauzhen, Nana, and Chuxiung, but each can only service a small enclosed valley area. Urban and industrial activity only commences

approximately 40 km west of Kunming near Anning, but the width of this ellipse is small due to the valley terrain.

223. Between Kunming and Nanning the alignment follows the G80 Guangkun Expressway. The expressway almost immediately enters hilly terrain and continues eastward with Yiliang being the only significant town. A new connecting section of 107 km has been completed in September 2012, running southward to link in with the main section of the G80 north of Honghe. The whole section of road and/or expressway from Kunming to Blaise is through hilly or mountainous terrain interspersed with lakes and small agricultural areas, thus, there is no section with realistic economic potential. From Blaise south to Nanning the expressway follows a river valley and there is no significant urban activity until Nanning. As earlier indicated, under the Eastern Corridor–Extension A, Nanning is a compact city with a development radius of only 10 km.

224. The route from Nanning to Fangcheng uses the Lanhai and then Qindong expressways. South of Nanning, the expressway transits initially through an agricultural area and then proceeds through hilly areas to Fangcheng. The only significant urban settlement is at Qinzhou where the two expressways interface. The economic ellipse for Fangcheng extends 25 km from the city in the north to the heavy industrial port in the south. However, this ellipse is narrow because the port is on a peninsula.

225. The Northern Corridor is approximately 2,050 km, marginally longer than the North–South Corridor. The length, covered by potential economic ellipses, is only approximately 175 km or 8%–9% of its overall length. This low potential suggests that it should not be classified as an economic corridor, but should be a transport corridor focused on connectivity, especially in Myanmar. However, it should be noted that it is estimated that over 75% of this route is through mountains with no economic potential and, therefore, the ellipses cover approximately a third of the corridor where development might theoretically be possible.

8. Western Corridor

226. The core economic concentrations are at the northern and southern ends of the corridor—at Mandalay and Yangon. As indicated in Chapter IV, it is proposed that the corridor be extended to Thilawa, which is planned as the new port development area. The road between Yangon and Thilawa currently passes through an open rural agricultural area with low population density. Despite investment by the Myanmar International Terminal Thilawa (MITT) in the container port, this southern section has not shown any recent significant economic activity. This is mainly due to the disadvantage of these deeper water berths compared to those in the center of Yangon. The benefits of having 9 meters of water alongside the MITT facility, as opposed to only 7 meters in Yangon, are insufficient to offset the additional road delivery costs, given that most of the demand is in Yangon. The container vessels are mainly feeder ships hubbing out of either Colombo or Singapore and most also service Kolkata and Chittagong on the same voyage. These other ports also have restricted draft and, therefore, it is clear the additional 2 meters of draft may not be effectively used in terms of larger vessels. However, Thilawa is already handling large bulk and car carriers where the extra draft can be utilized.

227. Changes in Myanmar's political environment resulting from the removal of most of the sanctions suggest there will likely be rapid growth in container traffic. This increase in demand will, on the one hand, put pressure on the terminals along the Strand in the middle of Yangon, leading to severe urban congestion, and on the other hand, promote the use of slightly larger vessels where the 9-meter draft can be more effectively be used. New larger feeder ships with

restricted draft can be employed as such container traffic increases. The proposed government plan is to close the downtown city quays for redevelopment and transfer the traffic downstream to Thilawa and develop the nearby Thanlyin–Kyauktan special economic zone (SEZ) in a way similar to that at Laem Chabang in Thailand where the port feeds off the SEZ and vice versa. For this to take place, it will be determined, to a major extent by the transfer of many of the Yangon terminals. Based on the experience of HCMC, this is by no means a certainty, although this appears to be the agreed government policy. Nevertheless, it is proposed that the southern end of the ellipse should extend around Thilawa and the proposed SEZ.

228. In the short to medium term, the industrial potential is likely to remain highly concentrated around Yangon with additional labor migrating toward the demand as the economy grows. The potential for the “widening and deepening” process through urban development is considered to be high within a 30–40 km radius of Yangon. The section between eastern Yangon and Thilawa is also ripe for industrial development, including the SEZ. The potential for increased trade with Thailand in the future could also suggest that the economic ellipse could stretch as far north–east along the Western Corridor as Bago. This is likely to initially be strip development along the corridor outside the 40 km Yangon radius with limited potential for widening and deepening.

229. The economic development in the north will be concentrated around Mandalay, the country’s second largest city. It is far less industrialized than Yangon and, therefore, its radius of economic development potential is likely to be lower. However, it does have other neighboring conurbations at Sagiang and Amarapura, which suggests an economic development of 20–30 km. The potential for economic development south of this radius along the Western Corridor is considered limited as this is generally poor-quality agricultural land. Further south, there is limited potential other than for urban development around Meiktila and the Pyinmana–Naypyidaw conurbation. The prospects for rural road development to generate trade are considered marginal as there is no significant agribusiness or plantation farming.

230. The distance of the Western Corridor from Thilawa to Mandalay is approximately 650 km. The potential economic development ellipses cover a corridor distance of approximately 130 km maximum. Thus, the economic development potential areas only represent about 20% of the corridor and it is heavily concentrated at the southern end.

D. Conclusions on Economic Corridors

231. The above assessments suggest the realization of the four-point strategy proposed by ECF-4 may be much easier in some corridors than in others. The first strategy parameter of linking their realignment and/or expansion to GMS trade flows is already accomplished as most of the identified trade corridors are all also classified as economic corridors. The missing trade sections not included on the economic corridors are located at the East–West Corridor at the border of Thailand–Myanmar and the Central–Eastern Corridor between Phnom Penh and Sihanoukville. In both cases, the economic ellipse would be relatively small and not form a significant part of the overall corridor. The priority in both cases is on improving connectivity on those corridors as a prerequisite to any later widening and deepening.

232. The third strategy parameter of promoting the economic viability of corridor development through strengthening links with maritime gateways and trade is also satisfied with the proposals to extend the Western Corridor to Yangon and Thilawa. However, it is the development of the economic and/or urban centers in and around the corridors, and the

enhancement of the connectivity of rural areas with the corridors and their urban growth nodes that sets the economic corridors apart from the transport corridors.

233. A key issue in the past has been the lack of specific criteria adopted to define whether a corridor should be qualified to be an economic, as opposed to a transport, corridor. This chapter suggests the difference, as follows: *the development focus of a transport corridor should be on enhancing the connectivity along that corridor, whereas in an economic corridor, the connectivity is largely completed and the focus should be on widening and deepening the economic activity in the vicinity of that corridor.*

234. Assessing the proposed economic corridors has highlighted a number of issues relating to the development of economic and/or urban centers and rural connectivity parameters. It has shown that economic corridors would never be completely developed along their total length and would more likely consist of numbers of economic sections that are elliptical in shape due to the influence of the corridor. However, what may not have been fully determined was the overall length of corridor sections that would have no potential for economic development. This is because the topography of the northern part of the GMS subregion is mountainous, with low-population density and negligible economic activity. In the Northern Corridor, this represents over 70% of the corridor, 50% in the North–South, 46% in the Central, and probably over 40% in the Eastern Corridor. The impact of this reality has to be considered when adopting selection criteria.

235. One option that could be taken when assessing a corridor's economic development potential is to exclude sections with no potential for geographical reasons. Only those sections where it is physically possible to “widen and deepen” should be considered and a minimum of 20% should be identified as existing or with high potential as economic sections. This approach will clearly establish which corridors have economic potential and which do not, and then focus on developing the identified economic ellipses.

236. Other important conclusions from the assessment are that the primary widening and deepening will be principally in the form of urban and industrial development, as opposed to enhancing rural connectivity. The trade assessment implies that rural connectivity relates principally to linkage with prime agricultural land where product is grown and processed for export. In only a few cases do the corridors transit through such areas. Secondly, the developments will be principally within existing areas of economic activity, which will form the “base” from which the “widening and deepening” process will take place. Thirdly, a significant amount of the “deepening” process will be in the form of in-filling within existing economic ellipses. Economic activities adjacent to many cities in the GMS countries become progressively dissipated further from the center, thus, there are agricultural areas within the economic ellipses that are likely to be gradually in-filled by urban and industrial sprawl, such as around Ha Noi, the outer areas of Bangkok, Vientiane, and eastern areas of HCMC along NQ51. The potential for totally new areas of development appears limited, except possibly in northern Thailand near Chiang Rai, or parts of Myanmar.

237. This assessment has not specified the need for specific road developments off the corridors that would “widen and deepen” the ellipses. One approach that could be adopted when examining national connectivity projects is to consider whether these are within an ellipse and if these are national projects with a regional trade dimension, in which case, they fall within the remit of the GMS initiative.

238. The identified economic section ellipses are shown in Figure 10. The location of the major ellipses tends to highlight the importance of the economic development along the seaboard, with significantly less economic development potential inland. At first glance, the extent of these economic ellipses in the GMS appears relatively small, especially for such a dynamic region. However, if these ellipses were placed on a topographical map, the perception would change as it would highlight the mountainous areas that have no potential, thus indicating that the ellipses cover a significant percentage of land area where development theoretically might be possible.

Figure 10 Economic Development Ellipses on the Greater Mekong Subregion Corridors



Source: ADB.

VI. IDENTIFICATION OF TRANSPORT INFRASTRUCTURE PROJECTS

239. After identifying the key trade corridors (Chapter III), preparing proposals to realign and reclassify GMS corridors (Chapter IV), and conducting a detailed assessment of the potential development of economic corridors (Chapter V), this study examined the overall GMS corridor network to identify the priority infrastructure projects.¹³ Given the trade facilitation orientation of this study, projects were identified and examined principally based on their ability to promote the movement of trade, both intra-GMS trade and external trade. It was not intended to cover all potential projects required to support the ECF-4 proposals for the “widening and deepening” of corridors, but concentrated more on ECF-4 parameters of corridor development that linked their realignment and/or expansion to GMS trade flows and promoted the economic viability of corridor development through strengthening links with maritime gateways and trade.

240. This chapter will (i) briefly summarize the information gathered and the primary findings of the rapid assessment site visits carried out in Cambodia, the Lao People’s Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam; (ii) provide an outline of the 11 identified transport infrastructure projects, in terms of background and status, trade facilitation impact, expected project components and costs, and the probable project outcome and impact; and (iii) provide a brief summary of the scope, cost, and required expertise for the five technical assistance (TA) studies and one capacity development TA project.

A. Site Visits, Meetings, and Project Information

1. Myanmar

241. A site visit to Myanmar was made on 21–27 October 2012. The objective of the visit was threefold:

- (i) to meet with concerned government officials and development partners, particularly representatives of the Japan International Cooperation Agency (JICA);
- (ii) to conduct a general reconnaissance of the existing Yangon port and logistic facilities south of the city, including the Port of Thilawa; and
- (iii) to conduct a site visit to the western end of the East–West Corridor, including the Kawkareik to Thaton Road (along AH1), and the existing road network in and around the city of Mawlamyine, the country’s third largest city.

242. During the October trip, the project team discussed with government officials the identified gaps and/or bottlenecks along the country’s major trade corridors, including possible investment projects to remedy the problems. The site visit to the western end of the East–West Corridor, including the Kawkareik to Thaton Road, were not realized, hence, no interaction with the government took place regarding these projects.

243. A meeting at the JICA representative office in Yangon was held on 22 October 2012 to identify ongoing and planned JICA projects in relation to the country’s national transport planning, Yangon urban and port planning, and in planning for the development of the Port of Thilawa, south of Yangon. The discussions confirmed that:

¹³ In accordance with the Terms of Reference (TOR), only a limited number of site investigations were carried out. The TOR indicated 2 or 3 (maximum) candidate trade routes to be visited but it was decided that only those locations that appeared to be the most critical were visited, irrespective of being on a particular trade route.

- the government eventually intends to develop 37 berths at the Thilawa port, and that there was an ongoing JICA consultancy¹⁴ to prepare a project for Japanese assistance that will develop five of these quays as container berths (Berths 22–26). There are plans to eventually consolidate most of the Yangon area port activities at Thilawa, so the waterfront along the Strand in central Yangon can be redeveloped for other tourist–recreational–commercial activities;
- JICA will be undertaking a Transport Master Plan of Myanmar covering road, rail, air, and waterway transport. Consultant bidding has been completed and work is expected to commence in November/December 2012, with master plan to be completed by the end of 2013. It is understood that the master plan will be presented as a development strategy for transport, rather than as a detailed (planning) study. It is expected to mainly focus on two corridors: Yangon–Mandalay and Yangon–Thailand, via the East–West Corridor. There are no proposals to study transport connections with Bangladesh, the People’s Republic of China (PRC), or India, although the team may be required to gather certain outline data and conduct limited research along these other corridors;
- JICA will also carry out a TA project on the country’s railways focusing on the Yangon–Bago region, which will likely include some element of capacity building. The TA project also will probably focus on the privatization of the Yangon circle railway line.
- JICA is developing plans for an official development assistance (ODA) loan for infrastructure and/or roads, but the scope of this future assistance is yet to be determined. The loan may also concentrate on rural development covering power and water supply to villages, but at this early stage, the coverage is not well defined; and
- JICA mobilized a consultant¹⁵ in August to carry out a Yangon City Urban Master Plan, a component of which will be urban roads and urban transport. It is likely that the Urban Master Plan will also recommend requirements for Yangon bypass roads and/or ring road or roads.

244. On 22 October 2012, a site visit was made to the existing port facilities at Thilawa, located approximately 25 kilometers (km) south–southwest of Yangon city along the eastern bank of the Yangon River, and to the existing port access road network. Currently, 90% of port traffic is routed through the congested Yangon city terminals, despite the restricted draft. Thilawa has a deeper water port located downstream and is intended as the future main general cargo port for Myanmar. This facility is adjacent to a proposed special economic zone (SEZ) that is presently under study, referred to as the Thanlyin–Kyauktan SEZ. The 2,400 hectare SEZ, adjacent and just to the west of the port, is scheduled to (partially) commence operations in 2015. It was currently undergoing planning and design by a JICA consultant team led by Nippon Koei. The Port of Thilawa is administered by the Myanmar Port Authority (MPA),¹⁶ under the overall management of the Ministry of Transport (MOT). The major operator at Thilawa is Myanmar International Terminals Thilawa (MITT), fully owned by Hutchison Port Holdings (HPH).¹⁷ The MITT operations at Thilawa encompass five container berths, with a total berth

¹⁴ The Overseas Coastal Area Development Institute of Japan and Nippon Koei have been appointed consultants and had commenced work in August 2012.

¹⁵ The consultant firm Nippon Koei is carrying out the assignment; a meeting was requested with Nippon Koei during the site visit to Yangon during the week of 22 October 2012, but the meeting never materialized.

¹⁶ Also referred to as the Myanmar Ports Authority, the MPA was originally formed in 1880 as the Commissioners for the Port of Rangoon, and in subsequent periods was known as the Board of Management for the Port of Rangoon (1954), the Burma Ports Corporation (1972), and in 1989 became the Myanmar Port Authority.

¹⁷ Hutchison Port Holdings (HPH), a subsidiary of the multinational conglomerate Hutchison Whampoa Limited (HWL), is a world leader in the development and operations of ports.

length of 1,000 meters (m), and covering a total area of 75 hectares. The primary imports are cars and other vehicles, construction materials, and general cargo containers. Unfortunately, to date, their penetration of the Yangon container traffic has been relatively minimal at approximately 20,000–30,000 twenty-foot equivalent unit (TEU) per annum and none of the major shipping carriers have moved to this site.

245. Two major bridges over the Bago River serve vehicular traffic to and from the Thilawa Port area. They are referred to as Thanlyin Bridge No. 1, to the west, nearer Yangon, and Thanlyin No. 2, to the east. Thanlyin Bridge No. 1, located downstream, is the older structure. This is about 1 km in length and was constructed with a single rail line in the center, and with single roadway lane on either side.¹⁸ It is in relatively poor condition, hence, a 40-ton vehicular load limit is presently being enforced. Thanlyin Bridge No. 2 is located about 6.5 km to the east and upstream of Bridge No. 1. It was completed in 2005, is about 1.4 km in length, and links the Dagon Seikkan township with the village of Kalawe to the south. The structure is configured with three roadway traffic lanes in each direction, and a pedestrian walkway on each side.¹⁹ It was designed for a maximum truck load capacity of 75 tons, although it is presently posted for a maximum 60-ton vehicle.

246. During the site visit, local truck drivers were interviewed at various rest stops to verify the most common route currently utilized by truckers to access the Thilawa Port area. It was determined that primarily, due the 40-ton bridge loading limit at Thanlyin Bridge No. 1, the vast majority of truck traffic and all container trucks utilize Thanlyin Bridge No. 2. The primary access road to Thilawa is logically divided into two sections: (i) Thilawa to the “T” intersection with Highway No. 2, near East Dagon township, via Thanlyin Bridge No. 2, an approximate distance of 32.8 km; and (ii) from this “T” intersection, along Highway No. 2, in a northeasterly direction to the intersection with NR1 (12 km east of Hlegu township), an approximate distance of 31.1 km.

247. Thilawa to East Dagon (32.8 km). The first 5.5 km after leaving Thilawa Port is a partially improved, poorly maintained, 4-lane divided road, with good vertical and horizontal alignments. This section will require major reconstruction. The next 16.5 km passes primarily through rural agricultural (rice fields) land. This section of relatively newly constructed 2-lane paved road is well aligned, in a well-maintained condition, and is constructed on a wide embankment with existing (ultimate) cross drainage already in place to facilitate roadway widening to 4–6 lanes. It ends at the southern end of the 1.4 km Thanlyin Bridge No. 2. Two additional lanes (including base and subbase courses, and new shoulders) will need to be constructed along this 16.5 km; and the existing 2 lanes will need to be resurfaced. Thanlyin Bridge No. 2 appears to be in good condition, but is in need of resurfacing and minor routine maintenance.²⁰ The improvement and upgrading of this initial 23.4 km of road and/or bridge should encounter only minor safeguard issues,²¹ and not require any land acquisition.

¹⁸ Thanlyin Bridge No. 1 was built with the assistance of the PRC. Construction began in 1985, but due to unstable political conditions, delays were incurred and was not completed and opened to traffic until 1993.

¹⁹ It is interesting to note that the original British system of units, i.e., feet, miles, and pounds, are still widely used throughout Myanmar; such that the official cross section of the Thanlyin Bridge No. 2 is inventoried as 6–12 foot lanes, with no median, and with two 6-foot sidewalks.

²⁰ Part of any road improvement investment project along this route will require the verification and/or checking of the bridge design, the as-build drawings, and a detailed bridge condition survey.

²¹ The individual consultant team that carried out this follow-on assignment did not include any safeguard specialists. Nevertheless, the international transport consultant, using (i) the ADB, Rapid Environmental Assessment (REA) Checklist, and (ii) the ADB, Initial Poverty and Social Analyses as guidelines, carried out a visual assessment on any readily apparent safeguard issues.



Looking East along the initial 5.5 km of existing 4-lane road from Thilawa Port



Looking back to the west from km 5.5 section toward Thilawa Port



Newly constructed 16.5 km section passing through rural agricultural land



Thanlyin Bridge No. 2



The 6-lane wide Thanlyin Bridge No. 2

248. From the northern end of Thanlyin Bridge No. 2, the existing road alignment enters the semi-urbanized area near East Dagon. This 9.4 km section of 2-lane road is poorly maintained and will likely need to be reconstructed, including adding cross drainage, when widened to a 4-lane road facility. Horizontal and vertical alignments are satisfactory. The existing right-of-way for the initial 22 km of Thilawa to East Dagon Road is about 40 meters or greater. The right-of-way along the 9.4 km north of the Thanlyin Bridge No. 2 is between 30 and 40 meters at most; hence, it is likely that some additional right-of-way will need to be acquired along parts of this 9.4 km section; and resettlement issues in these areas will need to be addressed.

249. East Dagon to NR1 (31.1 km). This road section is entirely along Highway No. 2. It presently carries most of the large truck and container truck traffic to and from the downtown Strand port area, as well as the Thilawa and other minor ports along the Yangon–Bago river network near Yangon. This 2-lane highway traverses a mixture of small urbanized towns and villages; rural agricultural land (primarily rice cultivation); and scattered, small factory and/or commercial sites. It passes near major military facilities in the vicinity of Intaing, just before reaching NR1. The existing 2-lane roadway is paved, with little or no shoulders, and is poorly maintained. There are numerous locations indicating pavement section shear failures due to poor-quality materials, poor workmanship, and/or vehicular overloading, or most likely, a combination of all three. There is little existing cross or side drainage. The entire 31.1 km may need to be reconstructed to the new 4-lane divided highway configuration. The existing right-of-way is about 30 meters, hence, it is likely that some additional right-of-way will need to be acquired along parts of this road section, primarily in build-up areas and in short road sections requiring improvement of horizontal geometry.



Typical scenes along rural area sections of Highway No. 2

250. From a trade facilitation perspective, these developments are considered of high priority, especially the Thilawa to East Dagon section. The existing port area in Yangon is highly congested due to the limited size of the container yards at various container berths along the Strand. The need for rapid movement of containers away from the berths with associated additional handling and traffic congestion within the city combine to raise trade transaction costs. There is limited capacity for growth in Yangon port, and thus the move to Thilawa is seen as critical. However, this cannot be achieved without developing the connectivity to Thilawa where there is ample scope for expanding the port and supporting industrial development.

251. From 25–28 September 2012, a reconnaissance mission consisting of staff from the Ministry of Construction (MOC) of Myanmar, the NEDA,²² and ADB visited Mon and Kayin States, Myanmar. The original purpose of the mission was to assess the Thaton to Kawkaik road project for potential ADB financing. This road project aims to upgrade the road to AH Class II, or similar, between Kawkaik and Thaton. At Thaton, the western end of the road would connect with the existing highway linking the capital Yangon with Mawlamyine, the country's third largest city. The project would necessarily also include upgrading and/or widening of two bridge structures—the major bridge at the town of Hpa'an about 685 m in length, and the Hlaingbwe Chaung River Bridge of unknown length, but estimated to be 50 m in length. The condition of both bridges is unknown, but based on discussions with the Department of Highways (DOH) officials, both bridges are in need of repairs, widening, and/or upgrading.

²² Neighboring Countries Economic Development Cooperation Agency, Ministry of Finance, Thailand.

252. Discussions were initially held with MOC officials to outline the objectives, scope, implementation arrangements, safeguard requirements, and other relevant aspects of a possible Project Preparatory Technical Assistance (PPTA) for the proposed project. Some of the initial observations, issues, and decisions that resulted from this reconnaissance mission were as follows:

- The road project from the end of the second phase of the NEDA road at Kawkareik to Thaton would be about 140 km in length, with about 40 km from Thaton to Hpa'an requiring overlay and other minor roadwork improvements. The remaining 100 km from Hpa 'an to Kawkareik would also require complete road reconstruction and upgrading.
- The road project would be a 2-lane highway with shoulders to AH Class II, or similar, essentially following the existing horizontal and vertical alignments with some short sections of realignment.
- The road project has been handed over to two concessionaires under a form of build–operate–transfer (BOT) arrangement. Since it is unlikely that ADB could finance the project if the road remained part of these concessions, it will probably be necessary for MOC to recover both parts of the road from their respective concessionaires.
- The *Safeguards Policy Statement*, 2009 of ADB²³ covers safeguards on the environment, involuntary resettlement, and indigenous peoples, which are aspects of projects that ADB finances. The policy requires safeguards to be applied to an entire project, even if ADB might only finance a portion of it. Hence, it was the opinion of the reconnaissance mission that it is likely that the NEDA part of the project would also need to meet the objectives of ADB's policy statement with respect to environment, involuntary resettlement, and indigenous peoples.

253. After a series of meeting between the government and ADB, the final results of this reconnaissance mission were summed up in three Minutes of Meetings (MOMs),²⁴ all dated 25 October 2012. One MOM, *Proposed GMS East–West Economic Corridor Extension into Myanmar Project*, is pertinent to this follow-on study since it (partially) deals with the section of the East–West Corridor between Kawkareik and Thaton, a gap identified here as along a key trade route. The government and ADB determined that, because of the existence of private sector BOT concessions that operate west of Eindu, only the Kawkareik to Eindu section, about 70 km in length, would be the focus of an ADB PPTA for road reconstruction. The PPTA will also need to include a due diligence assessment of the safeguard aspects of the section of the road between Kawkareik and Myawaddy presently under implementation by NEDA under a grant from Thailand. The PPTA is estimated to cost \$1.5 million, to be financed on a grant basis by the Japan Fund for Poverty Reduction to be administered by ADB, and is expected to be approved in December 2012 and completed by December 2013, with ultimate construction to be completed before the end of 2017. There has been no ADB commitment to fund the implementation of the project at this stage. For the immediate future, the government intends to depend on existing BOT operators to operate and maintain the section of road from Eindu to Thaton.

254. From a trade facilitation perspective, the development of this road connection at the western end of the East–West Corridor is considered a high priority, especially the section

²³ See <http://www.adb.org/documents/safeguard-policy-statement>

²⁴ They were entitled as (i) Road Asset Management Capacity Development Technical Assistance, (ii) Proposed Maubin–Pyapone Road Rehabilitation Project, and (iii) Proposed GMS East–West Economic Corridor Extension into Myanmar Project.

between Kawkareik and Thaton. Thailand is a major trading partner of Myanmar and it is recognized that trade has not only been constrained by sanctions but also by poor connectivity, which significantly increases transport costs. The new political situation means trade between the two countries can benefit and expand rapidly. The current road is unsuitable for this growth in trade traffic. In addition, a large number of workers are crossing from Myanmar to Thailand for work, but there is major potential for Thailand and others to invest in developments on Myanmar side of the border, thus utilizing the benefits of that labor force without the need for labor movement through the border. Part of the output from such developments would be products needed to be transported toward Yangon. This is a relatively poor area and the potential for poverty alleviation by trade growth between the two countries and industrial development are appreciable. Enhanced accessibility is crucial to achieving both trade growth and potential foreign direct investment (FDI) in this area.

255. During the same October visit to Myanmar, the project team made a site visit north along the AH1 corridor from Nay Pyi Daw to Mandalay. The team followed the old 2-lane highway (NR1), rather than the newly constructed expressway (NR2). The team had earlier utilized the expressway, traveling the 383 km between Yangon and Nay Pyi Daw. Although the observations were cursory, the following were noted:

- (i) the roadway is generally built to a 4-lane divided expressway standard, but with a number of small local unpaved roads allowing direct access to the highway, so it was not a completely controlled access facility;
- (ii) shoulder widths were well below international expressway standard;
- (iii) pavement structural sections appear poor, likely the result of inadequate thickness and/or poor quality base and subbase course materials;
- (iv) vertical alignments are adequate, whereas horizontal alignment (minimum radii) often appear to be below international standard.

In general, the roadway is very underutilized and in a relatively poor state of maintenance, primarily the riding quality of the pavement.

256. It is pertinent to note that no truck traffic is permitted along the total length of this new, underutilized expressway from Yangon to Mandalay. Hence, the expressway does not carry trade-related traffic, with all trucks required to ply the existing, parallel, and sometimes poorly maintained NR1. The traffic along the tolled expressway is limited to passenger vehicles, small pick-ups, and buses. The rationale behind not allowing truck traffic to utilize the expressway is not clear but it was suggested that it was due to (i) existing BOT operators along the parallel NR1, which depended on the income provided by trucks; and/or (ii) there was doubt about the structural design of the expressway road and bridge sections to carry heavy truck traffic.

257. While in Mandalay, the team met with an ADB consultant logistics team assessing the Northern Corridor, along NR3, from Mandalay to Muse at the border with the PRC. They had been requested in advance to look at the road and border infrastructure between Mandalay and Muse on behalf of the follow-on study.²⁵ The team reported that the border infrastructure appeared to be adequate for the needs indicating relatively high traffic levels of about 500 trucks per day in each direction, consisting mainly of 15 ton capacity rigs. Due to the adverse road conditions and poor roadway geometry, limited numbers of articulated trucks were present. The main cargoes are tropical fruit and vegetables northbound to the PRC, and temperate fruit and

²⁵ Consultants Christian Ksoll and John Quarmbly were accompanied by Captain Aung Khin Myint from the Myanmar International Freight Forwarding Association, who did not attend the Mandalay meeting but was subsequently interviewed by Anthony Bayley at the Asia-Pacific Business Forum in Colombo.

vegetables southbound to Myanmar. Other traffic from the PRC included cement, steel, and consumer goods. All cargo is transshipped at the border. The lack of refrigerated trucks and storage appears to be adversely affecting the quality of the foodstuffs, especially those northbound with write-offs or lower prices due to overripe conditions.

258. The majority of the length of NR3 from near Mandalay to the PRC border is in poor condition. Much of the alignment passes through mountainous areas and has been constructed to a restricted design speed, in terms of both vertical and horizontal alignments. Some of the worst conditions are between Nawngkhio and Gokhteik, and also north of Kutkai, where the existing road climbs sharply out of a valley below. Interviews with truckers all indicated that the main problem section was between Nawngkhio and Gokhteik, where the road drops sharply into a deep valley and then up the other side with extensive switchbacks on either side of the valley bottom. This section is dangerous with regular, almost daily, accidents often blocking traffic for hours in both directions. Road surfacing along this section is poor or absent. The tight turns on the switchbacks result in severe tire scrub causing both extreme tire wear, and also severe pavement damage. At this location, there is a well-known railway bridge, the Gokhteik Viaduct, that spans the valley and it was suggested that if a similar high-level roadway bridge and/or viaduct were constructed, this would significantly improve travel conditions, shorten travel times, and reduce vehicle operating costs. However, it is clear that without further investigation, this proposed improvement might not be technically and/or economically viable; nonetheless, since this was a particularly bad road section, examining the options to improve it could prove a useful exercise.

259. The following brief summary of road conditions along NR3 was obtained from the ADB logistics team:

On the Myanmar side of the Muse/Ruili border crossing, the road infrastructure is in much worse condition than on the [People's Republic of] China side. NR3 has narrow two lanes along the majority of the route between Mandalay and the Muse border station, with numerous steep climbs and tight curves, and with very limited sight distances, as it often traverses through hilly/mountainous terrain. The road surface is very run-down from the high traffic volume, permitting only very low traffic speeds and greatly increased vehicle operating costs. In addition, there are various bridges (posted with weight limits of only 13 tons) with restrictive bypasses for heavier traffic. However, the bypasses remain unused because they are inconvenient for the truckers. Hence, trucks with a weight of up to 50 tons use these low capacity bridge structures.



Series of switchback curves, steep vertical gradients, and narrow pavement section along NR3

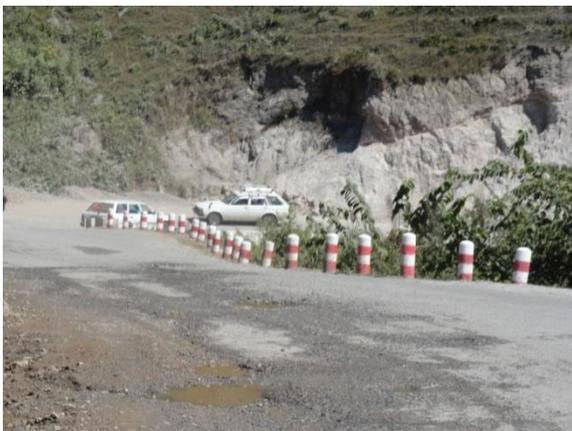
Long queues are frequent due to road accidents, mechanical breakdowns, and stalled vehicles



Road accidents can cause traffic for hours along the mountainous sections of NR3



Narrow section of NR3 climbs out of valley along the heavily travelled Mandalay to Muse road



Heavy pavement wear along typical dangerous mountainous section of the NR3



Large truck loaded with building materials descending down to a valley floor along steep, narrow roadway



More than 100-meter high railway called Gokhteik Viaduct spans the valley below



Difficult horizontal and vertical alignments for large trucks to maneuver

260. From a trade facilitation perspective, the road link between Mandalay and the PRC border at Muse is important, as the PRC is a major trading partner of Myanmar. The main traffic is fruit and vegetables in both directions and the extended transit times resulting from the difficult roads lead to losses of product and pricing due to the deterioration of the goods in transit. The poor roads also mean difficult access for the larger, more economical trucks. It is recognized that the terrain is difficult, but any enhancements that could reduce overall transit times would be beneficial to bilateral trade. On the PRC side, the highway is gradually being completed all the way to the border, but will then interface with an AH Class III road in Myanmar.

261. Yangon Inland Clearance Depot (ICD). There are government proposals to establish a rail-connected ICD at East Dagon, which is located to the east of the city. The concept is that the facility will initially act as a container freight station (CFS) and/or ICD for traffic using the terminals along the Strand, thus taking containers out of the small container yards to a point outside the city for subsequent processing. This could be a CFS operation for less-than-container load traffic, or for unstuffing and stuffing of containers where direct delivery is not possible, or for the storage of empty units. The site is adjacent to the junction between the road from Thilawa and the main route toward Bago and is therefore ideally situated to also handle Thilawa traffic as that port develops.

262. A key part of the development is rail connectivity, probably with the Myanmar Railways as the operator. This part of the concept relates to the distribution of container traffic around the country by rail, especially to locations along the realigned Western Corridor. The containers would be brought to the facility from the Strand area or Thilawa “in bond” and loaded onto rail wagons for delivery up-country, using standard freight trains or ideally “block” trains. While Thilawa area, theoretically, has rail access, this requires crossing the Thanlyin Bridge No. 1, which is considered unsuitable for handling heavy freight trains, thus the need to shuttle containers by road from Thilawa to the new ICD to gain rail access.

263. Indications were given that land was available for such a development, presumably using land owned by the Myanmar Railways. It is assumed that some additional sidings will be required, together with hard paving of a processing yard, some warehousing and fencing, as well as installation of offices. Equipment would include overhead rail gantries, reach stackers, and fork lift trucks. A key unknown at this stage is accessibility and it is assumed that a link road will need to be constructed between the facility and the nearest junction of Highway No 2. This is not a great distance (under 3 km).

264. From a trade facilitation perspective, such a facility would be an important development, if it were to be viable. It would reduce the amount of container traffic on the road and improve the performance of the ports by reducing congestion within the container yards. However, there are questions on whether the road shuttle and depot handling costs would keep costs to remain competitive versus direct road delivery or use of road contractors’ own depots. In other countries, the concept would be attractive, as in the case of Laem Chabang and Lat Prabang, but it is not clear whether at Myanmar’s current state of development, such a facility is required and if so, if it could be viable. Consequently, the recommendation to undertake a pre-feasibility study to assess its need and viability is important, combined with a concept design that also includes accessibility.

265. Mandalay ICD. There are government proposals to develop a similar ICD at Mandalay, which will be linked by rail to the proposed Yangon ICD at East Dagon. The concept is that

containers will come from either Yangon or Thilawa ports by road, and be transferred up to the Mandalay ICD using block trains. Myitnge, the proposed location of this new rail-connected ICD, was visited by the project team. The initially proposed site is adjacent to the major rail workshops, which are located a few kilometers south of the city. There is significant open land on either side of the track at the site on which an ICD could be developed. There should be no resettlement issues, and it is assumed the land is already owned by the Myanmar Railways. However, road access from the adjacent main road will need to be upgraded, or more probably a new road alignment will be needed for a distance of 2–3 km. This would be through a rural area, and some minor resettlement could be required.

266. The main ICD facility would require superstructure (offices, gate control points, fencing and others) and equipment, either two rail gantries and a large fork lift truck or two reach stackers. The existing railroad sidings could be used. Some covered warehousing may also be required. The present concept is that this should be a rail-owned and rail-operated facility. Although this will need to be studied, an alternative private operator concession approach might be viable, depending on projected container traffic volume. One of the initial concerns is the likely traffic imbalance, with potentially significant volumes of northbound imports but limited exports southbound. This may result in the sea carriers being reticent to offer through Bills of Lading to Mandalay because of their resultant liability for movement of the southbound empty units. In addition, appropriate insurance arrangements will be needed with the Myanmar Railways. One possibility would be for the ICD to also process the PRC traffic passing through the Muse border, although Myanmar Customs may be concerned at the long transit distance between the border and Myitnge.

267. From a trade facilitation perspective, the development of an ICD is important in facilitating the movement of trade through the ports and in repositioning the point of clearance closer to the end-user or export source. Three key issues will likely dictate the viability of this development. First, it is totally reliant on the initial development of the East Dagon ICD to feed traffic to this ICD. Second is the costs of the road movement from the ports to East Dagon, with the handling charges and the rail transit costs being lower than that of direct delivery through road transport costs. Third is that the Myanmar Railways can organize a minimum of one block train per week, in terms of train paths, flat wagons, and locomotives, and that there is sufficient traffic to fill the block train. These viability risks are seen as significant and this potential project is not viewed as a priority at this time. Should the East Dagon facility be assessed as feasible, it would be logical at that stage to examine the viability of the support ICD at Mandalay.



Existing railway station and rail siding at Myitnge

2. Thailand–Myanmar

268. Mae Sot–Myawaddy Border Crossing Project and Infrastructure Improvements, Thailand and Myanmar. The current arrangements at the border crossings between these two countries reflect the restrictions on international trade arising from sanctions and difficult economic conditions, as well as constraints in overall road connectivity. These problems have been exacerbated at the main border of Myawaddy–Mae Sot²⁶ on the East–West Corridor by the damage to the main international border bridge and the diversion of freight traffic to small riverside quays. The current crossing is a cross-border trade and/or passenger crossing with most freight being diverted to these river ports and then reloaded in the center of Myawaddy town for clearance and onward transit inland. This approach is not considered to be sustainable when unrestricted trade is permitted.

269. Both governments are aware of these constraints. The Government of Thailand through the NEDA is proposing construction of a second international bridge and a new northerly bypass for cross-border freight traffic, with passenger cars and bus traffic continuing to utilize existing border-crossing facilities in the center of the border towns. This approach will avoid freight moving through congested areas of town centers on both sides of the present border-crossing facility. The new bypass will link directly with a new envisioned special trade zone on the Myanmar side. This new crossing is presently under study by a Thai consultancy firm.²⁷ The overall project will consist of 16.9 km of new 4-lane divided highway (13.3 km in Thailand, 3.6 km in Myanmar), a new 4-lane 100-meter long bridge across the Moei River at the new border crossing, and associated cross-border facilities. It is not presently clear as to what components of the project will be financed by the Government of Thailand, as this is still under discussion by both governments. It seems likely that Thailand would only finance the road on both sides of the border, the bridge, and the cross-border facilities on its side. It is unlikely that any Cross-Border Transport Agreement (CBTA) arrangements will permit through transport in the near future and, therefore, the need to transfer loads on one side or the other will continue for some time.



Damage to existing friendship bridge in the center of urban Mae Sot–Myawaddy



Existing border check point at Mae Sot

²⁶ A site visit was originally made to the Mae Sot–Myawaddy border crossing during the initial phase of the work (the IAR study) in the early part of 2012. Meetings were held with officials of NEDA and Thailand's Department of Highways (DOH) to determine the status of present border operations and an ongoing DOH study to separate freight border traffic from passenger traffic.

²⁷ SEVEN Associated Co., Ltd., Bangkok, Thailand.

270. The potential issues in the funding are considered to be the border post on Myanmar, side at Myawaddy, and a freight terminal and/or ICD on the outskirts of the town. It is understood that incoming freight vehicles would register at the border post, which would have a check point role only, and then proceed to the freight terminal for clearance and/or transshipment. This is in line with international best practice. One option is for this freight terminal to be located within a planned cross-border economic zone (CBEZ). In practical terms, the freight terminal component would only require a processing yard, fencing, some warehouses, and an office. However, a CBEZ would be a more extensive development in terms of attracting foreign direct investment (FDI), particularly from Thailand.

271. From a trade facilitation perspective, this is a high priority development as trade between Thailand and Myanmar is expected to grow rapidly, given the new political situation and removal of sanctions. This is already a busy border and the current arrangements are unsatisfactory leading to nontransparent trading practices. Providing a new border checkpoint on a bypass north of the town will speed up border operations by eliminating congestion in the towns and the logistical inefficiencies inherent in the present cross-river regime. In addition, the freight terminal and the proposed CBEZ could benefit from the presence of the resident low-cost labor force in attracting FDI. Currently, much of this labor crosses into Thailand daily but in future, some manufacturing and/or processing could move across to the CBEZ, as and when FDI regulations in Myanmar are finalized.

3. Thailand–Cambodia

272. Aranyaprathet–Poipet Bypass Road and Infrastructure Improvements, Thailand and Cambodia. A project to upgrade the Aranyaprathet–Poipet border crossing has been the focus of discussion for a number of years. The highly congested areas surrounding this primary Thailand–Cambodia border crossing have suffered from decades of poor urban and transport planning. The congestion has been greatly compounded by the construction (some 7–8 years ago) of a number of mid-rise gambling casinos and/or hotels, and other commercial developments scattered in and around the border-crossing facilities. The result is a severely dysfunctional border crossing with no readily available options at the existing location to improve the operational characteristics and efficiency of the cross-border transport of goods and people.



Aranyaprathet, Thailand border checkpoint

273. A border-crossing improvement project to upgrade the Aranyaprathet–Poipet crossing has been discussed off and on among Cambodia, Thailand, and ADB, but the parties have been unable to agree on a mutually acceptable solution. After a number of years of inactivity, the governments of Thailand and Cambodia have, in 2012, rejoined in bilateral discussions concerning the possible relocation and improvements of this border crossing. According to reports from the Government of Thailand, discussions at the level of the Prime Minister’s Office between Thailand and Cambodia have taken place and agreed in general to a new southerly (bypass) location for the Poipet–Aranyaprathet border crossing to accommodate freight traffic. Passenger traffic would continue to cross at the existing border crossing.²⁸

274. The new freight traffic crossing will require a new 19.6 km southerly bypass road—about 2 km of new 4-lane roadway in Cambodia and about 17.6 km in Thailand. The new road in Thailand would primarily follow NH 3366 and NH 3511, both narrow village roads, and would include new border-crossing facilities on both sides of the border. Resettlement, primarily in Thailand, will be the major safeguard issue, due to the significant length of road widening (and new road) required in Thailand. Cambodia has requested that Thailand considers providing financial and technical assistance to implement these improvements and that this request is presently under consideration by Thailand. The DOH has prepared some preliminary alignment sketches and cost estimates, as requested by the Prime Minister’s Office, for use during the initial bilateral discussions.

275. Based on most previous investigations over the past few years, the consensus had been that a bypass along a northern alignment appeared to be the more logical and most feasible solution to facilitate cross-border movements at this location. Nevertheless, the reported agreement between the two countries to follow a southerly alignment, together with the separation of passenger traffic and freight traffic, will still significantly improve the efficiency of cross-border operations at this critical congestion point along the Southern Corridor, although entailing higher costs and resettlement issues than the northerly alignment.

276. A key funding issue may be the need for a new border post and freight facility on Cambodia’s side of the border, a similar situation to that at the Mae Sot–Myawaddy crossing. A simple checkpoint facility adjacent to the actual border would be required, and an ICD nearby for clearance and transshipment. At this stage, it is not known whether this has been included in the bilateral funding discussions.

277. From a trade facilitation perspective, this is a high priority project along the Southern Corridor. Although volumes of freight traffic have varied significantly in recent years partly due to political differences, nonetheless, there is an underlying demand for increased trade. Observations of the current arrangements suggest that the levels of non-formalized trade (unregistered for duty purposes) and the physical layout of the facilities compound the situation. Laem Chabang is a natural gateway for trade with western Cambodia, as well as for bilateral trade and, therefore, this border crossing is important to both countries. The proposed development would speed up border transits by avoiding congestion in both towns and ensuring that cross-border trade movements became more transparent and efficiently handled.

²⁸ It is also reported that both countries have agreed to undertake repairs and upgrading of the railway link between Thailand and Cambodia at the Aranyaprathet–Poipet border crossing, utilizing the existing railway alignment through the border station.

4. Cambodia

278. During 4–6 November 2012, a site visit was conducted to Cambodia. The purpose of the site visit was threefold:

- (i) to determine the status and scope of the various ring roads and/or bypasses around Phnom Penh that have been the subject of discussion within the government and with various donors for a number of years,
- (ii) to verify or determine the status and scope of the proposed improvements of the border-crossing facilities and approach roads at Poipet (Cambodia) and Aranyaprathet (Thailand), and
- (iii) to determine the present operating conditions and scope of any proposed improvements along the Phnom Penh to Sihanoukville road corridor.

During this visit, there were discussions with the Cambodia Ministry of Public Works and Transport (MPWT) on all of these issues.²⁹

279. Phnom Penh ring roads. A major land transport bottleneck exists at the intersection of the Southern Corridor and the Central Corridor (both major trade routes), within the urbanized areas around Phnom Penh. Solving the present traffic congestion and lack of connectivity between the major corridors is compounded by the existence of three major rivers—Tonle Sap, Bassac, and Mekong rivers. The study and implementation of the various ring roads proposed around Phnom Penh is presently under the jurisdiction of the MPWT.³⁰ The proposed ring road concept has developed slowly, in a piecemeal manner, over the past 5–6 years without the benefit of any overall city master planning, any detailed urban transport planning, or associated network and/or traffic analyses. In general, the major drivers of the various concepts (and specific ring road alignments) were, and continue to be, individual (housing, commercial) and land development schemes, and not driven by comprehensive transport demand planning.

280. A ring road can be defined in engineering terms as a main road that encircles (or partially bypasses) a city or city center. Its purpose is to allow traffic to avoid the congestion that is found in city centers, and to decrease this congestion by keeping through-traffic, i.e., traffic not destined for the city center, out of the most densely urbanized areas. Often urban transport planners develop multiple ring road systems, with the inner ring roads being boulevards or multi-lane arterial streets. Middle ring roads operate as (partially) controlled access roads, with controlled parking or with parallel frontage roads. Outer ring roads are developed as controlled access expressways.

281. There are four Phnom Penh ring roads, either existing or currently under consideration by the Government of Cambodia. These are (i) the inner ring road (Ring Road 1), (ii) the first of the intermediate ring roads (Ring Road 2), (iii) the second of the intermediate ring roads (Ring Road 3), and (iv) the outer ring road (Ring Road 4). The operating concept of the MPWT is that all ring roads will essentially be configured as 4-lane urban streets. Unfortunately, there is no present thinking in terms of a conventional outer ring road, built to an expressway standard, i.e., that would be capable of efficiently carrying large volumes of traffic around the periphery of the urban center of Phnom Penh. The four ring roads according to present planning are as follows:

²⁹ Visits were made to the offices of the following officials and their staff: Director General Vasim Sorya of the Department of Planning and Administration, MPWT; and Director General Kem Borey of the General Directorate of Public Works, MPWT.

³⁰ Discussions of such ring roads began in 2007 under the jurisdiction of the Municipality of Phnom Penh, initially following an old French-era plan. Since that time, JICA has been attempting, on and off, to move forward with a comprehensive ring road master plan study for Phnom Penh, but such a definite master plan never materialized.

- The inner ring road (Ring Road 1), which encompasses the western edge of the inner environs of Phnom Penh connecting to NR5 in the north, and to NR1 in the southeast. The inner ring road, under the responsibility of the municipality, is a fully urbanized and congested city road and is located only about 3–4 km from the center of the city.
- The first of the intermediate ring roads (Ring Road 2) is located only a few kilometers beyond the inner ring road. It is only partially completed along the western section where it will eventually connect to NR6, and to the southeast where it will eventually connect to NR1. The completed sections are also heavily congested, poorly maintained urban streets passing through heavily urbanized areas with no control of access and inadequate control of parking and turning movements. The possible extensions of this ring road to the east to intersect with NR1 are likely to be developed by local land developers;
- The second of the intermediate ring roads (Ring Road 3), presently commences in the northwestern part of the town with a privately constructed bridge³¹ over the Tonle Sap River, connecting to a large land development area north of the city. This ring road is projected to eventually encircle Phnom Penh and is primarily driven by private land developers.
- The proposed outer ring road (Ring Road 4) appears to still offer an opportunity for a true operational ring road, or partial bypass of the urban center of this rapidly expanding capital city. The JICA is reportedly providing in-house technical assistance to MPWT for the planning of Ring Road 4, and also Ring Roads 2, 3, and 4. Discussions are ongoing with private and public sector entities, primarily from the Republic of Korea and the People's Republic of China (PRC)³² for a possible mix of public–private partnership (PPP) development and official development assistance (ODA)-financed public sector funding of the design and construction of sections of the northern part of the outer ring road. The southern section of the outer ring road, approximately 63 km in length, appears to present an appropriate opportunity for implementing a section of ring road around Phnom Penh, connecting NR4, NR3, NR2, and NR1, that will allow for a controlled access road, and for the free flow of traffic around much of the center of the city.

282. The next step in project identification would be to conduct a small-scale pre-feasibility technical assistance to confirm the scope, the project rationale, and the acceptance by the Government of Cambodia of the logic and need for a ring road facility that would be based on transport demand planning, and not primarily on land development schemes. If this initial TA project determines that such facility is reasonably viable, then this would be followed by a full feasibility study (or PPTA if ADB is involved) to prepare the project, possibly based on a conventional public sector design–build concept.

283. From a trade facilitation perspective, this project only has a medium priority rating. This is principally because the volumes of trade transiting through Phnom Penh, as opposed to or from the city, are considered to be relatively small. There are no indications of significant trade movements between Thailand and Viet Nam moving along this corridor or from western Cambodia across to Viet Nam or vice versa. The major beneficiaries of the ring road

³¹ Referred to as the L.Y.P. Toll Bridge, financed by a wealthy local land developer.

³² The PRC has reportedly committed to finance two sections to be implemented in 2014. These are (i) along national road NR51, connecting NR5 and NR4, at an estimated cost of \$27 million; and (ii) along a new alignment connecting NR4 and NR2 at an estimated cost of \$52 million, but at the time of this report, discussions are still ongoing between Cambodia's MPWT and the PRC.

development would principally be domestic, rather than trade, traffic. Thus, while it is accepted there could be some minor benefits in trade facilitation, principally through faster transit times, this would not represent significant justification for such a development in isolation.

284. During discussions with the MPWT of Cambodia, it was confirmed that Thailand and Cambodia have agreed to proceed with a new Poipet–Aranyaprathet border station for freight traffic in accordance with the sketch developed by Thailand’s Department of Highways. It was further confirmed that Cambodia was seeking technical and financial assistance from Thailand in order to design and construct this new crossing (see previous section).

285. Presently, the primary road along the Central Corridor major trade route between Phnom Penh and Sihanoukville is via NR4—Phnom Penh—Kompong Speu—Kaaong—Veal Renh—Sihanoukville. Most of the length of NR4 is under a 30-year rehabilitate–operate–transfer contract to a concessionaire. MPWT is the concession authority, but the concession was reportedly obtained in a nontransparent manner and continues to operate in a similar manner. Toll rates are \$2.80 per car and reportedly about \$20 per truck. Revenue is collected and kept by the concessionaire, but there is scant disclosure of details of the contract, investment in rehabilitation, or information concerning operation and maintenance (O&M) activities. Average daily traffic on a build–operate–transfer (BOT) road is not treated as public information. The concessionaire is reportedly not only responsible for routine maintenance, but is also responsible for periodic maintenance, including pavement overlays, for widening to 4 lanes, and road safety improvements as required. There is ample evidence that the performance of the concessionaire is well below acceptable international O&M standards for a national highway.

286. The Government of Cambodia intends to build a expressway between Phnom Penh and Sihanoukville, presently referred to as the Trans Khmer Express Highway. If implemented, it would be the first controlled access highway in Cambodia. The 209 km expressway project will follow a new alignment between NR4 and NR3, starting along NR4, and in general follow a corridor to the west of NR41, and around the southern end of Phnum Bokor National Park. The preliminary scope for this BOT project with a 50-year concession period is based on a design speed of 100 km/hour; a 60-meter wide right-of-way, consisting of a 4-lane, tolled, divided expressway configuration, with 4 exit–entrance interchanges. Discussions are ongoing with the Government of the Republic of Korea and with Korea’s private sector seeking both technical and financial assistance for this project. However, it is unclear at this time if funding could be made available to prepare this project for possible feasibility, detailed design and implementation.

287. From a trade facilitation perspective, this project only has a medium priority rating. This is because the relative benefits of the proposed Trans Khmer Express Highway, as opposed to using the current N4 4-lane route, are not significant in reducing overall trade transaction costs. However, as the road gets closer to the port, any developments would have a higher priority, particularly if it resolved the congestion caused by vehicles waiting to enter the port complex.

5. Lao People’s Democratic Republic–Thailand

288. A site visit was made to the Lao PDR and Thailand on 22–23 November 2012. The objectives of the visit were

- (i) to meet with officials of the Ministry of Public Works and Transport (MPWT), Vientiane, to discuss the follow-on study with MPWT, to obtain government input on trade

- facilitation issues affecting the Lao PDR, and to seek guidance as to possible infrastructure investment projects to be included in the study;
- (ii) to have a meeting with the World Bank's trade facilitation specialist based in Vientiane to discuss ongoing and programmed WB trade facilitation initiatives;
 - (iii) to make a field site visit to the Thanaleng Border Station area and vicinity; and
 - (iv) to carry out a reconnaissance visit along the Nong Khai to Udorn Thani section of the Central Corridor.

289. A meeting with the MPWT held at the offices of the Department of Planning and Cooperation, MPWT aimed to (i) discuss recent developments in the Lao PDR on trade facilitation and logistics, and (ii) identify potential infrastructure projects for consideration in the follow-on study. The meeting discussed three main issues, as follows:

- A general briefing on trade facilitation issues emphasized the logistical and trade difficulties faced by the Lao PDR due to the dominance of its larger neighboring countries—Thailand and the PRC—and to a lesser extent, Viet Nam. A “new” transport corridor connecting Vientiane with Chiang Mai, Thailand that was being promoted by both governments was mentioned.
- The JICA 2011 study, *The Comprehensive Study on Logistics System in Lao People's Democratic Republic*, prepared by the International Development Center of Japan (IDCJ) and Nippon Koei (NK) was discussed. The study was divided into two parts: (i) National Logistics Strategy; and (ii) feasibility studies of (a) Vientiane Logistics Park, (b) Savannakhet Logistics Park, and (c) Champassak Logistics Park. The three primary objectives of each logistics park are (i) cargo consolidation, (ii) business stimulation, and (iii) market expansion. A major output of the JICA 2011 report was a feasibility study for Vientiane Logistics Park, with the recommended optimum site being adjacent to the Thanaleng Railway Station.
- The ongoing WB-assisted PPP project, *Feasibility Study of Two Pilot PPP Road Projects in Lao PDR* was briefly discussed. The project aims to assist MPWT in managing government and donor resources to achieve national socioeconomic development objectives in a sustainable manner and will assist MPWT in identifying and carrying out preliminary PPP assessments for the expansion of (i) NR13 North from Vientiane to Phonhong at km 80, and (ii) NR13 South from Vientiane to km 64. Consulting services are ongoing and the objectives are to (i) assess the viability of the two pilot projects from technical, social, environmental, and economic perspectives; (ii) refine cost and benefit estimates, through the preparation of preliminary engineering design for the two project roads; (iii) assess the options for private sector finance of the projects, exploring different investment models including BOT; and (iv) prepare draft bidding documents for the preferred PPP option so that the competitive bidding process can be launched upon completion of the consultancy assignment.

290. The World Bank's trade program for the Lao PDR is predominantly focused on the “soft” aspects of trade facilitation.³³ The system has already become operational at Thanaleng Border and is expected to be present at all the main borders by the end of 2013. Smaller borders would have a delayed input system. The second part of the trade program was addressing the legal side by helping to revise laws relating to “e-signature” and risk management that would allow its application. The third area was on centralization of the customs organization in Vientiane. The

³³ The first World Bank program was assisting with the rollout of ASYCUDA World. ASYCUDA is a customs processing software system.

previous system was a decentralized type, which meant the use of local interventions and of different systems at the various borders. The World Bank had also been assisting in the move from a reference pricing system for imports to the World Trade Organization (WTO) valuation system by helping to develop a valuation support database.

291. The second World Bank program is with the Ministry of Commerce. It is designed to develop a national trade facilitation strategy and to establish a secretariat within the ministry to address trade facilitation issues. A major output has been the development of the Lao PDR trade portal (Laotradeportal.org.com.la), which contains all the various requirements for trading with this country on a product-by-product basis. This is seen as the first step in the development of a “Single Window,” which is the next goal. The development of this portal took 9 months at a cost of \$0.5 million. The “Single Window” approach is based on a trade portal connecting with all the border agencies. Thus, importers and exporters will make their ASYCUDA declarations via the portal rather than direct into the customs system, as is the current practice.

292. The Thanaleng Border Station area and vicinity in the Lao PDR was visited by the study team later on 23 November 2012. The Nongkhai (Thailand)–Thanaleng (Lao PDR) border crossing is located along the Central Corridor and is the most active border crossing between the two countries. The site visit encompassed three locations: (i) the Thanaleng border station located at the northern end of the Thai–Lao Friendship Bridge No. 1; (ii) the Thanaleng freight custom clearing and warehouse complex along Thadeua Road, about 1 km east of the border station; and (iii) the railway station at Dongphosy, located about 3 km north of the Thanaleng cross-border facilities.

293. The Nong Khai–Thanaleng border crossing at the Mekong River is serviced by the 1,170 m long³⁴ Thai–Lao Friendship Bridge No. 1, which opened in April 1994 at a cost of about \$30 million funded by the Government of Australia. In March 2009, a 3.5 km railway extension in the Lao PDR, from the end of the bridge to Thanaleng Railway Station, financed through a combined grant and loan from the Government of Thailand, was officially inaugurated. The bridge presently caters to vehicular, rail, and foot traffic.

294. Thanaleng’s border-crossing facilities (see Figure 11 for aerial view) presently operate in a restrictive and inefficient manner with regard to both passenger and freight traffic processing. Originally, the facility was constructed so that all Lao PDR *exiting* passenger traffic would share three through-traffic lanes. But present border station operations have blocked two of the traffic lanes, and all exiting traffic (passenger vehicles and buses) are essentially “squeezed” from three lanes into the one “open” available lane. With no separate channel for bus traffic, buses often have to slowly maneuver, and even back-up into a temporary parking area, while waiting for bus passengers to clear immigration and re-enter the bus. In effect, these reversing bus movements block the only available lane and often result in a complete “gridlock” situation. There are three outer lanes originally designed for freight traffic but these are now also filled with passenger cars. The passengers in these lanes have to leave their vehicles and cross lanes to access immigration controls as there are no processing booths for these lanes.

Figure 11 Thanaleng Lao PDR Border Crossing Facility Layout

³⁴ The north end of the bridge is about 20 km east of Vientiane, and the south end is within the city of Nongkhai, Thailand. In the center is a single 1-meter-gage rail track, with a single 3.5-meter wide roadway lane on each side of the track; and with a 1.5-meter wide sidewalk on either side of the bridge deck.



Source: <<??>>

295. Entering traffic from Thailand is likewise funneled down to one lane, although trucks, after passing immigration, are shunted off to an adjacent truck holding area to the north, where customs officials determine either to process the truck at the holding area or, most often, to divert it to the Thanaleng freight custom clearing and warehouse complex located about a kilometer away.

296. The overall operation of the border station is further constrained by the conflicting vehicular turning movements for traffic exiting and entering the border station from Thadeua Road. Efficient operations are further compounded by the narrow and restrictive number of traffic lanes along the border station's entry road, and the short turning radii between the entry road and Thadeua Road. Trucks and buses entering and returning to Thailand experience the most acute of the conflicting turning movements, often creating long queues along Thadeua Road, blocking all traffic in both directions. In addition to these traffic management issues, the border station also operates with nonstandard practices in immigration controls.

297. Located along Thadeua Road, about 1 km east of the entrance to the Thanaleng border station, is the Thanaleng Freight Customs Clearing and Warehouse Complex. At the border crossing, an initial screening of all inbound freight traffic is undertaken. Certain homogenous loads are cleared at that point for final delivery, but the majority is on-forwarded to the warehousing complex for import clearance. There are two main operations at the complex, according to the logistics of the traffic. The first stream is cargo, which is offloaded from the inbound vehicle for temporary storage, and the empty vehicle returning to Thailand. Later, when the goods are cleared by the relevant authorities, local trucks collect and deliver the goods. The second stream is goods that are cleared on the inward vehicle and then delivered directly by the Thai truck in the Vientiane area. There are indications that this is the larger stream.



View from Thadeua Road when traveling east, before Thanaleng border station.

Photo by <<????>>



Chaotic and conflicting traffic turning movements at Thanaleng border station, blocking traffic along Thadeua Road



Approaching exit facilities at Thanaleng border station



Blocked Left Traffic Lanes Used for Parking only Right Lane Available for Through Traffic

298. From a trade facilitation perspective, redeveloping the Thanaleng Border Crossing would have a high priority. The Lao PDR is highly dependent on this crossing, which accounts for the majority of its imports and a significant proportion of exports. Not only is Thailand its major trading partner but Laem Chabang and Bangkok ports act as the country's primary gateway to the rest of the world. The current delays will only increase as passenger traffic is rapidly increasing, particularly as wealth disseminates in Vientiane. In addition, border control regimes are not compliant with international best practice and are exposed to malpractices.



Access road to the warehouse complex.

Photo by <<????>>



Thanaleng Customs Department

Figure 12 Thanaleng Freight Custom Clearing and Warehouse Complex



Source: <<??>>



Trucks awaiting clearance at the warehouse complex.

Main yard of the warehouse complex.

299. During the visit to the Thanaleng Border Crossing area, a side visit was made to Thanaleng Railway Station, the railway station servicing the only railway line in the Lao PDR. The station is located at the northern terminus of the railway, a short rail line connecting to the main State Railway of Thailand (SRT), a railway network at the Nong Khai Railway Station 5.3 km to the south,³⁵ via the Thai–Lao Friendship Bridge No. 1. The Thanaleng station is located in the village of Dongphosy in a relatively isolated area 2.5 km north of the Thanaleng Border Crossing station. There is no freight traffic at present and only two passenger trains a day cross the bridge, one in the morning and one in the afternoon, at which times the bridge is closed to roadway traffic. Sometimes, these bridge closures and disruptions to vehicular service can last up to one hour. The twice-daily train service generally consists of only two coaches, and carries only local passengers between Nongkhai and Dongphosy.

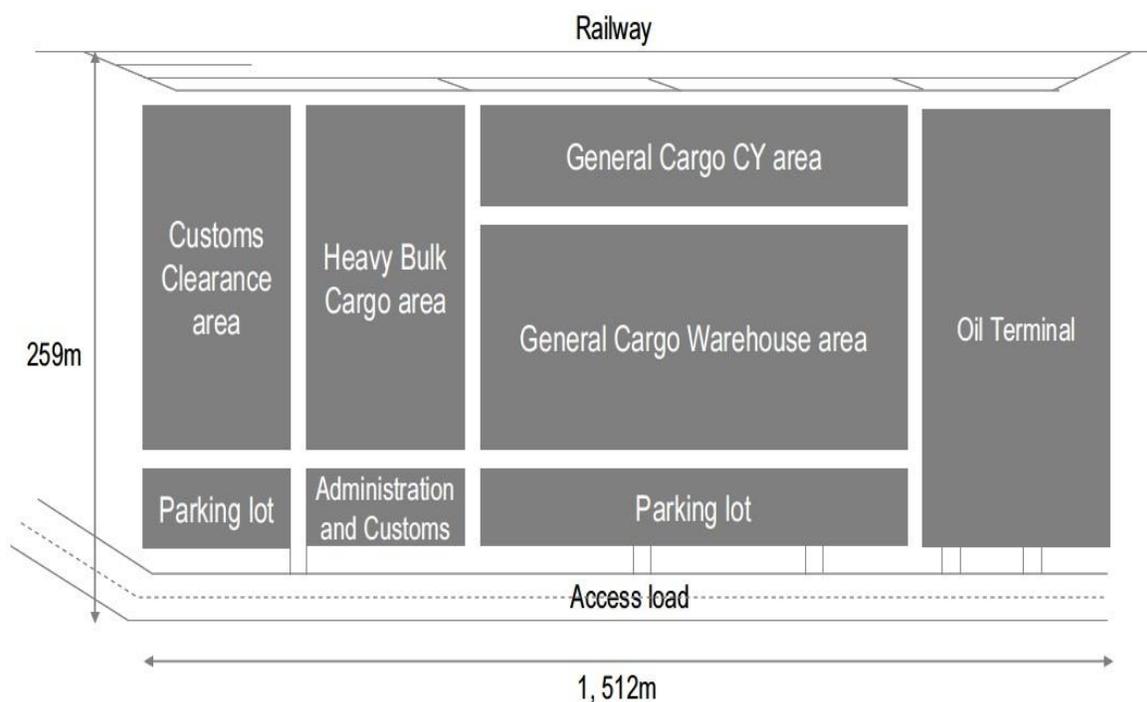
³⁵ The overall cost of the Nong Khai–Thanaleng railway line was about \$7 million, financed primarily through loans from Thailand. Construction began in early 2007 and the line was formally inaugurated in March 2009.

300. Over the past 8 years, discussions have been ongoing, initially on a trilateral basis among the Lao PDR, Thailand, and France, to extend the railway line to a distance of about 8 km to Xaysettha District in Vientiane City. Eventually in 2012, Thailand, through NEDA, agreed to provide technical and financial assistance for the railway extension (including other associated components) for an amount not to exceed B1.65 billion (\$53.7 million). The project included the following components:

- (i) about 8 km of new railway line, including an at-grade railway crossing at Khamsavath Road;
- (ii) supporting signaling and communication equipment and facilities;
- (iii) a Vientiane Main Railway Station;
- (iv) a Lao Railway office building;
- (v) a Lao Railway staff dormitory building;
- (vi) a container yard at Thanaleng;
- (vii) design and supervision of construction consulting services; and
- (viii) contingencies.

The layout of the proposed container yard and/or rail ICD is shown in Figure 13.

Figure 13 Layout of the New Rail Terminal at Thanaleng



Source: JICA (2011).

301. It can be seen that the proposal is more for a general rail freight facility rather than a container terminal. The provision of an oil terminal is considered important in generating the likely volumes of traffic to make this facility viable. The overall layout is considered to be poor and needs to be reviewed as the dominant position of the warehouse would be expected to make the facility more difficult to operate especially for container traffic.

302. This project, except for the proposed container yard at Thanaleng (discussed earlier), appears to be in limbo pending the finalization of a possible mega railway project from the PRC

border in the north to Vientiane. It is believed that if this PRC-assisted railway project materializes, a second parallel Mekong River bridge dedicated to rail traffic would also be constructed between Thanaleng and Nong Khai, dedicated to rail traffic only, and the existing Thai–Lao Friendship Bridge would be converted to road traffic only.



Nong Khai–Thanaleng Rail line south of Thanaleng Railway Station



Thanaleng Railway Station



Approach road from Thanaleng toward Thai–Lao Friendship Bridge



Roadway Deck Thai–Lao Friendship Bridge with railway line in the center



Railway line diverts from center of roadway toward Nong Khai SRT Railway Station



Approaching Nong Khai Border Station from the Thai–Lao Friendship Bridge

303. From a trade facilitation perspective, developing the rail link is unlikely to be a priority. This is because the majority of the trade movements are bilateral, using overnight road transport services from Bangkok. It is unlikely that rail could be competitive over these short distances,

especially as the shipments would not be unitized. The international traffic offers more of an opportunity, but it is doubtful whether there is sufficient volume to make a regular block train viable. The major traffic imbalance is also a problem for rail services. The SRT in Thailand does not have a significant share in the domestic freight market and its ability to provide the necessary international service standards is a concern. The best opportunities are probably for moving fuel from the Thai refineries and ports rather than using the current road deliveries.

304. The section of the Central Corridor between Nong Khai and Udorn Thani follows National Highway No. 2. Except for a short 7 km section of the highway south of Nong Khai, the entire 68 km has already been upgraded to a 4-lane and 6-lane divided highway sections. There is little economic activity adjacent to the highway along the majority of this highway, as it passes through a few small villages and relatively poor rice-growing areas.



National Highway No. 2, south of Nong Khai toward Udorn Thani. The widening of the 7 km section of the Nong Khai–Udorn Thani Road to a 4-lane divided highway is ongoing

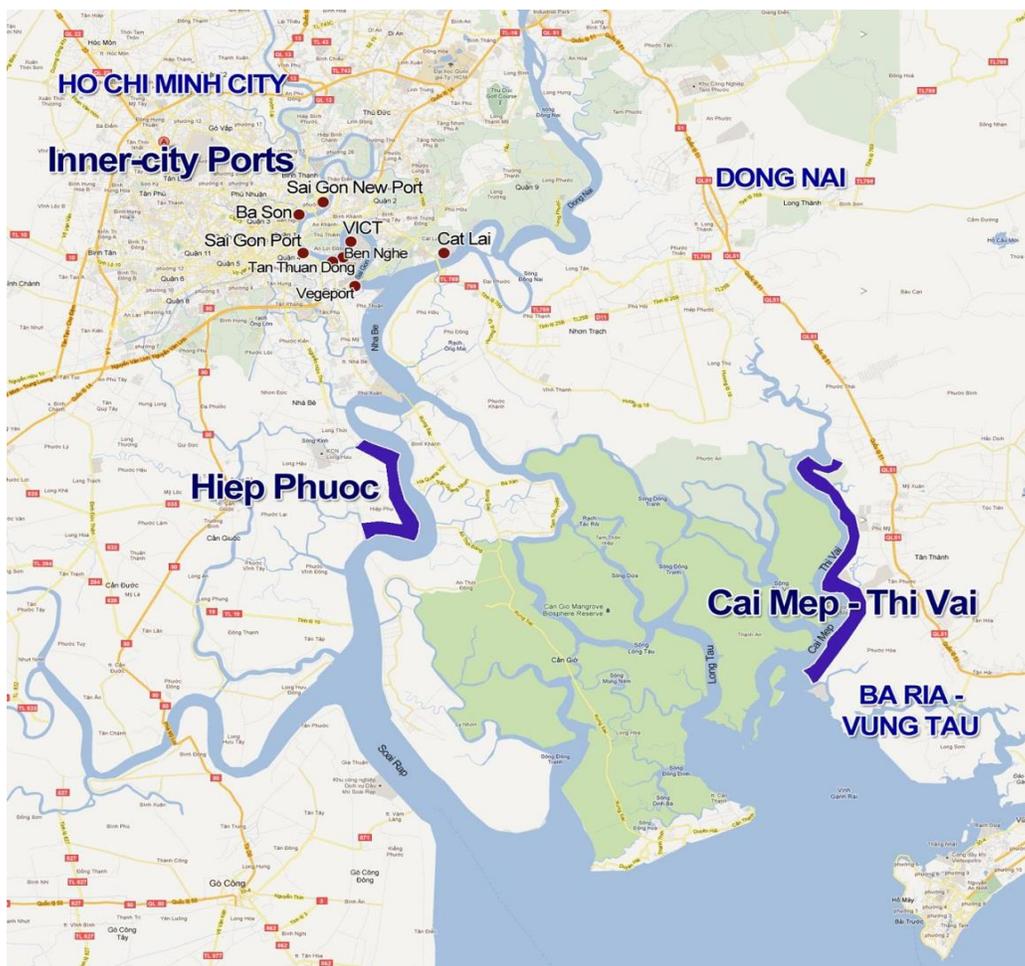
Photo by <<??>>.

6. Viet Nam

305. A number of the current and proposed port development port sites serving the general area around Ho Chi Minh City (HCMC) were visited by the Follow-On Study team during 3–4 December 2012. The objective was to identify any constraints in the connectivity between the container terminals and the main road network that could potentially affect trade movements now or in the future. The locations visited included (i) the downtown HCMC port areas, mostly in Districts 1 and 4; (ii) the recently developed port area at Hiep Phuoc south of the city center in Nha Be District; and (iii) the complex of new ports that have recently opened and/or are under construction as of 2012 in the Cai Mep area to the southeast of HCMC in Ba Ria–Vung Tau Province.

306. Access to and from the downtown area ports are through congested city arterial streets. Since the city government has issued a policy to phase out the city ports over time in compliance with a central government decree, which would transfer most of the maritime cargo traffic from the city to newer port areas downriver outside of the city proper, possible road improvements to access the city ports was not specifically addressed in this study. The locations of the various terminals are shown in Figure 14.

Figure 14 Existing and New Container Terminals in Ho Chi Minh City



Source: <<??>>

307. The Saigon Premier Container Terminal (SPCT) is located in the Hiep Phuoc Industrial Zone and was opened in 2009.³⁶ It is situated along the west bank of the Soai Rap River, about 16 km south of the HCMC center, but still within the city limits in Nha Be District. Access to the SPCT site is provided by 2.2 km of newly constructed private roads within the Hiep Phuoc Industrial Zone, and along the North–South highway Provincial Road (PR) 34—presently being upgraded by the Ho Chi Minh City government—that connects at the northern end with the Nguyen Van Linh Highway (HCMC Second Ring Road) in District 7. In the future, the Hiep Phuoc area will also be serviced by the most southerly section of the HCMC Fourth Ring Road, which is currently at the planning stage and will consist of a 4-lane divided urban roadway. By that time, the port facilities to Hiep Phuoc will have adequate roadway connections into the center of HCMC, as well as access to the city ring road network of highways. It is unfortunate that the access roads were not developed at the same time that the SPCT was constructed as this has undoubtedly adversely affected its potential up to the present.

³⁶ SPCT is a joint venture between DP World (UAE) and the Tan Thuan Industrial Promotion Company (IPC), a state-owned enterprise (SOE) of Viet Nam.



Hiep Phuoc industrial estate road



**Construction of the North–South access road
PR34**

308. The importance of the Hiep Phuoc site, which is scheduled to have another terminal adjacent to the south, being developed by the government-owned Saigon New Port is that it is the nearest site outside the city center that is still within the metropolitan area. It thus generates revenue to the city whereas developments further downstream will provide revenue to other entities. The closure of the city terminals on the Saigon River will potentially reduce the city's revenue, except in relation to cargo transferred to these two terminals. The ultimate closure of the major government terminal at Cat Lai is uncertain. Cat Lai is located on Viet Nam Navy land and is further up the Soai Rap River, rather than on the Saigon River. It is possible that the new terminal at Hiep Phoc, south of the existing SPCT facility, is a potential replacement for Cat Lai.

309. Another key feature of the Hiep Phoc site is that the river is to be dredged to 9.5 meters to a point slightly upriver from the SPCT. A €70 million contract has been given to a Belgian company for the 54 km channel deepening and is scheduled to commence at the start of 2013.

310. The main sources and destination of cargo in HCMC tend to lie immediately to the northeast of the city. Since there is no backland in the city terminals, when cargo is cleared it is taken from the container yards to the ICDs in Phuc Long or slightly further northeast toward Bien Hoa. Empty containers are stored in these ICDs and after loading either in the ICD or in a factory are returned to the terminal for loading onto an outward vessel. Empty containers cannot be returned to the container yards due to lack of space. This approach creates heavy highway traffic congestion, especially on the National Highway (NH) 1A coming into the city from the northeast. The SPCT operates barge services between their terminal and the ICDs to save the costs incurred in a trans-city road movement.

311. The agricultural and seafood-producing areas lie to the southwest of HCMC and, therefore, Hiep Phuoc is well positioned to connect with this region by NH 1A. However, as indicated earlier, they are less well placed for industrial traffic from the northwest, although the completion of the second ring road project will greatly improve their accessibility. It will probably be another 5 years before the Hiep Phuoc site reaches its potential.

312. The major new port developments are southeast of the city toward Vung Tau, almost 80 km out of the city. The existing primary road access to the new Cai Mep port complex area³⁷ is provided by NQ51, which begins at NH 1A near Bien Hoa (Dong Nai Province) in the north, and ends at Ba Ria–Vung Tau (Ba Ria–Vung Tau Province) in the south. The 4-lane and 6-lane NQ51 provides relatively adequate service for existing traffic demand, with minimal volumes of

³⁷ Five private port developments are currently in the Cai Mep area, either operating or under construction.

container traffic. However, the situation will change dramatically with the industrial and port developments along the NQ51 and around Phu My over the next 5–8 years, and the traffic arising from the construction of the Long Thanh International Airport,³⁸ and ongoing and future tourist facilities³⁹ in and around Vung Tau.

313. Port developments at Cai Mep demonstrate the problems of lack of coordinated transport planning in developing the port and of its connecting roads. The core problem is in port planning as this new port complex was intended to replace the city terminals. With the high growth in exports in recent years, the shipping lines and port operators saw the need to introduce larger vessels providing direct services with “mother-ships” rather than rely on smaller feeder vessels “hubbing” out of Singapore; Shenzhen; or Hong Kong, China. Cai Mep, with its deeper water of about 13–14 m, could accommodate such large vessels. Unfortunately, a large number of (private port operation) permits were issued by the government to various operators for 600-meter quays, which are not ideal as they are too small to accommodate 2–3 mother-ships simultaneously.

314. The combination of falling export demand due to the fiscal crises in Europe and the US has meant that many of the direct services have been withdrawn in favor of feeder operations (which can use the city terminals) and, thus, the benefits of these deep water berths have been eroded. More importantly, the city terminals have not been closed. The fact that the new port is in Baria–Vung Tau Province may also be a factor. The reality is that the Cai Mep port development consists of a series of expensive terminals “marooned” 80 km from HCMC with little or no traffic.

315. The situation is further compounded by the lack of connecting roads between the new port and the NQ51 at Phu My. These are still under construction. Given this situation, only two terminals are open. These are the Tan Cang–Cai Mep (TCIT) terminal, which is owned by the government firm Saigon New Port; and the Cang Quoc Te Cai Mep (CMIT), in which Maersk is a key shareholder. In 2012, the latter was the first facility to achieve 40 moves per hour with their gantry cranes. While each has 2–3 direct services, they are reliant on barging traffic up or downstream from the city terminals and ICDs, as there is almost no local traffic at this stage. While this takes traffic off the NQ51, it is a high-cost solution given the long barging distance. Other terminal developments with Singaporean, US, German, and French interests are either “mothballed” or implementation has been suspended. Both TCIT and CMIT are heavily underutilized and have to offer subsidized rates merely to remain in operation until conditions improve.

³⁸ The estimated \$10 billion Long Thanh International Airport Project, to be located just east of NH51, will become the new international airport servicing HCMC. It covers an area of 50 square kilometers (km²) and with a programmed capacity of 80–100 million passengers a year. The first phase is scheduled to be open in 2020 with an annual capacity of 25 million passengers.

³⁹ Tourist facilities will include at least five large-scale luxury resorts and convention-entertainment-casino centers situated on a 2.2 km stretch of beach along the South China Sea coastline.



CMIT Terminal



TCIT with road development

316. In the longer term, provided the city terminals are closed and exports continue to show steady growth, Cai Mep is well placed to service the major economic developments taking place to the east of the city. There is significant industrial development activity taking place all along the NQ51 and in the immediate vicinity of Phu My. It is expected that this port development could be attractive in about 10 years as these industrial complexes grow.

317. Two major expressway projects are being implemented to provide for this projected increase in demand. These are

- the Bien Hoa–Vung Tau Expressway, to run north–south and parallel to NH51; and
- the Ho Chi Minh City–Long Thanh–Dau Giay (HLD) Expressway, to run east–west from the center of HCMC and intersecting the Second, Third, and Fourth HCMC ring roads.

The 88 km Bien Hoa–Vung Tau Expressway is expected to cost approximately \$181 million, and is scheduled to begin construction in 2013, with 80% of the cost reportedly to be financed by JICA. The HLD Expressway comprises approximately 51 km of 4-lane tolled expressway and is being implemented in sections by ADB and JICA. It commences at the junction of the Second Ring Road in District 9, HCMC and ends at a junction of NH 1A at Dau Giay in Dong Nai Province.



NQ 51 Bien Hoa–Phu My highway



HLD/NQ51 Interchange under construction

318. Access to and from the HLD Expressway, as initially designed, will be restricted to three locations: the intersection at the Second Ring Road, the intersection at NH 51 at the southern end of Long Thanh town, and NR1A at Dau Giay, which will make for a high-speed expressway from the north of HCMC and from the new international airport into the center of the city. The HLD Expressway includes construction of a major and new 1,700-meter bridge over the Dong Nai River at Long Thanh. These two expressways will provide very good access to and from the Cai Mep port areas in the near and midterm, but in the long term, as these expressways are

only 4-lane facilities, there will probably be a need to widen them to at least a 6-lane configuration.

319. Within the Cai Mep port complex area, there is complete network of 4-lane divided roads under construction. The network is being provided by the government as part of the incentive package for private port developers to establish operations at this new location. Construction of the road network has been considerably delayed and construction work on many sections of roads has ceased. Construction work along the main 4-lane divided port complex entrance road, west, and just off of NR51, was the only ongoing road work at the time of the site visit.



Main entrance road to Cai Mep Port Complex still under construction after port facilities were constructed and opened for business

320. The conclusion reached after this visit to Viet Nam is that while there appears to have been significant problems in both planning and implementation of the port subsector infrastructure development around HCMC, including coordination for the provision of a supporting road network, the various road access requirements are being addressed under existing or planned programs. Delays in implementing road access infrastructure have adversely effected these new port developments; it is important that further delays be avoided as the ongoing and programmed road and expressway projects are critical to the long-term success of port development around HCMC.

B. Project Identification

321. The controlling guidelines followed in identifying investment projects were based on criteria where (i) the project would close an existing infrastructure gap or overcome a bottleneck along a major trade corridor and if implemented, it would facilitate trade; and (ii) the project is warranted *per se*, without any specific consideration of which entity would implement the project.

322. A total of 16 projects have been identified during this study. Of these projects (i) 11 are classified as road, road-related, or border-crossing projects, and all will require a feasibility study (or a Project Preparation Technical Assistance [PPTA] if being considered for ADB financing,); (ii) 4 are purely studies and/or pre-feasibility projects to determine if a resulting infrastructure project will be technically and economically viable; and (iii) 1 is a capacity development technical assistance project.

1. Kawkareik–Thaton Road Improvement Project, Myanmar

323. **Background and status of the project.** This 140 km western section of the East–West Corridor is the next key priority road link to be improved to support overland trade facilitation and land transport connectivity between Thailand and Myanmar. The Kawkareik–Thaton Road Investment Project is considered one of the highest priority GMS road investment projects, and one of the most important road projects in Myanmar in terms of trade facilitation. The project would begin at Kawkareik, at the western terminus of the Government of Thailand-assisted Myawaddy–Kawkareik Road Project, which is currently being implemented at the time of this study.

324. The majority of the existing Kawkareik–Thaton 2-lane road is in poor condition while the approximately 100 km section from Kawkareik to Hpa-an requires complete reconstruction and upgrading, and the approximately 40 km section from Hpa-an to Thaton is in need of rehabilitation, including an overall throughout pavement, roadway and/or shoulder widening, and other minor works and improvement of highway furniture. Most of the project would follow existing horizontal and vertical alignments, although a few short road sections will need to be realigned to improve sight distances and avoid sharp horizontal curvature. In early 2012, the Government of Myanmar and ADB, as outlined in a Minutes of Meeting (MOM) dated 25 October 2012, have agreed that ADB will proceed with the processing of a PPTA, but for only a part of this road project—the 70 km section from Kawkareik to Eindu.⁴⁰

325. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

326. **Expected project components and project costs.** The project will require standard feasibility and/or detailed design phases, followed by tendering and construction, with an estimated total implementation period of 4 years—1 year for project feasibility and design, and 3 years for construction. The existing right-of-way appears to be sufficient and only minor resettlement will be required where road widening is needed along short sections of built-up areas. It is expected that a full Environmental Impact Assessment (EIA) would not be needed; only an initial environmental examination (IEE) and a relatively simple Environmental Management Plan (EMP) will be required. With a total cost of \$111.0 million, excluding any right-of-way acquisition, the project components include the following:

- i. Civil works—140 km of 2-lane road improvement, including earthworks; subbase, base, and asphaltic concrete pavement construction; reinforced concrete box and pipe culverts and other minor drainage improvements; upgraded minor items and standard highway furniture improvements. Budget cost: \$96.9 million.
- ii. Civil works—a bridge condition and load capacity study of the 685 m Thanlwin Bridge (Hpa-an), including its upgrading and/or strengthening, as may be required. Upgrading and widening of 1–365 m long, 1–115 m long, and 16 other smaller highway bridge structures will be required. Budget cost: \$8.3 million.
- iii. Resettlement—preparation of a Resettlement Plan and allowance for minor resettlement costs. Budget cost: \$0.8 million.
- iv. Consulting services—Mawlamyine Road Connectivity Study, for a possible road improvement and upgrading of a connecting road to Mawlamyine City, which could be

⁴⁰ The project was referred to in the referenced MOM as the proposed *GMS East–West Economic Corridor Extension into Myanmar Project*.

included in the feasibility study or PPTA for the Kawkareik–Thaton road improvement project. Budget cost: \$0.2 million.

- v. Consulting services—complete construction supervision and safeguard monitoring services will be required for a construction period of about 36 months. Budget cost: \$4.8 million.

327. **Probable project outcome and impact.** It is expected that the Thailand–Myanmar East–West Corridor traffic would move more efficiently with lower transport costs. The expected impact would be improved trade facilitation between Thailand and Myanmar.

328. **Project priority ranking.** This project is ranked with the highest priority, hence, project implementation should commence as soon as possible.

2. Thaton–Payagyi Road Improvement Project, Myanmar

329. **Background and status of project.** This 151 km road improvement project will service two separate traffic streams, which are (i) the East–West Corridor traffic to and from Thailand, as a continuation of the Kawkareik–Thaton road; and (ii) the domestic traffic at Myanmar along NR8 to and from the southern part of the country’s divisions and/or states of Tanintharyi, Mon, and Kayin. The project would begin at Thaton, at the western terminus of Kawkareik–Thaton road, carrying traffic over the newly constructed 670 m Sittaung Bridge,⁴¹ spanning the Sittaung River, and terminating just north of Bago at the town of Payagyi. In total, there are 31 bridge structures along the route, many of which will require repair and/or upgrading.

330. The existing 2-lane road is relatively narrow and generally in fair to poor condition. The improvement project will primarily constitute road repair, some widening, and upgrading throughout much of its length; with major reconstruction and widening through the urbanized areas of Bilin, Kyaikto, Waw, and Payagyi; and likely require a grade-separated interchange connecting to the NR1 at Payagyi. The implementation of this project would become the third and final road upgrading project of Myanmar along the “realigned” East–West Corridor, from the Thai border to Payagyi on the Western Corridor.

331. **Trade facilitation impact.** This project has moderate impact in terms of trade facilitation.

332. **Expected project components and project costs.** The project will require standard feasibility and/or detailed design phases; followed by tendering and construction, with an implementation period of 3.5 years where 1 year is for project feasibility and design and 2.5 years for construction. Existing right-of-way appears to be sufficient and only minor resettlement will be required where road widening is needed along short sections of built-up areas. It is expected that a full EIA would not be needed and only an IEE and a relatively simple EMP will be required. With a total cost of \$128 million excluding any right-of-way acquisition, the project components include the following:

- i. Civil works—151 km of 2-lane road improvement, including earthworks; subbase, base, asphaltic concrete pavement construction; reinforced concrete box and pipe culverts and

⁴¹ The new Sittaung Bridge was opened some 4 years ago. Its main center span over the Sittaung River is about 670 m in length, with an 8 m wide roadway and a 1.2 m pedestrian sidewalk on each side. It was reportedly designed for an HS 20-44, bridge loading, and is posted to carry up to 60-ton loads.

other drainage improvement; upgraded roadway minor items and standard highway furniture improvements. Budget cost: \$104.4 million.

- ii. Civil works—a new Payagyi “trumpet” type, grade-separated interchange; upgrading and repair of 1–181 m long bridge, and 30 smaller highway bridges as required. Budget cost: \$15.3 million.
- iii. Resettlement—preparation of a Resettlement Plan and allowance for minor resettlement costs. Budget cost: \$0.8 million.
- iv. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 30 months. Budget cost: \$7.5 million.

333. **Probable project outcome and impact.** The outcome is a more reliable and efficient domestic traffic at the southern part of Myanmar and at the Thailand–Myanmar East–West Corridor. The impact would be improved trade facilitation between Thailand and Myanmar.

334. **Project priority ranking.** Ranked with the lowest priority, project implementation should commence within the next 6 years.

Figure 15 Investment Projects 1,2, and 9



Source: <<??>>

3. Thilawa–East Dagon Road Improvement Project, Myanmar

335. **Background and status of the project.** This 32.8 km road improvement project will upgrade and expand—from 2 lanes to 4 lanes—the primary access road connecting the Thilawa Port area (and the Thanlyin–Kyauktan SEZ), to the East Dagon township along Highway No. 2, via the 1.4 km Thanlyin Bridge No. 2. The project can be divided into four sections, as follows:

- (i) the first 5.5 km section from Thilawa Port is a partially completed, poorly maintained, 4-lane divided road, with good vertical and horizontal alignments that will require major reconstruction;
- (ii) the second section is a newly constructed 16.5 km of well-aligned and well-maintained 2-lane paved road that will need to be widened to a 4-lane divided cross section;
- (iii) the third section is across a 1.4 km Thanlyin Bridge No. 2, which is in need of resurfacing and other routine and/or periodic maintenance upgrading; and
- (iv) the last section is 9.4 km of poorly maintained 2-lane road beginning at the north end of Thanlyin Bridge No. 2, and ending in a semi-urbanized area near East Dagon, where the road intersects Highway No. 2. This last section will need to be widened and reconstructed, requiring additional right-of-way while moderate resettlement issues will likely be encountered.

336. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

337. **Expected project components and project costs.** The project will require standard feasibility and/or detailed design phases, including a design review and condition survey of Thanlyin Bridge No. 2; to be followed by tendering and construction, with an implementation period of 3.5 years where 1 year is for project feasibility and design, and 2.5 years for construction. The existing right-of-way appears to be sufficient, except for the most northerly 9.4 km near East Dagon, which will require some additional right-of-way. It is expected that a full EIA would not be needed, only an IEE and a relatively simple EMP will be required. With a total cost of \$41.0 million excluding any right-of-way acquisition, project components will include:

- i. Civil works—14.9 km of reconstruction of an existing 2-lane road, and widening to 4 lanes, in addition to major improvements at the intersection of road project Highway No. 2. Work will include earthworks; subbase, base, and asphaltic concrete pavement construction; reinforced concrete box and pipe culverts and new side drainage near East Dagon; and 16.5 km of highway widening from 2 lanes to 4 lanes. Budget cost: \$37.4 million.
- ii. Civil works—complete resurfacing and other routine and/or periodic maintenance upgrading of Thanlyin Bridge No. 2, and construction of a new 2-lane bridge that is 60 m in length. Budget cost: \$1.0 million.
- iii. Resettlement—preparation of a Resettlement Plan covering the 9.4 km section south of the intersection with Highway No. 2 at East Dagon. Budget cost: \$ 0.1 million.
- iv. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 30 months. Budget cost: \$2.5 million.

338. **Probable project outcome and impact.** The outcome is a more reliable and efficient Thilawa freight traffic that is linked with the national road network. The impact is improved trade facilitation for Thilawa Port and the SEZ.

339. **Project priority ranking.** Ranked with the highest priority, project implementation should commence as soon as possible.

4. East Dagon–NR1 Road Improvement Project, Myanmar

340. **Background and status of the project.** This 31.1 km road widening and reconstruction project is entirely along Highway No. 2. Together with the Thilawa–East Dagon Road Improvement Project, the two road improvement projects will be the new backbone and/or corridor access to Thilawa Port. This road will also carry most of the large truck and container truck traffic to and from the downtown Strand port area, and service other minor ports along the Yangon river network near Yangon. It is currently a 2-lane highway that traverses a mixture of small urbanized towns and/or villages, scattered rural agricultural lands, and small factory and commercial sites. The existing 2-lane roadway is paved, with little or no shoulders, and in poorly maintained condition. Numerous locations indicate pavement section failures due to poor quality materials, poor workmanship, and vehicular overloading. There is little existing cross or side drainage. The project would end at NR1 where there is a proposal to construct a new grade-separated interchange. The entire 31 km will need to be reconstructed to a new 4-lane divided highway configuration.

341. **Trade facilitation impact.** This project has moderate to high impact in terms of trade facilitation.

342. **Expected project components and budget costs.** The project will require standard feasibility and/or detailed design phases; to be followed by tendering and construction, with an implementation period of 3.5 years where 1 year is for project feasibility and design and 2.5 years for construction. In general, the existing right-of-way appears to be adequate although some additional right-of-way will need to be acquired along parts of this road section, primarily in build-up areas and at the location of the NR1 interchange. Only moderate settlement issues are expected to be encountered. It is expected that a full EIA would not be needed, only an IEE and a relatively simple EMP will be required. With a total cost of \$58.0 million excluding any right-of-way acquisition, project components will include:

- i. Civil works—31.1 km of complete reconstruction and widening of an existing 2-lane facility to a 4-lane divided highway configuration, including earthworks; subbase, base, and asphaltic concrete pavement construction; reinforced concrete box and pipe culverts and extensive new side drainage particularly at the western end of the project near East Dagon. Budget cost: \$43.4 million.
- ii. Civil works—construction of seven new 4-lane bridges with a total length of 125 m; and one grade-separated “trumpet” type interchange at the intersection of Highway No. 2 and NR1. Budget cost: \$9.7 million.
- iii. Resettlement—preparation of a Resettlement Plan covering the initial 5 km of the project near East Dagon and at the location of the NR1 interchange. Budget cost: \$1.5 million.

- iv. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 30 months. Budget cost: \$3.4 million.

343. **Probable project outcome and impact.** The outcome will be increased freight traffic capacity on the road linking Thilawa and Yangon to the national road network. The impact will be improved trade facilitation for Thilawa and Yangon.

344. **Project priority ranking.** Ranked with the highest priority, project implementation should commence as soon as possible.

5. Yangon/East Dagon Inland Clearance Depot Study, Myanmar

345. **Background and status of the project.** The present market penetration of containerization in general cargo in Myanmar is significantly lower than in other GMS countries, but in the near term, high growth is expected in container traffic, particularly into and out of the Thilawa Port area. With this expected high growth of overall container usage, it is anticipated that the government's policy to phase out the downtown Yangon City wharf port and associated container areas along the Strand will be implemented. Hence, there is a clear need to conduct a study and/or assess the need for container capacity expansion and supporting container freight stations (CFSs) and inland clearance (container) depots (ICDs) in the greater Yangon–Thilawa area. This study would be done in conjunction with studies and/or designs of proposed road improvements to the road network connecting Yangon and Thilawa, with the city's main industrial centers and with the Asian Highway 1 (AH1). This will help identify potential investment needs for the development of a rail-connected ICD on the east side of Yangon, probably in the general area of East Dagon, primarily to support Thilawa Port and special economic zone (SEZ) developments. The ICD would act as a CFS and handle full container load traffic on through bills of lading, and as storage of empty containers.

346. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

347. **Scope of study, expertise required, duration, and budget cost.** The scope of this pre-feasibility and concept design study would be divided into three phases, as follows:

- (i) An analysis phase, to substantiate the policy and/or timing of the closing of the various container terminals along the downtown Strand area, and to determine the rationale and demand for a new centralized ICD to service future combined container traffic in the Thilawa–Yangon area.
- (ii) A site study phase, to locate an appropriate, approximately 10 ha site for a new ICD, most likely in the general East Dagon area, with ready access to Highway No. 2 and the existing main railway line east of Yangon.
- (iii) A prefeasibility phase, to determine the scope of the project; prepare a conceptual design for required facilities; and prepare a pre-feasibility level assessment of technical, financial, and economic viability. International expertise required would include a logistics and/or ICD operations specialist, a site and/or civil engineering specialist, and an economic and/or financial specialist, for a total of 6–8 person–months; and a similar number of person–months for supporting national specialists. The estimated duration of the small-scale technical assistance would be 2–3 months, with an approximate budget of \$0.23 million.

348. **Project priority ranking.** Since it was given the rank of highest priority, project implementation should commence as soon as possible.

Figure 16 Investment Projects 3, 4, and 5



Source: <<ADB?>>.

6. Mandalay Inland Clearance Depot Study, Myanmar

349. **Background and status of the project.** There are government proposals to develop an ICD at Mandalay, which will be linked by rail to the proposed Yangon ICD at East Dagon. The concept is that containers will come from either Yangon or Thilawa ports by road and be transferred up to the Mandalay ICD using block trains. The likely location of this new rail-connected ICD is near the Myitnge railway station, adjacent to the major rail workshops, which are located a few kilometers south of the city of Myitnge. Three key issues will dictate the viability of this development, as follows:

- (i) It is totally reliant on the initial development of the Yangon–East Dagon ICD to feed traffic to this ICD;
- (ii) The costs for the road movement from the ports to East Dagon, the handling charges, and the rail transit costs being lower than that of direct delivery road transport costs; and
- (iii) If the Myanmar Railways can organize a minimum of one block train per week, in terms of train paths, flat wagons, and locomotives, and there is sufficient traffic to fill the train.

Clearly, one of the initial concerns is the likely traffic imbalance, with potentially significant import volumes northbound but limited exports southbound.

350. **Trade facilitation impact.** This project has low impact in terms of trade facilitation.

351. **Scope of the study, required expertise, duration, and project cost.** The first primary output of this initial small-scale study would be assessing the three key issues dictating project viability. The second primary output would be the results of a preliminary site location, land availability, and an ICD concept study for the proposed ICD. International expertise required would include a logistics/ICD operations specialist for about 2 person–months, assisted by a national logistics specialist. The duration of the small-scale technical assistance would be about 2 months, with an approximate budget of \$0.10 million.

352. **Project priority ranking.** Given a rank of moderate priority, project implementation should commence within the next 3 years.

7. Myanmar Inbound Clearance Depot Investment Project

353. **Background and/or status of the project.** For this study, it is assumed that results of the Yangon–East Dagon ICD study will prove favorable to be able to proceed with detailed design and project preparation for a Myanmar ICD Investment Project, likely on a 10-hectare site near East Dagon. The ICD would act as a CFS and handle full container load traffic on through bills of lading, and as storage of empty containers.

354. **Trade facilitation impact.** This project has moderate impact in terms of trade facilitation.

355. **Expected project components and project costs.** The project will require standard detailed design phases followed by preconstruction tendering and construction, with an implementation period of 1.5 years where 0.5 year is for site detailed design, land acquisition and approvals, and 1.0 year for construction. It is likely that land required for the entire project will be provided by the government and that resettlement cost will not be a major issue. It is expected that a full EIA would not be needed, only an IEE and a relatively simple EMP will be required. With a total cost of \$15.0 million excluding any right-of-way acquisition, project components will include the following:

- i. Civil works—to include a rail siding capable of handling container trains; a container yard, including working and storage areas; covered warehouse space and/or sheds, including a bonded warehouse space; a gate complex area for documentation, security, and inspection activities; and associated utilities (water, electricity, sewerage, and others), access roads, drainage, site flood lighting, fencing, and related civil site works. Project cost: \$9.0 million.
- ii. Equipment—to include overhead cranes (at the rail siding and within the ICD), fork lifts and other lifting and moving equipment; truck scales; and ICT equipment. Project cost: \$5.0 million.
- iii. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 12 months. Project cost: \$1.0 million.

356. **Probable project outcome and impact.** The outcome would be a more efficient handling of containerized freight in Yangon–Thilawa and Mandalay. The impact is an improved containerized trade facilitation.

357. **Project priority ranking.** With a rank of moderate priority, project implementation should commence within the next 3 years.

8. NR3 Road Safety Audit and Nawngkhio–Gokhteik Alignment Improvement Study

358. **Background and status of the project.** Day traffic is reported at about 500 trucks per day in each direction consisting mainly of 15-ton capacity rigs. Due to adverse road conditions and poor roadway geometry, use by articulated trucks is limited. The majority of the NR3 section from Mandalay to the PRC border, along the Northern Corridor, is in poor condition. Much of the alignment pass through mountainous areas and have been constructed to a very restricted speed design in both vertical and horizontal alignments. Some of the worst conditions are between Nawngkhio–Gokhteik, and at the north of Kutkai where the road rises out from the valley. However, result of interviews with truckers all indicated the main problem section was between Nawngkhio–Gokhteik, where the road drops sharply into a deep valley and up the other side with switchbacks on either side of the bottom of the valley. This section is dangerous with regular accidents and the road surfacing is poor or absent. The tight turns result in tire scrub that wear off tires and take away the surfacing on switchback corners.

359. **Trade facilitation impact.** This project has moderate to high impact in terms of trade facilitation.

360. **Scope of the study, required expertise, duration, and budget cost.** The scope of this project would be divided into two study components: (i) a (rapid) road safety audit; and (ii) a proposed alignment improvement report, focusing on the Nawngkhio–Gokhteik section of NR3. The road safety audit would be not intended to be a full audit along the entire length of NR3 in accordance with normal international guidelines.⁴² Rather it will be a narrowly focused, rapid

⁴² Typically, a full Road Safety Audit (RSA) in developing countries is conducted over a relatively long period and have three objectives: (i) to inculcate safety consciousness among road authorities and other stakeholders, (ii) to carry out RSAs often along selected sections of national and state highways to identify typical and recurring problems

assessment and/or road safety audit (RA/RSA), following acceptable guidelines for gathering and analyzing field data along the existing road.⁴³ It would focus primarily on site visits along NR3 to assess existing infrastructure and its condition, existing highway design parameters, and roadway operational characteristics and accident history, all from a road safety perspective. The assessment team would be headed by a road safety audit specialist.⁴⁴ In general, the objective of the RA/RSA is to answer the following questions:

- (i) What elements of the road may present the most critical safety and operational concerns, and to what extent, to which road users, and under what circumstances do these safety concerns apply?,
- (ii) What cost-effective opportunities exist to eliminate or mitigate these critical safety concerns and improve the operational characteristics of NR3?

The RA/RSA would develop appropriate solutions for a minimum of 5–10 of the most common recurring problems and then outline standard repair and/or upgrading details or approaches to mitigate the problems. The alignment improvement component would be a follow-on from the RA/RSA and develop a scope, and possible terms of reference for a detailed feasibility study for a subsequent road safety improvement project. The present thinking is for this alignment improvement report to concentrate on the Nawngkhio–Gokhteik section of NR3. However, this would need to be verified in accordance with the government’s maintenance and priorities for improvements on NR3 before the scope of this study could be finalized.

International expertise required would include a road safety audit specialist, a highway design specialist, a geotechnical and/or slope stabilization specialist, and a highway maintenance specialist, for a total of 6 person–months; and a similar number of person–months for supporting national specialists. The estimated duration of the small-scale technical assistance would be 2–3 months with an approximate cost of \$0.23 million.

361. Project priority ranking. Ranked as a moderate priority, project implementation should commence within the next 3 years.

and possible solutions, and (iii) to train highway engineers and officials of road authorities so they can carry out or organize others to carry out RSAs.

⁴³ For background information on carrying out a full RSA, refer to ADB (2003).

⁴⁴ The assessment team should also include a representative of the road safety and/or maintenance division of the Ministry of Transport or other appropriate highway authority, and a representative of the highway police responsible for the traffic regulation enforcement along NR3.

Figure 17 NR3 Road Safety Audit and Nawnghkio–Gokhteik Alignment Improvement Study



PLAN

8 NH3 Road Safety Audit and Nawnghkio - Gokhteik Alignment Improvement Study Project



Profile along Existing NH3 Road (from 'A' to 'B' Red line in Plan)



Profile along Existing Railway Line (from 'A' to 'C' Blue line in Plan)

Source: <<??>>

9. Mae Sot–Myawaddy Border-Crossing Project and Infrastructure Improvements, Thailand and Myanmar

362. **Background and status of the project.** For the past few years, the Government of Thailand, through the Neighboring Countries Economic Development Cooperation Agency (NEDA), and the Government of Myanmar have been carrying out a series of site studies and field investigations and holding discussions on a project to improve the Mae Sot–Myawaddy border facilities along the East–West Corridor. The project would be designed to separate the freight traffic from the passenger traffic at this location, with passenger traffic continuing to use the existing border crossing in the center of the two border towns. Three possible alignments on the side of Thailand have been looked into and one has been tentatively selected. A new road alignment on the side of Myanmar has also been agreed upon. A Thai engineering consulting firm is, at the time of this study, carrying out a feasibility study for this project, which was expected to be completed by the end of 2012. The project will consist of 16.9 km of new 4-lane divided highway (13.3 km in Thailand and 3.6 km in Myanmar), including a new 4-lane, 100 m long Moei River Bridge at the border, and new freight border crossing stations, and associated cross-border facilities. No decision has yet been agreed to proceed with detailed designs, or acquire the new right-of-way, and no agreement is in place between the two countries as to how the costs will be shared.

363. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

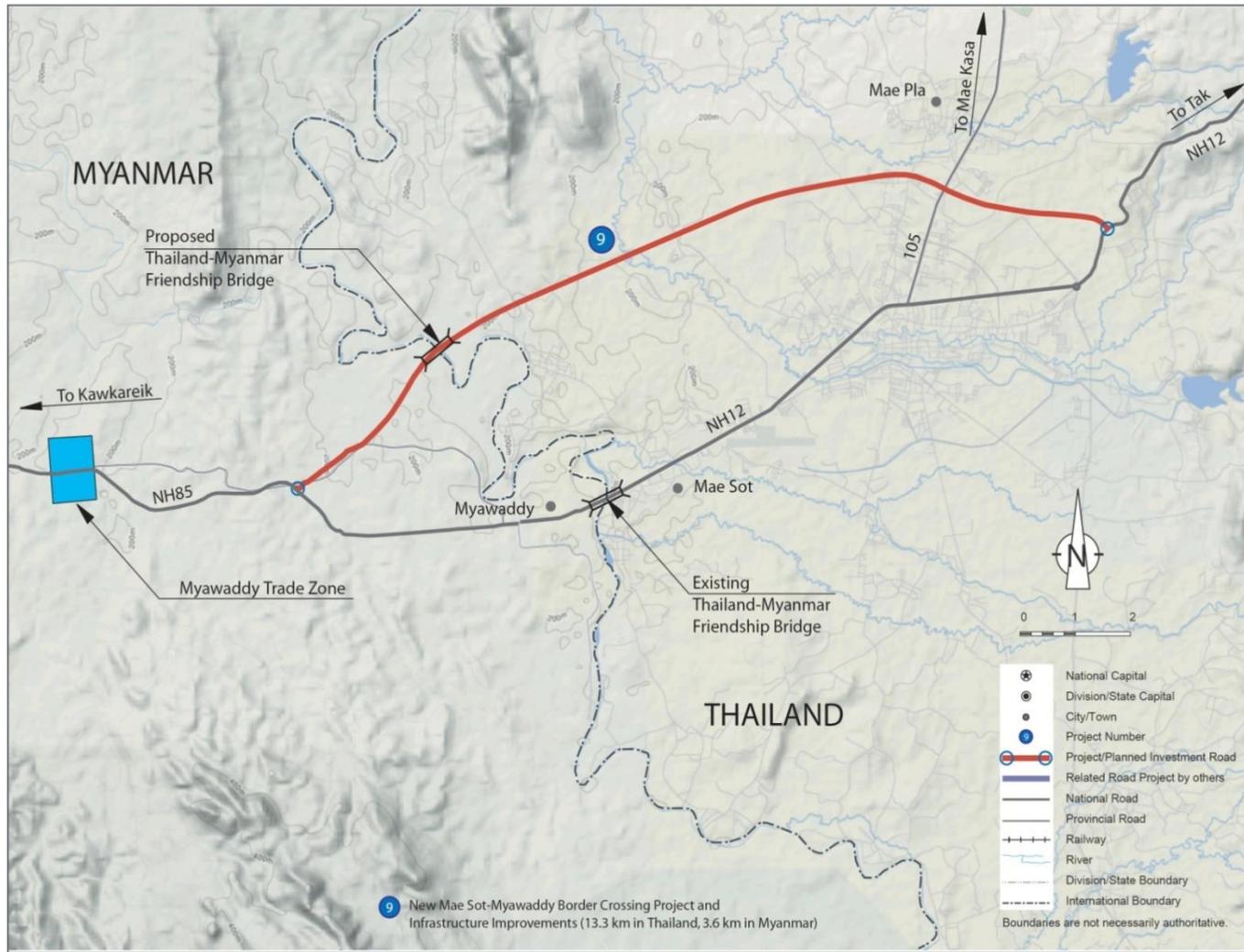
364. **Expected project components and project costs.** Implementation of the project will require a detailed design phase for both roadway and bridge components and for architectural and engineering services for buildings and associated facilities, to be followed by tendering and construction. Total implementation period is estimated at 3 years where 1 year is for detailed design, acquisition of right-of-way, and approvals from officials of both countries; and 2 years for construction. The entire project will be constructed along a new right-of-way. It is expected that a full EIA would be required, and a detailed EMP to be followed during project implementation. With a total cost of \$40.0 million excluding any right-of-way acquisition, project components will include the following:

- i. Civil works—16.9 km of completely new 4-lane highway, including earthworks; subbase, base, and asphaltic concrete pavement construction; and reinforced concrete box, pipe culverts, and side drainage. Project cost: \$16.8 million.
- ii. Civil works—construction of a new 4-lane bridge, 100 m in length. Project cost: \$1.3 million.
- iii. Civil works—construction of border station buildings and associated facilities. Project cost: \$12.0 million;
- iv. Equipment—truck scales, security and/or CCTV and ICT equipment. Project cost: \$3.0 million.
- v. Resettlement—resettlement costs along the entire length of the new alignment. Project cost: \$4.0 million.
- vi. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 24 months. Project cost: \$2.9 million.

365. **Probable project outcome and impact.** The outcome is a traffic that is more efficiently processed through the Mae Sot–Myawaddy Border Crossing. The impact is improved trade facilitation at the Mae Sot–Myawaddy Border Crossing.

366. **Project priority ranking.** Ranked with the highest priority, project implementation should commence as soon as possible.

Figure 18 Investment Project 9: Mae Sot–Myawaddy Border Crossing Project and Infrastructure Improvement



Source: <<??>>

10. Aranyaprathet–Poipet Bypass Road and Infrastructure Improvements, Thailand and Cambodia

367. **Background and status of project.** The highly congested areas surrounding this primary Thailand–Cambodia border crossing along the Southern Corridor have suffered from decades of poor urban and transport planning, resulting in a severely congested and inefficient border crossing. A project to upgrade the Aranyaprathet–Poipet border crossing has been discussed between Thailand and Cambodia for a number of years, often with ADB acting as the “friendly broker.” After a number of years of inactivity, the two governments resumed bilateral discussions in early 2012. They have agreed to a southerly (bypass) location for a new border-crossing facility to be dedicated to freight traffic. The southerly bypass, primarily along a new alignment, will require acquisition of a right-of-way throughout much of its length. No agreement has been reached as to providing financing for the design and construction of this new freight border crossing, although Cambodia has reportedly asked Thailand to consider financial and technical assistance for the project. Passenger traffic would continue to cross at the existing border crossing, although it is currently unclear if there are plans to upgrade the existing facilities to more efficiently handle passenger car and bus traffic. At present, bus traffic is relatively large, handling traffic back and forth from Thailand, which are destined for the tourist areas around Siem Reap and the Angkor Wat–Angkor Thom (UNESCO) World Heritage sites.

368. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

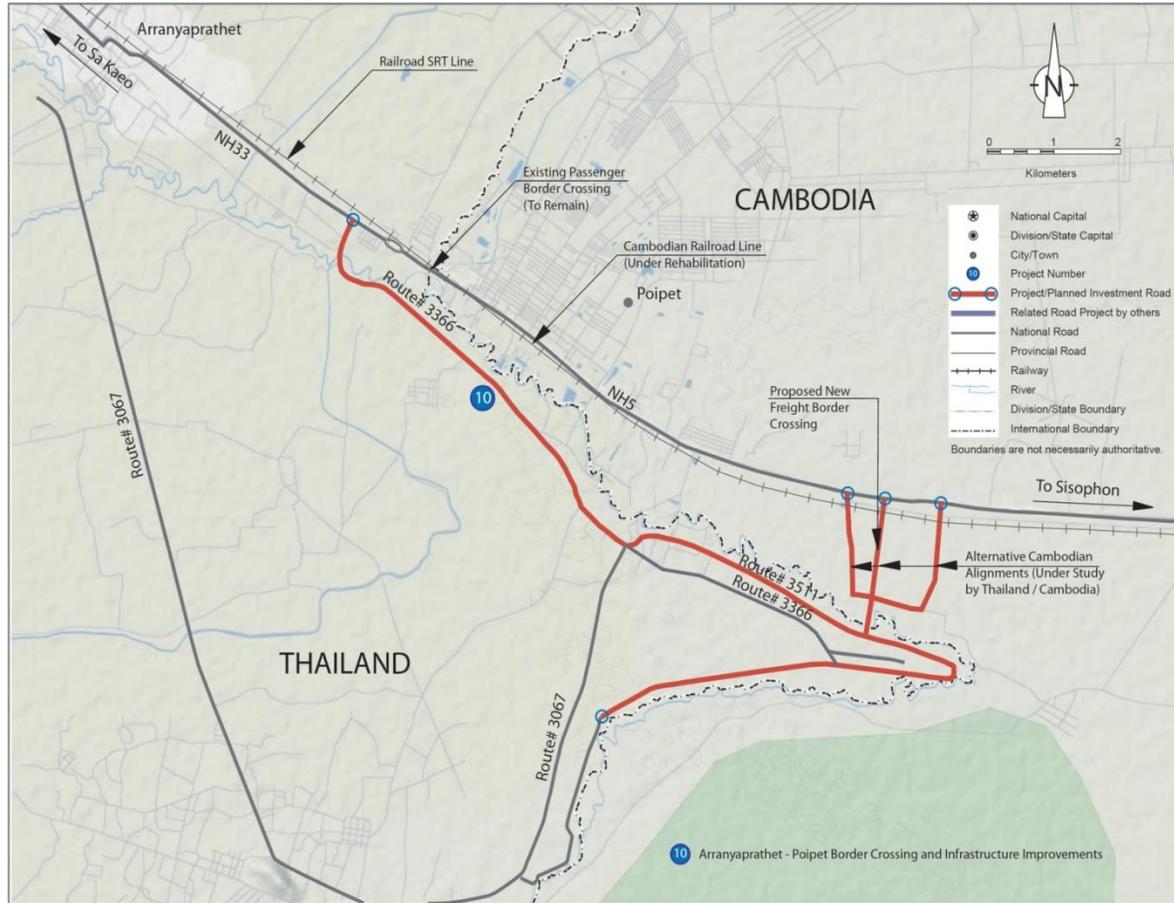
369. **Expected project components and project costs.** Implementation of the project will require detailed design phase for both roadway and bridge components and architectural and engineering services for buildings and associated facilities; this is to be followed by tendering and construction. Implementation period is estimated at 3 years where 1 year is for detailed design, acquisition of right-of-way, and approvals from officials of both countries; and 2 years for construction. The entire project will be constructed along a new right-of-way. It is expected that a full EIA would be required, and a detailed EMP is to be followed during project implementation. With a cost of \$40.0 million excluding any right-of-way acquisition, project components will include the following:

- i. Civil works—19.6 km of completely new 4-lane highway, including earthworks; subbase, base, and asphaltic concrete pavement construction; and reinforced concrete box, pipe culverts, and side drainage. Budget cost: \$17.9 million.
- ii. Civil works—minor highway bridge construction for a small stream at the new border crossing. Budget cost: \$0.3 million.
- iii. Civil works—construction of border station buildings and associated facilities. Budget cost: \$12.0 million.
- iv. Equipment—truck scales, security and/or CCTV and ICT equipment. Budget cost: \$3.0 million.
- v. Resettlement—resettlement costs along the entire length of the new alignment. Budget cost: \$5.5 million.
- vi. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 24 months. Budget cost: \$3.3 million.

370. **Probable project outcome and impact.** The outcome is a more efficient traffic through the Aranyprathet–Poipet Border Crossing. The impact is improved trade facilitation at the Aranyprathet–Poipet Border Crossing.

371. **Project priority ranking.** With a rank of highest priority, project implementation should commence as soon as possible.

Figure 19 Investment Project 10: Arranyapraphet–Poipet Bypass Road and Infrastructure Improvement



Source: ???

11. Phnom Penh Sihanoukville Highway Corridor Improvements, Thailand and Cambodia

372. **Background and status of the project.** The primary road along this major trade route between Phnom Penh and Sihanoukville is via NR4, along the Central Corridor. It is currently operating under a 30-year rehabilitate–operate–transfer type of contract to a private concessionaire. There is ample evidence that the concessionaire’s performance is below acceptable international standards for a national highway. The government intends to implement an expressway between Phnom Penh and Sihanoukville, referred to as the Trans Khmer Express Highway. This build–operate–transfer (BOT) project with a 50-year concession period is based on a design speed of 100 km/hour, a 60-meter wide right-of-way, and consisting of a 4-lane, tolled, divided expressway configuration, with four exit/entrance interchanges. Discussions are ongoing with the Republic of Korea, and Korea’s private sector is seeking both technical and financial assistance for this project, but it is still unclear, at the time of the study, as to the source of funding to prepare the feasibility, detailed design, and for its implementation.

373. **Trade facilitation impact.** This project has moderate impact in terms of trade facilitation.

374. **Expected project components and project costs.** The 209 km project will require complex feasibility and detailed design phases, to be followed by preconstruction tendering and construction. Its implementation period is estimated at 5 years, where 1 year is for project feasibility and design, and 4 years for construction. It is expected that the entire length of the project will require right-of-way acquisition. The Resettlement Plan will be complex and require a significant degree of consultancy (and independent) monitoring services. A full EIA would be needed and a detailed and comprehensive EMP will be required. With a total cost of \$605 million excluding right-of-way acquisition, project components will include the following:

- i. Civil works—209 km of 4-lane divided (at-grade) expressway, including earthworks; subbase, base, and asphaltic concrete pavement construction; and reinforced concrete box and pipe culverts. Budget cost: \$255 million.
- ii. Civil works—construction of 4 grade-separated interchanges and 5.5 km of bridges and flyovers for crossing roads. Budget cost: \$191 million.
- iii. Civil works—operations building, toll plaza offices and facilities, and rest areas. Budget cost: \$32 million.
- iv. Equipment—toll collection, traffic control, communications, security and/or CCTV and ICT systems. Budget cost: \$48 million.
- v. Resettlement—cost assumed to be incurred along the entire 209 km length of the project. Budget cost: \$50 million.
- vi. Consulting services—complete construction supervision and safeguard monitoring services will be required for an estimated construction period of 48 months. Budget cost: \$29 million.

375. **Probable project outcome and impact.** The outcome is increased capacity and reduced transport costs along Phnom Penh–Sihanoukville highway corridor. The impact is improved trade facilitation between Phnom Penh and Sihanoukville.

376. **Project priority ranking.** Ranked as of moderate priority, project implementation should commence within the next 3 years.

Figure 20 Investment Project 11: Phnom Penh Sihanoukville Highway Corridors Improvement



Source: <<????>>

12. Sihanoukville Port Access Road Improvement, Cambodia

377. **Background and status of the project.** Sihanoukville Port is a city port located in the northwest corner of the town center and the only deep-water international port serving Cambodia. Since the capacity of the bulk and general cargo terminal of the Sihanoukville Port was limited and there were concerns about safety due to the aging facilities, a new terminal that can meet such increasing and emerging demands and can accept large vessels was required. In 2009, the Japan International Cooperation Agency (JICA) signed an agreement with Cambodia to provide an official development assistance (ODA) loan of \$75 million for the Sihanoukville Port Multipurpose Terminal Development Project. The overall output of this ongoing project is a multipurpose and oil and/or equipment supply terminal.⁴⁵ Specifically, the loan proceeds are being used for the construction of quays and yards, the dredging of berths and channels, and for consulting services. The existing port approach road, an extension of NH4 into the city center, is often congested with queued and double-parked trucks. It is clear that in the near future, this section of NH4 will need to be widened to increase its capacity and to facilitate the movement of truck traffic to and from the port area.

378. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

379. **Expected project components and project costs.** The project will require feasibility and detailed design phases, to be followed by tendering and construction, with implementation period estimated at 2.5 years where 1 year is for project feasibility, design, and acquisition of additional right-of way; and 1.5 years for construction. Resettlement will be a significant issue near the end of the project at the port area. A full EIA would be needed and an EMP will be required. With a total cost of \$11.3 million excluding right-of-way acquisition, project components will include the following:

- i. Civil works—3.5 km of 2-lane roadway improvement, 4.2 km of roadway widening from a 2-lane to a 4-lane divided road, and 1.8 km of road widening to a 4-lane divided road, with an additional truck parking and/or queuing lane on each side; work to include earthworks, subbase, base, asphaltic concrete, and portland cement concrete pavement construction; reinforced concrete box and pipe culverts, and curb-gutter-sidewalk construction at the port area. Budget cost: \$6.1 million.
- ii. Equipment—traffic control, signalization and security and/or CCTV systems. Budget cost: \$2.0 million.
- iii. Resettlement—cost is assumed to cover the westerly 1.8 km near the port area. Budget cost: \$2.5 million.
- iv. Consulting services—complete construction supervision and safeguard monitoring services will be required for an estimated construction period of 18 months. Budget cost: \$0.7 million.

⁴⁵ The construction of an oil supply base at the Sihanoukville Port is considered urgent by the Government of Cambodia in order to support oil and gas production expected to start in the near future. Several international oil and/or gas exploration companies have been conducting offshore test drilling in the Gulf of Thailand. When they start full-scale production, an oil supply base in Cambodia will be essential to send out material, equipment, and other cargo to the offshore oil platform, which are needed for oil production.

380. **Probable project outcome and impact.** The outcome is more efficient access to Sihanoukville Port. The impact is improved trade facilitation at Sihanoukville Port.

381. **Project priority ranking.** Given a rank of moderate priority, project implementation should commence within the next 3 years.

13. Phnom Penh Outer Ring Road Study, Cambodia

382. **Background and status of the project.** In recent years, various ring road proposals for Phnom Penh have developed slowly and in a piecemeal manner, without the benefit of an overall city master planning, or detailed urban transport planning, or associated network and/or traffic analyses. In general, the major drivers of these various proposals have been, and continue to be, individual (housing, commercial) land development schemes, and not by comprehensive transport demand planning. Cambodia envisions four Phnom Penh ring roads, either existing or currently under consideration, and that all are, or will be, configured as 4-lane urban streets. There is no present planning in terms of a conventional ring road configured to an expressway or near-expressway standard, i.e., a roadway that would be capable of efficiently carrying large volumes of traffic around the periphery of the urban center of Phnom Penh. The proposed Outer Ring Road (Ring Road 4) may still offer an opportunity for a true operational ring road, or partial bypass of the urban center of this rapidly expanding capital city. The Government of Cambodia has ongoing discussions with private and public sector entities, primarily from the Republic of Korea and the People's Republic of China, for a possible mix of PPP development and ODA-financed public sector funding for the design and construction of sections of the northern part of the Outer Ring Road. The southern section of the Outer Ring Road appears to present an appropriate opportunity for implementing a critical section of ring road around Phnom Penh, connecting NR4, NR3, NR2, and NR1, that will allow for a controlled or partially controlled access road, and for the free flow of traffic around much of the center of the city.

383. **Trade facilitation impact.** This project has moderate impact in terms of trade facilitation.

384. **Scope of the study, required expertise, duration, and project cost.** The logical first step would be to conduct a small-scale pre-feasibility technical assistance to confirm the scope, the rationale, and acceptance by Cambodia of the logic and need for a ring road facility that would be based on transport demand planning, and not primarily on land development schemes. This initial small-scale study would answer the following issues and achieve specific outputs, as follows:

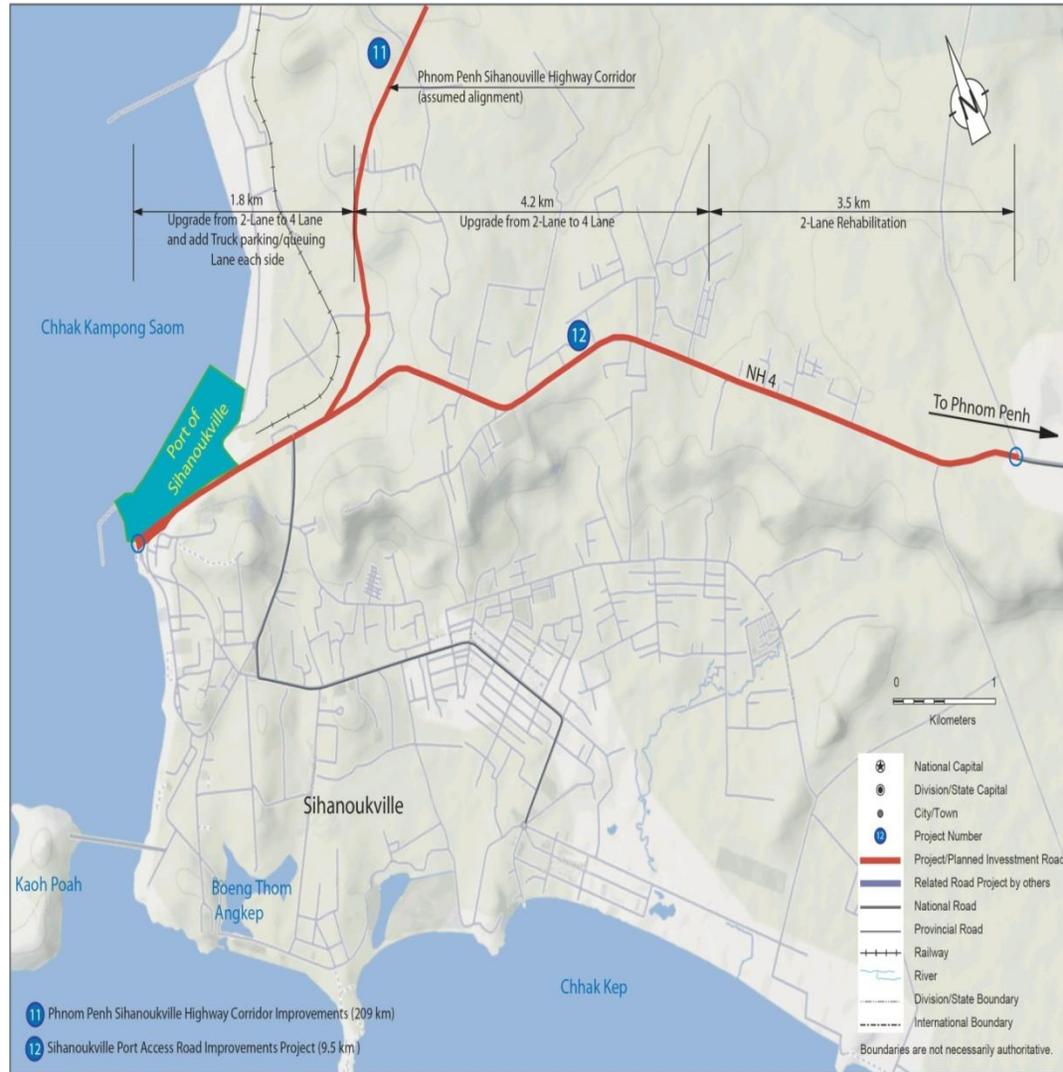
- (i) Is there political will and high-level support for the project concept and rationale, and if so, obtain appropriate government commitments to move forward?
- (ii) Is it likely that the right-of-way along the 63 km corridor of the southern section of the Outer Ring Road can be acquired for the project? The level of complexity regarding safeguard requirements to implement the project should also be determined,.
- (iii) A realistic preliminary cost estimate and a schedule for the implementation of the project,
- (iv) An assessment of the likely investment scheme(s) for project implementation, and

(v) Preliminary traffic forecasts and initial economic analyses to determine economic (and financial) viability.

International expertise required would include an urban transport planner, an urban expressway specialist, a resettlement specialist, and a transport economist and/or financial specialist, assisted by national specialists. The estimated duration of the small-scale technical assistance would be 3 months, with an approximate budget of \$0.23 million.

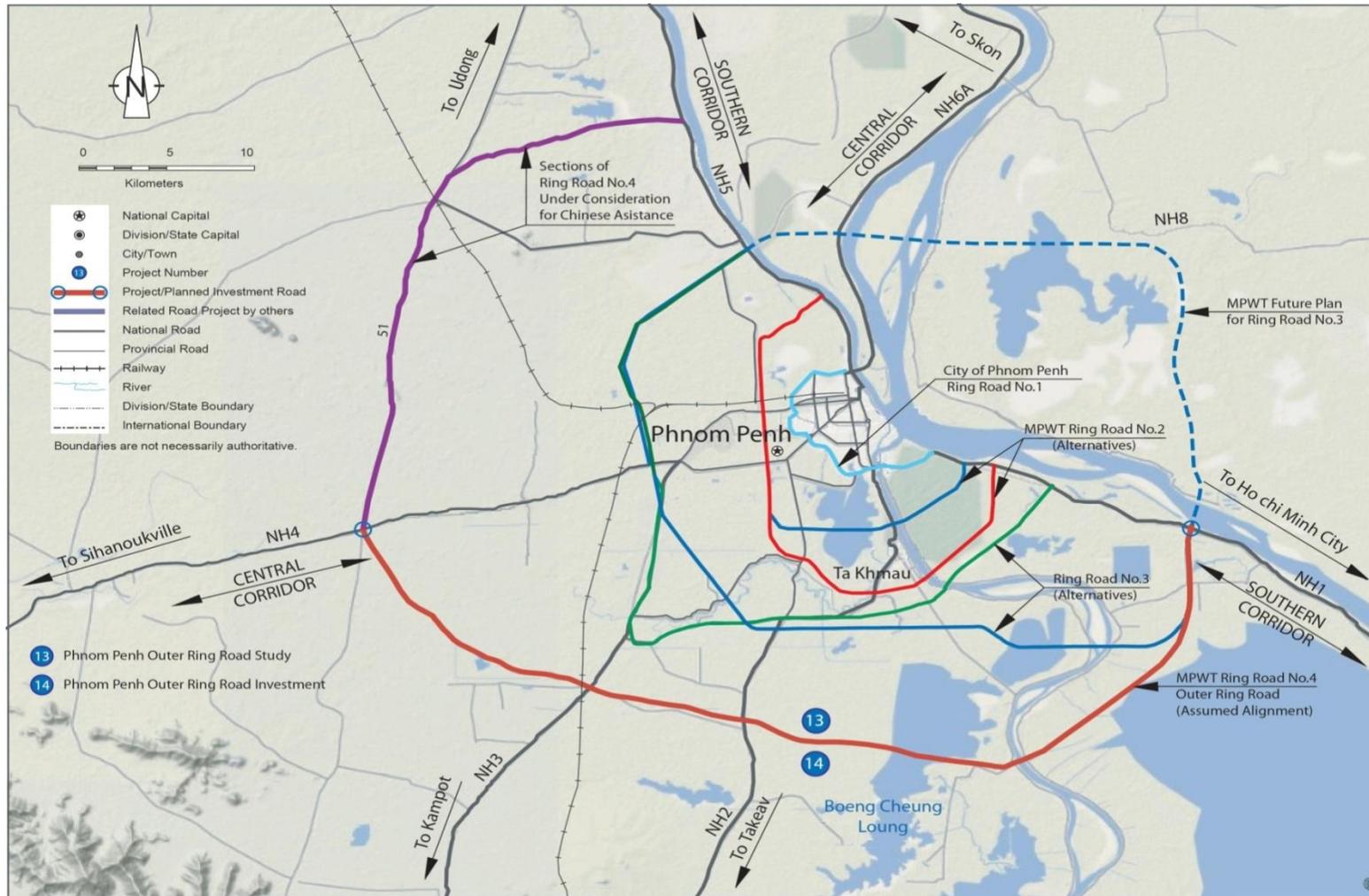
385. **Project priority ranking.** The project was given the highest priority, hence, project implementation should commence immediately.

Figure 21 Investment Project 12: Sihanoukville Port Access Road Improvement



Source: <<????>>

Figure 22 Study and Investment Projects 13 and 14: Phnom Penh Outer Ring Road



Source: <<?>>

14. Phnom Penh Outer Ring Road Investment Project, Cambodia

386. **Background and status of the project.** If the initial technical assistance—Project No. 13—determines that Phnom Penh Outer Ring Road Investment Project is fully supported by the government, is socially sustainable, and likely to be technically and economically viable, then this would be followed by a full feasibility study (or a PPTA if ADB is involved) to prepare the project, possibly based on a conventional public sector design–build concept.

387. **Trade facilitation impact.** This project has moderate impact in terms of trade facilitation.

388. **Expected project components and project costs.** The project will require complex feasibility and detailed design phases; to be followed by preconstruction tendering and construction. Total implementation period would be 5 years where 1 year is for project feasibility and design, and 4 years for construction. It is expected that the entire length of the project will require right-of-way acquisition. The Resettlement Plan will be complex and require a significant degree of consultancy (and independent) monitoring services. A full EIA would be needed and a very detailed and comprehensive EMP will be required. With a total cost of \$337.0 million excluding right-of-way acquisition, project components will include the following:

- i. Civil works—59.8 km of a 4-lane divided (at-grade) expressway, including earthworks; subbase, base, and asphaltic concrete pavement construction; and reinforced concrete box and pipe culverts. Budget cost: \$56.7 million.
- ii. Civil works—construction of six grade-separated interchanges, and 3–4 km of 4-lane elevated expressway section. Budget cost: \$180.1 million.
- iii. Civil works—operations building, toll plaza offices, and facilities. Budget cost: \$20.0 million.
- iv. Equipment—toll collection, traffic control, communications, security and/or CCTV and ICT systems. Budget cost: \$45.0 million.
- v. Resettlement—cost is expected to be incurred along the entire 62 km length of the project. Budget cost: \$20.0 million.
- vi. Consulting services—complete construction supervision and safeguard monitoring services will be required, over a construction period of about 48 months. Budget cost: \$15.2 million.

389. **Probable project outcome and impact.** The outcome is a more efficient highway linkage among Sihanoukville Port, Phnom Penh, and the Viet Nam Southern Economic Zone, while avoiding Phnom Penh intercity congestion. The impact is a more efficient urban transport in and around Phnom Penh.

390. **Project priority ranking.** Ranked as moderate priority, project implementation should commence within the next 3 years.

15. **Thanaleng Border-Crossing Infrastructure Investment Project, Lao People's Democratic Republic**

391. **Background and status of the project.** The Thanaleng border-crossing facilities currently operates in a restrictive and inefficient manner for both passenger and freight traffic processing. Originally, the facility was constructed so that all Lao PDR *exiting* passenger traffic would share three through-traffic lanes. Present border station operations have blocked two of the traffic lanes and all exiting traffic are “squeezed” from three lanes into one lane. There are three outer lanes originally designed for freight traffic, but these are now also filled with passenger cars. *Entering* traffic from Thailand is likewise funneled down to one lane, although trucks, after passing immigration, are shunted off to an adjacent truck holding area to the north. The overall operation of the border station is further constrained by the number and severity of conflicting vehicular turning movements for traffic exiting and entering the border station from Thadeua Road, and by the narrow and restrictive number of traffic lanes along the border station entry road, and the short turning radii between the entry road and Thadeua Road, which often create long queues along Thadeua Road blocking all traffic in both directions. In addition to these significant traffic management issues, the border station also operates with nonstandard practices with regard to immigration controls.

392. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

393. **Expected project components and project costs.** It is proposed that the initial component of the project will be a small-scale conceptual plan study, estimated to cost \$0.20 million, with a time frame of about 2–3 months to complete. The concept would involve undertaking a combined vehicular traffic flow and/or capacity and border post-operational study of the entire border station, extended to include the section of Thadeua Road, connecting the border station with the Thanaleng Freight Custom Clearing and Warehouse Complex. It would also involve preparing a conceptual design for necessary improvements.

It would likely require three international experts: border station operations specialist, a traffic engineering specialist, and a road and/or bridge engineering specialist. After review and acceptance of the conceptual plan study, the project preparation feasibility study (i.e., PPTA if ADB were to finance the project), followed by detailed design would be required. The conceptual plan–feasibility–design phases would take about 18 months and construction tendering and construction would take about 2 years to complete. It is expected that only an IEE and a simple EMP would be required. With a total cost of \$25.0 million excluding right-of-way acquisition, project components will include the following:

- i. Civil works—widening of the Thadeua Road and adding traffic management left turn and right turn storage and turning lanes, widening and adding entrance and exit lanes to the main border station, and adding new roads and ramps to support a separate westerly truck entrance. Budget cost: \$11.3 million.
- ii. Civil works—possible extension of the existing overpass of Thadeua Road and provision of new westerly overpass for truck traffic. Budget cost: \$4.0 million.
- iii. Civil works—construction of border station building expansions for separate truck entrance–exit lanes and improvements to existing buildings. Budget cost: \$3.0 million.
- iv. Equipment—traffic signalization along Thadeua Road and an allowance for new truck scales, security and/or CCTV, and ICT equipment at the border station. Budget cost: \$4.0 million.

- v. Resettlement—allowance for minor resettlement costs if border facility is expanded to the west. Budget cost: \$0.2 million.
- vi. Consulting services—complete construction supervision and safeguard monitoring services will be required, for an estimated construction period of 24 months. Budget cost: \$2.5 million.

394. **Probable project outcome and impact.** The outcome is a more efficiently processed traffic through Thanaleng Border Crossing. The impact is improved trade facilitation at Thanaleng Border Crossing.

395. **Project priority ranking.** Ranked with the highest priority, project implementation should commence immediately.

Figure 23 Investment Project 15: Thanaleng Border Crossing Infrastructure Improvement Project, Lao People's Democratic Republic



Source: <<??>>

16. Greater Mekong Subregion Transport Database Capacity Development Technical Assistance Project

396. **Background and status of the project.** There is no systematic or coordinated approach by the GMS government transport sector agencies, particularly in Cambodia, the Lao PDR, and Myanmar to gather (i) existing cross-border traffic and commodity data; and (ii) existing traffic data along GMS corridors and other major road routes, including conducting periodic traffic surveys. Often, the tendency is to rely on information provided in individual studies for proposed projects. Lack of access to such a periodically updated database is constraining effective sector and subsector transport planning efforts. Such coordinated and reliable data will be critical as the GMS countries move forward in the upcoming years to close the gaps and alleviate congestion along the corridors and as part of the programs to “widen and deepen” the corridors.

397. **Trade facilitation impact.** This project has high impact in terms of trade facilitation.

398. **Scope of capacity development technical assistance, required expertise, duration, and project cost.** The GMS database capacity development technical assistance would guide, and provide training in a GMS-wide effort to institutionalize the program to gather and maintain a traffic and trade database. The technical assistance (TA) program would be implemented in two steps, as follows:

- (i) A small-scale TA to establish the scope and details of the capacity development program, including meetings with appropriate transport officials from each GMS country and the ADB/GMS, and to prepare an initial draft of the concept paper for a large-scale capacity development TA; and
- (ii) A large-scale capacity building assistance targeted for Cambodia, the Lao PDR, and Myanmar, but incorporating Thailand, the PRC, and Viet Nam into the data gathering system.

International expertise required would include a transport planner–team leader, a trade facilitation specialist, and an information technology specialist, assisted by national specialists. The duration of the small-scale technical assistance would be about 3 months, with an approximate budget of \$0.23 million. At this stage of project identification, the estimated total project cost is \$3 million.

399. **Project priority ranking.** With a rank of highest priority, project implementation should commence immediately.

VII. FINANCIAL ECONOMIC ASSESSMENTS

1. Assessments were conducted to understand the relative economic viability of the Long List investment projects, using basic data available from field and site visits, and other accessible sources. The assessments served as a first screening exercise to sort the projects into the following three categories: (i) likely to be economically viable, (ii) viability is problematic, and (iii) unlikely to be viable. Viability here refers to a notional cutoff point—the minimum economic yield of 12% per annum for a project that is acceptable for multilateral development bank financing. The financial sustainability of the projects were also examined.
2. **Approach.** Economic assessments were carried out at the project level, which means cross-border projects were assessed at the subregional level but not at the national level. For these high-level assessments, an estimate of the project economic cost was obtained from engineering cost estimates, shown in Table ES.1. The required benefit estimates were obtained by examining the expected project outcomes in order to identify and quantify the likely benefits. Table ES.1, or alternatively Table 7, contains a description of the intended outcome, expected impact, and proposed outputs of each Long List investment project.
3. All Long List investment projects have, to different degrees an expected impact linked with improved trade facilitation. Each project has an intended outcome that is one of two types, as follows:
 1. improved efficiency of road transport infrastructure linked to a trade corridor (a transport outcome), and
 2. improved efficiency of border-crossing infrastructure and operations (a border processing outcome).
3. For projects with a transport outcome, the road users' travel time saving formed the key estimated benefit. While usually important, the vehicle operating cost (VOC) saving was considered to require greater detailed data and analysis than is meaningful. Value of time estimates were made for travelers by nationality, making use of comparative data from 2012 willingness-to-pay surveys, which was done for a road transport project in southern Viet Nam.⁴⁶ Broad assessments of future traffic were made based on site inspection and considerations of macroeconomic development. In this exercise, when comparing the scenarios with and without the project, the possible generated traffic was ignored.
4. Projects with a border-crossing outcome have both transport and border facility components. Based on data availability, savings were estimated for either or both of transport and border processing time. The key parameters used in the relative economic assessments are listed in Table 4.⁴⁷

Table 4 Economic Assessment of Long List Investment Projects: Key Parameters

Long List Project			Key Assessment Parameters				
No.	Project Name and Country	Route (km)	Cost (\$ million)	ADT		Average Value of Time (Hour)	
				2020	Growth (%) ^a	2020	Nationality ^b
1.	Kawkareik–Thaton Road Improvement Project, MYA	140	111	3,100	7; 4	\$5.50	THA
2.	Thaton–Payagyi Road Improvement Project, MYA	151	128	6,200	7; 4	\$5.50 \$2.50	THA (50%) MYA (50%)

⁴⁶ Project country unit value of time estimates were based on survey data from a feasibility study for a regional transport project, after adjusting for the average income differential between the reference country and the project country.

⁴⁷ See ADB. 2010. Consultant's Report for TA 7443 VIE: Ho Chi Minh City MRT Line 2 Project. Manila.

Long List Project			Key Assessment Parameters				
No.	Project Name and Country	Route (km)	Cost (\$ million)	ADT		Average Value of Time (Hour)	
				2020	Growth (%) ^a	2020	Nationality ^b
3.	Thilawa–East Dagon Road Improvement Project, MYA	33	41	9,200	7; 4	\$2.50	MYA
4.	East Dagon–NR1 Road Improvement Project, MYA	31	58	9,200	7; 4	\$2.50	MYA
9.	Mae Sot–Myawaddy Border Crossing Project and Infrastructure Improvements, Thailand and MYA	n/a	40	n/a	n/a	n/a	n/a
11.	Phnom Penh–Sihanoukville Highway Corridor Improvements, Cambodia	209	605	15,300	7; 4	\$3.50	CAM
12.	Sihanoukville Port Access Road Improvements, Cambodia	10	10	2,200	7; 4	\$3.50	CAM
14.	Phnom Penh Outer Ring Road Investment Project, Cambodia	63	337	15,500	7; 4	\$3.50	CAM
15.	Thanaleng Border Crossing Infrastructure Investment Project, Lao PDR	n/a	25	Daily persons 4,300	7; 4	\$5.50	THA

ADT= average daily vehicle traffic, CAM = Cambodia, km = kilometer, m = million, Lao PDR = Lao People's Democratic Republic, MYA = Myanmar, n/a=not applicable, THA= Thailand.

^aGrowth rate during 2020–2030 is assumed to be 7% per annum. From 2030 onward, 4% per annum is assumed.

^bThe predominant nationality of travelers along the road or corridor.

Source: Consultants.

5. **Assessment findings.** Table 5 sets out the findings on economic viability and financial sustainability by individual project.
6. **Projects with a transport outcome.** All road improvement projects (Projects 1–4) in Myanmar are likely to be economically viable. Of the three road projects in Cambodia, Projects 12 and 14 are likely to be viable. The viability of Project 11, a 4-lane tolled expressway from Phnom Penh to Sihanoukville earmarked for public–private partnership (PPP) treatment, is problematic. Based on what is considered top of the range forecast of average daily traffic (ADT), the indicated economic yield is borderline, and given the uncertainties in the assessment parameters, it is significantly likely that the project will not be viable. Project 7, an inland clearance depot (ICD) investment in Myanmar, is assessed as having a problematic viability owing to demand and other complications, and further study is needed.
7. **Projects with a border-processing outcome.** For the three border crossing projects, Project 10, located at the Aranyaprathet–Poipet Thai–Cambodian border, is not likely to be viable. Compared to the freight traffic, time saved by passenger traffic due to a border-processing improvement tends to be relatively small. Although an approximate annual Thai export movement worth \$500 million is processed through this border, it represents freight with a high value-to-tonnage ratio, which is estimated to be carried in no more than 50 12-ton trucks a day. It is highly unlikely that time and other transport cost efficiencies for this small traffic volume will make up a minimum acceptable yield on the \$40 million estimated costs of project investment, subsequent operation, and asset management.
8. Located at the Maesot–Myawaddy border crossing (Thailand–Myanmar), Project 9 faces a similar problem as Project 10. With low time saving benefits from the passenger traffic, it has a dependency on the freight traffic, which also turns out to be relatively small. But unlike Project 10, Project 9 is saved by one associated effect of the border-processing improvements—an anticipated reduction in illicit trade on the Myanmar side. This can be expected to lead to greater benefits for Myanmar, namely, (i) the quantum of duty avoidance

reduced, and logically, (ii) the value of the import that becomes legal property upon payment of duty (which is considered contraband without it). If the recovery of the lost customs revenue is added, it might secure the project's likely viability.

9. Only Project 15, located at the Thanaleng (Lao PDR–Thai) border crossing, has the volume and mix of traffic that is likely to be viable in terms of its time savings benefits.
10. ***Trade facilitation projects and economic assessment.*** At the Poipet border crossing, a project aimed at improving the border processing of freight with an annual value that is more than 10 times the project investment cost, fails the economic viability assessment. With the Mae Sot–Myawaddy crossing, the same result could be anticipated but for the special circumstance of the illicit trade mitigation, and the illicit trade flow can be assumed as evidence of a high-value freight movement. These results have a paradoxical air—food for thought regarding the accepted methodology for assessing economic viability of projects with a border-processing outcome.

Table 5 Summary of Relative Economic and Financial Assessments of Long List Investment Projects

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
1.	Kawkareik–Thaton Road Improvement Project, Myanmar	111	Rapid growth of Thai cross-border traffic is expected following the rehabilitation (reconstruction or repair) and upgrade of the 140 km 2-lane road, including Thalwin Bridge.	Main benefits expected are user time saving and VOC. Benefit growth likely to be strong, given the anticipated growth in traffic volume.	Economic viability is likely, given the expected growth in Thailand’s cross-border traffic.	Performance-based contract (PBC) with a competitively selected private enterprise for rehabilitation and maintenance can mitigate risk of inadequate maintenance budget after project completion.
2.	Thaton–Payagyi Road Improvement Project, Myanmar	128	Repair and upgrading of the 151 km road are likely to lead to a high growth Thai cross-border movement, in addition to what is at present a predominantly domestic south–north traffic.	The same expected benefits as Project 1, with potential benefit growth based on the anticipated high-growth traffic volume.	Economic viability is likely, given the expected growth in Thailand’s cross-border traffic and southern domestic flows, with the liberalization and accompanying economic growth of Myanmar.	Same measure as in Project 1 needs to be considered to mitigate risk of inadequate funding for maintenance.
3.	Thilawa–East Dagon Road Improvement Project, Myanmar	41	Given this 32.8 km road section reconstruction, upgrading, and bridge repair improvement, strong growth of Thilawa Port–East Dagon traffic is expected.	Projects 3 and 4 together make up complementary improvements to the Thilawa Port–East Dagon–NR1, 63 km corridor and these are assessed together. Time and VOC are the expected main benefits; accident savings are also likely. Expected high traffic growth based on the port traffic factor implies strong benefit growth.	When combined with Project 4, economic viability is likely, given the expected growth in freight traffic mainly associated with Thilawa Port.	PBC contract by competitive bidding could mitigate the risk of poor maintenance as a result of inadequate funding.
4.	East Dagon–NR1 Road Improvement Project, Myanmar	58	With this 31.1 km reconstruction of a section of Highway 2 from a 2-lane to a 4-lane divided highway, a Yangon city traffic element will	Same benefits as Project 3.	When combined with Project 3, economic viability is likely, given the expected growth in freight traffic mainly associated with Thilawa Port	Similar to Project 3.

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
			be joining a Thilawa Port traffic with potential high growth moving north to NR1.		and Yangon traffic resulting from Myanmar's liberalization and economic growth.	
7.	Myanmar ICD Investment Project	15	<p>Demand for container handling and CFS services of this prospective ICD, to be linked to Mandalay by rail and by road to Thilawa Port, depends critically on a decision by the government, and in the case of Thilawa by the private port operator, to terminate all cargo operations—and probably also wharf operations—in Yangon. Owing to its location, the government-owned wharf and CY site on the Strand would realize higher return if commercially redeveloped. While there is currently no scarcity of space in Thilawa Port for both CY and CFS operations, it is unclear what will motivate the port operator to move CFS operations off-terminal.</p>	<p>Achievement of ICD user benefits is problematic. Merchants (freight shippers and consignees) currently delivering and receiving CFS cargo at Yangon port may prefer to use the ICD because of two factors: (i) the Strand wharf and CY site is close to the freight's origin or destination, and (ii) charges for the government-operated CFS service do not reflect an opportunity cost rental of the Strand site, i.e., the service is greatly subsidized. Without the subsidy, the merchants' lower hauling cost—relative to a more distant ICD—could be an insignificant part of their total logistics cost. With the subsidy, that cost becomes significant. In short, the current CFS operation at the Strand site does not only involve a subsidy with a high social cost, but also creates disincentives for the service users. Meanwhile, it is uncertain if merchants using the CFS at Thilawa terminal would</p>	<p>Economic viability is problematic. A study is needed to understand (i) the social benefit and cost of changing the land use for the Strand wharf and CY site to commercial or other high-value, central business district property development that should include examining (a) the likely effects on the present CFS cargo stakeholders and on the Yangon urban transport system, and (b) possible mediation and/or mitigation of conflicting stakeholder interests; (ii) the benefit and cost of moving the Thilawa CFS operations to the proposed ICD; and (iii) the expected demand for the ICD, the cost and the prospective financial sustainability arrangements. The study can be included in the Yangon/East Dagon ICD Study (Long List Project 5—see Table ES.1 or Table 9.)</p>	<p>Financial cost recovery based on ICD user charges is highly unlikely without a decision to move CFS operations out of the Strand and Thilawa CYs. Further questions on financial sustainability can be addressed in the study described in the economic viability column.</p>

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
				<p>prefer the ICD's CFS.</p> <p>With the Strand wharf and CY site released for redevelopment, and the high social opportunity cost incurred in conducting wharf and cargo operations at the site eliminated, a substantial social benefit can be realized. The challenge for the government is to mediate the conflict of the Yangon CFS users' group interest and that of the public at large.</p>		
9.	Mae Sot–Myawaddy Border Crossing Project and Infrastructure Improvements, Thailand and Myanmar	40	The new bypass for freight traffic, dedicated freight crossing, and bridge will provide infrastructure support for an improved Myanmar border's post operations to serve an expected rapid growth of trade traffic.	<p>With the urban congestion in Myawaddy and Mae Sot avoided, and a new road and bridge in use, there are expected time, VOC, and cargo-related cost savings, which will create flow-through benefits to sellers and buyers in the markets for the goods transported. With border post improvements in Myanmar, a major benefit is expected from reduced social cost to the country's illicit trade, and its implied illegal transfers out of the country's legal customs resources.</p>	Economic viability is likely, assuming the inclusion in the calculation of benefits the reduction in the losses of Myanmar customs' revenue owing to illicit trade. ⁴⁸	Recovery of losses in the country's customs revenue provides a clear budget justification to maintain the financial viability of the project. How this can be put into practice needs to be taken up at the pre-feasibility and/or feasibility study.

⁴⁸ See the discussion in the text of Chapter 7 on the methodology.

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
10.	Aranyaprathet–Poipet Bypass Road and Infrastructure Improvements, Thailand and Cambodia	40	Comprised of a freight traffic bypass—17.6 km in Thailand and 2 km in Cambodia—and a dedicated freight crossing, the project is designed to separate high Poipet-destination passenger flows from freight traffic carrying Thai exports—estimated to be worth \$500 million—which is about 350,000 tons annually (or equivalent to around 50 12-ton truck loads per day).	With the project implemented, freight vehicles are expected to save 3 out of the current 4 hours average time to complete the border crossing. A free-flow condition on the bypass road is likely to bring VOC savings for the freight vehicles, given that more fuel-efficient speeds can be achieved. Accident savings can also be expected by eliminating the high-volume mixed traffic of pedestrians and vehicles at the Poipet crossing. But the average daily freight traffic is low at 50 trucks.	This project is unlikely to be economically viable. Given the low truck traffic, an assessment is unlikely to show adequate economic return if based on benefits from savings in drivers' time to make the border crossing and VOC. Including the accident savings benefit is unlikely to be sufficient to tip the balance.	The Department of Highways in Thailand is considered to be proficient and adequately funded to undertake road asset management; the 16km bypass in Thailand can be expected to be appropriately asset-managed.
11.	Phnom Penh–Sihanoukville Highway Corridor Improvements, Cambodia	605	The project for a 209 km 4-lane, tolled, and divided expressway between Cambodia's capital and the important southern port city is expected to increase road capacity, and introduce segregation of slow and fast traffic between the existing NH4 and the expressway. Traffic in this section of the Southern Corridor is expected to grow at 7% annually, which implies a doubling in 10 years.	With this project, time savings can be expected both for travel on the expressway and on the existing corridor highways (NH3 and NH4). Other benefits include smaller VOC savings, and reduction of accident.	Economic viability is problematic. Viability is borderline under a most optimistic scenario of daily traffic of 15,300 by 2020.	Even if the project is proven economically viable, which is in significant doubt, based on regional and international experience, the expressway toll revenue is unlikely to yield full recovery of project costs. A financial viability gap funding (VGF) would be required to provide the needed public subsidy.

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
12.	Sihanoukville Port Access Road Improvements, Cambodia	11	The upgrading to a 4-lane divided highway of a 9.5 km road section joining NR4 to the port, designed with a truck queuing lane outside the port entrance, is expected to relieve traffic congestion outside and in the vicinity of the port.	The benefits are likely to be time and VOC savings for road users, and in particular, for freight receivers and shippers at the port. The reduction in the merchants' logistics costs will create flow-through seller and buyer welfare benefits in the respective products' markets.	The project is likely to be economically viable	With the relatively small project cost of \$10 million, no implementation approach is likely to be more economic than conventional public sector detailed design and bill-of-quantity construction. The financial sustainability of road asset management is an endemic challenge for GMS governments, with the possible exception of Thailand. For Project 12, a solution could be a joint action by port, shipping, and cargo interests to fill the gap left by the road authority; and further study is needed to confirm this.
14.	Phnom Penh Outer Ring Road Investment Project, Cambodia	337	The capital city, with a 2 million population growing at a rate of 25% every 5 years, is connected by road to the port city of Sihanoukville and the coastal developments at Koh Kong by NH4 and NH3. The capital is also connected to Viet Nam's Southern Economic Zone by the major NH1 eastern border crossing at Moc Bai, and a minor NH2 southern crossing at Ha Tien. The proposed 63 km section of the Outer Ring Road will enable controlled access for traffic between Phnom Penh and any of the four named national highways without traversing the city center,	Benefits of time and VOC savings can be expected for the bypass traffic. The avoided through traffic in the inner city means less congestion, improved traffic speed, and lower accident costs, thus, also generating time, VOC and accident savings that will benefit the Phnom Penh city urban transport system.	Economic viability is likely. This will require examining both the expected project road traffic and beneficial downstream impact on the inner city transport system.	As a prospective user-based mechanism to recover the completed project's asset management cost, tolling should be examined at pre-feasibility and feasibility study. The assessment should be part of a study of a potential toll road project with PPP treatment, with VGF for full project cost recovery. Details are presented in Table 8.

Long List Project		Approximate Cost (million \$)	Likely Traffic or Trade Volume	Expected Benefits	Potential Economic Viability	Potential Financial Sustainability
No.	ProjectTitle/Country					
15.	Thanaleng Border Crossing Infrastructure Improvement Project, Lao People's Democratic Republic	25	<p>In November 2012, daily traffic at this border post comprised 500–700 18-ton trucks, 1,000 cars and/or light vans, and 50 buses.</p> <p>With significant growth potential, this traffic will benefit from the project rationalization of the border operations and improvements in the support infrastructure.</p>	<p>Border-processing time in November 2012 was an average of 60 minutes for light vehicles, 90 minutes for buses and 2–3 hours for trucks. With the project implemented, the processing time is expected to be reduced by 30 minutes for light vehicles, 45 minutes for buses, and 1 hour for trucks.</p> <p>The benefits include savings in user time costs. With traffic conflicts reduced by an improved infrastructure and a reengineered management of traffic that will use border processing, accident reduction will represent another benefit.</p>	<p>This project is likely to be economically viable, based on the benefits generated by the proposed improvement in border-crossing infrastructure and operations.</p>	<p>One issue a project feasibility study should help resolve is the question on whether, following project completion, the project asset management would have greater financial sustainability if responsibility was assigned to the customs or to the Public Works Department.</p>

CFS = container freight station, CY = container yard, ICD = inland container depot, PPP = public–private partnership, VOC = vehicle operating cost.

Source: Consultants.

VIII. PRIVATE SECTOR DEVELOPMENT ASSESSMENTS

11. An assessment of private sector development was undertaken to determine the likelihood of private sector participation, whether in the form of direct investments or public–private partnerships (PPPs), for the projects identified in the Long List (Table 9). For each project in that list, a high-level appraisal was conducted to identify possible direct private investment or PPP options, and outline the direct investment. In terms of established PPP models, a PPP preference should take into account the likely gains in terms of effectiveness and efficiency of the infrastructure and service delivery after project completion, and its financial and social sustainability.
12. The host countries of the Long List projects have some familiarity with the concept of private sector participation and PPP in delivering infrastructure.⁴⁹ All are pursuing opportunities or have actual experience of some form of similar engagement with the private sector, in sectors including transport. Meanwhile, Greater Mekong Subregion (GMS) governments and official development partners are working on, and in some cases have begun, introducing a technical assistance program to build capacity for better utilization of PPPs in developing infrastructure.⁵⁰
13. With that background to the present assessments, priority was not assigned to examining matters certain to be more effectively addressed in the country-level assistance programs, such as the legal and regulatory framework for private sector participation and PPP. Instead, when looking at the delivery of the project outputs, the focus was on identifying (in outline) a match of private enterprise incentives and public administrative oversight, to achieve the expected outcome and impact more efficiently, and with adequate mitigation of the risks to their financial and social sustainability, than would be achieved without that joint effort.

1. Approach and Methodology

2. **Comparative advantage in infrastructure delivery.**⁵¹ An infrastructure project necessarily involves two kinds of activities, namely, (i) public administration, which are typically policy, planning, and regulatory action for public interest; and (ii) development and running of an enterprise. In an expressway project, public administration involves capacity planning, setting the toll tariff, decision making and action on a public subsidy needed to enable full project cost recovery, and regulating road quality and safety conditions. The expressway investment, toll collection, services to users, and maintenance are, by nature, enterprise activities.
3. Enterprises supplying a competitive market develop institutional skills for meeting a cost-recovery imperative, while operating under a competitive pressure to deliver greater value to customers. The skills are supported by a regime of economic rewards and penalties, which targets enterprise members' self-interest at the individual level, focuses enterprise resources on a single prime economic goal, and drives accountability along the entire enterprise input chain. These skills do not naturally belong to public administration, with its complex public interest goals and objectives, nor in state-owned enterprises, which typically operate without

⁴⁹ The countries hosting a Long List project or project component are Cambodia, the Lao PDR, Myanmar, and Thailand.

⁵⁰ This includes Cambodia and Thailand with ADB, and the Lao PDR and Viet Nam with the World Bank. Meanwhile, it can be assumed that many donors would be keen to assist Myanmar.

⁵¹ Discussions on the role of the private sector in delivering infrastructure and associated services is often filled with subtexts carrying advocacy interests—political, legal advisory, investment banking, management consulting, and others. An extreme is reached when, subtexts ignored, a much-quoted principle becomes a simple tautology (e.g., *risk should be allocated to the party best able to manage it*). To be free of the advocacy burden, the Approach and Methodology keeps to common terms of economics.

the competitive pressure private firms need to bear to achieve and retain financial self-sustainability.

4. Operating under public interest mandates, public organizations face complex goals and objectives, while serving diverse and possibly conflicting interests of their public constituencies, which therefore require mediation. With complex goals, and individual members motivated by a complicated mix of altruism and economic self-interest,⁵² these public organizations need to develop and implement complex administrative processes. To enforce accountability, a public agency is more dependent on a hierarchical structure than its private counterpart. These factors help to determine the institutional skills found in public administration.
5. In short, the institutional skills in private enterprise management can be expected to be more productive in enterprise activities than in public interest administrative tasks, and the institutional skills in public administration to be more productive in activities centering on taking policy, planning, and regulating action in the public interest, than in enterprise activities. Borrowing a notion that has come down from Ricardo (1817), given the comparative advantage of the skills in enterprise activities on the one hand, and the public interest action in the other, there will be an overall gain in infrastructure delivery if the public and the private parties cooperate, each specializing in the activities in which one has the comparative advantage in skills.⁵³
6. An example will illustrate the meaning of this statement. Table 6 sets out measures of output from applying combinations of G, representing public administration skills, and P, representing skills in private enterprise management, in each case using the same quantum of input, in two sets of activities, as follows:

A = public policy, planning, and regulatory tasks, and
B = enterprise management tasks.⁵⁴

Table 6 Illustration of Specialization Gains in the Delivery of Infrastructure

Item	Output Measure											
	Combination I			Combination II			Combination III			Combination IV		
	A	B	A+B	A	B	A+B	A	B	A+B	A	B	A+B
Application of G ^a	5	3	8	10	0	10	3	4	7	0	6	6
Application of P ^a	3	5	8	0	12	12	4	4	8	7	0	7
Total output measure	8	8	16	10	12	22	7	8	15	7	6	13
Cost efficiency ratio ^b			1.25			0.91			1.33			1.54

A = policy, planning, and regulatory activities, B = enterprise activities, G = skills in public sector administration, P = skills in private enterprise management.

^a Each combination is assumed to have a total input cost of \$10.

^b Total input cost divided by total output measure.

Source: Consultants.

7. In combinations I and III, the skills sets are employed with differing partial misalignment of skills to tasks; in combination II, the skills are perfectly aligned with tasks; and in combination IV, the skills and tasks are perfectly misaligned. The effects are summarized in the combinations' cost efficiency ratios, which show that perfect alignment of skills to tasks has the highest cost efficiency, that is, the lowest average cost per measure of output.

⁵² Such altruistic motivations include patriotism, public obligation, social justice, social responsibility, and others.

⁵³ Ricardo (1817). Ricardo introduced the concept of comparative advantage in the context of international trade.

⁵⁴ The output measure can be a composite score reflecting both quality and quantity delivered. In the example, the simplifying assumption is made that output measures can be assigned to levels of activities A and B, but the detail has been ignored of how levels of activities are related to output measures.

8. **Conditions for skills availability.** For infrastructure projects, it can be assumed that the pool of international enterprise management skills, particularly those with a regional presence, would be drawn to attractive opportunities, provided a standard legal and regulatory framework is in place, addressing matters including contracting, foreign investment, taxes, foreign exchange, and foreign remittances. For the Long List projects, it seems unlikely that the available enterprise management skills will be limited to the capacity of the domestic pool. Instead, international–domestic cooperative ventures with potential skills transfer seem a more likely development.
9. Public administration is by nature domestic, not less the complex of public policy, planning, and regulating activity that provides an essential foil to the enterprise activity undertaken in a private sector participation project. Institutional capacity will be a factor in determining the nature and form of private participation to be adopted in Long List projects.
10. To exploit private enterprise skills to greater advantage in delivering infrastructure, there is a need for focused institutional capacity development to strengthen and improve public administration. Project 16 in the Long List is an example of a capacity-building technical assistance (TA) project that focuses on a common institutional constraint in most GMS countries. The TA project is aimed at creating a pan-GMS database of standardized and integrated trade and traffic data for transport planning, at the same time addressing a basic need for institutional capacity development, primarily in the transport sectors of Cambodia, the Lao People’s Democratic Republic (Lao PDR), and Myanmar.
11. **Governance in infrastructure projects.** Governance, which is a process for making decisions affecting the interests of many and a process for putting such decisions into effect, is an important feature of an infrastructure project. Project governance is likely to be strong when it possesses to a high degree the following eight attributes: (i) it is participatory, (ii) consensus oriented, (iii) responsive, (iv) transparent, (v) effective and efficient, (vi) accountable, (vii) equitable and inclusive, and (viii) follows the rule of law.⁵⁵ Some examples will help to explain how a strong project governance can be expected to enhance stakeholder support and strengthen the social sustainability of an infrastructure project’s operation. It is useful to begin by looking at a competitive market for a commodity from this perspective.
12. **The competitive market as a governance structure.** A competitive market in a legal commodity has two groups of key stakeholders: competing sellers, and buyers who are also competing among themselves. An important feature of the market is that it provides, through the movement of the market price, a process for deciding the key questions—which buyers obtain what quantity of the commodity, and which sellers disposes of what quantity—and, backed up by contract law and the possibility of recourse to the law courts, the market ensures that such decisions are implemented. The competitive market possesses the attributes of good governance. It is *participatory* because through the price mechanism, the sellers and buyers all participate in the key decision making, and also find it in their interest to see it implemented. It is *consensus oriented* because in making key market decisions, the price mechanism achieves a mediated consensus among buyers with competing interests, and similarly with the sellers. It is *responsive* in satisfying stakeholders’ (mediated) interests. It is *transparent* because the working of the price mechanism is understood by all. Its *effectiveness and efficiency* need no explanation. Parties to a market transaction can hold one another *accountable* under a legally enforceable contract, and competitive market operations *follow the rule of law*. Key decisions of the competitive market are seen to be *equitable and inclusive* for the participants—equal knowledge and equal opportunity with no discrimination but through the price mechanism (and admittedly because of that, the market

⁵⁵ See, for example, UNESCAP (n.d.).

is silent on social inclusiveness and income disparity). Possessing the governance attributes described, it is understandable that the competitive market has a universally well-established social acceptance and sustainability.

Example 1: Private participation in infrastructure. The development and operation of an inland container depot (ICD) has the potential to be a direct private sector investment. The government's involvement in the project will be focused on a less-intensive regulatory role that includes providing land use permit for the ICD site, review and approval of enterprise-requested physical linkage to national road and rail infrastructure, and enforcing applicable laws and regulations. Shipping lines will be the main user interests in the ICD enterprise container handling and container freight station (CFS) consolidation and deconsolidation services. Port operators have an interest in moving CFS operations outside the port area, in order to relieve the pressure on space and road access. The user charge revenues, made up of container handling and CFS charges, are expected to recover the ICD's full development and operation and maintenance cost, including a ground lease. The shipping and port interests establish a company to undertake the development and operation of the ICD. While competing sellers and buyers are not part of the scheme, as a mechanism for allocating services among its users, the ICD charge tariff plays a governance role corresponding to the price mechanism in a competitive market. Stakeholders participate in a decision process, which is consensus oriented and responds to stakeholder needs. The process is transparent since users and/or investors could have access to information on the cost of the services and prior approval of the charge tariff. With users who are skilled enterprise managers and having management control of the ICD, effectiveness and efficiency of the service can be expected, including mutual accountability of the parties involved in the project enterprise. Given the impartial implementation of the service charge tariff, the arrangement becomes equitable and inclusive for all stakeholders. With the indicated governance characteristics, the project is expected to receive continued stakeholder support.

Example 2: Private participation in infrastructure. In this example expressway project, the public administration project-specific role includes:

- i. making a public interest planning decision, based on traffic demand study, to improve a road corridor by adding an expressway to an existing non-tolled highway;
- ii. in line with that decision, identifying the expressway demand, user charge, service quality performance standards, and traffic capacity based on a survey of the target users for their willingness to pay and other pertinent user characteristics;
- iii. designing and implementing a scheme for a prospective expressway enterprise that meets service quality standards based on item (ii) above to achieve cost recovery, while minimizing expected costs; and
- iv. as part of item (iii), holding a competition for selecting the private sector candidate for the enterprise role, including as part of the criteria the candidate's proposal of a public subsidy needed to supplement collected toll revenue.

The enterprise role includes detailed design, construction and operation of the expressway to specified service standards, and sourcing of inputs including loan and equity capital, with all costs to be recovered from a combination of toll collection and competitively bid subsidy.

From a governance perspective, the expressway project introduces (i) a process for allocating the use of an improved means of travel to the road users in the corridor by means of the toll charge mechanism, and (ii) a process for selecting a private developer and operator for the required expressway enterprise. Table 7 highlights the expected key governance characteristics for an expressway project to have strong social sustainability.

Table 7 Social Sustainability Characteristics of a Public–Private Partnership Expressway Project

Attribute	Intended Achievement of the Attribute
Participatory	Both the allocation of expressway use (process i) and the selection of the enterprise developer and operator (process ii) make use of a price mechanism that is participatory.
Consensus oriented	In each process, different stakeholder interests are mediated through the price mechanism and a mediated consensus is reached.
Responsive	The interests of users of the corridor road system are addressed.
Transparent	Decisions made using processes (i) and (ii), being based on a price mechanism, have a clear justification.
Accountable	Expressway users are held accountable for toll payment by the enterprise management. The enterprise will, in turn, be accountable for the availability and performance of the expressway to specified output and quality standards.
Effective and efficient	Enterprise management and public administration skills are employed to comparative advantage in project-related activities where effectiveness and efficiency are being promoted
Equitable and inclusive	Owing to the respective price mechanism, fair allocation is achieved through process (i) and fair selection through process (ii). There is inclusiveness because users of the old highway also receive some benefits in reduced travel cost.
Follows the rule of law	The project complies with governing laws and regulations.

Source: Consultants.

Private Sector Participation Assessment for the Long List

13. Private sector participation assessments were conducted with a strict project-specific focus on the investment projects in the Long List, making use of available project information from study field visits and other research outputs. The projects are principally located in Cambodia, the Lao PDR, and Myanmar. Three of the projects address improvements to border post operations and infrastructure; in two of these border projects, two countries with a common border share project components. In both cases, Thailand is the second country. Following an overview of the assessments by country—for Cambodia, the Lao PDR, and Myanmar—this section presents in Table 9 a summary of the key assessment findings by the Long List investment project.
14. **Long List private sector participation assessment: Projects in Myanmar.** The country has a long history as a centrally controlled economy, from which the country is showing early signs of emergence. With the enactment of the Foreign Investment Law 2012, an open attitude has been shown by the government toward foreign investment. This should contribute positively to the country's prospects of modern enterprise management, and investment skills becoming more readily available for private participation in infrastructure delivery. Availability of skills to fill the public administrative role in an infrastructure project is a different matter. From an ADB initial assessment of the country's transport sector, it can be inferred that extensive capacity development is required before an adequate pool of public administration skills are available for the more complex PPPs (ADB 2012 <<which letter for 2012?>>). The approach taken with the country's private sector participation assessment reflects this understanding of an existing public sector constraint, and the consequent need to keep to enterprise models with less-intensive demands on public sector capacity. The following enterprise model is considered appropriate for private sector participation in road rehabilitation and upgrading.
15. **Road performance-based contract enterprise model.** The enterprise rehabilitates or upgrades (e.g., adding additional lanes) a road or road section. Following the investment,

the enterprise maintains the renewed or improved asset all at its own cost, and is compensated through an agreed payment structure by the public sector's contracting authority. A periodic payment of a fixed basic amount is made, or if determined to likely attract more bidders, use a structure of declining percentages of a competitively bid fixed total sum. A positive or negative incentive, added or subtracted depending on how the road is rated for performance against, for example, a specified international road surface roughness index, can be added. The basic amount to be paid is selected through the competitive selection of the enterprise candidate, while the superposed incentive structure is specified by the contract authority. International experience of the enterprise model is considerable and has generated well-tested standard contract models.⁵⁶ This is considered to be the preferred private participation model for Projects 1–4 in the Long List (Table 9).

16. **Proposed Myanmar ICD Project.** The Long List includes a proposed ICD project in Myanmar that is a potential candidate for the enterprise model described in Example 1. However, owing to certain complications, the project has been assessed as being problematic in terms of its economic viability and financial sustainability. The details are presented in Table 9.
17. The complications make an instructive example of an unintended consequence of government involvement in infrastructure. The cost recovery of the ICD project depends on the merchants (receivers and shippers of freight), who currently utilize the CFS services at Yangon port, agreeing to switch to the ICD, located some distance from Yangon, for their CFS services. It is uncertain if the merchants will accept the change. Two factors can be expected to influence their decision: (i) relative freight road haulage costs to or from the ultimate destination of the ICD compared to the Strand, which may be unfavorable for the ICD; and (ii) the best and highest use rental value of the Yangon wharf and container yard site on the Strand, which may not be reflected in the Yangon CFS charges, and if reflected, would render the ICD CFS option as the merchants' preferred choice, even given a higher haulage charge. A study to resolve the issues is included in the Yangon–East Dagon ICD study (Long List Project 5).
18. **Long List private sector participation assessment: Projects in Cambodia.** The Cambodia 2007 Law on Concessions represents legislation on the legal framework for PPP that is, in many respects, well in advance of Thailand's existing framework, as set out in the Act on Private Participation in State Undertaking, dating back to 1992. However, without an implementing sub-decree having been issued, Cambodia's PPP legislation remains in suspension. In Cambodia, highway build–operate–transfer (BOT) concession contracts have been executed by the government with the private sector, but apparently without competitive concessionaire selection and done on nontransparent terms, they lack the drive for cost efficiency and the transparency of the best practice PPP models. Discussions are in progress between Cambodia and ADB on technical assistance to advance the use of PPP.
19. **Public–private partnership with viability gap support enterprise model.** This enterprise model, developed for expressway projects, is described and analyzed earlier in the chapter. It is assessed as a preferred enterprise model for Long List Project 11: Phnom Penh Sihanoukville Highway Corridor Improvements, and Long List Project 14: Phnom Penh Outer Ring Road Investment. Details of the assessment are presented in Table 9.
20. **Long List private sector participation assessment: Projects in the Lao PDR.** Lao PDR has been a recipient of official development technical assistance for developing PPP capacity in the energy and water sectors and, starting in 2011, in the transport sector (PPIAF 2011). The Long List includes one investment project in the Lao PDR, the Thanaleng Border-Crossing Infrastructure Investment Project (Long List Project 15). In common with

⁵⁶See, for example, World Bank (2010).

two other border-crossing improvement projects (Long List Projects 9 and 10), the project has been assessed as unlikely to be more efficient if implemented with private participation than by conventional public sector development and operation. Details are presented in Table 9.

Conclusions

21. Based on the assessments described above, a total of five Long List investment projects were identified as having potential for private sector participation (Table 8).

Table 8 Candidates Identified for the Long List Private Sector Participation

No.	Long List Project Title/Country	Approximate Cost (\$ million)	Summary Description of Potential Private Sector Participation Arrangement
1.	Kawkareik–Thaton Road Improvement Project, Myanmar	111	Road rehabilitation, upgrading and maintenance, performance-based contract
2.	Thaton–Payagyi Road Improvement Project, Myanmar	128	Road rehabilitation, upgrading and maintenance, performance-based contract
3.	Thilawa–East Dagon Road Improvement Project, Myanmar	41	Road rehabilitation, upgrading and maintenance, performance-based contract
4.	East Dagon–NR1 Road Improvement Project, Myanmar	58	Road rehabilitation, upgrading and maintenance, performance-based contract
14.	Phnom Penh Outer Ring Road Investment Project, Cambodia	337	Expressway standard tolled bypass. PPP, probably with viability gap funding (VGF) support

Source: Consultants.

Table 9 Summary of Private Sector Participation Assessments of Long List Investment Projects

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
1.	Kawkareik–Thaton Road Improvement Project, Myanmar	111	<p>OC: Thailand–Myanmar East–West Corridor traffic carried more efficiently and reliably.</p> <p>I: Improved trade facilitation between Thailand and Myanmar</p> <p>OP: (i) 100 km of road reconstruction; (ii) 40 km of road repair and upgrading; (iii) bridge load capacity study of 685 m Thanlwin Bridge (Hpa-an), and upgrading and/or strengthening of bridge as required; and (iv) study of possible road improvement and upgrading of connecting road to Mawlamyine City.</p>	<p>1. Responsibility: (a) Detailed design, investment, and asset management for Project 1 OP (i)–(ii) and, as required following study, OP (iii); (b) The costs of performing task (a) over a contract term; (c) Transfer of the assets in 1(a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) An availability payment of a competitively bid fixed sum or, if likely to attract more bidding competition, a structure of declining percentages of a competitively bid fixed total sum, to be received periodically (e.g., quarterly) over the contract term; and (b) Incentive overrider added or subtracted depending on road asset performance measured against the contract’s specified KPIs (e.g., a road surface international roughness index)</p>	<p>1. Responsibility: (a) Preparation of Project 1 and implementation plan for private sector participation, due diligence review of the public interest case, and budget processing; (b) Procure bridge load capacity study in OP (iii) and study in OP (iv); (c) Competitive bidding selection of private enterprise; (d) Performing authority role in private sector participation contract; and (e) Road users consultation (e.g., survey, website interaction).</p> <p>2. Capacity need: (a) Policy, legal, and regulatory framework and reengineered public administrative culture to institutionalize competition in enterprise selection process ^c; (b) Policy, legal, and regulatory framework and personnel skills development for regulatory and contract management oversight of private sector participation; (c) Enterprise and private sector participation contract design capability; (d) Public financial and administrative control process in fiscal oversight of private sector participation contracts</p>	<p>1. Major risks of weakened governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage of the planning, implementation, and asset management process; (b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector participation contract life; and (ii) reduced transparency in performing the authority for private sector participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public.</p> <p>2. Mitigation of the risks: (a) Developed capacity and enforced public policy of road users consultation; and (b) Independent evaluation, and public disclosure of the findings on the private sector participation transaction, the enterprise and the authority contract performance, highlighting effectiveness and efficiency.</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
					payment obligations; (e) Public interest independent evaluation of the transaction and contract performance and reporting.	
2.	Thaton–Payagyi Road Improvement Project, Myanmar	128	<p>OC: Southern Myanmar domestic traffic and Thailand–Myanmar East–West Corridor traffic carried more reliably and efficiently.</p> <p>I: Improved trade facilitation between Thailand and Myanmar</p> <p>OP: (i) 151 km, 2-lane road repaired and upgraded throughout most of its length, with (ii) major reconstruction and widening through the towns of Bilin, Kyaikto, and Payagyi, including a possible grade-separated interchange with NR1 at Payagyi.</p>	<p>1. Responsibility: (a) Detailed design, investment, and asset management for Project 2 OP,(i)–(ii); (b) The costs of performing task (a) over a contract term; and (c) Transfer of the assets in 1 (a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) An availability payment of a competitively bid fixed sum or, if likely to attract more bidding competition, a structure of declining percentages of a competitively bid fixed total sum, received periodically (e.g., quarterly) over the contract term; and (b) Incentive override added or subtracted depending on road asset performance measured against the contract’s specified KPIs (e.g., a road surface international roughness index).</p>	<p>1. Responsibility: (a) Preparation of Project 2 and implementation plan for private sector participation, due diligence review of the public interest case, and budget processing; (b) Detailed design of the enterprise scope and private sector participation contract; (c) Competitive bidding selection of enterprise candidate; 9d) Performing authority role in private sector participation contract; and (e) Road users consultation (e.g., survey, website interaction).</p> <p>2. Capacity need: (a) Policy, legal, and regulatory framework and reengineered public administrative culture to institutionalize competition in enterprise selection process; (b) Policy, legal, and regulatory framework and personnel skills development for regulatory and contract management oversight of private sector participation; (c) Enterprise and private sector participation contract</p>	<p>1. Major risks of weakened governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage of the planning, implementation, and asset management process; (b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector participation contract life; and (ii) reduced transparency in performing the authority for private sector participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public.</p> <p>2. Mitigation of the risks: (a) developed capacity and enforced public policy of road users consultation; and (b) Independent evaluation, and public disclosure of the findings on the private sector participation transaction, the enterprise, and the authority PP contract performance,</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
					design capability; (d) Public administrative control process in fiscal oversight of private sector participation contracts payment obligations; and (e) Public interest independent evaluation of the transaction and contract performance and reporting.	highlighting effectiveness and efficiency.
3.	Thilawa–East Dagon Road Improvement Project, Myanmar	41	<p>OC: Thilawa freight traffic more reliably and efficiently linked to the national road network.</p> <p>I: Improved trade facilitation for Thilawa,</p> <p>OP: Improved 32.8 km, 4-lane divided roadway connecting the Thilawa Port with Highway No. 2 with (i) 5.5 km presently partially improved, 4-lane divided section reconstructed; (ii) 16.5 km of recently constructed, 2-lane section widened to 4-lane road divided typical section, with additional 2-lane bridges constructed; (iii) resurfacing and minor repair works for 1.4 km Thanlyin Bridge, including verification of original bridge design, the as-build drawings, and a complete detailed bridge condition survey; and (iv) reconstruction and widening works for northerly 9.4 km section of 2-lane road</p>	<p>1. Responsibility: (a) Detailed design, investment, and asset management for Project 3 OP (i)–(iv); (b) The costs of performing task (a) over a contract term; and (c) Transfer of the assets in 1 (a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) An availability payment of a competitively bid fixed sum or, if likely to attract more bidding competition, a structure of declining percentages of a competitively bid fixed total sum, received periodically (e.g., quarterly) over the contract term; and (b) Incentive overrider added or subtracted depending on road asset performance measured against the contract’s specified KPIs (e.g., a road surface international roughness index).</p>	<p>1. Responsibility: (a) Preparation of Project 3 and implementation plan for private sector participation, due diligence review of the public interest case, and budget processing; (b) Detailed design of the enterprise scope and private sector participation contract; (c) Competitive bidding selection of enterprise candidate; and (d) Performing authority role in private sector participation contract; and (e) Road users consultation (e.g., survey, website interaction).</p> <p>2. Capacity need: (a) Policy, legal, and regulatory framework, and reengineered culture to institutionalize competition in enterprise selection process; (b) Policy, legal, and regulatory framework and personnel skills development for regulatory and contract</p>	<p>1. Major risks of weakened governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage of the planning, implementation, and asset management process; and (b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector participation contract life; and (ii) reduced transparency in performing the authority for private sector participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public.</p> <p>2. Mitigation of the risks: (a) Developed capacity and enforced public policy of road users consultation; (b) Independent evaluation,</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
			connection of Highway No. 2.		management oversight of private sector participation; (c) Enterprise and private sector participation contract design capability; (d) Public administrative control process in fiscal oversight of private sector participation contracts payment obligations; and (e) Public interest independent evaluation of the private sector participation transaction and contract performance and reporting.	and public disclosure of the findings on the private sector participation transaction, the enterprise, and the authority for private sector participation contract performance, highlighting effectiveness and efficiency.
4.	East Dagon–NR1 Road Improvement Project, Myanmar	58	<p>OC: Increased freight traffic capacity of the road linking Thilawa and Yangon to national road network.</p> <p>I: Improved trade facilitation for Thilawa and Yangon.</p> <p>OP: 31.1 km section of Highway No. 2 reconstructed to a new 4-lane divided highway configuration.</p>	<p>1. Responsibility: (a) Detailed design, investment, and asset management for the Project 4 output; (b) The costs of performing task (a) over a contract term; (c) Transfer of the assets in 1 (a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) An availability payment of a competitively bid fixed sum or, if likely to attract more bidding competition, a structure of declining percentages of a competitively bid fixed total sum, received periodically (e.g., quarterly) over the</p>	<p>1. Responsibility: (a) Preparation of Project 4 and implementation plan for private sector participation, due diligence review of the public interest case, and budget processing; (b) Detailed design of the enterprise scope and private sector participation contract; (c) Competitive bidding selection of enterprise candidate; (d) Performing authority role in private sector participation contract; and (e) Road users consultation (e.g., survey, website interaction).</p>	<p>1. Major risks of weakened governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage of the planning, implementation, and asset management process; (b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector performance contract life; and (ii) reduced transparency in performing the authority for private sector</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
				contract term; and (b) Incentive override added or subtracted depending on road asset performance measured against the contract's specified KPIs (e.g., a road surface international roughness index).	2. Capacity need: (a) policy, legal, and regulatory framework and reengineered public administrative culture to institutionalize competition in enterprise selection process; (b) Policy, legal, and regulatory framework and personnel skills development for regulatory and contract management oversight of private sector participation; (c) Enterprise and private sector participation contract design capability; and (d) Public administrative control process in fiscal oversight of private sector participation contracts payment obligations; and (e) Public interest independent evaluation of the transaction and contract performance and reporting.	participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public. 2. Mitigation of the risks: (a) developed capacity and enforced public policy of road users consultation; (b) Independent evaluation, and public disclosure of the findings on the private sector participation transaction, the enterprise, and the authority for private sector participation contract performance, highlighting effectiveness and efficiency.
7.	Myanmar ICD Investment Project	15	OC: Yangon, Thilawa, and Mandalay containerized freight more efficiently handled. I: Improved containerized trade facilitation. OP: Yangon ICD with road shuttle link with Thilawa and	Assessed as problematic for economic viability and financial sustainability; details are presented in Table 5. In the event that the problems can be solved, the project would have a potential to be implemented as a direct private sector investment; see	Assessed as problematic for economic viability and financial sustainability. Details are presented in Table 5	Assessed as problematic for economic viability and financial sustainability. Details are presented in Table 5.

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
			rail link to Mandalay.	the discussion in Chapter 8.		
9.	Mae Sot–Myawaddy Border Crossing Project and Infrastructure Improvements, Thailand and Myanmar	40	<p>OC: Traffic more efficiently processed through Myawaddy–Mae Sot border crossing.</p> <p>I: Improved trade facilitation at Mae Sot–Myawaddy border crossing.</p> <p>OP: (i) 16.9 km of new 4-lane divided highway (13.3 km in Thailand, 3.6 km in Myanmar) north of Mae Sot and Myawaddy towns; (ii) a new 4-lane, 100-meter long bridge across the Moei River at the border; and (iii) associated cross-border facilities.</p>	<p>Conventional public sector implementation. While a feasible enterprise could probably be designed for immigration and/or customs operations with or without the associated facilities and/or infrastructure and asset management, it is highly uncertain if either border authority would be ready to take on the challenges and risks in the design and the regulatory and contract management oversight of the counterpart private enterprise and finish with a more effective and efficient delivery of the border post outputs than the conventional public sector approach.</p> <p>Investment in Project 9 OP (i)–(ii), together or separately, and the associated asset management is likely to be too small to offer greater cost efficiency, transaction costs taken into account, through a private sector participation than under a conventional public sector undertaking by the Government of Thailand’s Department of Highways.</p>	Conventional public sector implementation. See entry in the Potential Enterprise column.	Conventional public sector implementation. See entry in the Potential Enterprise column.
10.	Aranyaprathet–Poipet Bypass Road and	40	<p>OC: Traffic more efficiently processed through Aranyaprathet–Poipet border</p>	This project has been assessed as unlikely to be economically viable, for the	Conventional public sector implementation. See entry in the Potential Enterprise	Conventional public sector implementation. See entry in the Potential Enterprise

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
	Infrastructure Improvements, Thailand and Cambodia		<p>crossing.</p> <p>I: Improved trade facilitation at Aranyaprathet–Poipet border crossing.</p> <p>OP: (i) About 2 km of new 4-lane roadway in Cambodia, (ii) 17.6 km of new 4-lane roadway in Thailand (mainly along a new alignment), and (iii) new freight border crossing facilities.</p>	<p>reason given in Table 5.</p> <p>If the project were to be implemented, the conventional public sector approach is preferable. While a feasible enterprise could probably be designed for immigration and/or customs operations with or without the associated facilities and/or infrastructure and asset management, it is highly uncertain if either border authority would be ready to take on the challenges and risks in the design and the regulatory and contract management oversight of the counterpart private enterprise and finish with a more effective and efficient delivery of the border post outputs than the conventional public sector approach</p> <p>Project 10 OP (i) is clearly too small for a private sector participation to be economically viable. For OP (ii), conventional undertaking by the Government of Thailand's Department of Highways is likely to offer better value than private sector participation, transaction costs taken into account</p>	column.	column.
11.	Phnom Penh–	605	OC: Increased capacity and	1. Responsibility: (a) Detailed	1. Responsibility: (a)	1. Major risks of weakened

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
	Sihanoukville Highway Corridor Improvements, Cambodia		<p>reduced freight and passenger transport costs along Phnom Penh Sihanoukville highway corridor.</p> <p>I: More effective and efficient Phnom Penh–Sihanoukville intercity transport.</p> <p>OP: A 4-lane, tolled, divided expressway on a 60-meter wide right-of-way, with 4 exit/entrance interchanges, and a design speed of 100 km/hour.</p>	<p>design, investment, and asset management for the Project 11 output;</p> <p>(b) Collecting toll under contract specified toll regime;</p> <p>(c) The costs of performing tasks (a) and (b) over a contract term; and</p> <p>(d) Transfer of the assets in 1 (a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) Collected toll, (b) Competitively bid public VGF as specified in the contract, and (c) Incentive bonus and/or penalty paid or deducted, depending on road asset performance measured against the contract's specified KPIs (e.g., a road surface international roughness index).</p> <p>3. Termination: Possibility is open for an enterprise to be terminated due to sustained failure to deliver specified key contract tasks.</p>	<p>Preparation of Project 11 and PPP implementation plan, due diligence review of the public interest case, and budget processing for public VGF;</p> <p>(b) Detailed design of the enterprise scope and private sector participation contract;</p> <p>(c) Competitive bidding selection of enterprise candidate;</p> <p>(d) Performing authority role in private sector participation contract; and</p> <p>(e) Road users consultation (e.g., survey, website interaction).</p> <p>2. Capacity need: Following an assessment of PPPs in Cambodia with AFD, ^d ADB is working with the government to provide advisory technical assistance on (i) improving the PPP policy, legal, and regulatory enabling environment; (ii) strengthening public sector capacity to plan and implement PPPs; and (iii) institutionalize competitive bidding for bankable PPP pilot projects. This provides an opportunity for the government to develop the capacity to use the VGF model of expressway development.</p>	<p>governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage of the planning, implementation, and asset management process; and (b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector participation contract life; and (ii) reduced transparency in performing the authority for private sector participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public; and (c) Weak technical capacity in (i) detailed design of the enterprise scope and private sector participation contract, (ii) competitive bidding selection of enterprise candidate, and (iii) performing authority role in private sector participation contract.</p> <p>2. Mitigation of the risks; ^e</p> <p>(a) Developed capacity and enforced public policy of road users consultation;</p> <p>(b) Independent evaluation, and public disclosure of the findings on the private sector participation transaction, the</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
						enterprise, and the authority of the private sector participation contract performance, highlighting effectiveness and efficiency; and (c) Donor technical assistance to develop capacity in (i) detailed design of the enterprise scope and contract; (ii) competitive bidding selection of enterprise candidate; and (iii) performing authority role in private sector participation contract.
12.	Sihanoukville Port Access Road Improvements, Cambodia	11.3	<p>OC: More efficient access to Sihanoukville port. I: Improved trade facilitation at Sihanoukville port.</p> <p>OP: Improved final 9.5 km section of NR4 leading to the port of Sihanoukville, with widening to a 4-lane divided highway with provision for an extended truck queuing parking lane outside the entrance to the port.</p>	<p>Likely to be too small for private sector participation and so it would be a conventional public sector implementation.</p> <p>For sustainability of road maintenance, Table 7.2 suggests, as a possible solution, joint action by port, shipping, and cargo interests to fill the gap left by the road authority; further study is needed to confirm this.</p>	Likely to be too small for private sector participation and so it would be a conventional public sector implementation.	Likely to be too small for private sector participation and so it would be a conventional public sector implementation.
14.	Phnom Penh Outer Ring Road Investment Project, Cambodia	337	<p>OC: More efficient highway linkage of Sihanoukville port, Phnom Penh, and Viet Nam Southern Economic Zone, mitigating risk of an aggravated Phnom Penh inner city congestion.</p>	<p>For PPP with tolling option: 1. Responsibility: (a) Detailed design, investment, and asset management for the Project 13 output; (b) Collecting toll under contract-specified toll regime;</p>	<p>For PPP with tolling option: 1. Responsibility: (a) Preparation of Project 13 and PPP implementation plan, due diligence review of the public interest case, and budget processing for public</p>	<p>1. Major risks of weakened governance: (a) Limited and/or irregular consultation of road users tends to reduce participation, consensus-orientation, responsiveness, and transparency in any stage</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
			<p>I: Improved urban transport in and around Phnom Penh.</p> <p>OP: Constructed 63 km southern section of the Outer Ring Road connecting NR4, NR3, NR2, and NR1, with a tolling option implemented as a PPP.</p>	<p>(c) The costs of performing tasks (a) and (b) over a contract term; and</p> <p>c) Transfer of the assets in 1 (a) to the contract authority at expiry.</p> <p>2. Remuneration: (a) Collected toll; (b) Competitively bid public VGF as specified in the contract; and (c) Incentive bonus and/or penalty paid or deducted, depending on road asset performance measured against authority pre-specified KPIs (e.g., a road surface international roughness index),</p> <p>3. Termination: Possibility is open for the enterprise to be terminated for sustained failure to deliver specified key contract tasks.</p>	<p>VGF;</p> <p>(b) Detailed design of the enterprise scope and private sector participation contract;</p> <p>(c) Competitive bidding selection of enterprise candidate; and</p> <p>(d) Performing authority role in private sector participation contract; and</p> <p>(e) Road users consultation (e.g., survey, website interaction).</p> <p>2. Capacity need: Following an assessment of PPPs in Cambodia with AFD, ADB is working with the government to provide advisory technical assistance on (i) improving the PPP policy, legal, and regulatory enabling environment; (ii) strengthening public sector capacity to plan and implement PPPs; and (iii) institutionalize competitive bidding of bankable PPP pilot projects. This provides an opportunity for the government to develop the capacity to use the VGF model of expressway development.</p>	<p>of the planning, implementation, and asset management process;</p> <p>(b) (i) Reduced transparency in enterprise competitive selection process poses risk to effectiveness and efficiency of the outputs over the private sector participation contract life; and (ii) reduced transparency in performing the authority for the private sector participation contract role lowers accountability of the enterprise and/or the public administration to the road users and the public; and</p> <p>(c) Weak technical capacity in (i) detailed design of the enterprise scope and contract; (ii) competitive bidding selection of enterprise candidate; and (iii) performing authority role in the private sector participation contract.</p> <p>2. Mitigation of the risks: (a) Developed capacity and enforced public policy of road users consultation; (b) Independent evaluation, and public disclosure of the findings on the private sector participation transaction, the enterprise, and the authority for private sector participation contract performance, highlighting effectiveness and efficiency; and</p> <p>(c) Donor technical assistance to develop capacity in (i)</p>

Long List Project		Approximate Cost (\$million)	Probable Outcome (OC) and Impact (I); and Proposed Outputs (OP)	Potential Enterprise	Public Administration Role and Capacity ^a	Governance and Social Sustainability ^b
No.	Title/Country					
						detailed design of the enterprise scope and contract; (ii) competitive bidding selection of enterprise candidate; and (iii) performing authority role in private sector participation contract.
15.	Thanaleng Border Crossing Infrastructure Improvement Project, Lao People's Democratic Republic	25	<p>OC: Traffic more efficiently processed through Thanaleng border crossing.</p> <p>I: Improved trade facilitation at Thanaleng border crossing.</p> <p>OP: i) A combined vehicular traffic flow and/or capacity and border post operational study of the entire border station, extended to include the section of Thadeua Road connecting the border station with the Thanaleng Freight Custom Clearing and Warehouse Complex, and preparation of a conceptual design for necessary improvements; and (ii) implementation of the required infrastructure investment project.</p>	Conventional public sector implementation. While a feasible enterprise could probably be designed for immigration and/or customs operations, it is highly uncertain if either border authority would be ready to take on the challenges and risks in the design and the regulatory and contract management oversight of the public sector participation enterprise and finish with a more effective and efficient delivery of the border-post outputs than the conventional public sector approach. Project 15 OP (ii), given its small size, is likely to have marginal interest as an investment and asset management private sector participation, transaction costs taken into consideration.	Conventional public sector implementation. See entry in the Potential Enterprise column.	Conventional public sector implementation. See entry in the Potential Enterprise column.

AFD = Agence Francaise de Developpement, ICD = inland container depot, km = kilometer, KPIs = key performance indicators, m = meter, PPP = public-private partnership, VGF = viability gap funding..

^a For public administration in projects implemented with private participation, the focus is on responsibility and capacity.

^b This aspect is considered only for projects assessed as likely to be (i) economically viable, and (ii) a candidate for implementation and operation with private sector participation.

^c It is not known if a competitive selection process was involved in the award of the existing road with PPP arrangements in Myanmar.

^d ADB and Agence Francaise de Developpement (2012).

^e A number of roads in Cambodia are reported to be PPPs based on the build–operate–transfer (BOT) model. However, very little information about them has been made publicly available.

Source: Consultants.

