



# Technical Assistance Consultant's Final Report

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Project Number: TA: PRC 4792

March 2007

## People's Republic of China Guangxi Longlin-Baise Expressway Project Financed by the ADB

Prepared by Halcrow China Ltd, Hong Kong

In association with

CIECC, Beijing

& Jiangsu Scott Wilson Ltd, Jiangsu



## CURRENCY EQUIVALENTS

(as of 1 February 2007)

Currency Unit	–	Yuan (CNY)
CNY 1.00	=	\$0.1289
\$1.00	=	CNY 7.76

## ABBREVIATIONS

AP	-	Affected Persons
BDCC		Baise Disease Control Center
DPA		Direct Project Area
EA	-	Executing Agency
EIA:	-	Environmental Impact Assessment
EIRR	-	Economic Rate of Return
EMDP		Ethnic Minorities Development Plan
EMP		Environmental Management Plan
EMoP		Environmental Monitoring Plan
FIRR		Financial Internal Rate of Return
FS	-	Project Feasibility Study
FYP		Five Year Plan
GASS		Guangxi Academy of Social Science
GEAB		Guangxi Expressway Administration Bureau
GEPB	-	Guangxi Environmental Protection Board
GHAB	-	Guangxi Highway Administration Bureau
GCD	-	Guangxi Communications Department
GCIB		Guangxi Communication Infrastructure Administration Bureau
GPSDI	-	Guangxi Planning Survey, Design, Research Institute
GPSB		Guangxi Public Security Bureau
GRG		GZAR Government
GZAR		Guangxi Zhuang Autonomous Region (Guangxi)
HB	-	Highway Bureau
HCV		Hepatitis C
IDU		Injecting Drug Use
IEE		Initial Environmental Examination
ITS		Intelligent Transport Systems
LIBOR		London Interbank offered rate
MOC:	-	Ministry of Communications (Beijing)
NDRC		Nation Development and Reform Council
NENP		National Expressway Network Plan
NTHS:	-	National Trunk Highway System
O-D	-	Origin and Destination Survey
O&M		Operations and Maintenance
pcu	-	Passenger Car Unit
PAO	-	Poverty Alleviation Office
PCR		Project Completion Report
PRC:	-	Peoples Republic of China
RP:	-	Resettlement Plan
SA:	-	Social Assessment
SAP		Social Action Plan
SEIA:	-	Summary Environmental Impact Assessment

SEPA	-	State Environmental Protection Agency
STI		Sexually Transmitted Infection
TA		Technical Assistance
TB	-	Transportation Bureau
WACC		Weighted Average Cost of Capital
WRDS		Western Roads Development Strategy

Mu                    -    Area of land, approx 0.067 ha, or 670m<sup>2</sup>}

## NOTES

(i)        The fiscal year (FY) of {the Government and its agencies} ends on 31 December.

In this report, "\$" refers to US dollars.

## CONTENTS

### Page

I.	INTRODUCTION	1
	A. Background to the Study	1
	B. Description of Project Highway	2
	C. Conduct of the Study	3
	D. Contents of the Report	4
II.	RATIONALE: SECTOR PERFORMANCE, PROBLEMS AND OPPORTUNITIES	6
	A. Performance Indicators and Analysis	6
	B. Analysis of Key Problems and Opportunities	7
III.	THE PROPOSED PROJECT	14
	A. Impact and Outcome	14
	B. Outputs	14
	C. Special Features	15
	D. Cost Estimates	19
	E. Financing Plan	19
	F. Implementation Arrangements	20
IV.	PROJECT BENEFITS, IMPACTS AND RISKS	23
	A. Traffic Forecast	23
	B. Economic Analysis	23
	C. Financial Analysis and Projections	24
	D. Poverty Reduction and Social Strategy	25
	E. Environmental Assessment	27
	F. Land Acquisition and Resettlement	28
	G. Risks	29
V.	RECOMMENDATIONS	30
	A. Road Design, Operation and Safety	30
	B. Transport Services.	31
	C. Regional Cooperation	31
	D. Small Business Development	32
	E. Institutional Arrangements	32
	F. Private Sector Participation	32
	G. Road Funding	33
	H. Financial Provisions	33
	I. Environmental Protection	33

J.	Vehicle Emissions	33
K.	Social and Poverty Reduction	34
L.	Rural Roads	36
M.	Resettlement	36

## Tables

Table 1.	Cost Estimates	19
Table 2:	Financing Plan	20

## Maps

National Expressway Plan
Project Area
Project Components

## APPENDICES

1.	Design and Monitoring Framework and Decision Tree	37
2.	Road Sector Analysis	45
3.	Guangxi Road Sector Revenue and Expenditures During 2001–2010	52
4.	External Assistance to the Road Sector	53
5.	Technical and Design Summary	56
6.	Rural and Village Road Component	59
7.	Transport Services Component	65
8.	Regional Cooperation	69
9.	Small Business Development	73
10.	Road Safety and Vehicle Emissions	76
11.	ITS and Asset Management	80
12.	Stakeholder Participation and Consultations	84
13.	Cost Estimates	86
14.	Implementation Schedule	87
15.	Contract Packages	88
16.	Monitoring of Socioeconomic and Poverty Impacts	90
17.	Traffic Forecast	94
18.	Economic Analysis	96
19.	Financial Projections and Analysis	101
20.	Summary Poverty Reduction and Social Strategy	107

21	Ethnic Minority Development Plan	112
22.	Summary Draft Resettlement Plan	117
23.	Corporatization and Organization	121

## **Volume 2. Supplementary Appendices**

1	Economic Profile and Economic Development in Guangxi
2	Detailed Traffic Forecasts
3	Design Criteria, Structures, Tunnels
4.	Project Cost Estimates and Implementation Schedule and Contract Packages
5	Road Safety, Asset Management and ITS
6.	Transport Services
7.	Regional Cooperation
8.	Institutional Arrangements and Private Sector Opportunities
9	Road Funding and Highway Tolls
10.	Rural Road Component
11	Detailed Economic Analysis
12A.	Financial Evaluation and Financial Projections for Expressway
12B	Financial Management Assessment
13.	Outline TOR for Consulting Services

## **Volume 3. Environment**

14	Summary Environmental Impact Assessment
15.	IEE Local Roads
16	SEIA Tianlin-Leye

## **Volume 4. Social Impacts**

17	Detailed Social and Poverty Analysis
18	EMDP

## **Volume 5 Resettlement**

19	Draft Resettlement Plan
20	Rural Road Component Resettlement Plans
21	Other Components Resettlement Framework











## I. INTRODUCTION

### A. Background to the Study

1. The People's Republic of China's (PRC) rapid economic growth during the last decade has substantially reduced poverty, but has increased the demand for transport services. Serious bottlenecks have appeared in the transport subsector. The Government is addressing these constraints by developing a '7918' China National Expressway Network Plan (CNENP), which was approved by State Council and announced by Ministry of Communications (MOC) in January 2005. In the plan, China will invest 2 trillion RMB (equivalent to 248 billion USD) in building 34 expressways in 30 years.

2. This '7918' CNENP is to build 7 radial links to Beijing, 9 North-South corridors, and 18 East-West corridors totaling 85,000 km of high-grade highways. The '7918' CNEN has been designed to reach more than 1 billion people by connecting all provincial capitals and large urban centers of more than half-a-million inhabitants with cities of more than 200,000 people (**Map 1**).

3. The Western Region Development Strategy (WRDS) adopted by the government in February 2000 aims to accelerate development in the western region. The government views road development as a key component of its WRDS to improve access to markets and social services, facilitate economic growth and reduce poverty. Western PRC lacks high class road infrastructure both within the region and linking the region to the rest of the PRC. The WRDS is focused on poverty reduction, economic growth and environmental protection. The government is using preferential policies to promote investment into the region. The development of road infrastructure is essential to ensure that this investment reaches the poor areas and rural residents living away from the cities and that the resultant economic and social benefits are widely spread. Guangxi Zhuang Autonomous Region (Guangxi) is part of the WRDS.

4. During the 2004 Country Programming Mission of the Asian Development Bank (ADB), the PRC Government requested technical assistance (TA) to help prepare an integrated roads development project, including the Longlin-Baise Expressway in Guangxi Zhuang Autonomous Region (Guangxi) and the TA was included in the ADB's 2005 country-assistance plan for PRC.

5. Guangxi Communications Planning, Survey & Design Institute (GPSDI) completed the feasibility study (FS) in January 2006 and this was sent to the Ministry of Communications (MOC) and the National Development Reform Commission (NDRC) for review; approval is expected by December 2006. A draft Environmental Impact Assessment (EIA), based on the FS, was prepared by the Environmental Protection Center of MOC for Guangxi Communications Department (GCD) and a copy of the draft EIA given to the PPTA consultants at the start of the project.

6. With the completion in the 11th Five Year Plan of the project expressway and of the short section of expressway from Guangxi/Ghuizou border in Guangxi there will be a continuous highclass road from Fencheng port, through Nanning to Kunming in Yunan, completing one of the Guangxi 'vertical' expressway corridors (**Map 2**). To the south the expressway will be connected to Nanning by the Nanning-Baise Expressway (ADB financing) to be completed in 2008. In the north the project expressway will be connected to the proposed Guizhou expressway to Xingyi City and the by Class I or expressway to Kunming, thus the corridor will become a major artery for the regional transport network, connecting with national and provincial roads, and it will have a significant, positive impact on the economic development of the region. The project expressway will also provide an important section of the Shantou-Kunming corridor, one of the E-W corridors, linking Shantou in Guandong Province to Kunming.

7. Other components of the project have been selected to provide an integrated transport solution to the area. The upgrading of 310 km of rural roads, which feed towns close to the expressway and will also improve access to international trade at Longbang Class I land port and Yuexu Class II port with Vietnam will serve to pass on the benefits of the reduced travel costs on the expressway to the poor counties in the project area and also simulate border trade, and create employment opportunities. The construction of 750 km of access roads to poor natural villages will allow these villages vehicle access to markets, reducing costs and allowing changes to cropping. The construction of 50 bus stations in the project area and reform of the bus operations will also assist in providing an integrated solution to the transport needs of the project area and the border-area communities. **Map 3** sets out the project components.

8. The completion of the proposed expressway will relieve traffic and reduce accidents on the existing G324, which will otherwise become very congested within a few years. This will cause a bottleneck in traffic movements between Guangxi and Guizhou and Yunnan and between the rural population in the project area and Baise town and beyond. Hence, the project expressway and other components is of vital importance to the effective operation of trade and the movement of traffic and goods between the project area, Nanning and other areas of Guangxi and other regions of PRC. It will also improve accessibility and reduce poverty in the region in the immediate vicinity of the project.

## **B. Description of Project Highway**

9. The proposed expressway will replace the existing national road G324, which runs from Nanning through Baise to the border with Guizhou province and on to Yunnan. The southernmost end-point of the expressway will be the northern end of the Nanning-Baise Expressway. The northern end of the proposed expressway will link to the Guizhou Expressway system.

10. The proposed expressway will supplant G324 which is mainly a poor Class III road with 7.5 m wide pavement and no shoulders. The proposed expressway generally follows the corridor of G324, except for 15 km in the northern section where it takes a more direct line by the use of tunnels and bridges to minimize high gradient and also where the expressway bypasses the City of Baise to the east.

11. The Expressway starts at Dabanba village on the Guangxi/Guizhou border, passes through Weile and Shali towns in Longlin county, Jiuzhou, Bantao, Lucheng and Leli towns in Tianling county, and Wangdian, Xiatang and Yongle towns in Youjian district in Baise city, then ends at Sitang Town where it connects with the (ADB financed) Tangluo-Baise Expressway which is under construction. Most of the alignment is parallel with the existing national highway, G324. The total length of proposed alignment is 176.7 km., a saving of 34 km from Baise to the Guizhou border compared to G324.

12. The project is designed as a four-lane expressway (two lanes in each direction). Two different technical standards were adopted due to complex topographic and geologic conditions along the route: (i) from Km 0 to Km 114, the design speed is 80kph with a sub-grade width of 24.5 m; and (ii) from Km 114 to K177, the design speed is 100kmh and sub-grade width of 26 m. The pavement will be in asphalt concrete.

13. The expressway component of the project also includes a 22 km connecting road to Longlin county town, 10 interchanges, one monitoring center, one monitoring sub-center three service areas, two rest areas, and two maintenance areas. Traffic on the expressway is forecast to grow from between 3,500-5,500 passenger car units (pcus) per day in 2012, the year of opening, to between 11,000-20,000 pcus per day in 2022 and between 17,000-32,000 pcus per day in 2032. These volumes are well within the capacity of the expressway as planned.

## **C. Conduct of the Study**

### **1. Methodology**

14. In August 2006 ADB signed a contract with Halcrow China Ltd. to provide TA to the Guangxi Communications Department for the Baise-Longlin Expressway Project and the consultants' team started work in Nanning in September 2006. An inception report was presented on September 20th and an interim report on November 3rd.

15. An Inception Mission by the Bank was made in September to assess the project status and a further mission in the third week of October. Changes to the TOR arising from these missions included addition of 48 bus stations to the project scope and changes to the proposed rural roads to be upgraded as part of the project. A Tripartite meeting was held late in November which led to further changes in the scope of the rural roads, costs and other components.

16. The team has completed its analysis work and documentation and the Draft Final Report was submitted on 9th December 2006. A Fact Finding mission took place at the end of January 2007 and this Final Report was submitted on March 25th, 2007.

17. The overall aim of the project is to assist the GCD as executing agency (EA) by reviewing and refining the FS documentation for the proposed LongBai road. This was achieved by working closely with the Department and the associated GPSDI and ensuring that the revised feasibility studies and other documentation conform to the Bank's requirements.

18. An important aim of the project was to identify areas of complementary rural road and other transport related investment that could be included in the project scope to maximize the social and economic benefits of the project and thus aid the government in its efforts in poverty reduction. In addition a review of transport services was made, in particular in the border area around Longbang land port with Vietnam. The rural road upgrading, proposed rural bus stations and trial of changes to transport services regulations in Jingxi County were included in the project components to provide an integrated transport project which should greatly add to the dissemination of project benefits by improving both freight and passenger transport services in the project area.

19. An additional aim was to review the EIA and assist in the preparation of the Summary EIA (SEIA), IEE and Resettlement Plans (RP) and carry out a social and poverty impact analysis (SPA), including an Ethnic Minority Development Plan (EMDP) in accordance with the ADB's requirements. When the detail design survey is completed and land requirements defined, changes to the RP will be required. These tasks and documentation are a requirement of the ADB.

20. Finally the project has reviewed road sector issues and provides the basis for further dialogue with government in areas of poverty impact of road projects, nongovernmental financing, expressway commercialization, public transport services, small business development, road safety, vehicle emissions, intelligent traffic systems (ITS) and expressway and other road asset management.

21. The FS, EIA, draft RP, SA, SPA were all provided during the course of the TA . During September and October, field surveys were carried out for traffic, transport services, resettlement and social and poverty data collection.

### **2. Study Team**

22. The study team for the project consisted of:

Team Leader/Highway Engineer	Geof Connor
Transport Economist	Tim Yates
Trade and Transport	John Lee
Environmental	Geza Teleki
Social Development	Peggy McDonald
Highway Engineer	Zhao Hong
Economist	Li Kaimeng
Transport Specialist	Linda Zhang
Financial Analyst	Xu Chengbin
Tunnel Engineer	Zeng Weidong
Environmental Specialist	Chen Dong
Social Development Specialists	Li Fan/Wang Libin
Resettlement Specialist	Zhang Weijian
Project Secretary	Li Xiaoqi

### **3. Executing Agency and Counterparts**

23. The EA for the study was the Guangxi Communications Department (GCD). Counterparts for the study included:

Project Coordinator and Director	Zhang Xue Lian
Counterpart Team Leader	Tan Honghe
Translators	Lei Wenyan
	Chen Jingjing
	Chen Yingtao
	Li Jie

24. The project team would like to express its thanks for the excellent help, support and advice given to them by the counterparts, other staff of GCD, GPSDI, GHAB, GEAB and other organizations, particularly Baise Communications Department whose help during the site visits was invaluable.

### **D. Contents of the Report**

25. The main body of this report summarizes the analysis and results of the work carried out and discusses issues raised by the project. The appendices to the report describe in more detail the methodology used in the study, the review of the preliminary design and the environmental, social and poverty impact studies. The remaining sections of this report are as described in the following paragraphs.

26. Section II gives the background to the transport and road sector in PRC and the region of the proposed expressway. It also looks at the problems and opportunities and the lessons learned in PRC and Guangxi from previous projects.

27. Section III describes the project and its objectives and special features. It sets out the cost estimate and financing plan and describes the implementing arrangements for the project.

28. Section IV describes the technical, economic, financial and institutional benefits of the project. It also looks at the impact on the road subsector, on resettlement, minorities, gender, poverty and the environment. It also describes the risks associated with the project. Section V sets out the consultants' recommendations.

29. There are 23 appendices included with the main report. These are summaries of the key issues related to the project.

30. The main report is also accompanied by 20 supplementary appendices that describe the study methodology, technical analyses, and conclusions and recommendations in substantial detail. These appendices are divided into 3 volumes. Volume 2 includes Supplementary Appendices 1 to 13, Volume 3 contains Supplementary Appendix 14, SEIA of the expressway and Supplementary Appendix 15, Initial Environmental Examination (IEE) of the rural road upgrading, and Volume 4 contains Supplementary Appendix 17 and 18, Detailed Social and Poverty Analysis and EMDP. Volume 5 contains Supplementary Appendix 19 and 20, the Draft Resettlement Plan for the expressway and the rural roads.

31. The remainder of this report and appendices, except for Section V which contains the consultants' recommendations, have been formatted in a similar manner to ADB's RRP as an aid in preparing the Project RRP.

## II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS AND OPPORTUNITIES

### A. Performance Indicators and Analysis

32. The PRC economy grew rapidly during the past decade—averaging around 9 percent per annum—and is expected to continue growing rapidly in the foreseeable future. Despite this good progress, the Government's fight against poverty is far from over. There is a need to raise the living standards of millions of people, particularly in the western region. The inadequate road network, road transport bottlenecks, and the resulting high transport costs and poor levels of service are major constraints on development and subsequent economic growth and social development.

33. The change in the economy's structure and diversification has led to a change in the demand for transport and the growth rate of road transport demand has now outpaced that of rail for both passengers and freight. There is a rapidly increasing movement of goods and passengers by road, which is more flexible and responsive to the needs of a market economy than other modes. The shift in transport demand also reflects the loosening of anticompetitive restrictions in the road transport industry itself. Between 1995 and 2005, road passenger traffic grew by 7.3 percent per annum (p.a.), reaching 929 billion passenger-km in 2005, while goods traffic grew by 6.4 percent to reach 869 billion tonne-km. In 2005, road traffic accounted for 53.2 percent of the country's total passenger traffic and 10.8 percent of the total freight traffic. With the country's rapid economic growth, low vehicle ownership rates, lower automobile prices after World Trade Organization accession, increasing access to loans for automobile purchases and large investment in automotive manufacturing, the rapid expansion in the vehicle fleet will continue in the coming years. (Supplementary Appendix 1).

34. To meet the growing demand, the Government has made major efforts to increase the country's road capacity. Roads are classified into expressways, class I-IV and unclassified roads (rural roads)<sup>1</sup>. The National Trunk Highway System (NTHS), now nearly complete, has been superseded by the National Expressway Network Plan (NENP), announced by MOC in January 2005, as the principal trunk highway planning document. Under the plan, the PRC will invest CNY2,000 billion (\$250 billion) in order to build 34 expressways with a total length of 85,000km. The aim is to complete the network within 30 years.

35. The NENP is also known as the "7-9-18" network: seven radial routes from Beijing, nine north-south and eighteen east-west corridors. There are also five regional ring roads (i.e. circular routes within a province) and more than thirty connectors. As well as providing an efficient inter-city highway network, the aim of NENP is to connect all cities with populations of 200,000 or more, link economic zones, connect to international borders and facilitate the development of a logistics industry in the PRC by linking transportation hubs. The Western Region Development Strategy (WRDS), adopted in March 2000, with its emphasis on redirecting resources towards the west, remains a focus of the NENP. High priority under the WRDS was given to road development, reflecting the need for adequate road access in order to stimulate economic growth and reduce poverty.

<sup>1</sup> Roads in the PRC are classified by design capacity into expressways, and class I-IV and unclassified roads. The design capacity of a four lane expressway is 25-55,000 pcu/day and of a four lane class I highway 15-30,000 pcu/day. Two lane class II and III roads have capacities of 5-15,000 pcu and 2-6,000 pcu respectively and two and single lane class IV roads capacities of 2,000 pcu and 400 pcu/day respectively.

36. The expressway component of the proposed project is a 177km section of the Shantou-Kunming national east-west route. Compared with the existing national highway, the proposed expressway will be approximately 34km shorter (measured from Baise to the Guizhou border) and will offer a time saving for freight vehicles of up to 5 hours. The design and monitoring framework summarizing the main features of the proposed project is in **Appendix 1**

## **B. Analysis of Key Problems and Opportunities**

### **1. Problems and Constraints**

37. Despite the huge amount of investment, the road network still does not provide access to large parts of the country, particularly the poorer western regions, and is inadequate to support sustainable economic growth. Roads built to a high standard (class II and above) account for only 16.8 percent of the total network. The remaining 83 percent are medium- to low-grade paved roads and gravel roads (**Appendix 2**). As a result, the expansion in the demand for road transport has strained the road infrastructure, as manifested by bottlenecks in the network. The resulting high cost of shipping goods between inland provinces and ports has been a serious constraint.

38. Guangxi, in southern PRC, is one of the three least developed areas of the country. It is bordered by Yunnan province on the west, Guizhou on the northwest, Hunan on the northeast, and Guangdong on the southeast; the Gulf of Tonkin on the south; and Vietnam on the southwest. The population of Guangxi exceeded 49.25 million in 2005, when the province's per capita GDP was CNY 8,800 or 74 percent of the national average. As in other parts of China, Guangxi has seen rapid economic growth in the past few years with GDP rising by 13.2 percent in 2005. Nevertheless, Guangxi still lags behind many of its neighbors and the country as a whole. Guangxi's per capita GDP was only about one third of Guangdong province in 2005 and Guangxi ranked only 27th out of 31 provinces in terms of per capita GDP overall in the country.

39. Currently, Guangxi has 28 national designated poverty counties, accounting for 4.7 percent of total national poverty counties in PRC. There are 4,060 identified poverty stricken villages in these 28 counties with an average net per capita income of CNY 1,586. These villages accounted for 28.4 percent of the total administrative villages in Guangxi. In addition a further 21 counties are designated provincial poverty counties. The poor and the ethnic minorities are concentrated in the northwest, where the project will be located.

40. In the project area<sup>2</sup>, 6 counties are national poverty counties, and 2 are provincial poverty counties; 29.3 percent of the rural people are poor with 23 percent of these earning less than CNY668. Ethnic minorities, mainly Zhuang, account for some 80 percent of the population but 83 percent of the poor population..

41. The area's remoteness and inadequate road infrastructure are among the main causes of the area's high incidence of poverty. In the project area, 36 percent of administrative villages are not served by an all weather road and 3,844 natural villages have no highway access. The national highway (G324), which runs parallel to the project expressway, is a combination of class III, and IV roads, with steep slopes, sharp turns, and low allowable speed. Congestion is a daily occurrence because of the heavy truck through traffic. Traffic on G324 has grown by about 7 percent per year in recent years, and several stretches are already at the limit of their capacity.

<sup>2</sup> Defined as Youjiang District, Longlin and Tianlin Counties on the line of the expressway and Xilin, Leye, Lingyun, Tiangyang, Jinxi Counties on the line of the Rural roads, all in Baise City.

42. The poor road conditions have resulted in inadequate and unaffordable transport services in the area. The poor quality of the roads deter licensed bus and truck operators from plying the routes to townships and villages. As a result, many villages in the project area still have no direct bus service. In addition, the fares and routes of the formal bus system are regulated, which often results in inefficient services. Inadequate road access is an impediment to higher agricultural productivity and prevents the poor from taking advantage of job opportunities in towns. Better roads in Guangxi and the project area are needed to promote economic growth and integrate the poor, isolated regions with the economic centers.

## **2. Government and Asian Development Bank's Strategies**

43. The Government's strategy for highway development is to link cities with populations of 500,000 with expressways, develop secondary roads to serve the poor and to promote rural centers, and use improved roads to support regional cooperation with neighboring countries. New and better roads are seen as a key component of the Government's strategy to broaden access to markets and services, facilitate economic growth and reduce poverty.

44. The WRDS, to develop the poorer western part of the country, was a key theme of the 10th FYP and continues to be a priority for the 11th. Its aim is to reduce disparities between the western and more developed coastal regions. Road development has high priority as an effective means of promoting economic growth and reducing poverty. In addition, for the roads sub-sector, the WRDS aims to link the western region with central and eastern regions, provide access to trade outlets for the west at sea and land ports, and promote regional cooperation with neighboring countries.

45. The ADB's operational strategy for PRC's road sector supports construction of highways connecting major growth centers with hinterland economies; integration of the network so that the NTHS is supported by a system of rural roads, particularly those providing access to poor areas; delivery of adequate and affordable transport services; promotion of road safety and reduction of vehicle emissions; institutional strengthening to raise financial and management efficiency in expressway operations; appropriate pricing policies to optimize road transport capacity; and alternative methods of investment financing, including private sector participation. In line with the Government's strategy, ADB road sector assistance has also targeted the poor, less developed central and western provinces.

46. The proposed Project is consistent with the PRC's development priorities and ADB's strategy.

## **3. Opportunities**

47. The Project will support the WRDS by building a 177 km expressway from Baise to the border with Guizhou province (Longlin), a link in the Shakou-Kunming corridor and the last link in the Fencheng-Guizhou Expressway, both key features of the Guangxi 10th and 11th FYPs. The Project will shorten the distance from Baise to the Guizhou border by 34km and from G324 to Longlin town by a further 12 km and offer a considerably faster, safer alternative to G324. It will link Baise town with Tianlin and Longlin counties and also connect with the Nanning to Baise Expressway. Travel time savings in the year of opening are expected to be from 3-5 hours for through traffic. By lowering transport costs and improving the quality, frequency and reliability of transport services, and by providing a high-quality link to Guizhou, Yunnan and the Vietnam border at Youyiguan/Pingxiang, the Project is expected to spur economic activity and inter-regional and international trade, helping reduce poverty over a wide region, including on both sides of the border. A rural roads improvement program has been incorporated in the Project to expand the road network in rural and poor villages and improve access to border ports. A rural

transport services component will help improve the quality and efficiency of passenger services and spread the benefits of improved access. Improvements in border access roads, also incorporated in the Project, will help integrate the economies on both sides of the PRC-Vietnam border by promoting small-scale cross-border trade and the incomes of traders. This integrated approach will help spread the expressway's benefits to the poor in a comprehensive way.

48. The evaluations of several completed road projects financed by ADB have confirmed the impacts of road investments on poverty reduction<sup>3</sup>. Several ADB studies have also affirmed the relevance of ADB's strategy<sup>4</sup>, showing that road infrastructure has contributed to poverty reduction in the PRC not only by directly improving the living conditions of the poor, but also by diversifying their sources of income and helping to increase their productivity. The findings of an ADB-funded TA for Socioeconomic Impacts of Road Projects confirmed the validity of the road portfolio's geographic focus: the poorer western interior provinces. ADB has made significant efforts to identify road projects that have a strong focus on poverty.

49. External assistance has been provided to help the Government streamline its road sector strategy and investment projects, mainly by ADB, the Japan Bank for International Cooperation, and the World Bank. Since 1991, ADB has extended 33 loans totaling \$6.6 billion to finance 4,583 km of expressways and 8,536 km of associated rural road networks. As of 1995, local rural roads have been included in the scope of road projects to make ADB's interventions in the road sector more pro-poor. Of the ADB-funded projects, 22 have already been completed and are open to traffic. ADB has also supplied 58 TA packages totaling \$30.8 million to the road sector. The advisory TAs have addressed policy and institutional issues, including highway planning, road safety, human resources development, socioeconomic assessment, and transport pricing and the mobilization of non-government financial resources. The World Bank and the Japan Bank for International Cooperation have provided about \$7.1 billion and ¥219 million, respectively, to finance road investments. ADB coordinates with both these organizations to ensure that each major development partner focuses on different corridors, and information related to policy advice is shared across the development community (**Appendix 4**).

#### **4. Policy Dialogue**

50. **Transport Services in the Project Area.** The Government has given special attention to rural infrastructure and services under the 11th FYP, with the important aim of redressing urban/rural inequalities and reducing rural poverty. Rural transport services are a key component of this. By 2010, all townships and most villages in the central region will be connected by sealed roads, and in the west most townships will have sealed road access and most villages will have road access. To ensure that better transport services develop in response, MOC has established a rural bus station development program, providing subsidies for bus stations in rural areas. These strategies are strongly supported by ADB, whose commitment to rural transport infrastructure and services has been reinforced by evidence that improved accessibility and more reliable and efficient services are critical prerequisites for rural poverty reduction.

<sup>3</sup> In Liaoning and Yunnan provinces, construction of expressways complemented by upgrading local roads was associated to a significant increase in rural incomes in the project area. This is reported in ADB. 2000. Project Completion Report on the Liaoning Expressway Project in the People's Republic of China. Manila; and ADB. 2001. Project Completion Report on the Yunnan Expressway Project in the People's Republic of China. Manila.

<sup>4</sup> ADB. 2000. Regional Technical Assistance for Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction. Manila; ADB. 2002. Technical Assistance to the People's Republic of China for Socioeconomic Assessment of Road Projects. Manila.

PRC's and ADB's policies align in another important respect: bus licensing regulations issued by MOC in 2005 allow more flexibility than previously in developing services more in line with passenger needs and, notably, encouraging greater vehicle and driver productivity. These will result in lower cost, more frequent and more efficient services. These changes, acting in concert with a GCD subsidy scheme for bus services operating on Class IV roads or lower, are fully in accordance with the recommendations of TA 4351-PRC: Road Transport Policy Reform.

51. There are formal bus routes connecting all townships in the project area, but many villages, especially those with poor or no road access, have no direct service. In 2005 only 87 percent of project area villages had a formal service, and in Leye County the proportion was only 48 percent. Instead, they rely on expensive informal services or travel by foot (half of the few trips made by the poor beyond their home village are on foot). Consequently members of the average village household hardly ever travel beyond the nearest township center, and the poor rarely travel even there.

52. PRC's experience has been that transport services respond to road improvements, with bus operators taking advantage of better access to areas of potential demand. The combination of the Project's expressway and rural road improvements will therefore result in more available and more affordable services. Lower transport costs and travel times will, over time, result in better access to education and welfare services, more trade and investment, higher incomes, cheaper daily necessities and inputs in local markets, better information on market opportunities, and new income-earning opportunities for the poor.

53. The provision under the Project of 48 small and two medium bus stations and reform of bus licensing procedures will further support these improvements. The bus stations will be a focus for demand and, in conjunction with more flexible conditions for the operation of bus routes, will encourage quicker bus turnaround, higher rates of vehicle and driver productivity, more frequent services and lower bus operating costs. Together with the existing rural bus subsidy policy in Guangxi, these changes will also enable an extension of the routes over which services will be viable.

54. **Small Business Development Opportunities.** The Project's benefits are most likely to be felt by the communities in the project area if it creates new opportunities for participation in the cash economy and increased opportunities for existing small-scale businesses. The ADB has a clear policy of favoring projects that generate opportunities of this kind, particularly in poor areas.

55. Construction of the expressway and rural roads will directly create employment and business opportunities. About 15,488<sup>5</sup> local unskilled construction jobs are likely to be created from construction of the expressway and it is expected that 70 percent of all landscaping work for the expressway will employ local women. Another 3,700<sup>6</sup> local jobs are expected to be created through the construction of rural and village roads and bus stations.. Demand for daily necessities and local construction materials will provide opportunities for local business.

56. Other components of the Project will also generate cash-earning opportunities. Expanded bus services will create jobs for drivers and business opportunities for bus and terminal operators, as well as facilitating increased sales of local produce. The bus stations will create jobs and bring opportunities for vendors and ancillary businesses. Improved border market access will benefit regional and local traders, including small-scale traders and livestock

<sup>5</sup> Based on 70 percent of construction employment being unskilled and 50 percent sourced locally.

<sup>6</sup> Based on 80 percent of construction employment being unskilled and 70 percent sourced locally.

producers, vendors, porters, informal transport operators and providers of other ancillary services.

57. **Regional Trade.** Trade with Vietnam accounted for 19.1 percent of Guangxi's international trade in 2005, and grew 31.2 percent over the year before. Guangxi exports mainly light industrial and agricultural products (\$644 million in 2005) and imports mainly food, synthetic rubber and minerals (iron ore, coal and manganese) worth \$344 million. Small-scale border trade amounted to \$701.4 million, mostly by small-scale traders and producers.

58. Cooperation in cross-border trade and transport takes place at several levels: the Greater Mekong Subregion (GMS), under which the two countries have agreed to implement the Cross Border Transport Agreement (CBTA), simplify and harmonize cross-border customs and transport procedures and promote integrated logistics; the China-ASEAN Free Trade Area, under which there is an agreement to bring forward the ASEAN single market target to 2010; and between the provinces on both sides of the border, with agreements to allow international transport through designated Class I land ports. This regional cooperation is strongly supported by ADB's Strategy for Regional Economic Cooperation and Integration (July 2006).

59. The Project will help strengthen this economic cooperation and trade at two levels: by helping to complete a network of expressways linking Guizhou, Yunnan and Guangxi to the border at Youyiguan/Pingxiang; and by improving road access to regional and local border markets at Longbang Class I and Yuexu Class II land ports, where new border trade facilities are scheduled in the 11th FYP period and road upgrading projects are already underway on the Vietnam side of the border. In addition to serving regional trade flows, these Project components will also help promote economic development at the border and cross-border trade between small-scale traders and producers.

60. **Private Sector Participation (PSP).** There has been PSP in road development, financing, and management in Guangxi for around six years, to the transfer of operations of part of the Guilin-Liuzhou expressway to a joint venture (JV) between GCD and a Hong Kong investment bank. To date, nearly 600km of expressways with some form of PSP either exist, are under construction or are in an advanced state of planning. During the eleventh FYP a further 1,229km of PSP expressways are planned, making use of both BOT and co-operative JV arrangements. GCD is now in the early stages of forming the Guangxi Communications Investment Group (GCIG), which is expected to strengthen expressway management and may open the door for GCIG to participate in PSP contracts further afield. (**Appendix 23** and Supplementary Appendix 8)

61. **Road Safety.** Road safety is a serious issue in the PRC. Injuries from road traffic accidents are the leading cause of death for people 15 to 45 years old. They are the second leading cause of premature death, causing a drain on productivity due to short- and long-term disability. In 2005, there were 450,254 accidents in PRC with 98,738 fatalities or one every 5 minutes. The estimated direct loss was 1.88 billion Yuan (\$232 million). To address this issue, the Ministry of Public Security prepared the 2004 Road Safety Action Plan, whose primary aims are to reduce serious accidents and facilitate implementation of the 2004 Road Safety Law, which includes higher penalties for overloaded trucks. In Guangxi, the traffic police, part of the Guangxi Public Security Bureau (GPSB), are responsible for promoting road safety, enforcing traffic laws, and identifying preventive measures and accident black spots. This work is coordinated with the GCD to fulfill the requirements of the new law and enhance road safety. Prior to the opening of the expressway GCD, with the help of an international road safety specialist will carry out a full safety audit of the design and construction, with particular attention to safety in tunnels, and on long down slopes, typical accident locations on existing expressways. They will also coordinate with GPSB to ensure that a traffic police unit patrol the

expressway and enforce the new law and regulations. The Project's major contribution to road safety will be a controlled access road, reducing the possibility of pedestrian accidents, and the reduction of traffic volumes on the existing mixed traffic G324. **(Appendix 10)**

62. Vehicle overloading is a serious problem in Guangxi, as in other provinces, and the Government is addressing this problem through the new Road Safety Law which targets overloading of vehicles. Seven Ministries in PRC, including MOC, declared a one year large scale national drive to control the practice of overloading; this started in June 2004. This included stricter enforcement nation wide but also included lowering of highway fees and tolls for selected vehicles to encourage less overloading by making more and cheaper trips. Although overloading cases have decreased significantly, on G324, even with continuous enforcement at the weigh stations in the project area overloading is still endemic. Permanent weighbridges will be procured and installed at the major toll stations on the project expressway.

63. **Vehicle Emissions.** The increasing number of vehicles has raised concerns about vehicle emissions and air pollution. The Government has taken several steps to control emissions: imposing regulations on the automobile industry, requiring an annual vehicle test, and drafting a vehicle inspection and maintenance program. The new measures also set emission and fuel efficiency targets and offer tax incentives for manufacturers of more environmentally-friendly cars. Guangxi does not have provincial vehicle emission regulations, but rather has followed national vehicle emission control strategies including enforcing national emission standards for new vehicles, improvement of conventional fuels, alternative or cleaner fuels, vehicle inspection and maintenance programs, and retirement of obsolete pollution vehicles. By July of 2009, before the project road opens, it is expected that Guangxi will have adopted stricter emission standards for both new and used vehicles. In the first year of the expressway operation it is expected that fuel savings will be more than 28 million liters with sulfur dioxide carbon dioxide and nitrogen oxide emissions from vehicles on the project roads up to 30% lower than before the Project. With the assistance of consultants, GCD and the Guangxi Environmental Protection Board will monitor emissions on roads in the project area. **(Appendix 10).**

64. **HIV/AIDS.** Guangxi ranks the third nationwide for the number of HIV/AIDS cases with 8,625 new HIV/AIDS cases reported in 2005<sup>7</sup>, bringing the total number of people infected to 20,604, a jump of more than 50 percent. There is serious under reporting and the true figure is likely to be about 80,000 people. About 70 percent of Guangxi's HIV/AIDS cases result from injecting drug use (IDU). Coinfection of HIV/AIDS and hepatitis C is also high in Guangxi with 95 percent of HIV-positive and 70 percent of HIV-negative IDU also showing positive for HCV. The border area of Jingxi is a 'hot spot' for HIV/AIDS because it is an international border area along a heroin trans-shipment route, the number of IDU is high and there is a high HIV prevalence among IDU. Longing, Tianlin and Youjiang are also areas when drug users are concentrated because these counties are transit routes for drug trafficking from Burma via Yunnan and Guizhou

65. The Guangxi government strongly supports the fight against HIV, which, in the project area is lead by the Health Departments and Baise Disease Control Centre. Guangxi has appointed 15 city hospitals and 80 county hospitals as the lead hospitals for treatment of HIV/AIDS. Various international programs are also being implemented in Guangxi, such as the WB loan program, the Aus-AID technical assistance program, and USAID program.

<sup>7</sup> GZAR Department of Health

66. There is a potential risk that the project will increase infections from transmittable diseases. These include HIV/AIDS, sexually transmitted infections (STI), hepatitis C, typhoid, encephalitis and malaria. To minimize this risk as much as possible appropriate mitigating measures must be included as part of the loan agreement. Therefore, an action plan for the control of transmissible diseases will be funded as part of the loan.

## 5. Lessons Learned

67. ADB loans have facilitated the PRC's economic growth significantly, particularly in the poorer regions. A performance review of completed road projects concluded that, in general, all loans to the road subsector in the PRC have been or are being implemented satisfactorily<sup>8</sup>. The project completion reports prepared for nine road projects conclude that eight projects<sup>9</sup> were generally successful and one was highly successful. The project performance audit report for three road projects concluded that the three were either highly successful or successful. However most of these roads were not in the Western regions and some problems have arisen in recently completed roads.

68. GCD has implemented three ADB-financed transport projects. One after completion was assessed as highly successful, one is opened to traffic and one is under construction<sup>10</sup>. There are also two completed World Bank-financed transport projects: an inland waterway project and an expressway project. A lesson learned is that the long time it took to obtain approval for the feasibility study and the lengthy procedures for procuring civil works delayed the start of the Guangxi Roads Development I Project (Guangxi I). As a result, the establishment of the expressway corporation was also delayed. For this project the feasibility study was submitted early and approval is expected in December 2006.

69. Of concern is the low traffic volumes on Guangxi I that are significantly less than forecast volumes in the first years of operation. This appears to be because of overoptimistic estimates of future GDP growth in the counties traversed by the expressway<sup>11</sup> and slower than expected implementation of reforms and agreements related to border trade with Vietnam. For the present project this should not be a problem as the majority of traffic is established long distance through traffic whose growth is not reliant on local GDP growth. Given the completion of the contiguous Gangxi II expressway from Nanning it is expected that diversion to the project expressway from the existing G324 for long distance traffic should be immediate, however the forecast traffic volumes on the expressway have allowed for a 'ramp up' in diversion volumes in the first few years of operation.

70. Experience in the PRC road sub-sector elsewhere has indicated that while the overall performance of the highway portfolio is satisfactory, some problems occurred during

<sup>8</sup> ADB. 2001. PRC Procurement Review 2001 and PRC Portfolio Performance Review in the Road Sector. Manila.

<sup>9</sup> ADB. 1998. Project Completion Report on the Shenyang–Benxi Highway Project in the People's Republic of China. Manila; ADB. 1998. Project Completion Report on the Jilin Expressway Project in the People's Republic of China. Manila; ADB. 2000. Project Completion Report on the Hunan Expressway Project in the People's Republic of China. Manila; ADB. 2000. Project Completion Report on the Liaoning Expressway Project in the People's Republic of China. Manila; ADB. 2001. Project Completion Report on the Yunnan Expressway Project in the People's Republic of China. Manila; ADB. 2002. Project Completion Report on the Shenyang–Jinzhou Expressway Project in the People's Republic of China. Manila; and ADB. 2003. Project Completion Report on the Hebei Expressway Project in the People's Republic of China. Manila.

<sup>10</sup> ADB. 1996. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Fangcheng Port Project. Manila. The project included a highway component and completed in 2001; and ADB. 2001. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Guangxi Roads Development Project. Manila.

<sup>11</sup> In particular Chongzhou City has not developed as quickly as anticipated

implementation, including weak soil investigation during feasibility studies, underestimation of the technical complexity of expressway construction, and delays in resettlement operations. The former problem is of particular concern in the present project as the geology of the area can lead to slope slippage and collapse<sup>12</sup>. GCD are well aware of this problem and will pay particular attention to cut slope gradients and arch crib wall slope protection.

71. From previous ADB-funded expressways in Guangxi (TanBai Expressway<sup>13</sup>), it has been found the biggest change between plan and implementation is the construction of new houses in rural areas. According to present Chinese requirements for new village construction, new houses should be built in the planned resettlement areas with modern infrastructure. This improves the living conditions of the affected farmers but increase the cost of water, roads, and other necessary infrastructure. It would also appear that most of the farmland reclamation fee for this expressway was used far from the affected cities. Therefore the counties/districts directly affected by the Project Expressway, should carefully prepare well coordinated plans and schedules for land reclamation in the affected villages preceded by consultations with the affected parties before their relocation. If reclaimed land is not possible within the affected villages, they should target poverty villages in the county. For the present project consultations with affected villagers were emphasized from the start.

72. Other areas for improvement have been identified, including the use of road safety audits in designing and constructing expressways and making adequate provisions for operation and maintenance (O&M) to ensure sustainability. For this Project international consulting inputs for the supervision of civil works were included to ensure a careful review of safety measures, geological investigations and safe tunnel and bridge design and construction.

73. Overall, lessons from previous road projects in the PRC have been incorporated into the project design.

### **III. THE PROPOSED PROJECT**

#### **A. Impact and Outcome**

74. The Project will help promote sustainable economic growth and poverty reduction in Guangxi as a whole and the project area in particular. It will achieve this by (i) enhancing road transport efficiency and safety; (ii) improving the road transport network by building a section from Baise to Longlin (Guizhou border) in the Sekhou-Kunming east west corridor, one of eight high-priority western corridors; and (iii) improving poor rural and minority villages' access to income-generating opportunities and social services.

#### **B. Outputs**

75. The Project comprises (i) the construction of a 177 km, access-controlled toll expressway from Baise to the border with Guizhou province, including a 22 km connecting road to Longlin County center, 11 tunnels (7.1 km in total), 187 large and medium bridges (54.1 km in total), interchanges, toll stations, and service areas (**Appendix 5**); (ii) the upgrading of 310 km of rural roads to improve access to 275 villages in the rural poor areas and improve access to border areas; (iii) construction of about 750 km of access roads to poor and minority natural villages, (iv) construction of 50 township freight and passenger transport stations, (v) introduction of flexibility in issuing regional rather than fixed-route licenses and permitting

<sup>12</sup> The recently opened Baise to Luocunkou Expressway has had one carriageway closed to traffic for 3 months due to slope collapse

<sup>13</sup> Tanluo to Baise Expressway

variations from assigned routes as a trial in the project area, (vi) provision of equipment to enhance the capabilities of the border port freight handling center, and (vii) the strengthening of the Guangxi government's capacity in construction, road safety, project monitoring and evaluation, quality control and asset management through the provision of consulting services and training.

### C. Special Features

76. **Rural Road Component.** In line with ADB's policy dialogue with the Government, a rural road improvement program was integrated into the Project to expand the road network in rural minority villages and to improve access to land ports with Vietnam. The integrated approach will help spread the expressway's benefits to the poor, minorities and the small traders and villages who depend on border trade. Better tie-ins between the expressway and rural roads will enable more agricultural products to reach markets and allow farmers to upgrade their farming practices. As reliable transport to markets becomes more readily available, cash crop farming in remote or isolated areas will be stimulated and access to off-farm employment opportunities will be broadened. The Project includes four priority sections, selected from Baise's rural road development plan with the addition of two small roads one accessing a border livestock market and a planned border "trading street" and the other providing improved access to a new border facility and freight station. The total length of road is 310 km and they will serve 16 townships in the project area with a poor population of over 90,000. Also included is the construction of up to 750 kms of access roads to poor natural villages who at present have only foot and animal tracks.

77. Of the ADB loan, \$28.6 million will be allocated to the rural and village road component. Two sections (and the border roads) are currently unclassified roads, but will be upgraded to class III and IV roads, the remaining two sections will be upgraded from Class IV to Class II. Some 412,000 people will benefit from the Project rural road upgrading, of which 23 percent or 96,000 are in the poor minority villages. The rural roads will (i) be upgraded concurrently with the project expressway, (ii) use Government's design standards that are acceptable to ADB, (iii) follow ADB's social safeguard policies, and (iv) be accorded the same degree of attention as the expressway in relation to impact monitoring. Around 750km of roads or tracks to villages will be upgraded to a minimum standard to allow all weather access. These road will serve poverty villages and will allow vehicular access to markets and social services. (**Appendix 6**).

78. **Local Road Maintenance.** Adequate maintenance is crucial to ensure the sustainability of rural roads, a job for which local administrative units are responsible<sup>14</sup>. During the TA, the planning of and standards for maintenance, funding sources, and monitoring of maintenance activities of local roads were examined. At the present time maintenance planning usually hinges on subjective assessments, mainly because of the local government's lack of resources for maintaining its road networks. Recent changes in regulations<sup>15</sup> will help to ensure improved funding and give more importance for rural road maintenance, allow a systematic, preventive approach, establish a steady flow of funds and allow more privatization at the local level. GHAB are piloting the new system in three prefectures<sup>16</sup> and it is expected that they will then expand

<sup>14</sup> Guangxi Highways Administration Bureau (GHAB) is responsible for the management, construction, improvement, and maintenance of all roads above county level. For county (Class III highways and below) and township roads, maintenance is carried out through the regional Communication Departments and delegated to county and township authorities.

<sup>15</sup> On 22 October 2005 the administration office of the State Council of PRC announced new regulations for funding of village road maintenance. These were strengthened in August 2006 when three ministries (MOC, MOF, NDRC) provided more detail direction in the application of the regulations.

<sup>16</sup> Guilin, Laobin and Fencheng Port

the system to the rest of Guangxi. In order to take full advantage of the improvements to funding more dissemination of the activities or knowledge needed to carry out systematic maintenance and monitor performance is required at the county level.

79. During project preparation an action plan for GCD and GHAB was devised to strengthen rural road maintenance and assist the participation of local villages in the maintenance system. The action plan assumes that the new regulations will be adopted in the project area. With this plan GCD can develop and implement a sound road maintenance management system for the project area during project implementation which could later be extended throughout Guangxi. The system will have (i) measures that minimize maintenance costs; (ii) a modern method of evaluation and maintenance prioritization for efficient work programming and fund use; (iii) a compilation of road inventories, together with basic data on the condition of the roads; and (iv) a monitoring system to be used by local residents. GCD should, in line with the regulations, encourage county governments to adopt competitive bidding among maintenance contractors to enhance efficiency. **(Appendix 6)**.

80. **Rural Transport Services.** The Project includes a component to help GCD and the county CBs achieve their 11th FYP strategy of improving the accessibility of isolated rural and border communities. It will support (i) construction of 48 Class V bus stations throughout the project area and two Class III stations at Longbang and Yuexu at a total cost of CNY 35.0 million (\$ 4.5 million) and (ii) implementation of rural bus licensing reforms to provide incentives for operators to customize their routes, schedules and services to attract demand, raise productivity, lower costs and more closely meet the needs of rural communities. Together with an existing rural bus subsidy scheme, these will help expand the network of formal bus services and spread the benefits of improved accessibility that will be brought about by the project's expressway and local road components. Longbang and Yuexu will also benefit from border trade assistance under the project. **(Appendix 7)**

81. **Regional Cooperation and Cross-Border Trade.** The Project includes a further component involving upgrading access roads to border trade markets at Naxi (Longbang) and Yuexu. Both will serve border development projects that are in the 11th FYP and will link with roads in Vietnam that are in the process of being upgraded. The upgraded access roads will benefit international traffic between Guangxi (and beyond) and Vietnam, including cross-border livestock trade in the case of Naxi, as well as short-distance small-scale trade between communities on both sides of the border. These benefits will be magnified by other project components: the project expressway, which will improve regional linkages for long-distance traffic; the Jingxi-Longbang rural road component, which will substantially reduce travel times and costs to/from Tianyang and Baise for road freight and passengers; and the bus stations and route licensing reforms that will improve the availability, efficiency and quality of road passenger services. **(Appendix 8)**

82. **Small Business Development.** The program of bus stations and associated route improvements will help establish an integrated network of services that, in combination with the expressway and rural road improvements, will raise the accessibility of the areas served. The bus services themselves will offer opportunities for local bus and terminal operators. Cheaper, more frequent, more reliable and safer services will improve access to jobs and education, health and welfare services, as well as increase incomes from the sale of produce, increase the range of goods available locally and improve access to information on prices and marketing opportunities. In addition to encouraging these service improvements, the bus stations will themselves offer employment opportunities, create a focus and market for local vendors (of food, drinks etc) and businesses (eg vehicle maintenance, repair and washing services), improve access to information by public telephone, and provide better amenities for passengers, employees and traders.

83. In conjunction with planned border markets, including an important livestock market at Naxi, the border access road improvements at Naxi and Yuexu will also benefit both regional and local traders, strengthen cooperation between PRC and Vietnam and hasten the integration of their economies at the regional and local scale. During implementation, they will directly create jobs for local labor and opportunities for suppliers of construction materials. Increased border activity will benefit small-scale traders and livestock producers and provide additional opportunities for local vehicle maintenance and repair businesses, vendors, porters, informal transport operators and providers of other ancillary services. (**Appendix 9**)

84. **Expressway Management.** The predominant mode of operation in Guangxi at present is for expressways, once completed, to be handed over to the Guangxi Expressway Administration Bureau (GEAB) for operation and maintenance.

85. GCD is in the initial stages of creating a new organization, called the Guangxi Communications Investment Group (GCIG) that will combine financing, implementation, operation and maintenance within one organization. This is similar to the Sichuan model. It will take staff from GEAB and the Guangxi Infrastructure Construction Administration Bureau (GCIB). The objective is to devise an arrangement in which operations will enjoy economies of scale in operations and maintenance, GCIG is in a position where it can bid for operating contracts elsewhere (e.g. in other provinces), it remains fully accountable for the disbursement of grant and loan money and for GCIG to be able to raise finance on its own trading record (albeit probably with parent company, i.e. GCD, guarantees).

86. It is recommended that, within GCIG, construction and operations should be separate. It will be important for GCIG's operating entity to remain creditworthy and inter-entity financial arrangements need to be made such that large amounts of long term debt do not sit on its balance sheet. There may be a case for retaining GEAB's operating divisions beneath the umbrella of GCIG's operating entity, but it is suggested that, if so, the geographical groupings should be reviewed such that the gains from sharing plant, survey work and staff are maximized. A recommended road map and action plan is set out in **Appendix 23**.

87. GCIG should be encouraged both to seek operating contract opportunities elsewhere and to contract out operations and maintenance of its own expressways to private companies. GCIG should, once a commercialized body is up and running, be corporatized.

88. **Operation and Maintenance Concession(O&M).** The financial performance of the project expressway is expected to be weak: it would not be possible to attract private sector interest in its implementation. As a stand alone business, internal cash generation is expected to just cover long term debt service six years after opening. At that point it should be feasible to award an O&M concession, in joint venture with GCIG, that included debt service. It would make sense, however, to award a combined concession for both the project expressway and the Nanning-Baise expressway, currently under construction.

89. **Intelligent Transport System (ITS).** ITS<sup>17</sup> on expressways in Guangxi is partially developed and Guangxi uses the national ITS Center standards for its ITS facilities. ITS in some form is installed on every expressway in Guangxi. Common features on existing expressways include, monitoring surveillance cameras at toll plazas, and potential dangerous areas. The system is used to liaise with police/emergency services and provide traveler information through a control center, fiber-optic communication cabling running the length of each expressway, variable message signs (VMSs) beside and overhead the expressways providing information to motorists (such as road / traffic / weather conditions ahead and maximum speed, and changed

<sup>17</sup> The application of information technology to transport is referred to as an intelligent transport system.

speed limits) and video surveillance cameras, particularly at high-risk areas such as toll booths, long bridges and tunnels. On most expressways there is capability to measure vehicle weights, record details of over-weight vehicles and apply on the spot fines.

90. Although Guangxi does not have a formal ITS policy for the 11th Five-Year Plan (FYP) they have advised that they are to introduce systems to (i) reduce the time it takes to pay a toll by 'smart cards', (ii) improve safety through enhanced electronic enforcement and monitoring, (iii) extend and improve monitoring and enforcement of vehicle loading limits, and (iv) improve traffic management and infrastructure maintenance. In line with this policy, equipment for the ITS will be procured under the Project to enhance the effectiveness of traffic surveillance, traffic management and tunnel safety, and the monitoring of toll plazas. About 1.3 percent of the ADB loan (\$ 4.0 million) will be allocated to procure ITS equipment, and training will be provided with the help of consulting services. (**Appendix 11**)

91. **Weight Based Tolls:** To control overloading vehicles, some provinces in the PRC have now introduced weight based tolling for freight vehicles. The principle behind weight based tolling is that goods vehicles pay a rate per tonne-km that is based on the weight class of the vehicle (i.e. its actual gross vehicle weight); plus a penalty rate per excess tonne (i.e. its actual weight minus the permitted weight, itself based on permitted axle loads). The advantages of weight based tolls are: (i) It is more equitable in that operators are charged by weight rather than by vehicle class, in some cases an empty truck will have a lesser toll than a legally loaded one; (ii) helps to reduce pavement damage by discouraging overloading, especially on smaller trucks; (iii) produces a safer road by removing dangerously loaded trucks; (iv) reduces illegally modified trucks with strengthened bodies to carry higher loads; and (v) It provides a better way of controlling the freight fleet. Strict penalties will be imposed to overloading vehicles. Experiences gained in other provinces show that it is very effective in controlling overloading issues. It is proposed to introduce weight based tolls for freight traffic on all expressways in Guangxi by the end of 2007. Vehicle drivers will be issued with an electronic card upon entering the expressway which will be handed to the toll operator on leaving. All trucks will pass over an electronic weight bridge on exiting, which will measure the total load of the vehicle and tolls will be assessed on actual weight of the vehicle plus load. Overloaded vehicles will be charged a penalty toll based on the percentage they are overloaded.

92. **Asset Management.** Asset management must be developed to ensure the sustainability of the expressway and local road operations. To date in Guangxi, little major maintenance has been required on expressways, except for rectification of construction deficiencies, because the expressways are all still relatively new. As the expressways age, maintenance costs will undoubtedly rise, and the expressway companies are likely to come under increasing budget pressure. In these circumstances the current maintenance programming arrangements are unlikely to be satisfactory. The TA has recommended an asset management development plan for the expressway, which will establish a computerized database system and promote the use of modern equipment. To facilitate the implementation, the TA has developed an action plan comprising: (i) immediate measures needed when the project company is set up and the organizational structure is put in place, (ii) short-term measures needed prior to the completion of the expressway, and (iii) medium-term measures needed within the first 3 years of expressway operations. Measurement equipment to assist in pavement management will be procured under the Project (**Appendix 11**). A similar action plan has been formulated for local roads (**Appendix 6**).

93. **Stakeholder Consultations.** During preparation of the feasibility study, environmental impact assessment social assessment and resettlement planning consultations were conducted with government agencies, villagers, local groups, and other people likely to be affected by the Project to discuss environmental concerns, land acquisition and resettlement issues, and

economic development potential. Village investigations and surveys were conducted in the project area to assess the potential adverse effects and benefits of the Project. During the TA further village surveys and social, resettlement and environmental consultations were held in the area of the rural roads. Over 5,000 people were interviewed during the course of public opinion surveys, social and environmental assessments, and resettlement planning. For the resettlement plan, consultation meetings were held with representatives of affected counties, townships, and villages and a resettlement workshop held in Baise. Rural people were familiar with the Project and public support for it was high. Local officials explained the policies and regulations for compensation to those who would be adversely affected by the loss of farmland or housing. Villagers participated in the discussions and decisions on village resettlement. In the implementation stage, the resettlement offices at all levels will encourage further consultation and participation in the land acquisition and resettlement process by affected persons from the land-holding groups crossed by the expressway. (**Appendix 12**).

#### **D. Cost Estimates**

94. The total cost of the Project is estimated at \$1,522.5 million, with a foreign exchange cost of \$599.9 million (39.4 percent) and a local currency cost of \$922.6 million (60.6 percent) (**Appendix 13**). The total costs include physical contingencies, price contingencies, and interest and other charges during construction.

#### **E. Financing Plan**

95. The Government has requested a loan of \$300 million from ADB's ordinary capital resources to help finance the Project. The Borrower of the Loan will be the PRC. The loan will have a 20-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, and such other terms and conditions set forth in the draft Loan and Project agreements. The Government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB.

96. The MOC and the Guangxi Regional Government (GRG) will provide 46.3percent of the project costs on a grant basis. The Ministry of Communications grant will amount to \$168.2 million and the GRG grant to \$552.2 million. Domestic Banks will provide a \$533.8 million in loans on a 30-year term at an interest rate of 6.16 percent. The ADB loan proceeds will be made available by the Borrower to GPG, which will onlend \$260 million to the GCD with the same financial terms and conditions as those of the ADB loan. The project company will bear the interest rate variation and foreign exchange risks. GRG will keep the balance of \$40 million and use it for the local road, transport station and freight logistic equipment components; it will bear the interest rate variation and foreign exchange risks for this amount. A summary of the financing plan is in Table 2.

**Table 1. Cost Estimates**

A. Base Cost <sup>a</sup> (\$ Million)	Foreign	Local	Total
1. Expressway Civil Works	446.4	531.1	977.5
2. Equipment	16.1	0.7	16.8

3. Local and Village Roads	37.6	73.5	111.1
4. Bus Stations	1.1	2.5	3.6
5. Land Acquisition/ Resettlement <sup>a</sup>	0.0	69.6	69.6
6. Project Design and Supervision	1.7	43.5	43.5
7. Consulting Services and Training	2.0		2.0
8. Project Administration	0.0	8.5	8.5
<b>Sub Total A</b>	<b>503.2</b>	<b>734.9</b>	<b>1,238.1</b>
<b>B. Contingencies</b>			
1. Physical <sup>b</sup>	24.9	32.7	57.6
2. Price	25.8	70.2	96.0
<b>Sub Total B</b>	<b>50.8</b>	<b>102.8</b>	<b>153.6</b>
<b>C. Interest During Construction</b>	<b>45.9</b>	<b>84.9</b>	<b>130.8</b>
<b>Total Project Cost (A+B+C)</b>	<b>599.9</b>	<b>922.6</b>	<b>1,522.5</b>

a/ Preliminary estimates. b/Computed as 5% of base costs.

**Table 2: Financing Plan**

(\$ million)

Source	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank	300.0	0.0	300.0
Ministry of Communications	0.0	170.5	170.5
Guangxi Government	299.9	211.1	511.0
Domestic Loan	0.0	541.0	541.0
<b>Total</b>	<b>599.9</b>	<b>922.6</b>	<b>1,522.5</b>

## **F. Implementation Arrangements**

### **1. Project Management**

97. GCD will be the executing agency responsible for the overall implementation of the Project and direct implementation of the rural road component and transport centers. The Guangxi Communication Infrastructure Construction Administration Bureau (GIAB), will be the implementing agency and will coordinate and monitor the expressway's construction activities. Its Director, the project director, will be responsible for overall project management in relation to operation of the expressway, the approval of contracts, and payments. GEAB will be responsible for the operation of the expressway. GCD will implement the rural road component through Baise Communication Department and the Transport Stations component through its Highway Transport Administration Bureau. A project implementation unit established within GIAB will facilitate land acquisition, resettlement, and environmental protection measures and

will ensure that local concerns are addressed adequately. The unit will be headed by a project manager, who will oversee day-to-day physical implementation activities and prepare progress reports. GCD has sufficient technical capability to implement the Project, however, given the importance of the bridge and tunnel design and pavement construction, assistance will be provided in these areas under the consulting services.

## **2. Implementation Period**

98. Preliminary design was completed in December 2006. Other preconstruction activities—detailed design, preparation of bidding documents, prequalification of contractors, and tendering and awarding of contracts started in January 2007. Completion of the preconstruction activities is targeted for September 2007. The construction of the expressway is scheduled to start in October 2007 and the Project will be opened to traffic by March 2012. The implementation schedule is in **Appendix 14**.

## **3. Procurement**

99. All ADB-financed procurement will follow ADB's Guidelines for Procurement. The main civil works will be divided into 23 packages, the pavement into 6 packages, and the equipment into 6 packages, all of which will be procured under international competitive bidding procedures (**Appendix 15**). Ancillary facilities, including the administration buildings, service and parking areas, roadside facilities (fencing signs and road marking) and landscaping will be procured national competitive bidding (NCB) acceptable to ADB. The rural roads financed by ADB will be procured through NCB. ADB will require prior review of the bid evaluation report and award of contracts for the first batch of Jingxi-Longbang road. The village roads and township passenger stations financed by ADB will be procured through shopping. International bidding will be handled by a tendering company that is well qualified to perform these tasks. Only prequalified contractors with adequate technical and financial capacities will be allowed to bid for several packages and may be awarded more than one contract based on the least-cost combination of contracts. The relevant sections of ADB's anticorruption policy will be included in all documents and contracts related to the bidding for and implementation of the Project.

## **4. Consulting Services**

100. The Project will finance 58 person-months of international consulting services. Of these person-months of international consultants, 44 will be for the supervision of the civil works, two person-months for the following: bridge design and construction, tunnel design and construction, road pavement, road safety, expressway operations, corporate governance and road maintenance.. GCD will engage and finance 17,500 person-months of domestic engineering and technical consultants, 900 of which will be allocated to non-expressway component to ensure proper design, supervision, and project management, as well as to train engineering staff. About 20 person-months will be allocated to monitoring the Project's socioeconomic and poverty impacts.. The international consultants will be financed by the ADB loan and will be recruited through a firm in accordance with ADB's Guidelines on the Use of Consulting Services by Asian Development Bank and Its Borrowers. The domestic consultants will be financed from domestic resources and will be recruited in accordance with government procedures acceptable to ADB. GCD will establish three resident supervision engineer offices for construction supervision, environmental and resettlement monitoring, and project performance monitoring and evaluation. The chief supervision engineer's office will be responsible for overall project supervision. The chief supervision engineer will be assisted by two deputies, one of whom will be the team leader of the international consultants. The team leader will help the chief

supervision engineer with project and contract management activities and certify progress payments and contract variations prior to their approval by the chief supervision engineer.

## **5. Disbursement Arrangements**

101. The loan will be disbursed in accordance with ADB's Loan Disbursement Handbook<sup>18</sup>. Because most of the payments will be made for large contracts (above \$100,000 equivalent), direct payments, reimbursements, and commitment procedures will be used to withdraw loan funds. If government funds are used first for eligible expenditures, ADB's reimbursement procedure will be followed. To expedite the flow of funds, the statement of expenditures procedure may be used to reimburse eligible expenditures for any individual payment not exceeding \$100,000 equivalent.

## **6. Accounting, Auditing, and Reporting**

102. GCD and the project company will maintain separate accounts for the Project and related financial statements and will have them audited annually in accordance with appropriate auditing standards consistently applied by external auditors whose qualifications, experience, and terms of reference are acceptable to ADB. GCD and the project company will submit to ADB within 6 months of the end of each related fiscal year the project company's audited consolidated financial statements. To ensure that internal controls and checks on the project construction costs and operations are effective, GCD will establish an internal audit unit and will maintain it during implementation and operation of the Project. The unit will undertake independent tests on day-to-day transactions, prior to reference to external auditors. GCD will make satisfactory arrangements for reporting implementation progress through quarterly progress reports. Within 3 months of completion, GCD will submit a project completion report to ADB.

## **7. Anticorruption**

103. ADB's Anticorruption Policy was explained to, and discussed with, GCD. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through GCD, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. To support these efforts, relevant provisions of ADB's Anticorruption Policy were included in the loan regulations and the bidding documents for the Project. Attention was drawn to the section on fraud and corruption that was added to ADB's Guidelines on Procurement and Guidelines on the Use of Consultants. ADB's program for the PRC includes assistance that will improve governance and provide incentives to reduce the level of corruption over the long term.

104. In relation to the Project, GCD will ensure (i) that a supervisory body is established to prevent undue interference in business practices with adequate resources made available for its effective operation; (ii) that a leading group of officials from GCD's Supervision Division is located in offices involved in project bidding, construction, and other operational activities; (iii) that briefings between GCD and the Prosecutor's Office are held on a regular basis to share information on or warnings about any corrupt practices detected; (iv) that the contractors' activities in relation to fund withdrawals and settlements are periodically inspected; and (v) that a dual signing system is introduced whereby the civil works contract winner also signs an anticorruption contract with the employer.

<sup>18</sup> ADB. 2001. Loan Disbursement Handbook. Manila.

## 8. Project Performance Monitoring and Evaluation

105. To demonstrate the effectiveness of its operations and to be accountable for its performance to stakeholders, ADB uses the project performance management system. The monitoring will be undertaken with a focus on a few key representative communities in the project area. In addition to the Project framework macro indicators (Appendix 1), a basic socio-economic monitoring framework was constructed for the Project to permit a more definitive assessment of the actual benefits. GCD has concurred with (i) the monitoring framework, (ii) the set of indicators to be used for monitoring and evaluating the Project's impacts, and (iii) the four representative villages in the project area. The baseline values for the indicators were established, where available, during project preparation, and will be updated at project inception. The indicators will be measured at project completion and bi-annually for 5 years following completion. By December 2007, GCD will recruit an independent local institute to provide 24 person-months for surveys, analyses, and reporting. A report summarizing the key findings will be submitted to ADB. GCD and local governments have assured that adequate monitoring will be carried out in the selected communities (**Appendix 16**).

## 9. Project Review

106. In 2010, ADB and GCD will carry out a midterm review of the Project, focusing on policy, institutional, administrative, organizational, technical, environmental, social, economic, financial, and other relevant factors that may have an impact on the Project's performance and its continuing viability. The review will examine progress in sectoral reforms, policy development, resettlement, and compliance with assurances in the Loan Agreement.

## IV. PROJECT BENEFITS, IMPACTS AND RISKS

### A. Traffic Forecast

107. The existing national highway, the G324, is congested and carries unusually high volumes of goods traffic. The project will increase the corridor's capacity to meet transport demand and will significantly reduce transport costs and travel times. The expressway will reduce the travel time between Baise and the Guizhou border by approximately 34km and save over 3 hours. Traffic on the expressway is forecast to grow from 6,600 pcu/day in 2012, the expected year of opening, to 20,700 pcu/day in 2022. Opening traffic is reduced by the ramp-up effect observed elsewhere on expressways immediately after opening. The traffic projections also take account of (i) forecast economic growth in the zones used for trip generation, (ii) the additional traffic generated by the project through reduced transport costs, (ii) traffic diverted to and from the Nanning-Kunming railway and (iii) the impact of toll levels on the diversion of traffic from alternative routes. (**Appendix 17** and Supplementary Appendix 2).

### B. Economic Analysis

108. The economic appraisal covers the construction period (approximately 4½ years) and 20 years' operation. In the case of the expressway this means construction from 2007 to 2011, with opening (and a full year of benefits) in 2012. In all cases the appraisal compares a project case (with the expressway or improved rural road) with a without-project do minimum alternative comprising limited investment on the existing route. A 12 percent discount rate is used throughout. In the case of the expressway, traffic will, in the without-project case, use the existing G324 national highway, which will become congested and expensive to maintain as traffic increases. Some travel may not take place because of congestion and the resulting

increased travel times and vehicle operating costs (VOCs). With the project, congestion on existing roads will be reduced and traffic on both the expressway and the existing roads will benefit from faster, cheaper and safer travel. Some additional trips will be generated as the economy responds to lower transport costs. If rural roads are not upgraded, people in the remote parts of the project area will have less mobility and the mainly poor inhabitants will not be able to participate in the mainstream of economic activities. The project will provide employment opportunities both during and after construction and will remove constraints on economic growth and, with the increased growth, achievement of higher incomes. The rural roads component will help ensure that these benefits reach the poorest communities in the project area.

109. The evaluation uses first quarter 2006 economic prices. Expressway benefits to “normal” traffic (i.e. traffic that would have been present in the do minimum case) result from improvements in road and traffic conditions between the do minimum and project case and amount to savings in (i) VOCs, (ii) personal travel time for vehicle occupants (other than drivers and crew, whose costs are included in VOCs), (iii) road accident costs and (iv) the value tied up in freight during transit. In addition there are the benefits of additional trips made solely as a result of the lower costs brought about by the project (“generated” traffic) and the gains and losses to the expressway as a result of passengers and goods choosing to divert from rail to the expressway and vice versa. Rural roads are evaluated in the same way, i.e. focusing on conventional road user benefits and taking no account of any additional economic gains that may be induced by the introduction of new road capacity. Village roads are evaluated using a consumer surplus approach.

110. The project’s EIRR is estimated at 21.5 percent, well above the 12 percent threshold (**Appendix 18** and Supplementary Appendix 11). The EIRR of the expressway alone is 21.8 percent. Sensitivity analyses confirm the robustness of the expressway’s economic viability. Changes in the principal variables, e.g. construction costs, traffic growth, benefits, diversion to the Baise-Luocunkou expressway etc) do not have a significant impact on economic viability, and the EIRR remained above the threshold of 12 percent in all cases. The EIRR was also calculated separately for rural and village access roads and bus stations<sup>19</sup>. The rural and village roads’ EIRR is 16 percent, whilst that for the bus stations is 27 percent. A risk analysis was also carried out to determine the frequency distribution of expressway EIRRs. Each uncertain input (such as cost, traffic growth, accident savings etc) was varied at random within defined limits. The results of the risk analysis showed that, with these uncertainties, the mean expressway EIRR is 17.3 percent and the probability of the EIRR falling below 12 percent is 2.4 percent. The economic analysis of the project was extended further to analyze the distribution of project net benefits by determining the project effects for various beneficiaries, including road users, the local economy, labor, and government. Road users will receive the largest share of net benefits, accounting for 82 percent of total net benefits.

### **C. Financial Analysis and Projections**

111. The expressway financial evaluation, expressway tolls and financial projections are discussed in detail in **Appendix 19** and Supplementary Appendices 9 and 12A. Toll proposed are consistent with those proposed for Guangxi expressways in 2007. Tunnel tolls are not proposed as they are not currently used in Guangxi, but weight based tolls are expected to be introduced in the near future. Toll are assumed to be fully indexed in the base case. At 2006 prices the weighted mean toll is CNY0.55 per pcu-km.

<sup>19</sup> Because of changes to the scope of the rural road component at Tripartite the economic evaluation will require revision. This will be included in the Final Report.

112. For the financial evaluation, financial costs and benefits are estimated using the same constant price base and evaluation period as the economic evaluation. The evaluation is from the perspective of a financially autonomous investor-operator. The results of the financial evaluation show a financial internal rate of return (FIRR) of 3.6 percent after business taxes and corporate income tax. This exceeds the post-tax weighted average cost of capital (WACC) of 3.1 percent..

113. Financial projections shown in **Appendix 19** cover construction plus ten years' operations. They are in current prices and take account of taxation and current best information on financing terms. Performance is fair. Net profits remain negative until 2017. Internal cash generation only amounts to 48 percent of long term debt charges in 2012, but exceeding them in 2015. The cash flow gap is plugged by short term borrowings that peak at CNY0.6 billion in 2015. The liabilities that arise from the short term borrowings persist until 2023 and, as a result, it is assumed that no dividend distribution will be made. The performance is not materially improved even if a higher toll rate is assumed or tunnel tolls are introduced.

114. Evidently the expressway is not a viable self financing entity in the short to medium term with the proposed financing plan. It would not attract private sector support as currently structured. The longer term picture is better, however. All the debt is satisfactorily redeemed by the end of the evaluation period.

## **D. Poverty Reduction and Social Strategy**

### **1. Project Benefits**

115. The population of the project area is 2.3 million with 87 percent of people living in rural areas. 29.6 percent of rural people are poor (annual income less than 924 Yuan) and 7 percent are in absolute poverty (annual income less than 668 Yuan). Ethnic minorities comprise 80 percent of the project area population and 32 percent of these people are poor. There are 7,749 villages of which 633 have been designated as poverty stricken villages.

116. The road improvements will lead to lower transport costs, improved transport services, improved access to markets and social services, increased competitiveness, expansion of economic opportunities, diversification of rural livelihoods, and poverty reduction.

117. Farmers will benefit from reduced transport costs, better access to markets, increased opportunities for diversification and increase competition for their products leading to increased incomes. This will promote diversification to fruit and vegetable production and animal husbandry, currently hindered by rough rural roads and long travel times. Thus the project supports local poverty alleviation plans for agricultural diversification to products in which the project area has a competitive advantage. Current local level micro-credit and technical training programs are targeted for poverty villages in all of the 16 townships along the project's rural roads and 8 of the 10 townships along the expressway corridor within four years of the project starting. Project road improvements will significantly enhance the impact of these programs on farmer's incomes and community development.

118. Combined the expressway and rural road improvements will reduce the costs of all inputs to village-level activities, increase margins for those selling agricultural produce and other traded goods, and raises the volume of cash circulating in the rural economy.

119. Importantly, the project will increase economic development in the area and the growth of off-farm income opportunities so needed to counter significant underemployment. Improved accessibility from better transport services on better roads linked with an upgraded arterial network will open new opportunities and prospects for factories and agro-processing plants that were not there before. Growth potential for aquaculture is strong in Longlin and Xilin and the

expressway will provide the speedy transport essential for fresh and live products. Tourism is just starting to develop in the project area and there is substantial potential for eco-tourism. Clearly there is expectation that tourism can flourish and local investors are keenly aware of the need for better road access. Economic development and rising incomes will promote the services and retail industries creating further employment opportunities.

120. In the short term, expressway construction activity will stimulate an increase in demand for daily necessities and supply of local construction materials, both of which will provide small business opportunities. This could accelerate the development of sustainable small businesses by providing experience and seed money for such things as restaurants and catering, barber and beauty salons and transport services.

121. Construction of the expressway and local roads will directly create employment for local people. It is estimated that 53.1 million person days will be required for construction and that 70 percent of this labor will be unskilled and about 50 of this can be sourced locally. Thus about 18.6 million person days of local employment amounting to 317.8 million Yuan in wages will benefit local communities. Women will benefit from this employed and it is likely that about 70 percent of landscaping work can employ women. A total of 185,850 local people are likely to gain employment through the project.

122. Only 79 percent of villages have formal bus services and in more remote areas such as Leye County the proportion is lower and the cost of informal service is high. The expressway and rural road improvements will help establish better transport services. To expand the availability and improve efficiency and affordability of rural passenger services the project will support 48 Class V bus station and policies that allow greater flexibility in routes and schedules. This will increase services to poor villages providing passengers with more frequent and reliable services, lower fares, time savings and reduced safety risks. Both poor and non-poor will travel more in response to increased access, lower transport costs and time savings. The program of bus stations and associated route improvements will help establish an integrated network of services that will provide better access to jobs, markets, health care, schools and other services and will increase the range of goods and services available in the community. About a third of the population migrate each year for short and long term employment and they will also benefit from improved transport services will also benefit them.

123. Road improvements at the border with Vietnam will increase freight and passenger services facilitating cross-border movement of goods and people and the project will support two Class III bus stations at Longbang and Yuexu. These will help increase the flow of trade, much of which is undertaken by small scale traders, many of who are poor women. The bus stations themselves will offer employment opportunities, create a market for small scale traders and businesses and improve access to information. The improved roads and more open border between China and Vietnam will also help to boost tourism development.

124. Rural road improvements will provide better year round access for more isolated communities (Longlin, Xilin and Leye) and help to develop these communities. Poor women will benefit from easier transport, time savings and improved access to medical facilities and other social and civil services, and from a general improvement in their quality of life. Moreover, the ability of the public sector to provide services at cost efficiency will be enhanced by improved road access. In particular, more medical staff and primary school teachers will be willing to work at the village level once access is improved. The improved project roads and transport services have the potential to increase attendance at secondary schools and high schools that are located in townships. Women, including migrating women, will also benefit from greater access to information and jobs and increased opportunities for selling and buying goods at local markets.

## **2. Community Perspective**

125. The PSA concludes that the main beneficiaries will be people living in the Project area. Overall, people living in the project area showed unanimous support for improving the roads and welcomed the opportunity to express their views.

126. In total 979 local residents living in the project area were surveyed. According to local residents, the greatest benefits will be increased economic development in the area resulting in increased income sources and more job opportunities. Farmers had a keen understanding of the direct link between transport costs and farm profit margins and expected lower freight costs and improved access to benefit them directly. People also placed a good degree of emphasis on a cleaner environment with less dust and easier and faster transport in general. Residents also stated improved roads would provide better access for children traveling to schools and would improve road safety.

## **3. Ethnic Minority Development Plan**

127. Ethnic Minorities account for 80 percent of the total population and have a disproportionately high share of the poor population, comprising 82.8 percent of the total poor and 87.7 percent of the absolute poor. The poverty rate among ethnic minority people alone is 32 percent (28 percent for the whole population). They are less literate than the Han population and a greater proportion of ethnic minority people live in mountainous areas where conditions are harsher.

128. Ethnic minority people will benefit from the project. However, social risks arising from the project have been identified and mitigating measures are required under the loan agreement. An EMDP has been prepared for the project containing adequate provisions for special mitigation measures as well as measures to enhance project benefits.

129. Although this plan is referred to as an EMDP, it is prepared to better safeguard all the population of the project area, regardless their ethnic identities.

## **E. Environmental Assessment**

130. The EIA of the main alignment and Longlin connector road was prepared by the GCD and summarized in an SEIA during the TA. The EIA was approved by SEPA on October 11, 2006. The approval letter contained 6 conditions relating to minimizing land requirements and protecting the ecology. SEPA instructed the GEPB to take charge of the overall compliance monitoring and advised GCD to strengthen the EMP and EMoP. This latter requirement has been met with the completion of the SEIA and its EMP and EMoP. GCD will continue to closely follow SEPA's recommendations.

131. An EARP has been prepared for the 48 Class V (<300 passengers per 24 hours) bus stations and included in the SEIA, since no other environmental requirements are triggered by such a small-scale development.

132. An IEE has been prepared for three rural road improvements. One rural road upgrading was upgraded to a Category A and an EIA was prepared by GCD. The SEIA will be included with the Final TA Report

133. The project's impacts will be mainly in the areas of erosion, dust, water pollution and noise during construction and air and noise and stormwater pollution during the operating period. Six specific sensitive issues identified in the EIA are:

- preventing contaminated water from the expressway construction and operating getting into the Chengbehe Reservoir, the water supply of Baise City;

- protecting the near Class I water quality of the Leli River, which the expressway will parallel for >60 km;
- conserving the Paleolithic cultural relics from 10 site through which the alignment passes;
- managing the construction-period dust, construction camp sewage and garbage;
- protecting the 11 plant and 16 animal species identified by the EIA authors as species of importance in this part of China; and,
- mitigating the serious noise pollution by provision of barriers, noise reducing-windows and relocations during the operation of the road, at 32 sensitive sites of the expressway plus the connector road RoW.

134. These concerns have been addressed in a set of 47 mitigative measures defined in the Environmental Management Plan (EMP), to be implemented during the preconstruction or pre-contractor mobilization period, the construction period and expressway operation period. Responsibility for execution of the EMP rests with the GCD who will oversee the GCIB (or a construction corporation) who will have direct responsibility before and during construction. The Chief Supervising Engineer will coordinate the mitigation and monitoring with the contractors. During the operating stage, the GEAB will be responsible for all aspects of the mitigation and monitoring.

135. The Environmental Monitoring Plan (EMoP), included as part of the SEIA, is a detailed checklist defining the mitigative actions that need to be monitored during the three work periods, and is cross referenced to the EMP task numbers. Monitoring will be responsibility of various organizations, most notably the GCD during the pre-mobilization period, and the Contractor and their hired units, such as the Environmental Monitoring Stations, overseen by GCIB during the construction years. Responsibility will lie with GEBA during the operating period. The EIA's EMP and Monitoring Plan should be replaced with the ones prepared for this SEIA.

136. With an effectively delivered EMP and EMoP, the project should proceed without serious environmental effects.

137. Environmental training will be a crucial aspect of the follow-up work, and training associated with the implementation and maintenance of environmental mitigative measures are included in the project costs.

138. The EIA team discussed their findings with the local and provincial government authorities as well as the GCD and GCIB, and the government agreed to mitigate all concerns through the implementation of five major initiatives.

## **F. Land Acquisition and Resettlement**

139. The proposed Project includes the following components involving resettlement: the Expressway and its connector roads, 6 rural roads, 750 km of village roads and 50 township bus terminals. One Resettlement Plan (RP) covers the expressway and related connector roads, interchanges, toll stations, and service areas. Other RPs cover the rural roads component and a Resettlement Framework addresses the villager roads and bus terminals. The Expressway is based on preliminary design while the rural Road are based on feasibility level studies; no design-related documents are available at this moment for the other components.

140. Since 54.3 km (30.6 percent of the expressway length) is bridges and tunnels, the Project impacts on land and houses are reduced. The proposed expressway and its connector roads will affect 10 townships and 35 administrative villages in Longlin County, Tianlin County,

and Youjiang District of Baise Municipality. About 22,130 mu of land will be acquired, of which about 38 percent is farmland, and 42 percent is forest land. During the civil works construction, approximately 3,652 mu of land will be temporarily occupied. Along with land acquisition, 140,422 square meters of houses will be demolished, about 25 percent of houses are made of brick timber, and 59 percent are brick concrete structures. According to the method described in the Chinese Land Law, the land acquisition will directly affect 3,990 persons who will totally lose their contracted cultivated land. Given that on average the affected households will lose 25 percent of their landholdings, the land acquisition could affect 19,952 persons..

141. The 50.3-km Jingxi to Longbang Class II Road, including two short border roads, will have a new alignment over 10 kilometers. It will acquire 2,055 mu of land, including 38 percent paddy field, 20 percent dry land, and 24 percent forest land. It will also demolish 4,885 square meters of brick concrete houses and 4,340 square meters of brick timber houses. The total people actually affected by land acquisition will be 1,340 households or 6,020 people, and those affected by house demolition will be 95 households or 427 people. The 37-km Napo to Dingye Class II Road will acquire 1,262 mu of land, of which 54% is cultivated land which will partially affect 2,899 persons. It will also require the demolition of 1,000 m<sup>2</sup> of rural houses, requiring the relocation of 10 households with 36 persons. The 117-km Tianlin to Leye Class III and IV Road will acquire 613 mu of land, of which 72% is cultivated land which will partially affect 868 persons. It will also require the demolition of 5,200 m<sup>2</sup> of rural houses, requiring the relocation of 52 households with 233 persons. The 106-km De'e to Shali Class III and IV Road will acquire 327 mu of land, of which 27% is cultivated land which will partially affect 413 persons. It will also require the demolition of 2,101 m<sup>2</sup> of rural houses, requiring the relocation of 21 households with 90 persons.. The sites for 50 township bus terminals will be selected and provided by the township governments, mainly from state-owned land. The selection of the 750 km of the village road upgrading and the potential resettlement impacts will be determined during project implementation.

142. For people unavoidably affected, the resettlement objective is to achieve equal or better income and living standards in line with the PRC Land Administration Law (1998), State Council Document No. 28, and the ADB's Policy on Involuntary Resettlement. According to the policy and basic socioeconomic conditions among project counties, land compensation standards have been established based on 16 to 21 times the average annual output value (AAOV).. For structures to be demolished, replacement value will be provided to the affected households based on compensation rates adopted in Baise City.

143. The total resettlement budget estimate for the Project expressway is CNY 523.6 million (US\$ 69 million). This includes compensation for land, housing, other assets, moving allowances, assistance for vulnerable groups, infrastructure, administration, taxes, monitoring and evaluation, and contingencies.

## **G. Risks**

144. The project is being designed to reduce potential technical, economic, financial and social risks. The main technical risks are associated with the design and construction of the many medium and large bridges and eleven tunnels. To minimize risks, international consultant has been included in the consulting services to review detail design of the bridges and the design and construction methodology of the tunnels. There is still a risk however, that further detail geological investigation will reveal adverse geological conditions which may increase cost and/or change the alignment.

145. There have been some problems on expressways in China with early pavement damage from overloaded vehicles. This overloading is still prevalent even with increased enforcement.

The preliminary pavement design has been checked and has been found to take account of this overloading. To further minimize risk an international consultant has been included in the consulting services to review detail pavement design. The introduction of weight based tolls for freight traffic will help to reduce pavement overloading.

146. To minimize construction risks the prequalification of contractors will focus on their financial and technical capabilities in handling similar works. During the construction period, monitoring and contract management information systems will be set up and implemented, with the assistance of the international consultants, for timely identification of technical problems and implementation of corrective measures. GCD has a satisfactory track record in implementing internationally financed projects.

147. The financial risk associated with the construction and operation of the expressway will depend on the actual level and composition of traffic, the construction costs, the ability of the commercial management, and the tolls charged. Traffic volumes on other expressways in Guangxi and elsewhere in the western provinces have been low in the early years of operation leading to financial returns less than expected. Forecasts in the TA allowed for this by ramping down traffic forecasts in the first years of operation. To control the financial risks, it has been recommended that GCD create a commercial business environment for expressway operations. In addition the central and Guangxi governments will need to inject substantial equity into the project expressway, including taking on additional short term loans.

148. Social risks have been identified and appropriate mitigation measures are in place in the Resettlement Plan and the EMDP. These are discussed further in **Appendix 20**.

## **V. RECOMMENDATIONS**

149. It is recommended that the government and GCD give consideration to the PPTA consultants recommendations listed below. These recommendations are discussed further in the Appendices and Supplementary Appendices.

### **A. Road Design, Operation and Safety**

150. Detail design of the civil works and results of all soil and geological testing be included in the bidding documents so as to minimize later variations in cost. In particular a full site investigation should be carried out for each long tunnel and major bridge.

151. As part of the final design, a risk management plan should be prepared to cover areas of safety concern during construction, especially construction of bridges and tunnels.

152. During construction, using the risk management plan, a comprehensive risk management system should be put in place. This should include a value engineering workshop to identify, evaluate and assess the risks, ownership of risks by various responsible people, regular meetings for risk monitoring, contingency plans put in place, etc.

153. During the final design stage, GCD should consult local residents in order to optimize the location of underpasses and local bridges.

154. Access roads to villages used during construction should be fully rehabilitated by the contractor to at least all-weather standard, and where new tunnel or bridge access roads pass close to settled areas the contractor be required, as part of the contract, to maintain and leave these roads to all-weather standard.

155. An independent road safety audit of the road should be carried out after final design and again during construction.

156. GCD should make a commitment to safety by ensuring that road maintenance and road improvement works by GCD staff and contractors strictly follow relevant MOC regulations for road works in progress.

157. The expressway company should prepare an ITS plan for the expressway that should include adoption of a toll payment system allowing for cash and non-cash use and that can be integrated into a future system for other Guangxi expressways. It should use ITS technology to; monitor the full length of the alignment; detect weather at high risk locations; monitor and enforce speed limits and vehicle load limits; monitor and enforce toll payments, and interface with incident management systems.

158. GEAB should prepare an asset management system and organizational structure and staff training to ensure high-quality management of the expressway asset. It should coordinate all expressway companies in Guangxi to prepare an asset management database capable of recording and comparing key data for the effective management of expressway maintenance activities.

159. GCD or GEAB should update and implement the Road Asset action plan (Supplementary Appendix 5) for expressways in Guangxi.

## **B. Transport Services.**

160. To help improving the accessibility of isolated rural and border communities, expand the network of formal bus services and broaden the benefits of the Project's expressway and local road components, it is recommended that the Project should include:

- construction of 48 Class V bus stations throughout the project area and two Class III stations at Longbang and Yuexu; Longbang and Yuexu will also benefit from border trade assistance under the project (see below)
- extension of rural bus licensing reforms, including the introduction of a regional bus operating license, to the routes centered on Jingxi's two bus stations so as to provide incentives for operators to customize their routes, schedules and services to attract demand, raise productivity, lower costs and more closely meet the needs of rural communities.

161. It is also recommended that, prior to loan negotiations:

- GCD should (i) finalize designs and revise cost estimates for the Longbang and Yuexu Class III bus stations and prepare (i) an EIA, (ii) a RP in case land acquisition and relocation of activities is necessitated, (iii) a financing plan and (iv) approved arrangements for participation by private operator/s in the management and operation of the stations
- GCD should, in conjunction with local governments and potential private-sector partners, prepare financing and management plans for the remaining 48 Class V bus stations.

## **C. Regional Cooperation**

162. To benefit international traffic between Guangxi (and beyond) and Vietnam, including smallholder livestock and small-scale trade between the poor communities on both sides of the border, it is recommended that the Project should include:

- upgrading of the 1.4 km access road to livestock and border market at Naxi (Longbang), where a major trade facility is planned, at a cost of CNY 97.4 million (\$ 1.0 million).

upgrading of the 1.6 km access road to the border at Yuexu, where another major trade facility is planned, at a cost of CNY 7.0 million (\$ 0.9 million).

163. The border communities served are among the poorest in the region affected by the project. The benefits will be magnified by other project components: the project expressway, the Jingxi-Longbang rural road component, and the bus stations and route licensing reforms that will improve the availability, efficiency and quality of rural transport services.

164. It is also recommended that the Project should include the provision of selected facilities and items of equipment to meet expected demands for freight transshipment and storage at the Wantong Logistics Center and Free Trade Zone at Pingxiang, on the main Nanning-Hanoi corridor, one of the key GMS North-South Economic Corridors. Total estimated cost is CNY 79.47 million (\$ 10.06 million).

#### **D. Small Business Development**

165. In line with ADB's own poverty reduction strategy it is recommended that project social and poverty interventions are incorporated through fostering partnerships with local government strategies and programs. Current government actions to encourage small business and diversification include:

- Provision of micro credit;
- Technical training to farmers for agricultural diversification and expansion;
- Technical training for non-agricultural work;
- Promotion of tourism;
- Construction of rural roads

166. These activities will continue throughout and the components are an integral part of planned government poverty alleviation programs in the project area. and it is anticipated that the project's road improvements will complement and work to magnify the impacts of these programs.

167. GCD will seek the cooperation of PADO and other agencies to coordinate and harmonize poverty alleviation activities with project road improvements to ensure that the combined impact results in the greatest degree of poverty alleviation possible. Specifically, GCD should seek an agreement with local agencies to develop markets at the two Class III bus stations at Longbang and Yuexu to enhance small business in the area. GCD will evaluate and report on the degree to which cooperation and agreement have been achieved..

#### **E. Institutional Arrangements**

168. GCD's intention to set up the Guangxi Communications Investment Group (GCIG) is endorsed. GCIG's responsibilities will include financing, implementation, operations and maintenance of expressways. It is recommended that construction and operations be separated within GCIG and inter-entity financial arrangements set up that will keep large long term liabilities off the operating entity's balance sheet. Both GCIG and its operating subsidiary should become corporatized.

#### **F. Private Sector Participation**

169. There is no scope for PSP in implementation of the proposed expressway – its expected financial performance is too weak. An O&M concession, including debt service, could be awarded after several years' operation (financial projections indicate that internal cash would

just cover long term debt after six years). However, it is recommended that such an award, in joint venture with GCIG, be made jointly with the Nanning-Baise expressway.

### **G. Road Funding**

170. Toll revenues in Guangxi have not kept pace with claims on them. Although revenue during the tenth five year plan (TFYP) period covered operations, maintenance and loan interest charges, it was insufficient to meet principal repayments as well. It is recommended that, to reducing the gap, GCD introduce weight based tolls, following the recent example set in several other provinces.

### **H. Financial Provisions**

171. It is recommended that the most important provisions for the expressway operating entity to negotiate with both the GCD and its creditors include: (i) an acceptable debt service coverage ratio; with a minimum debt service coverage ratio higher than 1 after a specified number of years (present indications are that long term debt service cover would reach unity after six years' operations) and (ii) a maximum proportion of revenue lost through toll exemptions.

### **I. Environmental Protection**

172. The consultant urges GCD and its related divisions to review the suggested environmental clauses included in the SEIA and insert them into the contract specifications section of the bid documents and recommends the following actions:

- Implement vegetation rehabilitation and soil conservancy actions during construction and operation;
- Minimize woodland acquisition along G324 in Wangdian and Yongle Townships. since these have abundant woodlands which should not be lost;
- protect local natural landscape, avoid high fill and deep cut section when possible.
- Protect Chengbihe River as it enters the reservoir;
- Manage traffic congestion during construction so as to avoid long delays and maintain safe conditions, and,
- Employ local farmers for environmental mitigation activities they are skilled to undertake, e.g. the revegetation and replanting activities.

### **J. Vehicle Emissions**

173. Guangxi Province should consider the provision (at cost) of catalytic conversion kits for 1995-2001 vehicles <3 tons, and legislating their installation. Emission testing should be added to vehicle fitness inspections, with the sample size doubled or tripled from the present small number (<0.2 percent). Fines should also be increased dramatically. The further aggressive conversion of large trucks and buses to bio-diesel and LPG/LNG would be an important step toward reducing large transport-related urban air pollution, particularly SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

174. To begin this shift, Guangxi Communication Bureau should take the lead by having all its vehicle equipped with catalytic converters and an increasing number of diesel-powered vehicles converted to bio-diesel (e.g. *Jatropha curcus* , or soybean ) or LPG/LNG, with a goal to converting its entire fleet by 2010. State owned bus companies should, via policy changes, be required to make this conversion by 2010.

175. Secondly the province needs to enact a regulation which a) require catalytic converters to be installed on all vehicles after model year 1997, by 2009 and b) have serious non-compliance fines identified. The target percentage of fitness inspections and the inclusion of air emissions should be increased to at least 0.5 percent of the fleet, using a stratified random sampling approach.

## **K. Social and Poverty Reduction**

### **1. Recommendations for Mitigating Measure**

176. There is a risk that the project will increase infections from transmittable diseases. These include HIV/AIDS, sexually transmitted infections (STI), hepatitis C (HCV), typhoid, encephalitis, malaria and hepatitis. To minimize this risk as much as possible appropriate mitigating measures must be included as part of the loan agreement. Therefore, an action plan for the control of transmissible diseases will be funded as part of the loan.

177. **Control of Transmissible Diseases:** GCD will ensure that specific actions for the control transmissible diseases are undertaken for the construction of the expressway and rural roads. It is recommended that GCD implement this plan through cooperation with the Baise Disease Control Center (BDCC) which would take the lead role to plan, coordinate and monitor activities in each county. BDCC has demonstrated strong support for this action plan and has prepared proposals for undertaking the work. The action plan will include both a component for the control of HIV/AIDS/STI and a component to control outbreaks of typhoid, encephalitis, malaria and hepatitis C during construction activities.

178. It is estimated that the total budget of the HIV/AIDS/STI component would be 1.3 million Yuan. Implementation of the activities to control HIV/AIDS/STI should begin 3 months prior to the commencement of civil works.

179. Actions for control of typhoid, cephalitis, malaria and hepatitis would include:

- Monitoring for transmissible diseases;
- Monitoring of biological media for transmissible diseases (rat types and density, mosquito types and density);
- Enhance the management of migration populations and implement quarantine for malaria; and,
- Monitoring of drinking water in construction sites and resettlement sites.

180. It is estimated that the total budget of the HIV/AIDS/STI component would 1.5 million Yuan.

181. **Monitoring of Human Trafficking:** The project will ensure that appropriate information on the risk of human trafficking is provided to the communities along the expressway and rural roads. It is recommended that GCD implement this plan through cooperation with the Public Security Department in each county. Measures to provide awareness and prevent trafficking are being undertaken currently by Public Security Departments and Women's Federation (WF). It is recommended that GCD work through these agencies to monitor human trafficking and ensure the project does not negatively impact on human trafficking.

182. **Protection of Communities from Construction Disturbances:** GCD will ensure that construction contracts contain clauses to prohibit night time construction, ensure the restoration of damaged to irrigation and drainage systems caused by construction activity and the building of pedestrian crossing, over/under passes and culverts. Construction contracts should contain

penalty clauses for contractors that pollute surface drinking water or leave damage or debris behind.

183. **Resettlement:** A resettlement plan has been formulated for the project that will ensure adequate compensation for affected people. A special fund of 1 percent of the total resettlement cost will be used to provide necessary help for vulnerable people. Vulnerable people include the elderly, disabled, households headed by women, extremely poor households, and Yao people. In addition, people affected by the land acquisition and resettlement of the project will be offered training for livelihood restoration and agricultural techniques. Resettlement organizations at all levels will include staffs that are members of minority nationalities. Ethnic minorities and their representatives have participated in resettlement consultations and it is recommended that this participation continue throughout the resettlement process.

## 2. Recommendations for Enhancement Measure

184. **Assurances For Local Employment and Appropriate Employment Standards:** GCD will ensure that project construction contracts include clauses to encourage local employment for construction and maintenance. GCD will ensure that employment opportunities are announced to local communities and will also ensure that contractors conform with appropriate labor laws and standards. GCD will monitor the use of local labor and appropriate labor laws and standards within the first 3 months of the commencement of each construction contract and take appropriate action to improve the employment and compliance if needed.

185. **Linking Project Road Improvements with Government Poverty Alleviation Programs:** Current government programs to reduce poverty in the project area will be ongoing throughout the life of the project. Linking the project's road improvements with these poverty reduction interventions will complement and work to magnify the impacts of these programs and those of the project. Therefore, GCD will seek the cooperation of PADO and other agencies to coordinate and harmonize poverty alleviation activities with project road improvements to ensure that the combined impact results in the greatest degree of poverty alleviation possible. Specifically GCD should seek agreements with PADO and other agencies to ensure that villages along the project's expressway corridor and rural roads are targeted for poverty alleviation programs. Similarly, GCD should link its selection of village roads to poverty alleviation plans in the project area. GCD should also seek an agreement with local agencies to develop markets at the two Class III bus stations at Longbang and Yuexu to enhance small business in the area. GCD will evaluate and report on the degree to which coordination has been achieved and the resulting poverty alleviation impact in the project area. GCD should establish strong working relationships with PADO and other agencies involved in poverty reductions programs to regularly obtain relevant poverty monitoring reports and data.

186. **Micro-Credit:** PADO is currently supporting micro-credit for poor farmers to diversify and expand farming activities and to start up small businesses. It is recommended that GCD consider the augmentation of this program to increase the number of loans, especially for poor ethnic women. The construction tax from the project will be paid to each county in accordance with the construction work undertaken in each. In total this will amount to 242.6 million Yuan in additional tax collected at the county level due to the project. GCD should, therefore, seek an agreement with county governments to use 40 million (16.4 percent) of the construction tax to increase the number of micro-credit loans available to poor ethnic minority villages.

## **L. Rural Roads**

187. The rural road component should be regarded as an integral part of the project and its implementation ensured by the commitment of the requisite funds from GCD.

188. Local transport bureau should hold discussions with the local Poverty Alleviation Office (PAO), Minority Department and other agencies responsible for implementing rural development and poverty reduction programs so as to coordinate their efforts in townships and villages subject to project rural road improvements. These efforts should primarily involve increased technical advice on land development, cultivation and livestock-raising and improved access to credit.

2. It is recommended that contractors implementing rural road improvements employ as much local labor as possible and use labor-intensive methods where possible. Priority should be given to members of poor and minority households.

3. GCD and officials at the county level should undertake a thorough review of maintenance arrangements for rural roads and should apply the directives<sup>20</sup> being piloted in three cities to the project area. They should update the rural road maintenance action plan (**Appendix 6**) and implement it during the operation of the Project. They should also encourage contracting or sub-contracting maintenance arrangements to small maintenance companies made up of residents of townships and villages as recommended in the new regulations.

4. GCD should recruit a specialist independent consultancy or academic institution to carry out the proposed monitoring plan for the rural road component.

## **M. Resettlement**

189. . GCD should strictly follow relevant resettlement policy and compensation method; fully consider the actual situation of local building material, building standard and cost; lay down relevant compensation standard, to pay the compensation to household.

2. GCD should follow the Land Administration Law and Basic Farmland Protection Regulation. With the land compensation, the government shall organize to reclaim farmland of the same quality and quantity as was taken;

3. GCD should consider travel/access needs of the villagers living on both sides of highway and arrange necessary passages to avoid inconvenience of the village and ensure safety;

<sup>20</sup> Document 49 and 400, see Appendix 6.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b></p> <p>Sustainable economic growth and poverty reduction in Guangxi Province and the project area</p> <p>Promote cross-border trade with Vietnam</p>	<p>Gross domestic product (GDP) is forecast to increase per annum during 2010-2020 at 6% to 7%.</p> <p>Per capita rural income in Project area will increase from CNY 1,726 in 2005 by 10% p.a. to 2016.</p> <p>Poverty incidence in the Project area will be reduced from 30% in 2006 to 15% in 2016</p> <p>Value of trade through Longbang and Yuexu to increase by a minimum of 10% p.a. for 10 years</p> <p>Head of livestock traded through Naxi to increase by 10% p.a. for 10 years</p>	<p>Guangxi Yearbook      Statistic</p> <p>City and County Statistical Data</p> <p>Statistics offices at provincial and county level. Poverty Alleviation and Development Offices</p> <p>Longbang and Yuexu statistics compiled by Baise border trade officials</p> <p>Naxi statistics compiled by Baise border trade officials</p>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Government Investment projects implemented as planned</li> </ul> <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>PRC-Vietnam incorporate Longbang Class I status in border trade agreement; Yuexu border market proceeds as planned</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Existing Naxi market facility is not expanded as planned</li> </ul>
<p><b>Outcome</b></p> <p>An efficient, safe, reliable, and environmentally sustainable road transport system developed in the project area</p>	<p>Traffic volume for the expressway increased from 6,500 passenger car units (pcu) in 2012 to 20,700 pcu in 2022 and 33,152 pcu in 2032</p> <p>Travel time for the expressway reduced from 6 hours before project to 2 hours after project</p> <p>Travel distance is reduced by 34 km from Baise to Guizhou border after the Project.</p>	<p>Collection of actual traffic data at the expressway through its auto-monitoring system by the Guangxi Communications Department (GCD)</p> <p>Traffic counts and travel time survey for the expressway and local roads by GCD</p> <p>Project Completion Report</p>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Assumed economic growth rates of over 6% p.a. continue.</li> <li>Transport operators and drivers realize the benefits of using the expressway</li> </ul> <p>Contiguous section of expressway in Guizhou Province complete in 2012</p> <p>GCD demonstrates the capacity to implement the Project</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	<p>The road accident rate using G324 is reduced from 1.5 per million pcu-km to 1.0 by 2016</p> <p>The percentage of administrative villages with paved roads access increases from 53% to 70% by 2010, and 90% by 2015</p> <p>An estimated saving of 76 million liters of petrol and thousands of tons of pollutants over a 20-year projection period, and a marked improvement in air quality along GH 324</p>	<p>County statistics .Accident statistics from the Guangxi Public Security Bureau and hospitals</p> <p>Statistics offices at the provincial and county levels</p> <p>Measurements by local EPB and EMS</p>	<p>The nationwide road safety program is effectively implemented</p> <p>Government Investment projects are implemented as planned</p> <p>Revised standards enforced on Guangxi roads</p>

<p>The rural poor will have improved income-earning opportunities and social activities</p> <p>Road transport services improve in productivity, availability and</p>	<p>Reduced bus fares and freight rates on rural roads by 10% by 2016.</p> <p>Number of tonne-km reported by Baise City increases from 1.7 billion by 30% over next 5 years</p> <p>The percentage of transport expenses of total expenses increases from an average of 9.1% in 2006 to 12% in 2016</p> <p>Income from non-farm sector increases from 15% of total income in 2005 to 30% by 2016</p> <p>Cash crop output value increases from 18 % of total rural output value in 2005 to 25% in 2016.</p> <p>The number of tourists visiting Baise increases from 4.05 million in 2005 to 10 million by 2016</p> <p>Bus network coverage and service frequency increases</p>	<p>Monitoring of fares and rates by GCD</p> <p>Statistics offices at the prefecture and county levels</p> <p>Household survey by consultants</p> <p>Household survey by consultants</p> <p>Household survey by consultants</p> <p>Baise Tourist Bureau</p> <p>Length of licensed bus route, by class of route, from Baise transport administration officials</p>	<ul style="list-style-type: none"> <li>Operating cost savings realized by commercial vehicle operators are passed on to road users</li> <li>Transport services improve shortly thereafter the improvement of road access</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Assumed economic growth rates of over 6% continue</li> </ul> <p><b>Risks</b></p> <ul style="list-style-type: none"> <li>Transport administration officials fail to permit additional route licenses; provision of bus</li> </ul>
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Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
affordability	<p>Bus service availability increases from 50% of villages in 2006 to 90% by 2016</p> <p>Productivity of buses increases by 10% p.a. from 170km/day for medium bus and 30km/day for small bus.</p> <p>Fares rise by less than the Guangxi CPI for 5 years</p>	<p>Proportion of villages served by licensed bus services, from Jingxi transport administration officials</p> <p>Frequency of bus services operating from project bus stations and frequency of bus services on local roads upgraded under the project, from Baise transport administration officials</p> <p>Average utilization of buses, in kms p.a., from operator and terminal records in Jingxi</p> <p>Actual fares charged for rural bus services in Jingxi</p>	<p>stations meets indifference from potential route operators</p> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Development of licensed bus services will not increase the costs or lower the frequency of service to users</li> </ul> <p><b>Risks</b></p> <ul style="list-style-type: none"> <li>Transport administration officials fail to permit operators to utilize buses on additional routes</li> <li>Jingxi TAD fails to implement pilot project in bus route regulatory reform</li> </ul> <p>Jingxi TAD fails to allow fare discounting for services under pilot project</p>

Increased opportunities for small-scale traders	Value of small-scale cross-border trade in Jingxi County increases from 380 million CNY by 25% p.a. for 3 years	Statistical Trade Data in Jingxi Cross Border area	Government continues to expand the range, scale and geographic scope of approved border-trade activities
<p><b>Outputs</b></p> <p>1. Road infrastructure and associated equipment and facilities improved along the expressway between Baise</p>	Road capacity increased to 35,000 pcu per day at opening in 2012 by building a 177-km expressway	Project Completion Report (PCR)	<p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Construction of bridges may be delayed because of their number</li> </ul>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>and Longlin</p> <p>2. Road infrastructure and associated facilities improved for 4 rural roads in the Project area.</p>	<p>Vehicle operating costs in 2016 for a car reduced from CNY0.38 per vehicle-km in the base case to CNY0.25 per vehicle-km in the project case in 2016</p> <p>Safety audits implemented during design and construction.</p> <p>Equipment procured and installed for road maintenance, road safety, toll collection, communications, traffic management, vehicle weigh bridges, and office administration</p> <p>Welfare of those affected by land acquisition and resettlement are re-established to at least the same level as before land acquisition</p> <p>Poor and minority households are better off</p> <p>Environment at the project site protected and adverse environmental impacts minimized by implementing mitigation measures</p> <p>The welfare of minorities protected and the Project's adverse impacts minimized</p> <p>Control of HIV/AIDS and health risks for construction workers and service providers</p> <p>310 km of rural roads upgraded in the project area</p>	<p>Direct measure of vehicle operating costs by GCD</p> <p>Progress Reports (PRs) and PCR.</p> <p>PAM, PRs and PCR</p> <p>Regular monitoring by an independent institute engaged by GCD during resettlement implementation, at completion and 2 years after</p> <p>Environmental monitoring reports, PAMs, and PCR</p> <p>PAM, EMDP monitoring and evaluation reports and PCR</p> <p>Monitoring by the Guangxi Health Bureau and Baise Disease Control Center</p> <p>PCR</p>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Recommendations of the safety audits are implemented by GPCD</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Economic conditions continue to improve which enables APs to restore their living standards and vulnerable groups to improve their living standards</li> </ul> <p>Commitment of GCD supervision consultants, and contractors to implementation of mitigation measures</p> <p>Adequate implementation of complementary activities by local government</p> <p>The funding for the Baise Centre for Disease Control is sufficient to monitor activities</p> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>GCD's capacity to plan and coordinate with local governments the timely implementation of rural roads.</li> </ul>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>3. Provision of road access to poor villages</p> <p>4. Improvement to public transport in the project area</p> <p>5. Border trade facilitated</p> <p>6. Corporate governance promoted in expressway operations in Guangxi Autonomous Region.</p> <p>7. Private sector participation encouraged in the project expressway</p>	<p>Average road capacity of rural roads increased to 1,500 pcu per day for Class IV and 12,000 pcu per day for Class II at opening</p> <p>Implementation of monitoring and evaluation for the rural road component</p> <p>750 km of Class IV and lower roads constructed to villages</p> <p>Construction of 48 Class V and 2 Class III bus stations</p> <p>Implementation of pilot project in regulatory reform in Jingxi</p> <p>Upgrading of access road improvements to Naxi livestock market and Yuexu border market</p> <p>Autonomous expressway operator established with clear financial goals and separate financial reporting.</p> <p>An operation and maintenance concession awarded when the expressway meets the required financial performance</p>	<p>PPMS and PCR</p> <p>PAMs and PCR</p> <p>PPMS and PCR</p> <p>PAMs and PCR.</p> <p>PAM and PCR</p> <p>PAM and PCR</p> <p>Midterm review missions and PCRs.</p> <p>PCRs</p>	<ul style="list-style-type: none"> <li>• Timely completion of quality facilities</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Funding for county rural road development plans not sufficient</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>• Suitable selection, implementation and procurement.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Unforeseen problems with availability of land; projects are unattractive for private-sector participation</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• GCD fails to approve relaxation of route license and fare controls</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Planned market improvements at Naxi and Yuexu are not implemented</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>• Provincial government approval will be given in a timely manner.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Few private firms are interested in the expressway's operations.</li> </ul>

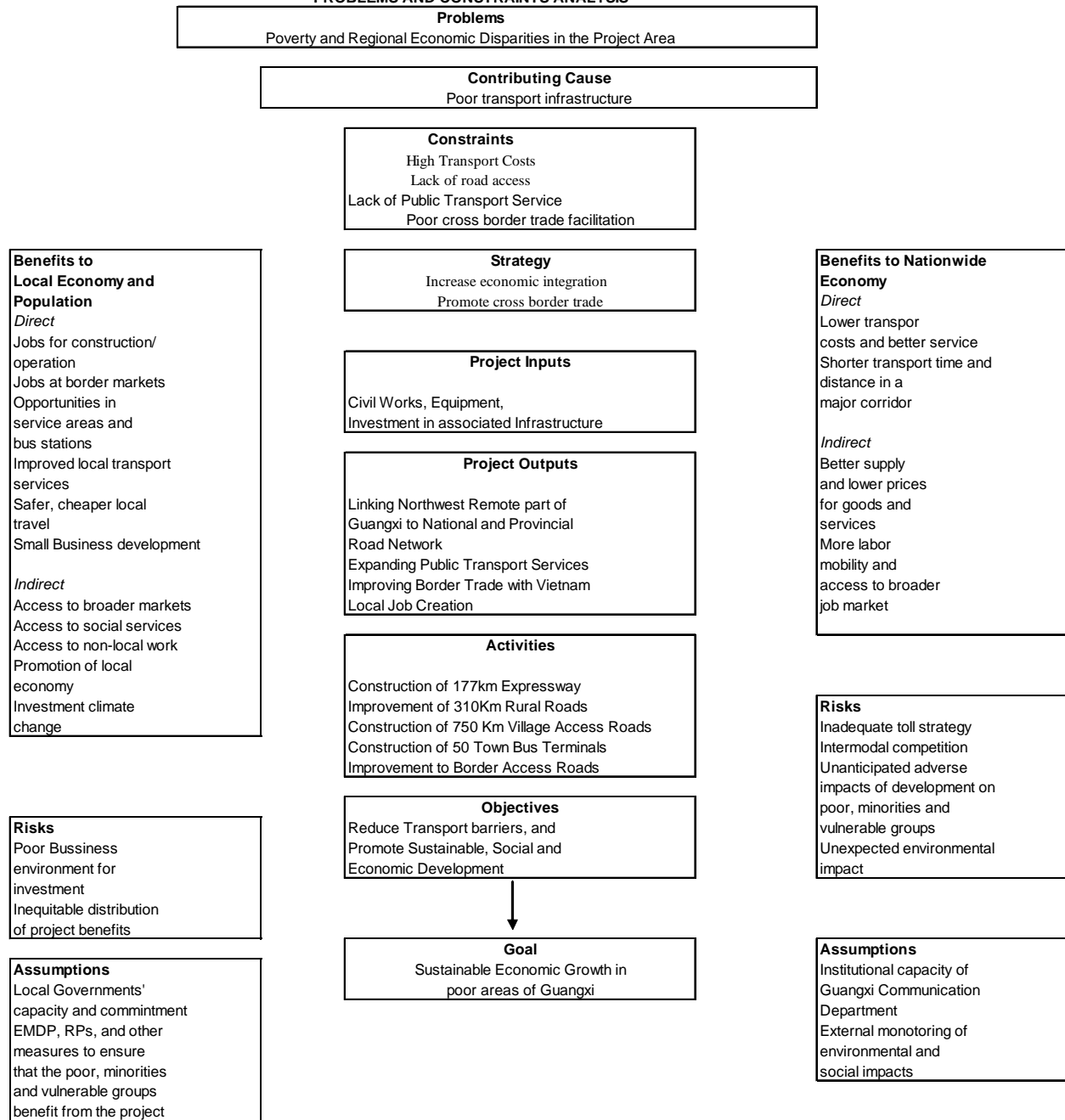
Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>8. GCD and domestic consultant capacity strengthened in asset management, quality control, expressway operations and commercialization and ADB procedures.</p>	<p>70 person months of international training will be provided for GCD staff. On-the-job training of domestic consultants will be provided by the international consultants.</p>	<p>A report by international consultants on the capacity building component.</p>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>• Consultants are recruited in a timely fashion and perform well in providing training to GCD.</li> <li>• Trainees apply what they have learned.</li> </ul>

<p>9. Asset Management. Upgrading of operations, maintenance and management systems.</p>	<p>Implementation of a 'whole life' asset management plan for expressway and rural roads by expressway company including asset management training</p> <p>Private sector participation introduced through tendering of highway maintenance</p> <p>Introduction of new funding regulations for rural roads in project area</p>	<p>PCRs.</p> <p>Annual road condition reports by expressway company</p> <p>PAMs and PCR</p> <p>Annual reports from GHAB and Baise CB PAMs</p>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>• Commitment by GCD to implement plan and training.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>• Few private firms are interested in the expressway maintenance</li> </ul> <p>Commitment by GCD to implement new regulations Guangxi wide</p>
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Activities with Milestones			
<p>1. Implementing and supervising expressway works.</p> <p>2. Installing Equipment</p>	<p>Civil works contracts awarded by September 2007 and completed by March 2012.</p> <p>Equipment procured by December 2011.</p>	<p>Asian Development Bank \$300 million</p> <p>MOC \$170</p>	

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
3. Implementing Resettlement Plan		Resettlement Plan (RP) updated prior to civil works, land acquisition completed by December 2007, and rehabilitation of APs completed by end of 2008	GZARG \$512
4. Establishing a road maintenance management system		An action plan prepared by 2010	Domestic loans \$541m
5. Providing Consulting and training services		Consultants recruited by December 2007 and completed by March 2012.	
6. Implementing and supervising upgrading of rural and village roads		Civil works contracts awarded by December 2007, and completed by December 2010.	
7. Implementing and supervising upgrading of bus stations.		Contracts awarded by December 2007 and completed by December 2010	
8. Implementing and monitoring the EMP		Commence in October 2007 and continue until project completion	
9. Implementing and monitoring the EMDP.		Commence in October 2007 and continue until project completion	
10. Implementing and monitoring measures for prevention of HIV/AIDS and other transmissible diseases		Commence in October 2007 and continue until project completion	
			(Above includes expressway, rural and village roads and ADB financing share of equipment and bus stations)

**PROBLEMS AND CONSTRAINTS ANALYSIS**



## ROAD SECTOR ANALYSIS

### A. Road Network

1. The road network of the People's Republic of China (PRC) was 1.93 million km in 2005, an increase of 60,000km over 2004. Of this, 1.59 million km were to class III standard or better. Roads of class II and above accounted for 326,000km, 17 percent of the total. Road density has increased from 12.8km per 100 km<sup>2</sup> in 1997 to 20.1km per 100 km<sup>2</sup> in 2005. In 2005 Guangxi's road network accounted for 3.2 percent of the country's total. By 2005 it had a total length of 62,000km. Of this, 51,000km (82 percent) were classified: 1,411km to expressway standard (2.3 percent); 546km to class I (0.9 percent); 6,299km to class II (10.2 percent); and 42,790km to class III or IV (69 percent). Unclassified roads amounted to 10,957km (17.7 percent). Road density in Guangxi in 2005 was 27km per 100 km<sup>2</sup>, slightly higher than the national average.

### B. Vehicle Fleet and Traffic

2. In 2005 the PRC vehicle fleet had 31 million trucks, cars and buses and 720,000 other motorized vehicles (motorcycles and agricultural vehicles). Between 1985 and 2005 the privately owned fleet of motor vehicles increased more than 60 times, from 0.3 million vehicles to 18.5 million. Indicative of recent and continuing growth is the sale of 5.2m vehicles during the first nine months of 2006 alone<sup>21</sup>, a 25 percent increase over the same period in 2005. Despite the rapid increase in total vehicles, there are still only about 24 vehicles per 1,000 people, fewer than in other Asian countries. The PRC's accession to the World Trade Organization has increased investment in the automobile industry, reduced the tariffs on imported vehicles, and contributed to easing motor vehicle financing. These factors, plus rapidly growing urban incomes, underpin the growth in road traffic. The modernization of the vehicle fleet will improve vehicle safety and reduce individual vehicles' fuel consumption and their emissions<sup>22</sup>. In 2005, the number of vehicles registered in Guangxi was 380,000 passenger vehicles and 195,000 freight vehicles. At 12 per 1,000 head of population, vehicle ownership is about half the national average. Road passenger traffic in Guangxi measured in terms of passenger-km of travel grew by 9.3 percent per year between 1995 and 2005, exceeding the national average of 7.3 percent. Road freight traffic, in tonne-km, grew at 6.1 percent per year over the same compared with 6.4 percent nationally.

### C. Road Administration

3. Guangxi Communications Department (GCD) regulates the road transport industry in Guangxi by licensing drivers, vehicles and intercity bus services. Freight transport is essentially deregulated. Interprovincial bus routes still require the approval of each province's Transport Administration Bureau (TAB). Through trucking reforms, there has been an increase in private operations resulting in improved transport efficiency and quality of services and increased competition. ADB supported this process through a technical assistance (TA)<sup>23</sup>, which was completed in August 2005. Following up on this TA this project aims to help improve the performance of the road transport industry by formulating policy reforms in passenger services in the project area and improving fifty bus stations in the project area. Road administration is decentralized. Bus fares are allowed within a range of

<sup>21</sup> Source: China Daily AutoChina supplement, 18/19 Nov 2006.

<sup>22</sup> However, the luxury segment of car sales from Jan-Sep 2006 grew by 79 percent compared with the same period in 2005 (more than any other)

<sup>23</sup> ADB 2004: *Technical Assistance to the People's Republic of China for Policy Reform in Road Transport*.

15 percent above a benchmark price plus tolls, taxes and bus station charges. Benchmark prices are set by local TABs or by GCD and the price bureau as appropriate. Freight rates are fully deregulated.

#### **D. Road Sector Revenue and Expenditures**

4. Expenditures in highway infrastructure are financed from dedicated user charges, government grants, domestic bank loans and bonds, and foreign loans and investments. Historically, two dedicated user charges, the road maintenance fee and vehicle purchase tax, have provided much of the financing for the road sector, but this has been replaced by increased dependence on loan finance. During the tenth five year plan, 2001-2005, the road maintenance fee and vehicle purchase fee provided 15 percent and 16 percent, respectively, of the total road investments, while loans provided 46 percent. The rest was financed from bonds and subsidies (6 percent), passenger and freight surcharges (5 percent), the transport management fee (1 percent) and provincial budget allocations (less than 1 percent). Although shown as a revenue item, toll income (10 percent of the total) has by law to be used to service debt and meet toll road operating expenses.
5. As part of a tax reform to bring off-budget revenue and expenditures within the framework of the national budget, the National People's Congress passed amendments to the Highway Law on 31 October 1999. The amendments laid the foundation for future legislation providing for national taxes to replace provincial and local fees. The vehicle purchase fee was replaced by the vehicle purchase tax effective January 2001. Although a fuel tax was proposed in 1997 as a replacement for the road maintenance fee, it has still not been introduced. Based on findings of an ADB-financed TA<sup>24</sup>, introduction of a fuel tax should improve financing of the road sector.
6. In 2005 GCD invested CNY7.6 billion in new road construction, including rehabilitation projects, and CNY960 million in maintenance. During the 10th Five-Year Plan (2001–2005), total investment amounted to about CNY33 billion (excluding debt service costs) with an annual growth rate of 13 percent. GCD plans to approximately double road investment during the 11th Five-Year Plan (2006-2010).

#### **E. Road Engineering, Construction and Maintenance**

7. The overall responsibility for road planning, construction and maintenance in PRC lies with MOC, which guides network management and sets national standards and regulations.
8. Road projects are designed by planning and design institutes at the provincial, prefecture, and county levels. MOC reviews the designs of expressways, high-standard roads, and associated structures. Design institutes are staffed by experienced, well-qualified personnel. The city and county highway bureaus have their own construction units to carry out minor projects within their administrative districts. Drawing on the experience gained under ADB- and World Bank-financed projects, competitive bidding practices were mandated by the 1999 Tendering and Bidding Law<sup>25</sup>. Many of the largest provincial and urban construction units are being reorganized into financially independent companies and have been awarded contracts individually or as partners in joint ventures on several ADB- and World Bank-financed projects, both within the PRC and internationally.

<sup>24</sup> ADB 1998: *Technical Assistance to the People's Republic of China for Regional Road Sector Study*, Manila.

<sup>25</sup> ADB helped develop the implementing regulations – ADB 1997: *Technical Assistance to the People's Republic of China for Establishment of National Procurement Regulations for the Public Sector*, Manila.

9. In Guangxi, GCD is responsible for the development of policy, strategy and the formulation of medium-term and long-term construction plans and the examination and approval of construction projects. It also has overall responsibility for road maintenance.
10. At present, Guangxi Communication Infrastructure Administration Bureau (GIAB) constructs, and Guangxi Expressway Administration Bureau (GEAB) operates and maintains expressways in Guangxi<sup>26</sup>. Expressway construction and operation are in the process of being separated from the provincial government following agreements reached between ADB and GCD under the two ongoing ADB-financed projects (Guangxi I and Guangxi II). Dialog during ADB-financed projects have led to the creation of the Guangxi Southwest Expressway Company (SWEC). A concession framework agreement between the Company and GCD was reached in September 2005. The SWEC is responsible for operation of Guangxi I and Guangxi II projects. Guangxi Highways Administration Bureau (GHAB) is responsible for the management, new construction, improvement works and maintenance of all other roads. GHAB has overall responsibility for the maintenance of non-expressway national roads, provincial roads and the main county roads. Actual maintenance is carried out by fourteen subsidiary Communication or Highway Bureaus, each of which is responsible for these types of roads within each of Guangxi's fourteen city and regional areas. For most county (Class III highways and below) and township roads, maintenance is carried out through the regional Communication Departments and delegated to county and township authorities.
11. Arrangements for rural road maintenance changed in October 2005 with the issue of Document 49<sup>27</sup>, strengthened by Document 400<sup>28</sup> in August 2006. More detail can be found in Supplementary Appendix 10, but, put briefly, the new arrangements aim to (i) guarantee certain minimum levels of maintenance funding, (ii) make county governments responsible for village roads, (iii) strengthen the planning and survey needed for maintenance and (iv) open bidding for road maintenance at all levels to companies.

#### **F. Government's Rural Road Development Program**

12. By the end of 2005 the total highway length in PRC was 1.92 million km, of which 1.46 million km were county and township roads. In addition to these documented roads there are an estimated 1.54 million km of simple village to village roads, 64 percent of which are unclassified and 77 percent unpaved. By the end of 2005, 99.8 percent of townships and 94.3 percent of administrative villages had vehicle access. During the tenth five year plan the total investment on construction of rural roads was CNY417.8 billion, about three times the amount spent in the 9th FYP. By the end of the 11th FYP it is proposed that all townships will have asphalt or cement concrete road access. All administrative villages in the east and central regions of PRC will also have asphalt or cement concrete road access while in the west most administrative villages will have all weather vehicle access. To achieve this it is proposed to spend CNY100 billion for asphalt and cement concrete pavement roads and another CNY40 billion to provide vehicle access roads to the remaining villages. It is expected that a total of 810,000 km of rural roads will be constructed or upgraded, including 200,000 in the east, 500,000 in the central region and 110,000 in the west.

<sup>26</sup> As most expressways are quite new, especially in the western provinces, maintenance requirements are still minima

<sup>27</sup> 22 October 2005, issued by the administration office of the State Council

<sup>28</sup> Issued by MOC, MOF and NDRC: *Notice for reform of rural highway management and maintenance mechanism.*

13. By end of 2005, all townships in Guangxi had vehicle access, all weather access in 80 percent of cases. Over 91 percent of administrative villages had vehicle access, 27 percent of which were all weather. By the end of the 11th FYP (2010) it is planned that all townships and administrative villages shall have all weather access. This will require construction or upgrading of 223 township roads and 1,262 village roads.

## **G. Road Transport Services**

14. The PRC's road freight transport industry is made up of state-owned enterprises (SOEs), joint-venture firms, private companies, own-account operators and smaller private owner-operators. Forwarders play a role in consolidating shipments and negotiating volume rates, but are not yet well-established. Entry to the trucking industry is now relatively easy, helping to ensure competition in all but specialized markets. Guangxi's road transport operates competitively and relatively efficiently.
15. Compared with other countries, bus services are extensive and frequent, even on relatively minor routes. The range includes long-distance 40-45 seat express services based in provincial centers and operating on inter-provincial/inter-city routes, medium-distance 18-30-seat buses based in county/township centers, and smaller 6-8-seat microbus/van services linking villages to township centers. The inter-city services are usually offered by provincial- or municipal-owned enterprises but there are growing numbers of private operators. The range and availability of services falls away with distance from county and township centers, of course, but where demand exists there are usually services – formal or informal – available to accommodate it. Bus productivity in the project area is low as a result of thin demand, poor roads and inefficient scheduling.
16. The project's transport services component is intended to help spread the benefits of improved accessibility by expanding the availability and improving the efficiency and affordability of rural passenger services. This will be done by helping GCD and the county CBs to (i) develop their planned network of bus terminals in townships and villages which, together with the subsidy scheme, will result in an expansion of the network of formal bus routes and (ii) relax restrictions that prevent operators from customizing their routes, schedules, services and, potentially, prices to attract demand, raise productivity and more closely meet the perceived needs of users.

## **H. Policy Dialogue**

17. ADB has been undertaking policy dialogue on the PRC road sector since 1991. The principal issues addressed include the poverty impact of road projects, highway design standards, and construction quality, road safety, vehicle emissions, pricing policies, commercialization and corporatization, and nongovernmental financial resources. The status and achievements to date are summarized in the following table.

Table A2.1: Roads Sector Policy Reform Plan

Initiative	Current Status	Actions	Target Date
1. Poverty impact	All projects financed by the Asian Development Bank (ADB) in the People's Republic of China (PRC) country assistance plan are located in poorer central and southwest regions	Project identification and design assisted through technical assistance (TA) 3086-PRC: <i>Regional Road Sector Study</i>	Recommended investment packages taken up for the 10th Five-Year Plan (10FYP)
	Rural road components are included in all expressway projects	Poverty impact of transport projects assessed through:  TA 5947-REG: Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction  TA4322-PRC: Poverty Impact of Area Wide Road Networks	Completed in 2005  Completed June 2006
		Monitoring framework and indicators prepared under TA 3900-PRC: <i>Socioeconomic Assessment of Road Projects</i>	Completed in 2004 Results of the TA adopted for designing poverty monitoring system for ADB-financed road projects
		ADB loans for expressway projects finance the local road component (\$26.5m as part of the Western Guangxi Roads Development Project)  (\$1.25m for new bus stations as part of the Western Guangxi Roads Development Project)	Being implemented since 1995
2. Road design standards and construction quality	Inadequate highway design standards for vehicle mix and road conditions	Ministry of Communications (MOC) engineering standards were revised and reissued on 1 March 2004	New design standards applied from 1 March 2004
		Production of highway design manual to complement MOC standards in areas such as identification of accident black spots	Highway design manual adopted by selected executing agencies and design consultants
3. Road safety	High fatalities in PRC in 2005, 98,378 and 3,489 in Guangxi province. Both show improvements over 2004: PRC down 8 percent, Guangxi 7 percent	Road safety program for Heilongjiang province prepared under TA 2177-PRC: <i>Preparation of a Road Safety Program</i>	Recommendations disseminated in 1999–2000
		Recommendations of TA 5620: <i>Regional Initiatives in Road Safety</i> adopted by the PRC.	Being implemented in 10FYP
	Poor safety design, lack of attention to safe roads, inadequate traffic enforcement, driver training and limited use of seat belts	Public awareness in road safety raised and the Ministry of Public Security's capacity strengthened in traffic safety, planning, and management under TA 3341-PRC: <i>Capacity</i>	The new Traffic Safety Law became effective on 1 May 2004. Among other things, it

Initiative	Current Status	Actions	Target Date
	contribute to poor safety record	<i>Building in Traffic Safety, Planning, and Management</i>  Safety audits to be carried out with assistance from the consultants	mandates the use of seat belts  Prior to construction and opening of the Project
4. Vehicle emissions	Vehicle emission is becoming a primary source of air pollution in major cities Vehicle inspection and monitoring program	Leaded fuel banned for motor vehicles. European vehicle emissions standards adopted for all new vehicles  Vehicle testing and monitoring promoted under TA 5937-REG: <i>Action Plans for Reducing Vehicle Emissions</i>  Chongqing Municipal vehicle emission reduction guidelines prepared and the relevant action plans developed	Completed in 2002 Implemented by vehicle size in 2001–2005  Implemented in 2002–2005  Recommendations being considered in Guangxi province
5. Transport Services	Low vehicle utilization, high operating costs and unprofitable bus routes because of restrictive regulations.	Road Passenger Transport Action Plan prepared under ADB TA 4351: <i>Policy Reform in Road Transport</i> .	Completed 2005.
6. Road pricing	Tolls structured so that users pay for operating and maintenance expenses and a portion of debt service in most provinces  Introduction of weight based tolls will reduce overloading and maintenance expenses	Toll levels set for ADB projects set to ensure limited cost recovery.  Weight based tolls, including penalty tolls for overweight vehicles, introduced in some provinces, e.g. Tianjin 2005 and Anhui 2006. Under consideration in Guangxi.  Guangxi tolls reviewed by GCD.  Toll diversion manual disseminated under TA 3102-PRC: <i>Toll Diversion Study</i> .	Annual review of tolls    New tolls in Guangxi scheduled for January 2007
7. Corporatization	Lack of a legal agreement between provincial communications departments and expressway companies  Expressway construction and operations are undertaken by Guangxi Communications Department	A model concession framework agreement prepared under TA 2592-PRC: <i>Corporatization, Leasing, and Securitization in the Road Sector</i> .  O&M Framework prepared for this project	Main findings published by the book entitled “The New Frontier: Investing in Toll Roads” in 2003.
8. Commercialization	Present practices do not take full advantage of possible revenues from expressway operations.	Commercialization of operations will be required by a corporate development plan.	GCD studying proposals.
9. Financial mobilization	Financing requirements for road infrastructure investments are increasing  Refinancing or leasing arrangements for selected road sections in place in several provinces	Results of TA 2409: Appraisal Methodologies and Restructuring Highway Financing in Hebei Province under consideration  BOT guidelines and feasibility study for a pilot project prepared under TA 2649-PRC: <i>Facilitating the BOT Modality in the Highway Sector</i>	Implementation of recommendations during 10FYP  BOT road projects are planned by Guangxi Government during 10FYP  ADB's Private Sector Department actively looking for

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Initiative	Current Status	Actions	Target Date
		Assistance provided through TA 2592-PRC: Corporatization, Leasing, and Securitization in the Road Sector	a road BOT project
		ADB-financed Jilin expressway company and Changyong expressway corporation securitized as part of stock listing	Stocks listed in 1999

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Source: PPTA Consultants and Asian Development Bank.

**GUANGXI ROAD SECTOR REVENUE AND EXPENDITURES: 2001-2010****(CNY million)**

Item	10th FYP					Total	11th FYP
	2001	2002	2003	2004	2005		2006-2010
<b>Revenue</b>							
1. Road maintenance fee	1,057.6	1,186.2	1,253.7	1,398.2	1,636.1	6,531.9	5,810
2. Toll revenue	461.4	669.7	734.5	1,022.9	1,276.6	4,165.2	
3. Surcharge on passenger tickets	359.1	325.1	294.5	346.3	315.9	1,640.9	
4. Freight surcharge	104.9	113.2	115.0	124.6	151.8	609.5	
5. Transport management fee	62.4	62.5	61.0	69.1	80.4	335.4	
6. State bonds and subsidies	576.3	976.0	325.0	300.0	322.5	2,499.8	1,050
7. MOC subsidy (including VPF allocation)	829.9	1,121.6	1,413.5	1,234.9	2,328.1	6,928.0	14,610
8. Provincial budget allocation	30.0	15.0		60.0	26.7	131.7	
9. Bank loans	661.9	955.4	5,294.7	5,907.3	6,646.0	19,465.2	18,810
10. Private capital							50,120
<b>Total</b>	<b>4,143.3</b>	<b>5,424.8</b>	<b>9,491.9</b>	<b>10,463.4</b>	<b>12,784.1</b>	<b>42,307.4</b>	<b>90,400<sup>a</sup></b>
<b>Expenditure</b>							
1. New construction and rehabilitation	3,872.6	3,124.3	5,069.6	7,181.7	7,563.7	26,811.9	88,900
2. Traffic safety supervision	80.3	29.5	36.9	38.4	50.9	235.9	
3. Major maintenance	124.9	137.0	150.8	193.3	11.7	617.6	
4. Medium maintenance	531.9	514.0	522.7	488.7	783.5	2,840.8	
5. Routine maintenance	56.2	77.2	93.7	109.0	164.2	500.4	
6. Road administration, design costs etc	66.7	102.7	103.7	138.7	179.7	591.4	
7. Repayment of interest and principal	1,723.6	1,103.6	2,382.2	2,013.9	2,580.6	9,803.8	
8. Transport service expenditure	110.9	116.8	147.1	162.0	368.9	905.7	1,500
<b>Total</b>	<b>6,567.1</b>	<b>5,204.9</b>	<b>8,506.7</b>	<b>10,325.6</b>	<b>11,703.1</b>	<b>42,307.4</b>	<b>90,400<sup>a</sup></b>

Source: Guangxi Communications Department

Note: (a) 11<sup>th</sup> FYP values not available in same format as those for 10<sup>th</sup> FYP. For more details see Supplementary Appendix 9.

## EXTERNAL ASSISTANCE TO THE ROAD SECTOR

Table A4.1: Asian Development Bank-Financed Loans

No.	Loan Number	Loans	Express -way (km)	Local Road (km)	Loan Amount (\$ million)	Date Approved
1	1082-PRC	Shanghai Nanpu Bridge	—	—	70	28 May 91
2	1168-PRC	Shenyang–Benxi Highway	75	—	50	2 Jul 92
3	1188-PRC	Shanghai Yangpu Bridge	—	—	85	17 Nov 92
4	1261-PRC	Hunan Expressway	52	—	74	9 Nov 93
5	1262-PRC	Jilin Expressway	133	—	126	9 Nov 93
6	1 324-PRC	Heilongjiang Expressway	350	—	142	29 Sep 94
7	1325-PRC	Yunnan Expressway	200	—	150	29 Sep 94
8	1 387-PRC	Hebei Expressway	200	179	220	28 Sep 95
9	1 388-PRC	Liaoning Expressway	110	203	100	28 Sep 95
10	1470-PRC	Chongqing Expressway	89	—	150	27 Sep 96
11	1483-PRC	Shenyang–Ji nzhou Expressway	192	291	200	19 Nov 96
12	1484-PRC	Jiangxi Expressway	134	253	150	19 Nov 96
13	1617-PRC	Hebei Roads Development Project	140	340	180	18 Jun 98
14	1638-PRC	Chengdu–Nanchong Expressway	208	300	250	10 Nov 98
15	1641-PRC	Changchun–Harbin Expressway: Hashuang Expressway	101	—	170	27 Nov 98
16	1642-PRC	Changchun–Harbin Expressway: Changyu Expressway	161	—	220	27 Nov 98
17	1691-PRC	Southern Yunnan Road Development Project	147	540	250	24 Jun 99
18	1701-PRC	Shanxi Road Development Project	176	418	250	30 Sep 99
19	1783-PRC	Chongqing–Guizhou Roads: Leichong Expressway	50	122	120	21 Nov 00
20	1784-PRC	Chongqing–Guizhou Roads: Chongzun Expressway	127	704	200	21 Nov 00
21	1838-PRC	Shaanxi Roads Development	176	627	250	30 Aug 01
22	1851-PRC	Guangxi Roads Development	179	507	150	30 Oct 01
23	1918-PRC	Southern Sichuan Roads Development	160	558	300	20 Sep 02
24	1967-PRC	Shanxi Road Development II Project	65	70	124	12 Dec 02
25	2004-PRC	Ningxia Roads Development Project	182	400	250	11 Sep 03
26	2014-PRC	Western Yunnan Roads Development Project	77	294	250	28 Oct 03
27	2024-PRC	Xi'an Urban Transport Project	71	16	270	27 Nov 03
28	2089-PRC	Hunan Roads Development II Project	173	517	312.5	9 Sep 04
29	2094-PRC	Guangxi Roads Development II Project	188	750	200	21 Oct 04
30	2125-PRC	Guangxi Roads Development Project	231	470	300	13 Dec 04
31	2181-PRC	Central Sichuan Roads Development Project	244	678	600	22 Sep 05
	2219-PRC	Hunan Road Development III	64	129	208	15 Dec 0
	2247-PRC	Heilongjiang Road Network Development	128	170	200	26 July 06
<b>Total</b>			<b>4,583</b>	<b>8,536</b>	<b>6,571.5</b>	

km = kilometer, PRC = People's Republic of China,

Source: Asian Development Bank estimates.

**Table A4.2: Asian Development Bank-Financed Technical Assistance**

No.	TA Number	Technical Assistance	Type	Amount (\$'000)	Date Approved
1	1049-PRC	Huangpu Bridge	PP	95	24 Oct 88
2	1152-PRC	Design Review of the Nanpu Bridge	PP	100	26 Apr 89
3	1509-PRC	Ningguolu Bridge	PP	100	18 Apr 91
4	1517-PRC	Toll Bridge Operations and Management	AD	760	28 May 91
5	1533-PRC	Design Review of the Yangpu Bridge	AD	100	10 Jul 91
6	1664-PRC	Shenyang–Benxi Highway	PP	100	22 Jan 92
7	1533-PRC	Design Review of the Yangpu Bridge (supplementary)	AD	416	28 Apr 92
8	1724-PRC	Institutional Strengthening for Highway Operation and Management Improvement	AD	500	2 Jul 92
9	1725-PRC	Jilin Province Highway Network Study	PP	600	2 Jul 92
10	1728-PRC	Changsha-Xiangtan Expressway	PP	100	9 Jul 92
11	1785-PRC	Comprehensive Toxic and Hazardous Chemicals Transport Management Plan in the Huangpu River Basin	AD	600	17 Nov 92
12	1940-PRC	A study of Efficiency Improvements in Road Transport	AD	550	25 Aug 93
13	1972-PRC	Institutional and Policy Support in the Road Sector	AD	1,200	9 Nov 93
14	1975-PRC	Policies for Strategic Development of Transport and Communications Infrastructure	AD	100	11 Nov 93
15	1981-PRC	Heilongjiang and Yunnan Expressways	PP	320	16 Nov 93
16	2155-PRC	Sichuan Expressway	PP	350	16 Sep 94
17	2177-PRC	Preparation of a Road Safety Program	AD	600	29 Sep 94
18	2178-PRC	Provincial Highway Network Planning	AD	600	29 Sep 94
19	2195-PRC	Hebei and Liaoning Expressways	PP	560	31 Oct 94
20	2212-PRC	Beijing Urban Transport	AD	715	28 Nov 94
21	2302-PRC	Symposium on Urban Transport	AD	100	22 Feb 95
22	2409-PRC	Appraisal Methodologies and Restructuring Highway Financing in Hebei Province	AD	740	28 Sep 95
23	2482-PRC	Liaoning and Jilin Expressways	PP	400	18 Dec 95
24	2486-PRC	Jingxi Highway	PP	250	20 Dec 95
25	2573-PRC	Review of Highway Design Standards	AD	420	24 May 96
26	2649-PRC	Facilitating the Build-Operate-Transfer Modality in the Highway Sector	AD	1,100	27 Sep 96
27	2663-PRC	Hebei Roads Development	PP	600	16 Oct 96
28	2777-PRC	Chengdu to Nanchong Expressway	PP	600	07 Apr 97
29	2846-PRC	Changchun-Harbin Expressway	PP	600	22 Aug 97
30	2952-PRC	Corporatization, Leasing, and Securitization in the Road Sector	AD	1,000	17 Dec 97
31	3033-PRC	Shanxi Expressway	PP	570	24 Jun 98
32	3039-PRC	Yunnan Road Environmental and Social Analysis	PP	150	07 Jun 98
33	3086-PRC	Regional Road Sector Study	AD	1,180	13 Oct 98
34	3102-PRC	Preparing the Chongqing-Guizhou Expressway	PP	900	26 Nov 98
35	3220-PRC	Preparing the Guanxi Highway	PP	540	07 Jul 99
36	3248-PRC	Preparing the Shanxi and Shaanxi Roads	PP	640	30 Aug 99
37	3341-PRC	Capacity Building Safety, Planning, and Management	AD	600	14 Dec 99
38	3546-PRC	Preparing the Southern Sichuan Roads Development	PP	800	16 Nov 00
39	3569-PRC	Jiangsu Highway BOT Project	AD	555	12 Dec 00
40	3642-PRC	Preparing the Western Yunnan Roads Development	PP	770	20 Mar 01
41	3376-PRC	Preparing the Ningxia Roads Development	PP	600	16 Nov 01
42	3900-PRC	Socioeconomic Assessment of Road Projects	AD	250	12 Aug 02
43	3907-PRC	Preparing the Xi'an Urban Transport Project	PP	750	27 Aug 02
44	3929-PRC	Preparing the Hunan Roads Development	PP	600	23 Sep 02
45	4119-PRC	Preparing the Guangxi Roads Development II	PP	500	23 May 03
46	4211-PRC	Preparing the Guangxi Roads Development	PP	500	5 Nov 03
47	4274-PRC	Preparing the Central Sichuan Roads Development	PP	700	18 Dec 03
48	4322-PRC	Poverty Impact of Area Wide Road Networks	AD	1,000	26 Mar 04
49	4351-PRC	Policy Reform in Road Transport	AD	500	24 Jun 04
50	4384-PRC	Preparing the Hunan Roads Development III	PP	500	2 Sep 04
51	4592-PRC	Heilongjiang Road Network Development	PP	500	2 Jun 05
52	4639-PRC	Western Roads Development	PP	800	30 Aug 05
53	4650-PRC	Evaluating Poverty Impacts of Transport Projects	SS	150	21 Sep 05
54	4671-PRC	Rural Road Development Strategy	AD	250	21 Oct 05
55	4698-PRC	Road Safety Improvements	AD	625	24 Oct 05

No.	TA Number	Technical Assistance	T ype	Amount (\$'000)	Date Approved
56	4773-PRC	Xinjiang regional Road Improvement Project	PP	600	21 Mar 06
57	4782-PRC	Central Yunnan Road Development	PP	500	28 Apr 06
58	4792-PRC	Guangxi Longlin-Baise Expressway	PP	500	26 May 06
<b>Total</b>				<b>30,806</b>	

AD = advisory, PP = project preparatory., km = kilometer, PRC = People's Republic of China,  
Source: Asian Development Bank estimates.

**Table A4.3: Other Funding Sources**

No. of Loans	Organization	Road	Loan Amount	
		Length (km)	Unit	Total
38	World Bank	10,598	\$ million	7,109
16	Japan Bank for International Cooperation	1,695	Yen million	219,036

Km = kilometer

Source: Asian Development Bank Estimates

## TECHNICAL AND DESIGN SUMMARY

1. The Longlin-Baise Expressway (LongBai) is a 177km highway linking Baise City in northwestern Guangxi to the border with Guizhou province in Longlin County. At its southern end it connects with the Nanning (Tanluo)-Baise Expressway and at its northern end to the planned Guizhou expressway network system linking Xingyi City, to Kunming Province. In Guangxi, the project will be the final section of the Beihai/Fangcheng Port-Guizhou border expressway corridor that includes the Bank-financed TanBai Expressway and is also one section of the Shantou to Kunming national E-W corridor.
2. The Project Expressway will run parallel to and take traffic from the existing G324 national highway. G324 is a mixture of poor Class III and Class IV road with pavement less than 8.5 meters wide and no shoulders. The asphalt pavement is in poor condition in many places, mainly due to the many heavy overloaded trucks that travel its length. Much the highway is in mountainous country and has tight curves and steep grades. Sections are already at capacity and there are many delays to traffic for a number of hours when trucks brake down, a common occurrence. Although the time to cover the 193 kms from Baise Town to the Guizhou Border can be as low as five hours for freight traffic, it is frequently many hours more.
3. The expressway will pass through Youjiang District and Tianlin and Longlin counties, the two latter ones are national poverty counties. It will also, through rural roads provide direct access to the poverty counties of Xilin, Leye and Lingyun. The total population of this direct project area is 2.34 million of which 649,780 or 28 percent are poor. The economic development of all these counties depends, to a large part, on good transport connections.
4. The alignment starts at Banba Village on the Nanpan River, the border with Guizhou. An extra large bridge will be required to cross this river.
5. The terrain through which the expressway, especially in the northern section, has steep sided valleys and, in some places, steep longitudinal slopes. The limestone geology has produced weathered fractured rock slopes prone to land slips and limestone karsts are subject to frequent collapse. Extensive geological testing will be carried out at bridge and tunnel sites and around proposed steep, high cuts.
6. The alignment runs mainly through the same valley system as the existing G324 and the Nanning-Kunming railway, except for a section between Weile to Shali (km 5 to 22 km) where it diverts to the west to take a shorter alignment. This section contains two medium tunnels (1.7 and 1.6 km long).
7. The alignment leaves the NanPan river, crosses the existing G324 and follows a small river valley to Weile interchange. The Longlin town connector road (22 km) joins at this interchange. It then climbs out of the watershed to 700m altitude, staying around this height until it rejoins the G324 alignment at Shali Interchange (access to the Shali-Xilin local road). It then stays west of G324 until the Juizhou interchange, which gives access to a minor road to Guizhou.
8. The alignment then joins the Leli river valley, which it follows for the next 100km. The alignment crosses and recrosses G324 four times before reaching Bantiao (Town) Interchange at km 63, where it meets and crosses the main Nanning-Kunming railway, recrossing it at km 66.5 and then crossing G324 and the end of the new Pingyi reservoir on a large bridge. It then stays on the slope of the valley with a series of bridges and small tunnels to km 80 where it crosses to the eastern side of the valley, over the G324 and the railway up

and down two small valleys to avoid a large bend in the river valley and stays on the eastern slopes of the valley until Tianlin Interchange at km 95. The alignment then stays on the eastern slopes, crosses over the Leye (local) road to descend to again cross the rail, G324 and river at km 111, skirts the side of the new Wangdian reservoir to leave the Leli river at km 125, following the western side of a tributary with the rail and G324 finally crossing the watershed at km 137 (elevation 330m). The alignment then briefly leaves G324 to enter the Chengbi river valley which it follows to the outskirts of Baise. Close to Baise the alignment travels close to the Chengbi Reservoir Scenic Area (km 146), using viaduct to cross the northern edge of the reservoir. It crosses the Chengbi river on a large bridge (km 158), heading east of Baise town to the proposed Nawu Interchange which will give a second access to Baise town and to the future Baise-Hechi Expressway. It then circles the town to cross the railway and G324 one last time before joining the Nanning(Tanluo)-Baise Expressway at Sitang – km 177.6 .

9. The major components of the expressway are set out below

**Table A.5-1 Expressway Components**

Item	Unit	Quantity	Remarks
Tunnels	Length m/No.	7,076/11	Longest 1.7km
Large/Extra Large Bridge	Length m/No.	53,081/173	Longest 934 m
Medium Bridge	Length m/No	1,044/14	
Stoneworks	m <sup>3</sup> '000	39,950	
Pavement	m <sup>2</sup> '000	2,320	
Interchange	No	10	

10. The project is designed as a four-lane expressway (two lanes in each direction). Two different technical standards were adopted due to complex topographic and geologic conditions along the route: (i) from Km 0 to Km 114, the design speed is 80kph with a sub-grade width of 24.5 m; and (ii) from Km 114 to K177, the design speed is 100kmh and sub-grade width of 26 m.
11. The project also includes a 22 km connecting road to Longlin county town, 10 interchanges, one monitoring center, one monitoring sub-center three service areas, two rest areas, two maintenance areas, and electrical and mechanical equipment (E&M) for maintenance operations and management. E&M equipment includes toll, telecommunications, and traffic monitoring systems, safety and fire emergency facilities in tunnels and road maintenance equipment.
12. Earthworks and stoneworks are estimated at 39.9 million m<sup>3</sup> of cut and 37.2 million m<sup>3</sup> of fill. The total length of the 187 medium and large bridges total 54 km and 11 tunnels total 7.1 km. LongBai construction should last 48 months; the opening to traffic is planned for March 2012.
13. A asphalt concrete pavement has been recommended with an 18cm asphalt surface, a 60cm cement stabilized base and sub base and a 15cm graded aggregate subgrade capping layer. This pavement thickness should be adequate to withstand the high proportion of heavy vehicles in the traffic flow.
14. The reasons for asphalt cement pavement were:
- The alignment passes through Karst areas and sections of poor geology, especially in the mountainous terrain, there is, therefore, a concern about

possible post construction settlement. If there are some areas of settlement it is much easier and cheaper to repair asphalt than cement concrete.

- The expressway alignment is in the same corridor as the existing road and thus goes close to inhabited areas. Driving on ribbed cement concrete causes more noise pollution than asphalt.
- An anti-skid layer can be incorporated in asphalt concrete surfaces. This is important in the mountainous areas.
- The pavement of the two contiguous expressways, Nanning-Baise and Longlin to Xingyi in Guizhou are designed for asphalt concrete. For conformity it would be best to use this material throughout.

15. A joint foreign–local team will carry out the supervision of LongBai civil works and E&M works. Contracts will be open for domestic and international firms. The supervision office will be staffed by domestic consultants. International experts will assist the chief supervision officer and support domestic firms in managing and supervising project contracts, bridge works, environmental and other monitoring. The tasks of domestic supervision firms are estimated to require 6,360 engineering persons per month and the tasks of the international supervision firm are estimated at 54 persons per month.

16. During operation of LongBai, weight based tolling will be introduced for truck traffic and all trucks will be weighted when leaving the expressway; heavily overloaded trucks, however, will not be allowed on the expressway.

17. The project will involve land acquisition and resettlement, which will be financed from domestic sources.

## RURAL ROAD COMPONENT

### A. Existing Situation

1. Guangxi Highways Administration Bureau (GHAB) is responsible for the management, construction, improvement, and maintenance of all roads above county level. For national, provincial and county roads (up to Class II highways), GHAB carries out maintenance of the roads. However, for county (Class III highways and below) and township roads, maintenance is carried out through the regional Communication Departments and delegated to county and township authorities: for county and township roads the county is responsible for maintenance, while for town and village roads the local traffic administration bureau is responsible.
2. Although general administration of the local road network remains with Baise City (Prefecture), maintenance and management of the road network is the responsibility of the counties within the city. Most road maintenance funds are used to maintain roads that are class III or above. Maintenance of unclassified roads (over 45 percent of the network) is carried out by local people using their own resources. In Baise City, there are approximately 7,077 kilometers (km) of roads, of which 3,166 km are unclassified.

**Table A6.1: Basic Local Road Data**

Location	Townships	Villages	Total Road km	Rural Road <sup>1</sup> km	Funding
Baise City.	133	1,804	7,172	6,504.8	Classified Roads Class II and above by province Classified roads below Class II: funded by counties Unclassified roads: funded by local people
Longlin	21	179	735	702.3	
Tianlin	20	165	780	775.3	
Xilin	11	93	499	456.1	
Leye	10	86	323	281.3	
Lingyun	10	110	631	545.6	
Jingxi	24	291	874	609.5	
Tianyang	15	152	535	753.3	
Youjiang	12	108	684	490.3	
Project Area	123	1184	5061	6,504.8	

<sup>1</sup>. Rural roads are roads Class II and below. Km = kilometer.

Source: PPTA consultants estimates. Baise Transport Statistics

### B. Rural Road Development Plan

3. By the end of 2010 it is planned that all townships and administration villages in Guangxi have all weather road access. This will required construction or upgrading of 223 township and 1,262 village roads. It is proposed that 100 percent of township roads be paved and 44 percent of village roads.
4. Baise City proposes to carry out 55 road construction or upgrading projects in the 11th FYP with a total investment of CNY 653 million. An additional 54 township roads will be improved to sealed pavement, as will 189 administration village roads. The total length of road to be constructed or improved is 1,415 kilometers. Details of proposed road transport development in the project area from 2006-2010 is set out in Table A6-2.

**Table A.6-2 Road Development in Project Area 11<sup>th</sup> FYP**

County/District Name	Road Construction Length and Standard (KM)			Project Investment(CNY '000)			Towns with Paved Roads	Admin. Village with Paved Roads
	Total Length	Class III	Class IV	Total Investment	Financed by GPG	Financed by Local g'ment		
Youjiang District	106	0	106	45,280	42,400	2,880	4	11
Tianyang	64	6	58	35,140	25,600	9,540	5	13
Jingxi	115	37	78	63,440	46,000	17,440	6	25
Lingyun	41	27	14	26,810	16,400	10,410	2	5
Leye	126	36	90	61,380	50,400	10,980	5	13
Tianlin	442	0	442	188,950	176,800	12,150	14	39
Longlin	384	29	355	174,800	153,600	21,200	13	63
Xilin	128	0	128	53,480	51,200	2,280	3	20
Project area	1,406	135	1,271	649,280	562,400	86,880	52	189

### C. Project Rural Road upgrading

5. The Project includes a local road component, comprising seven sections totaling 310 km, to expand the road network into rural villages inhabited by poor and improve access to border towns. Conditions of the roads vary from poor to bad, and only minimal maintenance is being carried out at present on the unclassified roads.
6. Approximately \$25.6 million of the loan amount will be used in upgrading these roads, the rest to be financed out of MOC grant and the provincial government local road improvement budget.
7. The project also includes up to 750 km of access roads to natural villages with no existing motorable access. It is anticipated that ADB will fund 24 percent of the cost of these low standard roads, a total of \$3 million. The Village Access Roads Program (VARP) aims at providing basic access to the administrative villages. Currently, 592 administrative villages have no road access in the project area. The ADB loan will be used to rehabilitate 750 km out of 4,000 km earth tracks in the project area following the village roads implementation framework (VRIF) agreed upon with GCD. Some 250,000 people will benefit from the project rural roads upgrading, of which 85% are monitories and 50% are poor.
8. The roads have been evaluated, the major cost savings will be in the form of reduced vehicle operating costs which will ultimately convert to lower agricultural input costs and higher margins for agricultural outputs. The EIRR of all the rural roads was satisfactory with an overall EIRR of 13 percent and an NPV of 45 million CYN.<sup>29</sup> A large proportion of the beneficiaries come from poor villages

<sup>29</sup> Because of late changes to the scope of the rural road program the evaluation will be revised in Final Report.

**Table A.6-4 Summary of the Rural Road Upgrading**

No	Project Name	Current Road Class	After Upgrading Standard (km)					Cost in	Cost in	ADB Fin. %	ADB Fin. in US\$ million
			Sub-total	Class II	Class III	Class IV	UC	CNY million	US\$ million		
1 (a)	Jingxi-Longbang	IV	47.0	47.0				235.0	30.0	35%	10.5
1 (b)	Naxi-Border	UC	1.4	1.4				7.4	1.0	35%	0.3
1 (c)	Yuxu-Border	UC	1.6	1.6				7.0	0.9	35%	0.3
2	Napo-Dingye	IV	37.0	37.0				296.0	37.8	2 sec	5.0
3	Tianlin-Leye <sup>a</sup>	UC	117.0		37.0	80.0		170.8	21.8	35%	7.6
4	De'e-Shali	UC	106.0		29.0	77.0		48.2	6.2	2 sec	1.9
5	Village access roads	Foot-path	750.0				750.0	97.5	12.6	24%	3.0
		Total	<b>1060</b>	<b>87</b>	<b>66</b>	<b>157</b>	<b>750</b>	<b>862</b>	<b>110.3</b>		<b>28.6</b>

a. Reduced Class III design and upgrading on existing alignment only for Class IV sections.

Source: PPTA consultants estimates.

**Table A.6-4 Users of the Local Road Sections**

Project Name	Townships	Population ('000)	Poor Pop ('000)	Poor %	Pop/Km
Napo-Dingye	3	73.1	13.6	18.6%	1,959
Jingxi-Longbang <sup>a</sup>	5	160.8	27.9	17.3%	2,361
Tianlin-Leye	4	77.0	27.4	35.5%	659
Xilin-Shali	4	100.9	26.7	26.5%	952
Total	16	411.8	95.5	23.2%	1,254

<sup>a</sup>. Includes Wuping-Xingwang and two border roads.

Source: PPTA consultants estimates and GCD Feasibility Studies.

## D. Rural Road Maintenance

190. **Institutional Arrangement** Guangxi Highways Administration Bureau (GHAB) is responsible for the management, construction, improvement, and maintenance of most of the roads above county level. For national, provincial and some county roads (down to Class II highways), GHAB carries out maintenance of the roads. However, for most county (Class III

highways and below) and township roads, maintenance is carried out through the regional Communication Departments and delegated to county and township authorities: for county and township roads the county is responsible for maintenance, while for town and village roads the local traffic administration station is responsible.

191. **Project Rural Road Maintenance.** For the Rural Road Improvement Program (RRIP) under the Project, except for the De'e-Shali road (106-km) which will be maintained by Longlin County Communication Bureau after upgrading, the rest of roads after upgrading will be maintained by GHAB. For the Village Access Roads Program (VARP), all of the 750-km village roads after upgrading will be maintained by county and township governments with assistance provided by Baise Communication Bureau and GHAB.

192. **Policy Reform** On 22 October, 2005, the State Council set out (Document 49) new regulations for rural road maintenance. These regulations called for reform of the village road maintenance system. Under the new regulation, construction, administration, and maintenance of rural roads will have same importance. The new regulation: (i) establish a steady fund flow for maintenance to assist in enhancing the privatization of village road maintenance; (ii) demarcate responsibilities with county level governments as the main administrator for village road maintenance; and local governments should manage the fund, and ensure proper maintenance of rural roads; (iii) stipulate a specific ratio of the Highway Maintenance Fund and all the farm vehicle tax should be allocated to rural road maintenance (80% after deductions<sup>30</sup>); (iv) in special areas, central government funds can be allocated to prop the funding ability of the local governments; and (v) call for privatization of rural road maintenance. (See Box 1 Below)

193. **Alternative Strategies:** Alternative Strategies include (i) All levels of road maintenance projects be open to companies and a public bidding system be applied gradually to all projects with provincial cross border participation encouraged for qualified units. (ii) In case of lower level roads and/or harsh natural condition roads for which privatization of maintenance is not a realistic option, construction and maintenance can be combined within one contract and/or main and branch roads combined into one contract. By using such flexible contract methods, companies can contract the maintenance works to other people (farmers). (iii) encourage road maintenance units which are presently dealing with major or periodic repair works to form companies, and maintenance rights shall be awarded to the companies through bidding procedures. The established road maintenance companies will then accomplish the maintenance projects at their own risk by making contracts with workers.

- Local government at prefecture, county and town level shall plan rural road financial budget and arrange funding from road maintenance and farm vehicle tax and other sources;
- Integrated plans must be prepared for both rural road construction and maintenance;
- Regular surveys should be carried out to list rural road length and conditions, including unclassified roads, and a data base prepared to allow proper maintenance budgetary planning;
- The system of rural road maintenance should be improved by exploring new methods; and
- Management and administration of rural road maintenance should be strengthened and regularly assessed.

<sup>30</sup> Deductions include collection costs, traffic police and water conservancy construction fund.

194. **Recommendations.** Although major maintenance works are normally carried out by open bidding, rural road maintenance is normally carried out by force account through the local highway maintenance stations. It is recommended that maintenance units with personnel and equipment, who are dealing with major or periodic repair works, form companies and maintenance rights be awarded to the companies through bidding procedures. The established road maintenance companies will then accomplish the maintenance projects at their own risk by making contracts with workers.

195. Effective on 1 January 2007, Guangxi have adopted the new requirements (*Rural Road Maintenance Policy Reform Announcement*) and piloting them in Guilin, Laobin and Fancheng Port cities. For the pilot areas the road maintenance allocation has been increased as shown in Table A6-5. It is suggested that Baise be included in the pilot tests to ensure the rural road sustainability.

**Table A6-5: Revised Rural Road Maintenance Funding**

Class	Routine	Periodic
	RMB/km/year	RMB/km/year
County Road	5,000	7,000
Township Road	2,500	3,500
Village Road	1,000	1,000

196. **Public Bidding System.** All levels of road maintenance projects should be open to companies and a public bidding system should be applied gradually to all projects. GHAB can determine payment to companies, by considering a cost per kilometer. In case of lower level roads and/or harsh natural condition roads, however, for which privatization of maintenance is not a realistic option construction, it is suggested that construction and maintenance be combined within one contract and/or main and branch roads combined into one contract. By using such flexible contract methods, companies can contract the maintenance works to other people (e.g. villages).

**Box A1: State Council Rural Road Policy Framework (issued on 22 October 2005)**

- **Defining the roles and major responsibilities.**  
County governments are responsible for rural road development and maintenance.  
Provincial governments will be mainly responsible for funding and supervision.
- **Providing adequate funding for the rural roads maintenance.**  
Road maintenance shall receive a major share (typically not less than 80%) of the annual “road maintenance fee”. The central government funds will be allocated to prop the funding ability of local governments in the west.
- **Imposing a minimum level of funding for rural road maintenance.**  
The allocation level shall not be lower than CNY7,000 per km per annum for county roads, CNY3,500 per km per annum for township roads, and CNY1,000 per km per annum for village roads.
- **Introducing “rewarding instead of subsidizing” criteria for funding allocation.**  
Central government will allocate funds on the need-based (towards the west region). Performance indicators and proper conditionalities will be adopted.
- **Adopting more rigorous financial discipline.**  
Using reimbursement procedure in lieu of biannual appropriation to provinces.  
Promote community consultations and disclosure of monitoring results to communities.
- **Introducing market-oriented mechanism.**  
Introduce public bidding system, and cross-border participation is encouraged.

Km. = kilometer

Source: Ministry of Communications.

## RURAL TRANSPORT SERVICES COMPONENT

### A. The Rural Transport System

1. **Background.** While the provincial economy grew at 9.4 percent p.a. between 1995 and 2005, the numbers of passengers carried by road in Guangxi rose by 5.0 percent p.a. and freight tons by 3.0 percent p.a. The passenger vehicle fleet grew by 13.5 percent p.a. and trucks by 3.9 percent p.a. In 2005 there were 11.7 vehicles per 1,000 people, up from 5.3 ten years earlier. Yet most rural communities in the project area, where 28 percent of households are classified as poor, saw little of these changes. Members of the average household hardly ever travel beyond the nearest township center, and the poor rarely travel even there. 21 percent of villages had no formal bus service in 2005. Most rely on informal services that are up to twice as expensive. Village roads are in poor condition and are sometimes impassable.
2. **Transport Services.** Formal passenger services in rural areas are mostly by 6-8-seat minibuses or 15-20-seat buses. They are licensed to stop only at designated places and terminals, but few towns and none of the villages have terminals, even simple stops. Where there are no formal services, the informal sector plays an important role, especially on lower-quality roads. Generally bus services are good along routes between county and township centers, with frequencies of 10-30 minutes, but do not exist between villages and are rare between villages and townships. Overall, in 2005, all townships and 79 percent of villages in the project area had a formal service, though the proportion in Leye was as low as 48 percent.
3. **Regulatory Framework.** Responsibility for road transport administration, including licensing bus operators, trucks, buses, drivers and inter-city bus services, lies at the provincial level with GCD and at lower levels with county and township Communications Bureaux (CBs). Road safety is the responsibility of the Ministry of Public Security and its corresponding departments and bureaux in provinces and counties/townships. Licensing conditions for bus services, routes and terminals are somewhat restrictive, requiring buses and drivers to be confined to their authorized routes and schedules to be fixed by terminal operators. While freight tariffs are deregulated, passenger fares are allowed to vary within narrow bands around guideline rates set by MOC and GCD.
4. **Transport Demand and Users' Needs.** Most trips in rural areas are to buy/sell produce and for work. The average household in the project area makes 22 trips p.a. to their nearest township and only four to their nearest county center; the poor travel much less. Where formal services, which charge CNY 0.1-0.2 per km, are unavailable, fares on informal services are expensive: as much as CNY 0.40-0.50 per km. Consequently half of all trips by poor households are on foot (bicycles are unsuited to the mountainous terrain), even over distances of up to 14 km. On average, transport accounts for 4-8 percent of household expenses. For poor villages and those with poor road access, the proportion is much higher. To help bring down costs and encourage expansion of services, Guangxi discounts selected fees and taxes for buses that have at least 20 percent of their route on roads of Class IV or lower. Some 6,798 buses have benefited from this so far in 2006.
5. **Transport Plans.** In the 11<sup>th</sup> FYP period, GCD plans to have bus stations in all townships and main villages, simple bus stations in all villages on national and provincial highways and bus stops in all other villages with formal bus services. 61 Class III terminals (including 7 in Baise), 485 Class IV terminals (43 in Baise), 383 town Class V bus terminals (53 in Baise), 737 village Class V bus terminals (90 in Baise) and 20,407 simple bus stations (2,385 in Baise) will be built by 2010, with a total investment of CNY 1,724.25 million, including contributions by the private sector and a MOC grant of CNY 0.2 million for each rural station.

## B. Issues and Priorities for Improvement

6. **Freight Transport.** Since deregulation in the 1980s, Guangxi's road freight transport market operates competitively and relatively efficiently. Appropriate services are available when needed, ranging from specialized to low-cost services in rural areas. Greater efforts are needed to protect roads and bridges from damage by heavy vehicles, through restructured user charges and strengthened controls over overloading, and public safety and the environment require a more concerted national strategy. The ADB already plays a role in supporting these. Other than measures to facilitate cross-border trade and transport (see Appendix 8) and the inclusion of equipment and training to strengthen enforcement of regulations on the project expressway, however, only incremental gains can be achieved by including other regulatory measures for freight transport in the project.
7. **Rural Bus Services and Infrastructure.** Bus productivity in the project area is very low: 170 kms/day on average for medium buses and less than 30 kms/day for small buses according to official statistics (180 kms/day according to the project's surveys). This reflects thin demand, poor roads and inefficient scheduling of vehicles, in turn a function of long waiting times at terminals and an inability to rotate buses onto other routes. Unit costs are consequently high. In addition to extending the network of formal services into villages, there is a need to lower the cost of rural services by raising vehicle and driver productivity, increase competition between operators to provide users with more frequent services and a wider range of choices, and raise safety levels by bringing more of the network under the control of safety regulations.

## C. Rural Transport Services Component

8. **Rationale.** The project's transport services component is intended to help spread the benefits of improved accessibility, brought about by the expressway and rural road components, by expanding the availability and improving the efficiency and affordability of rural passenger services. This will be done by helping GCD and the county CBs (i) to develop their planned network of bus terminals in townships and villages which, together with the subsidy scheme, will result in an expansion of the network of formal bus routes, and (ii) to relax restrictions that prevent operators from customizing their routes, schedules, services and, potentially, prices to attract demand, raise productivity and more closely meet the perceived needs of users.
9. **Bus Stations.** The project will support the construction of 48 Class V and two Class III bus stations in the project area. The main criteria used in selecting the locations were that: (i) they should accord with MOC's standards and GCD's plan for 2006-2010; (ii) they should help develop bus services in areas also benefiting from the project's expressway and rural road components, ie contribute to an integrated solution to the needs of communities in the project area; (iii) they should help improve access to the poorer villages and townships in the project area; and (iv) their location and size should not result in any negative environmental impacts nor any need for compensation and resettlement.
10. Each Class V station will meet MOC standards and provide ancillary facilities for small-scale businesses where appropriate after consultations with local communities and potential operators. Each will require approximately 2,000 sq m of land, to be provided by the local governments. Estimated average construction cost is CNY 0.5 million, to be funded from the loan, a CNY 200,000 grant from MOC and contributions from local governments and/or the private sector<sup>31</sup>. Each will be managed by bus or terminal operators following tender.

<sup>31</sup> Prior to loan negotiations, the local governments will provide assurances that their contribution can be met from their own funds or that a private investor has committed to bridging the funding gap in return for operating rights.

11. The two Class III bus stations are in Longbang and Yuexu, where additional project components (see Appendix 8) will help facilitate cross-border trade and development of local businesses and employment. Each has a design volume of 2,000 passengers per day. The locations of both are near the center of town and closely integrated with planned border trade markets and freight interchange facilities. The Longbang station will have an area of 13,000 sq m; estimated cost is CNY 1.8 million, including land. The Yuexu station will be 10,000 sq m and cost CNY 1.8 million, including land. Forty percent of the construction cost of each will be financed from the project loan, CNY 800,000 will be provided by MOC and the remainder provided by the local government and private investors<sup>32</sup>. The investors, selected by tender, will have the opportunity to include additional commercial facilities within the design.
12. **Regulatory Reforms.** Regulations issued in 2005 allow, for rural bus services, some flexibility in issuing regional rather than fixed-route licenses and permitting variations from assigned routes. Baise road transport administration plans to introduce regional bus operating licenses in 2007 in three trial areas. These will allow operators to adjust their services in line with passenger needs and use their vehicles and drivers more productively. The changes are consistent with the recommendations of ADB-supported TA 4351-PRC: *Policy Reform in Road Transport*, 2006. Extension of the trial to include routes centered on Jingxi (and also serving Longbang and Yuexu) will be included in the project.
13. **Evaluation.** The combination of rural bus stations and route licensing changes will benefit passengers through (i) time savings resulting from more frequent and reliable services and quicker bus turnaround at terminals, (ii) lower fares reflecting operators' cost savings, (iii) reduced safety risk, (iv) improved amenity at terminals and (v) increased travel in response to lower transport costs and travel times. Bus operators will benefit by lower unit vehicle operating costs at higher levels of productivity and fleet savings resulting from the same level of demand being met by fewer buses. For a typical station and associated routes, bus turnaround times and average passenger waiting times at terminals are estimated to fall by 70 percent, the number of buses to be a third fewer, bus utilization (kms/day) to rise by 75 percent, average headways and passenger waiting times at the roadside to fall 14 percent, time per passenger round trip to be 30 percent lower, and unit bus operating costs to be 18 percent lower. For the typical rural terminal costing CNY 0.5 million, the economic internal rate of return (EIRR) is as high as 39 percent. Passenger time savings account for 37 percent of discounted benefits, operators' savings due to a smaller fleet 20 percent, and direct savings in vehicle operating costs 44 percent; benefits to generated traffic are negligible.
14. Moreover, for each original route, if the fleet savings were used on other routes at the higher level of daily productivity, an extra 1,680 bus-kms (13,440 seat-kms) of service could be offered each day, benefiting additional communities in the areas served by each bus station. If average occupancies and passenger trip lengths are as above, that would mean an extra 202 passengers served per day, a 51 percent increase.
15. **Integration with Other Project Components.** The program of bus stations and associated route improvements will help establish an integrated network of services that, in combination with the expressway and rural road improvements, will raise the accessibility of the areas served. Cheaper, more frequent, more reliable and safer services will improve access to jobs and education, health and welfare services, raise incomes from the sale of produce,

<sup>32</sup> Before loan negotiations, GCD will provide for each terminal (i) detailed physical plans and updated cost estimates, prepared in conjunction with the intended financier/operator, including plans for land acquisition, compensation and resettlement as required, (ii) financing plans and financial projections, identifying the loan/capital contributions of each party and the distribution of costs and revenues over 20 years of operations, and (iii) a draft agreement setting out the terms and conditions for the assignment of rights to operate the terminal.

increase the range of goods and tools available locally, and improve access to information on prices and marketing opportunities. As well as encouraging these service improvements, the bus stations will themselves offer employment opportunities, create a market for small-scale traders (of food, drinks etc) and businesses (eg vehicle maintenance and repair), access to information by public telephone, and better amenities for passengers.

16. The combination of bus stations, improved passenger services, trade-facilitating measures at the border with Vietnam and rural road improvements will help provide an integrated response to the needs of the relatively poor communities in the Jingxi-Longbang-Yuexu triangle and along the border itself, including the needs of small-scale border traders.

## REGIONAL COOPERATION AND CROSS BORDER TRADE

### A. Guangxi's Trade with Vietnam

1. The value of PRC's overseas trade has increased by 17.7 percent p.a. over the last 10 years and by 23.2 percent in 2005. Since resumption of economic relations in 1991, trade with Vietnam has grown at comparable rates: 21.6 percent overall in 2005, with exports rising by 32.5 percent. PRC is Vietnam's second-largest trading partner: excluding Hong Kong SAR it accounted for 12.6 percent of its trade in 2005. PRC-Vietnam trade is expected to reach \$10 billion by 2007.
2. Trade with Vietnam accounted for 19.1 percent of Guangxi's international trade in 2005: 22.4 percent of exports and 14.9 percent of imports. Total trade grew 20.9 percent in 2005, while trade with Vietnam grew faster, at 31.2 percent (41.7 percent for exports, 15.2 percent for imports). Guangxi's exports to Vietnam are mainly light industrial products (consumer goods, machinery, textiles) and agricultural goods with a total value of \$644 million in 2005 and it imports mainly food (seafood, cashews, fruit), synthetic rubber and minerals (iron ore, coal and manganese) worth \$344 million. Cross-border trade in goods grew by over 31 percent in 2005 and passenger crossings by over a third, rising to 4.5 million. Small-scale border trade, generally within administrative districts on both sides and no more than 20 km from the border, amounted to \$701.4 million in 2005. Small-scale traders based close to border areas benefit mostly from this. 85 percent of small-scale border exports and 77 percent of imports are traded by private enterprises and individuals.

### B. Regional Cooperation

3. Regional cooperation is strongly supported by ADB's *Strategy for Regional Economic Cooperation and Integration* (July 2006). PRC and Vietnam cooperate under Greater Mekong Subregion (GMS) initiatives; Guangxi joined the GMS in 2004. The *GMS Regional Cooperation Strategy and Program* (August 2006) aims, among other things, to facilitate cross-border movements and tourism and integrate markets to promote economic efficiency and private sector development. The *GMS Strategic Framework for Action on Trade Facilitation and Investment* covers four key activities: customs procedures, inspection and quarantine measures, trade logistics and mobility of business people. The GMS countries have signed a Cross Border Transport Agreement (CBTA) and are in the process of implementing its provisions to simplify and harmonize cross-border transport procedures and promote integrated logistics. Guangxi also participates in plans for the China-ASEAN Free Trade Area. The ASEAN member countries have agreed to bring forward their single-market target to 2010.

### C. Border Trading Ports

4. Three main crossings of Guangxi's 637-km border with Vietnam are at Dongxing, Youyiguan and Shuikou, all national-level Class I land ports through which international transport is authorized<sup>33</sup>. There is another Class I land port at Longbang and seven Class II ports, as well as 25 border trade markets. Regional trade through Youyiguan will benefit from the project by improved expressway connections to/from Yunnan, Guizhou and areas further west and north. Two of the others, Longbang (Class I) and Yuexu (Class II), will benefit from rural roads upgraded under the project<sup>34</sup>; completion of these will establish good-quality links

<sup>33</sup> To date, these include seven bus routes (Nanning-Xialong, Beihai-Xialong, Guilin-Xialong and Fangchenggang-Xian'an, all via Dongxing, Pingxiang-Liangshan via Youyiguan, and Chongzuo-Gaoping and Longzhou-Gaoping, both via Shuikou) and three freight transport routes (Fangchenggang-Xian'an, Pingxiang-Tongsheng via Youyiguan, and Longzhou-Gaoping via Shuikou).

<sup>34</sup> Jingxi-Longbang and its spur road to Renzhuang, to be upgraded from Class IV to Class II highway standard.

to the project expressway via Jingxi, Tianyang and Baise and serve border trade flows to/from Guangxi, Guizhou, Yunnan and beyond. Passenger services to/from Longbang and Yuexu will also be improved under the project by a program of bus stations and bus route reforms (see Appendix 7).

5. Longbang only recently received Class I status. The PRC-Vietnam agreement on road transport will shortly be revised to take account of this, designate international road transport routes through it, expand the scope of routes through other ports and make progress on implementing the CBTA. Until then, vehicles using the Longbang and Class II crossings, including Yuexu, must transfer their loads at the border.
6. Three provinces in Vietnam's Northeast Region are adjacent to Guangxi: Quang Ninh, Lang Son and Cao Bang, with a population of 2.33 million in 2005, 2.8 percent of Vietnam's total. These are among the poorest in Vietnam.

#### **D. Border Facilities**

7. **Youyiguan/Pingxiang.** 60 percent of Guangxi's cross-border trade with Vietnam passes through Youyiguan/Pingxiang, where the Wantong Logistics Center is shortly to open. This is a major international logistics hub, with direct access to the Nanyou expressway and a new border crossing point, providing facilities for international transport, transshipment, storage, freight forwarding, bonded warehousing, duty-free processing and assembly, office park, hotel and one-window visa processing, customs clearance, quarantine and inspection.
8. **Longbang.** An AFTA International Free Trade Area is nearing completion in the town: a 66,700 sq m logistics and transshipment park, storage/warehousing and one-window customs, quarantine and inspection facility for export cargoes. A 45,000 sq m Longbang Hulong international freight yard is being built east of the town as an alternative for mineral/ore (coal, manganese, iron ore and ilmenite) and machinery imports, the former now transshipped at three hillside locations west of the town. Longbang connects with Xionguo port in Vietnam, 5 km from Chaling county and 38 km from Gaoping City. The road linking Xionguo with Gaoping is currently being upgraded to Class II equivalent standard.
9. West of Longbang, at **Naxi**, is the only livestock border market in Guangxi, trading daily some 250 head of cattle, horses, goats and pigs from throughout Guangxi, and even as far as Guizhou and Yunnan, with the adjacent Vietnamese province of Cao Bang. A 1,000-head livestock facility opened in March 2005 is already approaching capacity. Jingxi Border Trade Bureau plans to expand this facility, almost doubling its capacity, and to develop a CNY 50 million China-Vietnam border trade "street" at the border, to provide improved facilities for traders and help generate local employment. Some 1,000 small-scale traders reportedly cross the border every day at Naxi, trading agricultural produce, utensils, poultry, livestock, fruit, timber etc with people from the adjacent Vietnamese township of Boli. The China-Vietnam border street project is expected to increase annual border trade by CNY 100 million, raise CNY 10 million p.a. in taxes and tariffs and increase local incomes by CNY 5 million.
10. **Yuexu.** Trade at Yuexu, 29 kms east of Longbang, is mostly in cement, animal feed, manganese, herbs, foodstuffs and household goods. Annual volume is about 40,000 tons. 50,000 people reportedly cross the border each year, mostly small-scale traders. The border has only a small check-point, but there are approved 11<sup>th</sup> FYP plans to develop a one-window immigration, customs, quarantine and inspection facility, offices, accommodation and freight transshipment facilities on 21,400 sq m of flat land adjacent to the border at a cost of CNY 10.46 million.

11. Yuexu is opposite Pobiao in Vietnam, which is 22 km from the center of Chongqing County and 72 km from Gaoping City. Upgrading of the road linking Pobiao and Gaoping is underway to Class II equivalent standard.

#### E. Project Components

12. **Naxi (Longbang) Border Market Access Road.** The existing access road to the livestock market and border at Naxi is an unclassified gravel road 2 km long and 3.5-4.0 m wide. There are two bridges, one 8 m long and the other 20 m long, with 2-3 m width. Average daily traffic is reportedly about 250 vehicles, but this fluctuates considerably.
13. The project will upgrade this road along its existing alignment to Class III standard, starting in Nongna village group on Provincial Highway 325, passing Naxi livestock market and ending at the border, in the planned PRC-Vietnam border street, a total distance of 2 km. The pavement will be asphaltic concrete, 8.5 m wide. The two bridges will be rebuilt 8.5 m wide. Total estimated cost is CNY 1.4 million<sup>35</sup>.
14. **Yuexu Border Access Road.** The existing access road to the border at Yuexu is a Class IV road with 6.5 m bituminous treated surface. Daily traffic is of the order of 650 vehicles. This will increase substantially when the planned new border freight station is built and Vietnam finishes upgrading the road to Chongqing, facilitating shipment of manganese and other minerals more directly through Yuexu.
15. The project will upgrade the Yuexu access road to Class II standard, starting from Provincial Highway 325 and ending at No 72 border marker, a total length of 1.3 km. The pavement will be upgraded to 9 m wide asphaltic concrete. Total cost is estimated at CNY 1.4 million<sup>36</sup>. The road will serve small-scale cross-border traffic and the new transshipment facility to be constructed behind the present border post.
16. The opening of the Wantong Logistics Center and Free Trade Zone at Pingxiang will provide a major impetus to cross-border trade along the Nanning-Hanoi corridor, one of the key GMS North-South Economic Corridors. Following discussions with GCD and the Wantong International Logistics Co Ltd, several shortcomings have been identified in the equipment and facilities required to meet expected demands for freight transshipment and storage at the Center. GCD have agreed that \$10 million of the loan be used to procure this equipment.
17. **Expected Benefits.** The benefits of the two access road improvements are difficult to quantify but are likely to be substantial. Both serve strategic border development projects that are in the 11<sup>th</sup> FYP. Both link with roads on the Vietnamese side that are in the process of being upgraded; in the case of Yuexu, this is expected to result in a significant increase in mineral/ore traffic, possibly at the expense of Longbang, which itself will benefit from recognition in PRC-Vietnam border agreements as a national Class I port and, as a result, will serve a wider variety of goods and origin/destination pairs.
18. The upgraded access roads at Naxi and Yuexu will serve two markets: longer-distance traffic, some of which will still be transshipped at the border, between Guangxi (and beyond) and Vietnam, including inter-regional livestock traffic in the case of Naxi, and short-distance trade between communities on both sides of the border that are both poorer than average. Long-distance traffic will benefit by improved border facilities and better road connections

<sup>35</sup> Preliminary designs for this access road are not yet available. Jingxi CB will need to complete these and update its estimated of construction cost, as well as carry out a survey of the requirements for land acquisition. On the basis of this, the need for a RP can be determined.

<sup>36</sup> Again, preliminary designs are not yet available. Jingxi CB will need to complete these and update its estimated of construction cost, as well as carry out a survey of the requirements for land acquisition. On the basis of this, the need for a RP can be determined.

from/to regional origins and destinations; and local border traffic by improved access to/from the border itself.

19. The equipment procured for the Wantong logistics center will enable efficient transshipment throughput at the Pingxiang facility, lowering handling costs and reducing transshipment delays for goods crossing the border, most of which will also significantly benefit from the three ADB-supported expressway projects in Guangxi, including the project expressway, as well as the ADB-supported upgrading of Highway I in northern Vietnam.
20. **Relationship with Other Project Components.** The benefits of border-trade facilitation through better border access roads will be magnified by other project components: the project expressway, which will improve regional linkages for long-distance traffic; the Jingxi-Longbang rural road component, which will substantially reduce travel times and costs to/from Tianyang and Baise for both road freight and passengers; and the bus station and pilot route licensing improvements (Appendix 7) that will improve the efficiency and quality of bus services.

## **SMALL BUSINESS DEVELOPMENT**

1. Market conditions in the project area are conducive for the growth of small business and a number of government programs exist that encourage diversification and promote business development; vocation and technical training, micro-credit and improvements to local infrastructure. As well, tax incentives are provided to private enterprises. Although most people are engaged in farming, there is significant underemployment available for commercially-oriented non-farm activities.
2. Most commercial enterprises along the existing highway and rural roads are simple, small scale businesses with larger enterprises concentrated in towns. For example, in Longlin there were 5,028 private business householders, with 8,050 employees, averaging 1.6 employees per business, at the end of 2005. Although project surveys showed that non-farm small business contributes only about 4 percent to total income the entrepreneurial spirit is nevertheless is high. For example, opening a small shop or service was ranked second highest as a preferred plan of rehabilitation by resettlement affected people. About a third of the population migrate each year for employment and many return not only with earnings but with new ideas for businesses. For example, in Jingxi, 1187 migrant laborers returned to open their own business in 2005.

### **A. Opportunities During Construction**

3. In the short term, expressway construction activity will stimulate an increase in demand for daily necessities and supply of local construction materials, both of which will provide small business opportunities. This could accelerate the development of sustainable small businesses by providing experience and seed money for such things as restaurants and catering, barber and beauty salons and transport services.

### **B. Opportunities From Improved Accessibility**

4. Improved accessibility from better transport services on better roads linked with an upgraded arterial network will reduce the costs of all inputs to village-level activities, increase margins for those selling agricultural produce and other traded goods, and raises the volume of cash circulating in the rural economy. This will open new opportunities and prospects for diversification of production that were unavailable beforehand. For example, growth potential for aquaculture is strong in Longlin and Xilin and the expressway will provide the speedy transport essential for fresh and live products. Production of fruit and vegetables, currently hindered by rough rural roads and long travel times resulting in spoilage, will be encouraged.
5. The main thrust of small business development will be agricultural diversification. Through technical training and micro credit county governments are helping poor areas diversify into agricultural products that capitalize on local competitive advantages as a key means of improving income levels. These products include fruit trees, organic tea, mulberry (silk worm), ginger, chestnuts, oil seed, tea oil, and prickly ash as well as cash/economic crops (tobacco and sugar) and animal husbandry. Poverty villages in 14 of the 10 rural road townships and in 5 of the 10 expressway corridor townships are targeted for this development assistance during 2007-2008. Poverty villages in the remaining 2 rural road townships and 3 of the expressway corridor townships are targeted for the following 2009-2010 phase.
6. Small non-farm rural enterprises such as seed multiplication, tissue culture and nursery operations relating to agribusiness will provide small business opportunities. They can also lower the cost of planting while ensuring the availability and use of high yielding cultivars. The same would apply to livestock, aquaculture and agroforestry activities.

7. PADO provides incentives to local agricultural processing enterprises that are willing to help poor villages develop commercial products. Poverty villages are matched up with these local businesses that provide technical advice and training to poor households before, during, and after the production process. Incentives and preferential policies include building the roads for raw material transportation and subsidized loans for fixed assets and cash flow needs.
8. With better information about prices and markets and the possibility of trading with more distant customers, individuals, buyers, small-scale traders and small businesses will all benefit. The increased spending resulting from higher incomes will circulate in ways that percolate down even to the very poor, whose chances of earning cash by providing labor will be enhanced.
9. The expressway will attract larger commercial establishments to the area and boost on-going enterprises. For example, in Tianyang the local textile factory, formerly a key employer, is near bankruptcy and has laid off many workers. County representatives felt confident the proposed express would allow it to recover. The expressway corridor will allow Baise and Longlin to develop logistics and distribution hubs that will have their own terminals but will rely heavily on small owner-operator cargo services.
10. Tourism is just starting to develop in the project area with potential for eco-tourism centered on the karst landscape areas and large water reservoirs as well as visiting minority villages. The expressway and improved rural road links undertaken as part of the proposed project will undoubtedly make a significant contribution to tourism growth creating opportunities for small business. In particular, ethnic minority groups will benefit from sales of cultural products or traditional food and from exhibitions of local culture and performance of traditional dance.

### **C. Opportunities Provided by the Rural Transport Services Component**

11. Additional income-earning opportunities for individuals, small-scale traders and businesses will be generated by the Project's rural transport services component – the 48 Class V bus stations, two Class III stations in Longbang and Yuexu, and licensing reforms aimed at improving the coverage, frequency, efficiency and affordability of rural bus services. These opportunities will be of four kinds:
  12. Direct employment at bus stations. Each Class V bus station will employ up to four people (a total of about 192) with skills varying from managers to cleaning staff. The two Class III stations will likely employ at least 8 staff each, including low-skill cleaners, bus washing and maintenance staff. All are reliable, long-term jobs with wages capable of supporting families.
  13. Indirect opportunities for providers of ancillary services. Each bus station, particularly (but not only) those at Longbang and Yuexu, will act as a focus of opportunity for vendors of food, drinks and other items in demand by bus passengers, providers of informal transport services carrying passengers and goods to their ultimate destinations and providers of ancillary services needed at the bus stations themselves (vehicle maintenance, refueling, oil changing, tyre sales/replacement, bus washing etc). In some cases, opportunities will exist for providers of overnight accommodation for drivers and passengers, as in Bangxu, for example.
  14. Direct employment as bus drivers and support staff. Although one effect of the bus route licensing and restructuring reforms will be a reduction in the numbers of buses needed to service any given level of demand (due to the increased service productivity and frequency), the overall reduction in operating costs associated with a more productive fleet will result in an expansion of the numbers of routes and services. The lower the unit cost of bus transport, the more services can expand to meet demand not currently met by less efficient services.

Overall, there will be an expansion of opportunities for bus drivers and supporting depot staff, both on new routes and on existing routes benefiting from more competition.

### **C. Opportunities Provided by the Regional Cooperation and Cross-Border Trade Component**

15. The upgrading of access roads to border markets at Naxi and Yuexu will also have a positive, direct impact on small-scale traders and businesses as well as those over the wider region who trade goods with Vietnam.
16. In both locations, planned border markets will substantially increase the volume, value and variety of goods traded by these businesses, local and regional. Stimulating this further will be recognition of Longbang in the cross-border transport agreement between PRC and Vietnam, expanding the range and scope of authorized transport services and traded goods, and the upgrading of connecting routes with Vietnam.
17. Estimates of local business income gains to be made at Naxi by the Jingxi Border Trade Bureau – a CNY 100 million increase in annual border trade, CNY 10 million p.a. in tax and tariff collections and local incomes increased by CNY 5 million p.a. – likely err on the low side, given the secondary opportunities likely to be created, eg for local (domestic) market traders, food and beverage vendors, porters, informal transport operators and providers of other ancillary services. The gains at Yuexu will likely be even greater, particularly if ore/mineral trade expands there and the planned industrial free trade zone at Renzhuang goes ahead as planned.
18. Notable among the small-scale traders who will gain are those who deal in livestock through the expanded Naxi livestock border market. There will be increased opportunities for direct employment at the market itself, as well as increased income and lower costs to traders using the access road.
19. The possibility that existing providers of informal services might be disadvantaged has been considered. The evidence of recently-built bus stations such as Bangxu, however, is positive. The improvement of formal services along roads connecting townships and villages generates a higher overall level of demand that offers new opportunities for informal operators: feeder services to formal bus routes, services linking farms with local roads, services to isolated villages without formal services, and local distribution in the areas around the new bus stations.

## ROAD SAFETY AND VEHICLE EMISSIONS

1. In the People's Republic of China (PRC), rapid economic development accompanied by increasing vehicular growth has resulted in rising traffic volumes and a substantial number of road accidents and loss of life, particularly amongst the poor people who represent over 60 percent of the victims. Rising volumes have also led to a rise in vehicle emissions. Both these problems inhibit economic and social development as they lead to millions of premature deaths and injuries, high medical costs, strain on welfare services, and reduced productivity. Many of the problems encountered with road safety and vehicle emissions are predominantly institutional in nature, resulting from fragmentation of responsibility, lack of interdepartmental coordination, inadequate data systems and monitoring, inadequate action plans and integrated strategies, inadequate enforcement and legislation, lack of road safety audits and accident black spot programs, weak vehicle inspection systems, and shortages of skilled staff and resources.

### A. Road Safety

2. It is estimated<sup>37</sup> that more than 600 lives are lost and more than 45,000 people are injured on PRC's roads every day. People living in low and middle-income countries suffer the most, having about 90 percent of all road traffic deaths and disabilities. Beyond the loss of human life, poor road safety has an enormous economic impact. Annual direct and indirect costs have been estimated at between \$US 12 to 21 billion, approximately 1.5 percent of PRC's GNP. In PRC, injuries from road traffic accidents are the leading cause of death for people 15 to 45 years old. They have wide social and economic impact. They are the second leading cause of premature death, causing a drain on productivity due to short- and long-term disability.
3. In 2005, there were 450,254 accidents in PRC with 98,738 fatalities and 469,911 injuries. The estimated direct loss was 1.88 billion Yuan (\$232 million). During January to October 2006, there were 317,476 accidents in PRC with 73,955 fatalities and 366,559 injuries. The estimated direct loss was 1.24 billion Yuan. Losses from traffic accidents in PRC over the period 2000-2005 is estimated at over \$16.7 billion, from 1-3 percent of total GDP, which is higher than the country's budget on public health services and rural education. In that time traffic accidents have claimed over 619,000 lives, equivalent to one person being killed every five minutes. To address this issue, the Ministry of Public Security prepared the 2004 Road Safety Action Plan, whose primary aims are to (i) reduce serious accidents (involving more than 10 fatalities), (ii) eliminate major accidents (involving 30 or more fatalities), and (iii) facilitate implementation of the 2004 Road Safety Law. This is to be achieved through improved vehicle safety, driver training, and improved traffic management. In Guangxi, the traffic police, which fall under the auspices of the Guangxi Public Security Bureau, are responsible for promoting road safety, enforcing traffic laws, and identifying preventive measures and accident black spots. This work is coordinated with the Guangxi Communications Department (GCD), although there is a need to improve this coordination to fully identify the relationship between accidents and road conditions and to improve detection and enforcement.
4. In Guangxi there were 8,895 road accidents, 3016 fatalities and 11,336 injuries in 2006, reported to the police, while there were 720 accidents, 250 fatalities and 818 injuries in the Project area during the same period.. In the last two years there has been a significant drop in the total number of accidents and fatalities. From 2003 to 2006 there was a drop of 41 percent in accidents, although only a 16 percent drop in fatalities. The reduction in accidents is encouraging and possible due in part the new road safety laws.

<sup>37</sup> WHO 2004

5. The two organizations concerned with road safety and traffic enforcement on the existing expressways in Guangxi are the Expressway Branch of the Traffic Police of GPSB and GCD. For the project expressway, GCD will concentrate on the engineering, road safety audit, blackspot improvement, and operational issues. The expressway will be designed to ensure that legal speed limits are attainable with an adequate margin of safety. Careful attention will be given to the design of super-elevation on curves, overtaking and sight distances, deceleration lanes at interchanges and service areas, and adequate road camber to ensure that surface water runs off the surface during heavy rainfalls. In addition, the enforcement of the overloading of vehicles will be strengthened. GPSB will deal with the traffic law enforcement. A qualified team to manage traffic operations for the expressway will be established. Road safety for the local roads will be the responsibility of the existing local traffic police.
6. Safety is one of the major factors that must be taken into consideration in order to achieve balanced design standards for roads. The expressway has been designed to ensure that posted (legal) speed limits are attainable with an adequate margin of safety. In this respect, careful attention was given to the design of super-elevation on curves, overtaking and curve sight distances, deceleration lanes at interchanges and service areas, and adequate road camber to ensure that surface water runs off the road surface during heavy rainfalls. Of particular importance will be the horizontal and vertical design approaching and on the many large bridges on the expressway and also the tunnel interior conditions, lighting and ventilation.
7. Controlling overloading of vehicles is essential. In addition to pavement damage heavily loaded vehicles affect road safety because of the higher demands placed on vehicles' braking systems, chassis strength, and flexibility; vehicles' stability when rounding curves; and steering difficulties resulting from heavy rear-end loads. GCD will install moving vehicle weighbridges on the expressway and coordinate with traffic police to monitor operations in relation to overloaded vehicles. The recent national drive to curb overloading (2004) has led to stricter enforcement and higher penalties. It is reported that since the introduction of the law overloading cases have decreased; the problem, however, is still endemic. GCD is also proposing to introduce weight based tolling for truck traffic which will require that each truck crosses a weighbridge on entering or leaving the expressway or tolled road. In addition to raising toll revenue and reducing pavement damage, this has been shown to reduce overloaded related accidents.
8. GCD is currently using the MOC Handbook for Road Safety Audits, which was developed under World Bank Highway Project in 2000. All road design and operation processes are subject to this road safety audit. Construction of the proposed expressway to a high standard will reduce accidents in the Baise-Longlin corridor.

## **B. Vehicle Emissions**

9. By the end of 2004 China became the world's fourth largest automobile producer and the third auto consumer. It manufactured 5.07 million automobiles, 17 million motorcycles and 2 million farm transport vehicles, and had national vehicle fleet of 27.42 million automobiles, 79 million motorcycles and 25 million farm vehicles. Of the 310 million tons of petroleum consumed in China in 2004, one third was utilized as fuel for vehicles. The increasing number of vehicles has raised concerns about vehicle emissions and air pollution. The PCR Government is taking significant measures to control emissions by adopting stricter vehicle emission standards and enforcing an annual vehicle test/inspection and maintenance program.
10. Guangxi does not have provincial vehicle emission regulations, but rather is attempting to followed SEPA's vehicle emission control strategies including (i) enforcing national emission

standards for new vehicles, (ii) improvement of conventional fuels; (iii) legislating the use of alternative or cleaner fuels, (iv) increasing the vehicle inspection and maintenance programs (I/M program), and (v) using the nationally regulated requirement for the retirement of obsolete polluting vehicles. These five initiatives have received a cautious reception since funding has been poor and technical capacity marginal. With its favorable meteorology and regular winds which clear the air over Nanning (the only large urban center in the province), Guangxi is not faced with a polluted urban airshed, adding to the slow pace of change. However, given the city's and the province's growth of more than 10 percent per year, the favorable ambient air quality will rapidly deteriorate if preventative measures are not taken soon.

11. The expressway project will by the end of 2011 lead to fuel conservation for passenger vehicles and trucks that use GH 324 and the expressway at more than 28.8 million liters with a total saving of 76.67 million liters over the 20-year forecast period. This will result in a monetary benefit of RMB 291 million per year, RMB 5.82 billion over the 20-year period. The direct benefit of the new expressway and the improved traffic flow on GH324 will be a reduction of the major emissions including CO<sub>2</sub>, by thousands of tons per year. The following actions are being taken:
  12. Guangxi (similar to a number of other southern PRC provinces) is developing a petrol/diesel free urban area initiative for Nanning. Actions are on three fronts; a) the banning of the use of all 2-stroke engines in urban areas, b) growing restriction of the use of any motorcycles in urban centers in favor of efficient and inexpensive electric motorbikes; and c) the conversion of bus and truck fleets to alternate fuels including LNG/CNG, bio-diesel and gasohol.
  13. SEPA has implemented a requirement for catalytic converters on new cars entering the national vehicle fleet. To date the PRC does not produce leaded fuel, thus making the use of catalytic converters viable. Guangxi Province adheres to this national policy objective. The major polluters are the fleet of petrol-fueled vehicle < 3tons brought into operation prior to the elimination of leaded fuel (2002), plus all other older trucks and buses. Vehicles more than 5 years old are likely not equipped with catalytic converters and therefore emit large volumes of pollutants. These vehicles will remain in the fleet for at least 10 years and therefore Guangxi should consider the provision (at cost) of catalytic conversion kits for 1995-2001 vehicles <3 tons, and legislating their installation. Emission testing should be added to vehicle fitness inspections, with the sample size doubled or tripled from the present small number (<0.2 percent). Fines should also be increased dramatically. The further aggressive conversion of large trucks and buses to bio-diesel and LPG/LNG would be an important step toward reducing large transport-related urban air pollution, particularly SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. The following integrated plan has been developed, to help the agencies to reduce vehicle emissions in Guangxi and the Project area.

**Table 1: Strategic Emission Reduction Plan - Targets and Expected Outputs**

Strategic Actions	Proposed Targets and/or Expected Outputs
Improve emission standards and fitness certification using the Euro system	Adopt performance standards equivalent to Euro III by December 2009 and Euro IV by December 2010 for gasoline performance standards for new light duty vehicles as identified by SEPA. Adopt performance standards equivalent to the Euro III by December 2007. By then, vehicle emissions will be reduced by 30–50%.
Improve conventional fuels	For diesel vehicles, reduce sulphur levels to < 500 parts per million. Impose further reductions in sulphur levels upon adoption of new stricter vehicle emission standards as proposed by SEPA.
Introduce alternative or cleaner fuels	Encourage production of alternative fuel vehicle or modification of existing vehicles to dual fuel engine vehicles, utilizing new Guangxi gas-pipelines and refinery. Promote establishment of compressed natural gas filling stations (CNG) in Guangxi. By 2010, 20% of buses and taxis in Nanning had been converted to CNG.
Initiate a program whereby Gas Stations along the expressway must provide clean fuel and be able to service pollution control systems	<ul style="list-style-type: none"> <li>- Make it a requirement of operations for gas stations along the expressway to provide clean fuels, such as compressed natural gas, liquefied natural gas and reformulated gasoline, in addition to normal gasoline.</li> <li>- Encourage gas stations to install fuel vapour capture equipment to reduce total hydrocarbon levels in the atmosphere</li> </ul>
Initiate a Mandatory Inspection and maintenance (I/M) program that includes emission testing, as well as fitness and safety inspection.	GEPB in collaboration with GCD and various PSB should initiate a mandatory I/M program for vehicle emissions by 2010. This program should require all vehicles to be inspected randomly. Promote current scheme of annual testing system and strengthen capacity of relevant agencies to provide efficient services. Emission control devices should be installed if the vehicle cannot meet the required PRC standards.
Retire obsolete vehicles	Force retirement of vehicles that are more than 8-10 years old and have failed the emission inspection test for three consecutive times. Encourage retirement of old vehicles through subsidy and enforcement.
Build environmental awareness	Implement senior agency officials mandatory environmental awareness workshop, defining CO <sub>2</sub> , global warming and impact of project on these issues, as well as economic gains from going green.
Strengthen capacity of Guangxi Environmental Protection Bureau and Annual Vehicle Testing Centers (Police)	<ul style="list-style-type: none"> <li>- Launch training programs to train vehicle emission control testing staff working at testing centers and I/M schemes with appropriate facilities, including roadside mobile emission facilities.</li> <li>- Launch/enhance training of technicians/mechanics to create more and upgrade vehicle emission repair facilities; and include updating licensing process for these facilities.</li> <li>- Establish emission testing centers in all municipalities of the province.</li> <li>- Introduce well-functioning audit and quality assurance system.</li> </ul>
Strengthen environmental monitoring	Engage a qualified environmental monitoring institution to monitor ambient air quality along the expressway, particularly at sensitive receptors, such as school, hospital, and residential sites, and be ready to take immediate action if standards exceeded on more than 2 consecutive tests.

Sources: ADB staff.

## **ITS AND ASSET MANAGEMENT**

### **A. Intelligent Transport System**

1. Intelligent Transport Systems (ITS) is a term that is used widely (and loosely) to encompass a wide range of technological solutions applied to the transport sector to improve the performance of the transport system. These improvements include safety and traveler information (speed signs, warning signs, etc), enforcement (over-speed, over-weight, non payment of tolls, etc), monitoring (traffic speeds, over-weight, traffic counting, etc), and toll and revenue collection (e.g. electronic tolling). The relative emphasis placed on ITS for these functions varies from place to place, depending on factors such as specific need, local technological skills and ability to reliably construct and maintain a relatively high technology system, and budget considerations for both construction and on-going maintenance. Although not yet extensively developed, ITS in some form is installed on every expressway in Guangxi.. From observation of the ITS on existing expressways in Guangxi it is concluded that existing systems are functioning as intended, however, in a number of cases areas have been identified where improvements could be made to further enhance expressway operational performance through ITS, and that should be considered for the Long-Bai Expressway.
2. it is proposed to introduce weight based tolls for freight traffic on all expressways in Guangxi by the end of 2007. Vehicle drivers will be issued with an electronic card upon entering the expressway which will be handed to the toll operator on leaving. All trucks will pass over an electronic weight bridge which will measure the total load of the vehicle and tolls will be assessed on actual weight of the vehicle plus load. Overloaded vehicles will be charged a penalty toll based on the percentage they are overloaded, using MOC loading limits. This will be based on a multiple of the base toll. This will be measured by weighbridges at the point of exit and the penalty added to their toll charge. Vehicles with an overload of up to 5 percent will be not charged any excess toll, from 5 to 30 percent they will be charged an excess ranging from 30 percent surcharge for 6 percent overload to 300 percent for a 30 percent overload, rising to 600 percent for a 100 percent overload.
3. Recommendations for extended ITS for the project were developed (Table A11.1) and can be implemented during the project. The ITS features of the Project will include (i) one traffic control center; (ii) advanced toll payment system; (iii) variable message displays to provide road users with information about speeding, and enforcement; (iv) emergency telephones and surveillance technology; (v) detection of black spot locations and property damage; (vi) monitoring of speed limits, congestion, and overloaded vehicles; and (vii) coordination of emergency service agencies. About 1.3 percent of the ADB loan (\$4.0 million) will be allocated to procure ITS equipment, and training in its use will be provided through international training (Supplementary Appendix 14).

### **B. Asset Management**

4. Asset management must be developed to ensure the sustainability of the expressway and rural road operations. Guangxi Expressway Administration Bureau (GEAB) is responsible for operation, maintenance and toll collection for all expressways within Guangxi province while Guangxi Highways Administration Bureau (GHAB) is responsible for the management, new construction, improvement works and maintenance of all other roads. Maintenance for Expressways is carried out by GEAB through its four divisions through work crews on each expressway located at about 60 km intervals.
5. To date, little major maintenance, except for rectification of construction deficiencies and slope failures , has been required on expressways because the expressways are all still relatively new. Thus maintenance costs have been well within funding limits. As the expressways age, maintenance costs will undoubtedly rise, and the expressway companies

are likely to come under increasing budget pressure. In these circumstances the current maintenance programming arrangements are unlikely to be satisfactory. Although expressway maintenance and repairs in Guangxi are undertaken in accordance with MOC specifications these do not specifically include any consideration of preventative maintenance which is a particularly cost effective form of maintenance.

6. It is recommended that GEAB introduce improved maintenance programming practices, improved computing skills and develop improved staff skills. This is consistent with the MOC's statement that expressway companies should introduce pavement management systems.
7. The TA prepared an asset management development plan, which, if adopted, will establish a computerized database system and promote the use of modern equipment, and provide a training program to enhance employees' skills at the provincial, county, and township levels. (Table A11.2).

**Table A11.1 ITS Recommendations**

Item	Recommendation	Comment
<b>VMS Displays</b>		
Fixed location variable message signs	35-45 kms apart on average	Every 20-30 minutes (depending on speed), with particular attention to location near 'high risk' locations
- Fixed location variable speed signs	35-45 kms apart on average	Every 20-30 minutes (depending on speed), with particular attention to location near 'high risk' locations
Mobile VMSs	4-6	Able to be rapidly deployed in case of major incidents / lane restrictions, etc
<b>Video Surveillance</b>		
Fixed location video surveillance.	On average around 1 km apart, subject to sight lines Cameras with variable focal length. Cameras able to be rotated / raised / lowered Cameras to provide full coverage within tunnels / on bridges / at intersections	To cover the entire length of the expressway Could also be integrated with vehicle speed, weight and toll payment monitoring and enforcement at selected locations Tunnel cameras should adjust for variable brightness
<b>Weather Monitoring</b>		
Visibility	In locations where roads are subject to fog	Would update preceding VMSs. Should be taken in to account in precise location of VMSs
Wind speed and direction	In location where roads are subject to high cross winds	
<b>Speed Monitoring and Enforcement</b>		
Fixed location	At each overhead VMS gantry	Speeding vehicles photographed
Variable location	By Police, focusing on high speed / high risk areas	
<b>Vehicle Weight Monitoring and Enforcement<sup>38</sup></b>		
Fixed location	Vehicles weighed at each expressway entrance point	Overweight vehicles photographed or apprehended

<sup>38</sup> With the introduction of weight based tols this recommendation will be satisfied.

**Table A11.2. Asset Management Action Plan**

Item	Recommended Measures
1. Almost Immediate	
.	1A For GEAB (the expressway company) to commit to introducing an asset management system that will achieve asset management outcomes equal to world best practice
	1B For the company to develop an organizational structure that recognizes the importance of high quality asset management practices and skill levels.
	1C For the company to introduce on-going asset management staff training program(s).
	1D For the company to procure (or develop) an appropriate asset management database and asset management system (software and hardware) capable of recording key data, comparing asset condition with asset 'trigger' points and capable of providing high quality information for the effective management of the maintenance activities. (Preliminary work will be required to specify the system to an appropriate level of detail).
	1E For the company to define the Long-Bai Expressway in terms of asset classes and asset types, for data analysis and reporting purposes.
2. Short Term (before expressway commissioning)	
.	2A For the company to develop and introduce a systematic yet dynamic asset monitoring regime, consistent with the data storage capability of the asset database and management information needs, taking in to account national requirements and standards.
	2B For the company too seek a relaxation of or exemption from the restriction on employing contractors with less than five years experience
	2C For the company to seek a relaxation of or exemption from the 'Technical Specifications of Maintenance for Highways (Reference JTJ 073-96), subject to the company having in place an appropriate asset management system
3. Medium Term (within 2 to 3 years of expressway commissioning)	
.	3A For the company to incorporate preventative maintenance plans within its overall asset management system.
	3B For the company's maintenance budget to be based on an optimum maintenance regime, rather than on the current formula method.
.	3C For the company to share data with other expressway companies and organizations responsible for highway and road maintenance to further improve maintenance practices

**PUBLIC CONSULTATIONS**

<b>Location</b>	<b>Date</b>	<b>Participants</b>	<b>No. of participants</b>	<b>Purpose</b>	<b>Main Issues Discussed/Concerns</b>
Counties in Baise	19-25/3/06	Local Government Departments	190	explanation of highway environmental effects	Purpose of EIA, general project information, possible environmental effects
Longlin County TV	21/3/05	Various	n.a.	Publicity of expressway plan	EIA, results of symposiums, general project information
Counties in Baise	1/2/05	Communities	22 communities, 222 individuals	Request for comments	General satisfaction with project. Concerns over land compensation and noise
Longlin, Tianlin Counties	6/5/06	Farmers, village leaders	10 townships, 500 villagers	Gain support of local people	Land acquisition and resettlement
Longlin, Tianlin County	8/06	Local Government	7	Alternative alignment schemes	Route selection
Youyiguan District	28/9/06	School heads, Village leaders, farmers	26	Finalize alignment	Detail route selection
Youjiang District	11/10/06	Brick and Coal plant managers	5	Settlement and resettlement	Brick plant demolition and mine effects on expressway.
Youjiang District	18/10/06	Village leaders, farmers	12	House demolition	Farmers suggestions on resettlement
Youyiguan and Longbang border areas	14-16/9/06	Importers/exporters, forwarding agents, trucking companies, truck drivers and cargo agents	199	Border survey for border facilitation recommendations	Requirements, preferences and suggestions of potential users on border trade facilities. Concerns about the need for improving border road and cargo transshipment facilities
Baise	9/06	Village leaders	50	Resettlement Issues	Requests for information .
Youjiang District Tonglin Xilin, Letye, Lingyuan and Longlin County	1-2/06	Farmers, village heads, local officials, public transport and freight vehicle drivers, road vehicle passengers, transport vehicle owners, traders and sellers, mining companies and agro-processors, and roadside service providers	16 townships 26 admin villages 650 h'holds 210 officials	Social and poverty impact assessment	Requests for socioeconomic information. Perceptions of positive and negative impacts as a result of the Project. Responses were overwhelmingly in favor of the Project. Determination of needs of each beneficiary group.
Youjiang District Tonglin, Jinxi, Tinayang, Xilin and Longlin County	10-14/9/06	Representatives from Baise Communication Bureau, County officials and	150	Consultants socio/resettlement impact survey for the rural roads	General attitude of the public to the rural road upgrading Potential adverse impacts

		villagers			Mitigation measures
Baise City and Jingxi County	25-28/9/06	Representatives from various government agencies. Transportation companies, bus and cargo drivers	56	Consultants impact survey for border road improvements and transport services improvements	General attitude of the public to the transportation services and rural road upgrading Potential impacts
Baise City, Longlin Xilin Counties	10-14/10/06	Representatives from Baise City and Longlin and Xilin County and Communication Bureaus and other organizations	53	Introduction of ADB and its objectives Understanding of overall situation and county development programs. Understanding of local road situation	Role of the expressway and local roads. Road safety improvements.
Baise City, Longlin, Tianlin Leye Xilin Jingxi, Tianyang and Lingyun Counties	20-22/10/06	329 households	1,350	Resettlement and social surveys	Socio-economic situations, attitude to the project construction, concerns on land acquisition and resettlement, and compensation
Baise City	26-27/10/06	District and county government, their related department officials, some villagers	78	Resettlement preparation	Resettlement training, resettlement institution setting up, resettlement policy and compensation standards, resettlement implementation, income rehabilitation programs
Total					5,000+ persons

### DETAILED COST ESTIMATE BY FINANCIER

(\$ Million)			ADB		China Development Bank		Government	
			\$ <sup>a</sup>	% Item <sup>b</sup>	\$	% Item	\$	% of Item
<b>A. Base Cost<sup>c</sup></b>								
1.	Earthwork	196.4	41.2	21	91.6	47.0	63.6	32
2.	Pavement	84.1	17.7	21	39.2	47.0	27.2	32
3.	Structures	5007.5	106.5	21	236.6	47.0	164.4	32
4.	Tunnels	77.6	16.3	21	36.2	47.0	25.1	32
5.	Interchanges	111.9	23.5	21	52.2	47.0	35.2	32
	<b>Expressway Civil Works</b>	<b>977.5</b>	<b>205.2</b>	<b>21</b>	<b>455.7</b>	<b>47.0</b>	<b>316.6</b>	<b>32</b>
6	Environmental Protection	5.5	0	0	0.0	0.0	5.5	100
7	Equipment <sup>d</sup>	16.8	16.8	100.0	0.0	0.0	0.0	0.0
8	Land Acquisition and Resettlement	69.6	0.0	0.0	0.0	0.0	69.6	100.0
9	Consulting Services Supervision and Training	2	2	100	0	0	0	0
10	Project Design and supervision <sup>e</sup>	43.5	0.0	0.0	0.0	0.0	43.5	100.0
11	Rural Roads and passenger transport stations	114.7	30.0	26	0.0	0.0	84.7	74
13	Project Management <sup>f</sup>	8.5	0.0	0.0	0.0	0.0	8.5	100.0
	<b>Subtotal (A)</b>	<b>1,238.1</b>	<b>254</b>	<b>21</b>	<b>455.7</b>	<b>37</b>	<b>528.4</b>	<b>43</b>
<b>B. Contingencies</b>								
1.	Physical Contingency <sup>g</sup>	57.6	0.0	0	0	0	57.6	100
2.	Price Contingency <sup>h</sup>	96.0	0.0	0	44.7	0	96	100
	<b>Subtotal (B)</b>	<b>153.6</b>	<b>0.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>153.6</b>	<b>100</b>
<b>C. Interest<sup>i</sup> Other Charges During Implementation</b>		<b>131.3</b>	<b>46.0</b>	<b>35</b>	<b>85.3</b>	<b>65</b>	<b>0</b>	<b>0</b>
	<b>Total Project Costs</b>	<b>1,523</b>	<b>300.0</b>	<b>20</b>	<b>541.0</b>	<b>36</b>	<b>682</b>	<b>45</b>
	<b>% Total Project Cost</b>	<b>100%</b>	<b>20</b>		<b>36</b>		<b>45</b>	

a. Amount of ADB loan proceeds allocated to cost item

b. The amounts disbursed by ADB for eligible expenditures under a cost category will be subject to the ceiling set by the allocation of loan proceeds for such cost category

c. At 2007 prices including taxes

d. Includes \$10 million for procurement of freight logistics equipment and \$0.7 million for pavement testing equipment.

e. Includes \$27.8 million design costs and \$15.7 million supervision cost

f. Project Management cost includes research, testing and quality control cost

g. At 5% of base cost

h. At 3% per annum for 2008-2011 for local currency cost and 1.2% per annum for foreign exchange cost during 2008-2011

i. Based on prevailing United States dollar 5-year swap rate plus a spread for the ADB loan and prevailing interest rate for China Development Bank. Source: PPTA Consultants estimates (See Supplementary Appendix 4 for further details).



**INDICATIVE CONTRACT PACKAGES**

No	Chainage	Length	\$US	Contract	Remarks
	Km	Km	Mill	Type	
C1	0.35-6.65	6.3	31.5	ICB	Civil work
C2	6.65-12.06	5.4	31.9	ICB	Civil work
C3	12.06-16.4	4.3	33.8	ICB	Civil work
C4	16.4-21.12	4.7	33.3	ICB	Civil work
C5	21.12-26.4	5.3	28.4	ICB	Civil work
C6	26.4-35.1	8.7	28.5	ICB	Civil work
C7	35.1-42.2	7.1	29.7	ICB	Civil work
C8	42.2-52.0	9.8	30.8	ICB	Civil work
C9	52.0-60.72	8.7	28.2	ICB	Civil work
C10	60.72-68.15	7.4	29.9	ICB	Civil work
C11	68.15-77.35	9.2	29.6	ICB	Civil work
C12	77.35-86.53	9.2	30.8	ICB	Civil work
C13	86.53-96.0	9.5	30.9	ICB	Civil work
C14	96.0-103.15	7.2	30.2	ICB	Civil work
C15	103.15-109.05	5.9	31.8	ICB	Civil work
C16	109.05-114.9	5.9	33.3	ICB	Civil work
C17	114.9-122.68	7.8	30.5	ICB	Civil work
C18	122.68-131.25	8.6	32.2	ICB	Civil work
C19	131.25-139.3	8.1	31.6	ICB	Civil work
C20	139.3-0-146.3	7.0	32.2	ICB	Civil work
C21	146.3-153.85	7.6	32.8	ICB	Civil work
C22	153.85-161.2	7.4	34.1	ICB	Civil work
C23	161.2-168.4	7.2	32.1	ICB	Civil work
C24	168.4-177.65	9.3	34.4	ICB	Civil work
C25	0.375-10.75	10.4	18.4	ICB	Longlin Connector
C26	10.75-21.22	10.5	17.1	ICB	Longlin Connector
PA	0.35-42.2	41.9	13.0	ICB	Pavement
PB	42.2-77.35	35.2	17.1	ICB	Pavement
PC	77.35-114.9	37.6	14.1	ICB	Pavement
PD	114.9-146.66	31.8	14.7	ICB	Pavement
PE	146.66-177.65	31.0	13.2	ICB	Pavement
PF	L0.375-21.22	20.9	2.5	ICB	Pavement
E1	Monitoring and Communication		3.9	ICB	
E2	Maintenance & Safety		1.8	ICB	
E3	Pavement Testing		0.7	ICB	
E4	Freight Logistics 1		5.0	ICB	Storage
E5	Freight Logistics 2		3.1	ICB	Handling
E6	Freight Logistics 3		2.0	ICB	System Hard/Software

### Contracts for Other Components

Item	Number of Contracts	\$US Million	Contract Type
Rural Roads			
Jingxi Lombang	8	30.0	NCB
Naxi-Border	1	1.1	NCB
Yuexu-Border	1	0.7	NS
Napo-Dingye (Government)	7	24.7	NCB
Napo-Dingye (ADB)	4	14.2	NCB
Tianlin-Leye	6	21.8	NCB
De'e-Shali (Government)	1	0.8	NS
De'e-Shali (ADB)	2	5.4	NCB
Village Roads			
Village Roads	20	12.5	NS
Bus Terminals			
Bus Terminals Class III	2	1.5	NCB
Bus Terminals Class V	48	3.0	NS

## MONITORING OF SOCIOECONOMIC AND POVERTY IMPACTS

### A. Flow of Project Benefits

1. The construction of the expressway and the improvement of local roads will lower transport costs and reduce travel time and thus, once completed, the Project will improve the quality of transport services. Better road infrastructure and services will encourage villagers and minority people to go to markets, use educational and health facilities more frequently, and avail themselves of increased agricultural extension services. These benefits, which accrue directly to road users, are the Project's direct effects.
2. Over time, improved road access will expand economic activities in the area and gradually lead to structural changes in production and consumption patterns and in the labor market. Lower transport costs reduce the costs of traded farm inputs, thereby raising agricultural productivity and profitability. Cropping patterns change with better roads, as farmers shift to higher-value crops because of easier access to markets and new farming technologies. Road improvement helps increase non-farm job opportunities and the potential for increased wages. Better roads reduce transaction time and costs, thereby spurring commercial activities. The construction of roads will also promote the development of local tourism since tourists are more willing to visit with improved transportation. In turn, higher incomes boost local people's demand for transport and the movement of local goods and services. These benefits trickle down to local people over time and even the very poor, who use roads less often, also benefit from improved roads through more and cheaper goods and services and increased economic opportunities. These are the Project's indirect effects.

### B. Monitoring Framework

3. A design and monitoring framework has been formulated for the overall Project. To measure socioeconomic benefits, a standard monitoring framework and a set of monitoring indicators have been designed to measure actual benefits (Table A16-1). These indicators have been chosen to measure key changes in village and household conditions, farm income levels and transport services that will provide a basis to assess the extent to which projected project benefits are achieved over time..
4. Monitoring will focus on ten villages representative of communities in the project area and that capture the project's diverse geographical scope and ethnic character. Four villages have already been selected: Banjian village (Jiuzhou township, Tianlin County), Baile Village (Gantian Township, Leye County), Bake village (De'e township, Longlin County), and Hulong village (Longbang township, Jingxi County). Banjian village is located in Tianlin county on the existing national highway G324 near the expressway corridor. Baile is located in Leye County on the Tianlin-Leye road. Bake village is more isolated and is located in Longlin at the end point of the Shali – De'e rural road. Hulong village is located on the Jingxi Longbang road near the border with Vietnam.
5. The baseline indicators for these micro-level indicators are shown in Table 2. The other six villages will be selected during the first year of implementation to ensure good representation of components where locations have not yet been finalized.
6. The macro-level indicators that are mainly based on government statistics are shown in Table A16.1.

Table A16.1: Monitoring Framework: Indicators and Mechanism

Timing of Benefits or Outcomes	Monitoring Indicators	Monitoring Mechanism
<b>A. During Project Construction</b>	Number of hired local labors by gender	Village survey
1. Employment of local labor (included in EMDP)		Contractor records
2. Prevention of HIV/AIDs, and other transmissible diseases		Data from local disease control centers
3. Tax to local government		Data from local tax bureau and contractor record
<b>B. Immediately Upon Project Completion</b>		Local statistics
1. Reduced travel time	Travel time to county center	Village survey
2.Reduced number of serious road accidents and fatalities	Number of serious road accidents and fatalities	Data from local public security bureaus
<b>C. Short-Term (within 1-3 years)</b>	Increased traffic volumes along the corridor	Local statistics
1. Lower transport costs	Transportation expenses of total expenses	Village survey
2. Improved transport services	Bus and freight fares	Village survey
3. Changes in producer prices	Villages with bus services	Village survey
4. Increased economic and market activities	Bus frequency to villages	Village survey
5. Increased access to social services	Fertilizer prices	Household survey
	Vehicle ownership	Household survey
	Frequency of visits to markets	Household survey
	Increased trade in the region	Local statistics
		Village survey
		Village survey
		Village survey
		Household survey
<b>D. Medium-Term (within 3-5 years)</b>	Travel time to the nearest school and clinic	Household survey
1. Developed non-farm sector	Middle school dropout rates (boys, girls)	Village survey
2. Increased agricultural extension services	Frequency of visiting doctors	County statistics
3. Increased rural incomes	Income from non-farm sector	Household survey
4. Reduced poverty incidence	Number of small business enterprises	Village survey
	Number of tourists in the area	Village survey
	Cash crops (percentage of total crops)	Statistics/village survey
	Frequency of visits by agricultural technicians	Village level
	New or renovated houses	
	Rural income	
	Poverty rate	

Source: ADB, 2002, Technical Assistance for Socioeconomic Assessment of Road Projects, Manila.

**Table A16.2: Baseline Data of the Monitoring Indicators**

Indicator	Jiuzhou Township			Gantian Township			De'e Township			Longbang Township		
	TS	BV	HH	TS	BLV	HH	TS	BKV	HH	TS	HV	HH
Distance to township center		8			15			2			4.5	
Villages with grade IV road access (%)	90			36			60			65		
Sub-Villages with tap water (%)	85			90			71			88		
Sub-Villages with access to telephone (%)	80			90			73			65		
Sub-Villages with bus services (%)	80			59			80			90		
Bus frequency to county center (bus service/day)	4			1			1			2		
Fertilizer input (%)			8.1			7.3			7.2			6.9
Number of vehicles		25			152			123			96	
Transport expenses (%)			8.4			5.6			9.3			3.7
Frequency of visits to county markets <sup>a</sup>			1			0.5			1			0.5
Frequency of visits to township markets			5			3			5			3
Frequency of visits of doctors (number per 6 months)		1			1			1			1	
Income from non-farm sector (%)		18			43			38			39	
HH selling surplus grain (%)		33			23			22			25	
HH selling animal products (%)		95			56			90			96	
Frequency of visits by agricultural technicians (no. per 6 months)		1			3			1			0	
Number of new or renovated houses		0			130			180			64	
Number of long-term migrants (greater than 6 months)		50			210			200			250	
Rural income (CNY) per year	1,598	1,650			1,020		1,378	974		1,434	1,124	
Rural poverty incidence (%)		20			30			50			45	

BV = Banjian village, BLV=Baile Village, BKV = Bake village, HH = household, HV = Hulong village, No. = number, TS = township.

<sup>a</sup> Number/household/month.

Sources: Project Survey and County Statistical Yearbooks, 2005

### C. Implementation of Monitoring

- GCD concurred with the monitoring framework and set of indicators for monitoring the project's performance. During project preparation, will be further updated, where necessary. GCD will measure the indicators for project evaluation prior to and during project implementation at completion, and annually 3 years after project completion. GCD will hire an independent, qualified institute for 20 person-months for surveys, analysis, and reporting. Reports will be submitted to the GCD and ADB. The budget for this socioeconomic monitoring is CNY 300,000. The Terms of Reference for the socioeconomic monitoring consultant is presented in TOR.

**Table A16-4: Baseline Data of Macro-Level Impacts in 2005**

Category	Indicators	Project Road Impact Area (County)				Broad Project Impact Area (Prefecture)
		Tianlin	Le'ye	Longlin	Jingxi	Baise
Economic	GDP (million CNY)	887	449	1,058	1,571	20,616
	Per capita GDP (CNY)	3,719	2,845	2,949	2,694	5,564
	• Primary industry GDP (%)	45.9	37.7	27.8	47.6	29.1
	• Secondary industry GDP (%)	23.4	25.7	43.5	27.7	43.2
	• Tertiary industry GDP (%)	30.7	36.6	28.7	24.7	27.2
Poverty	Rural income (CNY/capita/year)	1,696	1,428	1,478	1,642	1,787
	Villages	165	86	179	291	1,841
	Designated poverty villages	97	52	106	168	1,015
	Rural population	217,565	143,679	338,495	542,566	3,266,596
	Population in poverty	90,640	68,542	90,575	118,782	686,974
	Poverty ratio (%)	42	47%	27	22	21
	Secondary school enrollment rate (%)	96.5	96.2	96.1	96.7	96.4
Education	High school enrollment rate (%)	24.2	23.6	22.4	25.3	36.7
	Secondary school dropout rate (%)	2.2	2.4	2.9	2.5	2.7
	Class II roads (km)	4.8	41.3	32.5	120.5	667.3
Transport	Class III roads (km)	92.9	23.5	132.3	153.7	976.0
	Class IV roads (km)	206.1	96.9	259	383.3	2,513.6
	Unclassified roads (km)	476.3	160.9	311	216.3	3,015.2
	Density (km/100 km <sup>2</sup> )	14	12	21	26	24
	Villages with road access (no.)	106	86	120	196	1,555
	Passenger-km (million)	129	95	115	310	2,296
	Transport Services	Passengers (million)	2	1.63	2	5
Inter-provincial bus routes		32	6	76	4	106
Inter-prefecture bus routes		9	4	18	16	105
Inter-county bus routes		10	7	55	5	111
Townships served by bus		14	8	17	19	134
Villages served by bus		135	60	241	271	1,481
Ton-km (million)		51	26	11.6	56	1,702

## TRAFFIC FORECAST

1. The project expressway is a 177km section of the Shantou-Kunming corridor, one of eighteen east-west routes designated under the National Expressway Network Plan (NENP). After entering Guangxi from Guangdong at Hezhou, this route passes north of Nanning, going through Liuzhou and Hechi. After leaving Guangxi the route passes through Xingyi (Guizhou) before heading west to Kunming. The expressway will also be attractive to traffic traveling from Nanning to Kunming via the Nanning-Baise (TanLuo) expressway, currently under construction. Compared with the existing G324, the proposed expressway will be approximately 34km shorter (measured from Baise to the Guizhou border). It will offer a time saving of around 2½ to 3½h depending on vehicle type. Although there will be a considerable toll differential, diversion to the expressway is expected to be substantial.
2. Origin and destination (OD) surveys were carried out as part of the FS in May 2004 at seven stations on the G324 and other roads in the project area. The PPTA consultants also undertook a classified count in October 2006 at Yongle on the G324 close to Baise. Traffic on the G324 is heavy (7,500 pcu/day at Yongle) and has an unusually high proportion of long distance heavy goods vehicles, most of which carry bulk goods. At Yongle, 76 percent (as pcu) are goods vehicles while heavy goods vehicles ranged from 36 to 59 percent of total pcu at other stations. Sixty percent of goods vehicle drivers interviewed by the PPTA consultants were making trips of 500km or more, while coal accounts for 40 percent of all road freight.
3. A traffic demand model was constructed as part of the FS and traffic forecasts were developed for both passenger and freight vehicles for 2010, 2020 and 2030 from the base 2004 OD matrix. Although the FS indicates only modest amounts of generated traffic, its final forecasts suggest that large amounts of hitherto suppressed traffic are released by the addition of expressway capacity.
4. The PPTA consultants calibrated the FS OD survey to observed 2006 traffic and compressed the FS trip generation zones from twelve to ten. As traffic from Nanning heading towards Kunming will, during the course of the evaluation period, have a choice of alternative routes, it was assumed that 60 percent of traffic with a choice between the Longlin-Baise route and the route via Luocunkou and Funing (Yunnan) in fact chooses Longlin-Baise.
5. Normal traffic forecasts for 2012 (the expected year of opening), 2022 and 2032 were based on GDP growth estimates for each of the ten zones and demand elasticities of 1.2 for passenger trips and 1.0 for goods trips. Generated traffic, i.e. trips made as a result of the increased capacity provided by the expressway, were estimated using price elasticities of -0.3 and -0.2 for passenger and goods traffic respectively. Local traffic at 20 percent of passenger traffic was added to traffic on the existing road in both the project and without-project cases.
6. Ramp up<sup>39</sup> has been a factor on several expressways opened recently. Although not expected to be severe in the case of Longlin-Baise – most drivers will see Longlin-Baise as a continuation of their prior expressway travel – a review of recent toll records suggested factors of 60 and 80 percent for 2012 and 2013 respectively. A small amount of soft sleeper passenger traffic is expected to divert from the Nanning-Kunming railway once the expressway is open. Once railway capacity has been doubled, however, sometime between

<sup>39</sup> Ramp up is the propensity for some traffic not to immediately transfer from the existing road to the expressway. It often takes a few years for the full potential of expressway traffic to be realized.

2010 and 2020, some goods traffic will divert to the railway, as will some potentially non-sleeper class bus passengers. The former is estimated at 0.3m tonnes of bulk goods and the latter at 0.4m passenger trips per annum. Waterways traffic is very small and will neither affect nor be affected by the expressway to any significant extent.

7. The traffic on each of the expressway links is shown in Table A17.1. Between 2012 and 2022 the annual growth rate (ignoring ramp up) is 7.1 percent and from 2022 to 2032 it is 4.8 percent. Although absolute traffic forecast in the FS is similar to those adopted here, FS growth rates are somewhat higher at 9.0 and 5.7 percent.

**Table A17.1: Average Annual Daily Traffic of Project Expressway**  
(passenger car units)

Road section	2012	2022	2032
Guizhou – Weile	4,362	13,300	21,042
Weile – Jiuzhou	6,157	19,419	31,073
Jiuzhou – Lucheng	6,157	19,419	31,073
Lucheng – Tianlin	6,562	20,721	33,179
Tianlin – Xiatang	7,530	23,860	38,275
Xiatang – Yongle	7,663	24,381	39,115
Yongle – N Baise	7,765	24,724	39,669
N Baise – Satang	4,709	14,734	23,494
Longlin connector	2,977	6,831	10,966
Average	6,555	20,703	33,152

Source: PPTA consultants' estimates

Notes: (i) 2012 traffic is after application of ramp up to normal traffic

(ii) averages exclude the Longlin connector

8. In addition to the expressway, the project includes four local roads. Traffic forecasts for three of them were based on those in the FSs prepared by GPSDI and for the remainder from field counts undertaken by PPTA staff. Supplementary Appendices 10 and 11 contain the detail.

## ECONOMIC ANALYSIS

1. The proposed project comprises a 177km limited access expressway between Longlin and Baise and the upgrading of seven local roads. The project will be implemented over approximately 4½ years. The economic appraisal covers the construction period and 20 years' operation. In the case of the expressway this means construction from 2007 to end of 2011, with opening (and a full year of benefits) in 2012. In all cases the appraisal compares a project case (with the expressway or improved rural road) with a without-project do minimum alternative comprising limited investment on the existing route. A 12 percent discount rate is used throughout. In the case of the expressway, traffic will, in the without-project case, use the existing G324 national highway, which will become congested and expensive to maintain as traffic increases. Some travel may not take place because of congestion and the resulting increased travel times and vehicle operating costs (VOCs). With the project, congestion on existing roads will be reduced and traffic on both the expressway and the existing roads will benefit from faster, cheaper and safer travel. Some additional trips will be generated as the economy responds to lower transport costs.

### A. Expressway Component

2. The evaluation used first quarter 2006 prices. A shadow exchange rate factor (SERF) of 1.01 was used to convert border prices to domestic economic prices. With a financial exchange rate of US\$1 = CNY7.76, this gives a shadow exchange rate of CNY7.86. This is used to derive the economic cost of the principal tradable items. All other cost items were valued at domestic prices less taxes with the exception of (i) unskilled labor, (ii) fuel and (iii) the capital cost of vehicles. Unskilled labor is priced using a shadow wage rate factor of 0.7. The financial base cost plus physical contingencies is CNY8,633m and the economic cost CNY7,815, implying a conversion factor of 0.91.
3. Expressway benefits to "normal" traffic (i.e. traffic that would have been present in the do minimum case) result from improvements in road and traffic conditions between the do minimum and project case and amount to savings in (i) VOCs, (ii) personal travel time for vehicle occupants (other than drivers and crew, whose costs are included in VOCs), (iii) road accident costs and (iv) the value tied up in freight during transit. In addition there are the benefits of additional trips made solely as a result of the lower costs brought about by the project ("generated" traffic) and the gains and losses to the expressway as a result of passengers and goods choosing to divert from rail to the expressway and vice versa.
4. The economic evaluation made use of EcEval to estimate travel costs and times on each link for each forecast year, with and without the proposed expressway. EcEval is a standard economic evaluation spreadsheet developed for MOC and used in numerous ADB-financed PPTAs.
5. The estimated economic internal rate of return (EIRR) of the project is 21.8 percent, well above the 12 percent threshold rate. Using the 12 percent discount rate it has a net present value (NPV) of CNY8,003m at 2006 prices. Of the total benefits, 87 percent are VOC savings, 6 percent savings in passenger time costs, 4 percent accident cost savings (relatively high and the result of high accident rates on the G324), 2 percent generated traffic benefits, 0.2 percent savings in inventory costs in transit and a 0.3 percent cost arising from traffic diverted to and from rail.
6. The results of sensitivity analysis confirm the robustness of the project's economic viability: changes in the key variables—construction costs, 1-year delay in completion, and benefits

do not significantly affect the economic viability (Table A18.2). For the EIRR to fall to 12 percent, either (i) costs would have to be 2.5 times higher, or (ii) benefits 60 percent lower or (iii) tolls 70 percent higher (than the central estimate used in the evaluation).

7. A Monte-Carlo risk analysis was used to estimate the frequency distribution of EIRRs. Each uncertainty factor (such as investment cost, traffic growth, accident savings etc) was varied at random within defined limits. The results of the risk analysis showed with these uncertainties, that (i) the mean EIRR for the whole project is 17.3 percent, (ii) the probability of the EIRR falling below 12 percent is 2.4 percent and (iii) the maximum EIRR is 23 percent.

#### **B. Rural Roads, Village Access Roads and Bus Stations**

8. At the same time as the expressway is implemented, approximately 307km of rural roads, 750km of village access roads and fifty bus stations will be built. Road user cost savings were used to justify the rural roads (plus some gains from trade for the two border access roads at Naxi and Yuexu), while producer surplus was the basis for evaluating the village access roads. Bus station benefits are discussed in Appendix 7. The rural and village access roads have a combined EIRR of 16 percent and an NPV of CNY180m. The bus stations have an EIRR of 27 percent when the costs are spread over four years, and an NPV of CNY45m.

#### **C. The Whole Project**

9. The project as a whole has an estimated EIRR of 21.5 percent (Table A18.1). The VOC savings from the expressway are the major economic benefit (82 percent) followed by passenger time savings (6 percent) and rural and village access roads and bus stations at 5 percent.

#### **D. Poverty Impact Analysis**

10. Table A18.3 shows the results of the poverty impact analysis. The estimated poverty impact ratio (PIR) is 0.20, i.e. the net benefit to the poor is 0.20 times the economic NPV of the project adjusted for transfers. This value is at the low end of PIRs calculated for previous highway PPTAs in China. The reasons for this are: (i) a small rural roads program (less than 1 percent of the combined project's NPV) and (ii) an unusually high proportion of benefits to goods traffic, which only indirectly benefit the poor.

**Table A18.1 Economic Internal Rate of Return Whole Project  
(constant 2006 economic prices, domestic numeraire, CNY million)**

Year	Annual costs (CNY million)				Annual benefits (CNY million)										
	Without project road costs	With project costs			Incremental cost	VOC savings	VOT savings	Accident savings	Generated traffic	Freight transit savings	Rail diversion	Benefits of rural roads	Bus stations	Total benefit	Net benefit
	Base network	Capital	Operating & maintenance	Rural roads etc											
2007	0.0	857.5	0.0	0.0	857.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-857.5
2008	0.0	1,587.8	0.0	197.4	1,785.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1,785.2
2009	0.0	1,485.7	0.0	197.4	1,683.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1,683.0
2010	0.0	1,983.4	0.0	197.4	2,180.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2,180.8
2011	0.0	1,900.5	0.0	197.4	2,097.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2,097.9
2012	44.7	0.0	71.0	0.0	26.3	872.5	48.8	55.7	26.3	0.9	6.3	138.1	7.4	1,155.8	1,129.6
2013	46.8	0.0	72.8	0.0	26.0	1,283.5	73.5	79.6	37.9	1.4	6.6	146.9	8.1	1,637.5	1,611.6
2014	49.0	0.0	74.6	0.0	25.6	1,769.8	103.7	106.8	51.2	2.2	6.8	155.8	8.9	2,205.2	2,179.6
2015	51.2	0.0	76.5	0.0	25.3	1,951.7	117.1	114.6	55.4	2.6	7.1	157.2	9.8	2,415.5	2,390.3
2016	53.6	0.0	78.5	0.0	24.9	2,151.9	132.2	123.0	60.0	3.2	7.4	158.6	10.8	2,646.9	2,622.0
2017	56.1	0.0	80.6	0.0	24.5	2,372.1	149.2	131.9	64.9	3.8	7.7	160.0	11.9	2,901.5	2,877.0
2018	58.7	0.0	82.7	0.0	24.1	2,614.2	168.4	141.6	70.2	4.6	8.0	161.4	13.0	3,181.5	3,157.4
2019	61.4	0.0	84.9	0.0	23.6	2,880.5	190.1	151.9	76.0	5.6	8.3	162.8	14.3	3,489.5	3,465.9
2020	64.2	0.0	87.3	0.0	23.1	3,173.2	214.5	163.0	82.2	6.8	8.7	164.3	15.8	3,828.4	3,805.3
2021	67.2	54.3	89.7	0.0	76.9	3,494.9	242.1	174.9	88.9	8.2	9.0	165.7	17.4	4,201.2	4,124.3
2022	70.3	0.0	228.0	0.0	157.8	3,848.6	273.2	187.6	96.2	9.9	9.4	167.2	19.1	4,611.3	4,453.5
2023	73.8	0.0	94.9	0.0	21.1	4,116.2	298.9	197.0	100.4	11.6	9.7	170.0	21.0	4,924.9	4,903.8
2024	77.5	0.0	97.7	0.0	20.2	4,402.2	327.0	206.8	104.8	13.5	10.1	172.8	23.1	5,260.4	5,240.2
2025	81.3	0.0	100.5	0.0	19.2	4,707.8	357.7	217.2	109.4	15.8	10.5	175.6	25.4	5,619.5	5,600.3
2026	85.4	0.0	103.6	0.0	18.2	5,034.3	391.3	228.0	114.2	18.5	11.0	178.5	27.9	6,003.7	5,985.6
2027	89.7	0.0	106.7	0.0	17.1	5,383.1	428.1	239.4	119.2	21.6	11.4	181.5	30.7	6,415.0	6,397.9
2028	94.1	0.0	110.0	0.0	15.9	5,755.7	468.3	251.4	124.4	25.2	11.8	184.6	33.8	6,855.2	6,839.3
2029	98.8	0.0	113.5	0.0	14.6	6,153.8	512.3	264.0	129.8	29.5	12.3	187.7	37.2	7,326.5	7,311.9
2030	103.8	0.0	117.1	0.0	13.3	6,579.0	560.4	277.2	135.5	34.4	12.8	190.9	40.9	7,831.0	7,817.7
2031	109.0	0.0	120.8	0.0	11.9	7,033.2	613.0	291.0	141.4	40.2	13.3	194.1	45.0	8,371.3	8,359.4
2032	0.0	-4,420.8	135.8	-401.9	-4,686.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,686.9
PV, 12%	257.2	5,205.5	385.4	514.1	5,847.8	11,578.3	804.2	595.5	294.2	30.1	34.7	679.0	63.2	14,079.2	8,231.4

**Economic internal rate of return: 21.5%**

Table A18.2: Sensitivity Analysis

Scenario		EIRR (%)	NPV (CNY million)	Switching Value <sup>a</sup> (%)
(a)	Base case	21.8	8,000	
(b)	Benefits less 10%	20.5	6,670	0.4
(c)	Benefits less 20%	19.1	5,340	
(d)	Cost increased by 10%	20.7	7,470	2.5
(e)	Cost increased by 20%	19.6	6,940	
(f)	Combination (c) and (e)	17.1	4,270	
(g)	Toll + 50%	17.7	4,300	1.7
(h)	Toll - 50%	22.0	8,400	
(i)	Traffic Growth + 10%	23.2	9,900	
(k)	Traffic Growth -20%	18.3	4,500	
(l)	Opening delayed by a year	20.8	7,060	
(m)	Diversions to Baise-Luocunkou increased from 40 to 60 percent	19.3	5,600	

EIRR = economic internal rate of return, NPV=net present value.

<sup>a</sup> Switching value indicates the percentage increase in a cost item (or decline in a benefit item) required for the NPV to become zero.

Source: PPTA consultants estimates.

**Table A18.3: Poverty Impact Ratio**  
**(Present values at 12 percent, CNY million)**

Item		Financial PV	Economic PV	Econ-Fin PV	Road passengers	Freight users	Vehicle owners	Construction labor	Govt	Total
<b>CNY million at constant 2006 prices</b>										
Benefits	Toll revenue	2,509	0	-2,509	-828	-780	-352		-549	-2,509
	VOC savings		11,578	11,578	3,356	4,014	1,561		2,647	11,578
	Time savings		804	804	713	0	0		92	804
	Accident savings		595	595	184	69	206		136	595
	Generated traffic benefits		294	294	91	102	34		67	294
	Freight transit savings		30	30	0	16	5		9	30
	Diversion from rail		35	35	32	0	0		3	35
	Benefits of rural & village roads		679	679	247	158	158		116	679
	Benefits of bus stations		63	63	63	0	0		0	63
	<b>Total benefits</b>	<b>2,509</b>	<b>14,079</b>	<b>11,570</b>	<b>3,859</b>	<b>3,578</b>	<b>1,613</b>	<b>0</b>	<b>2,520</b>	<b>11,570</b>
Costs	Capital and O&M	-5,848	-5,210	637					637	
	Taxes, duties & other adjustments	-545	0	545					545	
	Unskilled labor	-955	-637	318				318		
	<b>Total costs</b>	<b>-7,348</b>	<b>-5,848</b>	<b>1,501</b>	<b>0</b>	<b>0</b>		<b>318</b>	<b>1,183</b>	<b>1,501</b>
Net benefits	Net benefits	-4,839	8,231	13,071	3,859	3,578	1,613	318	3,702	13,071
Gains and losses					3,859	3,578	1,613	318	-1,137	8,231
Total benefits					3,859	3,578	1,613	318	-1,137	8,231
Proportion to the poor					0.129	0.253	0.000	1.00	0.10	
Net benefit to the poor					499	905	0	318	-114	1,608
<b>Poverty Impact Ratio (PIR) =</b>										<b>0.20</b>

O&M = operation and maintenance, VOC = vehicle operating cost; PV = present value (at 12%)

## FINANCIAL PROJECTION AND ANALYSIS

### A Introduction

1. The project financial evaluation and financial projections are in accordance with ADB's Guidelines for the Financial Governance and Management of Investment Projects. FinEval, a financial program designed specifically to evaluate expressways in the PRC, was used to undertake the evaluation. It is assumed that the expressway will be operated by a financially autonomous entity responsible for both investment and operations. The evaluation period is the same as that used for the economic evaluation, while projections cover construction plus ten years' operations. The financial evaluation is at constant 2006 prices and the projections at current prices. The base case exchange rate is US\$1 = CNY7.76, the parity at end 2006, and is not varied throughout the evaluation period.

### B Financing Plan

2. Table A19-1 shows the indicative expressway financing plan in CNY and US\$.

**Table A19.1 Expressway financing plan, CNY million**

Total amount required	ADB loan	Domestic loan	MOC grant	Provincial and other grant
<b>CNY million</b>				
10,6661	1,955	4,198	1,320	3,193
<b>US\$ million</b>				
1,375	251.9	541.0	170.1	411.5
100%	18.3%	39.4%	12.4%	30.0%

3. The post-tax weighted average cost of capital (WACC) corresponding to the financing plan in Table A19.1 and calculated according to current ADB guidance is 3.1 percent. If there is no interest tax shield, the (pre-tax) WACC is 4.3 percent.

### C Financial Evaluation

4. The financial internal rate of return (FIRR) for the project expressway (excluding the local road component) is based on estimated incremental revenues and costs resulting from the construction and operation of the expressway. The assumptions for calculating the FIRR (in addition to those outlined in A above) are as follows:
  - (i) the base toll at 2006 prices is CNY0.55 per pcu-km. weight-based tolls will be introduced and will add 18 percent to revenue in 2012, falling to 9 percent in 2017 and 4 percent from 2022 onwards;;
  - (ii) tolls are fully;
  - (ii) losses resulting from exemptions and the "green passage" policy account for 10 percent of revenue;
  - (iii) other income (from advertising, fuel sales, penalties imposed on overweight vehicles etc) amount to 3 percent of toll income;
  - (iv) ramp up is applied at 60 and 80 percent of full revenue for 2012 and 2013 respectively;
  - (iv) FIRRs are calculated after business taxes and corporate income tax;
  - (v) capital costs include all incremental capital expenditures (civil works, equipment, land acquisition and resettlement, consulting services, and physical contingencies) as well as periodic maintenance costs, but price contingencies and borrowing fees are excluded;

- (vi) operation and maintenance expenses include all incremental costs necessary for operating the expressway, but exclude depreciation provisions;
  - (vii) periodic maintenance is assumed to be necessary in 2022 and 2032 and equipment replacement in 2021; and
  - (viii) projected annual operating revenues are estimated in real terms based on the discounted weighted average toll rate and the traffic forecast. Real increases in toll rates are not assumed. Other income (from fuel sales, rental income etc) amounts to 1.5 percent of toll revenue. Losses and exemptions reduce toll revenue by 10 percent, dropping to 5 percent after three years of operations.
5. The base case FIRR is 4.7 percent (pre-tax), 4.4 percent (after business taxes) and 3.6 percent after all taxes. Thus the FIRR exceeds WACC in all taxation cases – see Table A19.2.

**Table A19.2: Base Case FIRR compared to the Project WACC**

	Pre tax	Post business tax only	Post business tax and corporate income tax
FIRR: this study <sup>a</sup>	4.7	4.4	3.6
WACC (post corporate income tax)	-	3.1	3.1

6. Sensitivity analyses were conducted based on alternative toll scenarios. The results are summarized in Table A19.3. Either (i) full indexation of tolls or (ii) a 10 percent increase in tolls would produce an FIRR greater than WACC. Introduction of tunnel tolls (not currently Guangxi practice) would be approximately equivalent to a 1.14 multiplier.

**Table A19.3: FIRR under alternative toll scenarios (percent)**

	Post business taxes	Post all taxes
Partial indexation	4.0	3.3
Partial indexation and no ramp up	4.2	3.4
No weight Based Tolls	3.9	3.2
Base case tolls x 1.10	4.8	3.9
Base case tolls x 1.25	5.1	4.1
Base case tolls x 1.50	4.1	3.2

Source: consultants' estimates

7. Table A19.4 shows development of an adverse conditions scenario.

**Table A19.4: FIRR under adverse conditions scenarios (percent)**

	Post business tax only	Post business tax and corporate income tax
Base case (for comparison)	4.4	3.6
Partial Indexation	4.0	3.3
10% increase in costs	3.8	3.1
Opening delayed by a year	4.4	4.0
10% less traffic	3.7	3.1
Combined adverse conditions	2.9	2.4

Source: consultants' estimates

## D Financial Projections

8. Full projections are shown in Supplementary Appendix 12A, as are the detailed assumptions made. Indicative borrowing costs are in Table A19.5. The ADB interest rate is 6 month US\$ LIBOR plus 40 basis points (LIBOR as at early November 2006). The domestic rate is the Bank of China rate for 5 years or longer, discounted for public sector borrowers.

**Table A19.5: Borrowing costs**

Source	Interest rate, % pa	Repayment period, yrs	Amortisation	Grace period	Fees		Interest capitalised?
					Front end	Commitment	
ADB	5.6 <sup>a</sup> /5.79	15	Annuity	Construction	0	0.35%	Yes
Domestic	5.8 <sup>a</sup> /6.16	20	Annuity		0	0	Yes

- a. Lower interest rates during construction

Sources: ADB, Bank of China and consultants' estimates

9. Summary financial projections are shown in Table A19.6. Returns to equity are not calculated as the liabilities built up by short term external financing continue until 2025.
10. Profitability is affected by high interest charges and high depreciation charges. As a result, profit before interest and tax (PBIT) shows losses for the first year of operation, becoming positive in 2013, while net profit is negative until 2017, i.e. for the first seven years of operation. Cash flows are initially weak. Internal cash generation only amounts to 48 percent of long term debt service charges in 2013, but exceeds them in 2017. The gap is plugged by short term borrowings, which reach CNY0.6 billion in 2015. The annual debt service cover ratio (ADSCR) with respect to long term debt is initially poor, but just exceeds 1.0 in 2015. The usual benchmark ratio of 1.2 is not exceeded until 2018.
11. Such a result amounts to a conclusion that the project is not financially viable in the short to medium term with a large debt element in its financing. This was to be expected from the low FIRR. It would not attract private sector support as currently structured. The longer term picture is better, however. All the debt is satisfactorily redeemed by the end of the evaluation period.
12. Financial viability is summarized in Table A19-6.

**Table A19-6: Base case financial viability**

Parameter	Assessment
Profit	PBIT > 0 in 2013; net profit >0 in 2017
Need for short term external financing	Excessive at CNY0.6 billion
ADSCR <sup>a</sup>	0.48 on opening, >1.0 in 2015
Discounted return to equity	No dividend payments (see discussion above)
Return on net assets <sup>b</sup>	4.6%

Notes: (a) ADSCR = (cash collected - O&M costs - taxes - essential capital expenditure)÷long term debt service charge. Calculated on long term debt only.

(b) profit before interest and tax÷net assets. The weighted average is an arithmetic average and takes no account of the time value of money. It is calculated over the period 2007-2021

13. Sensitivity tests to non-toll factors are shown in Table A19-7 and to changes in toll in Table A19-8. Table A19-7 shows that either absence of ramp up or delayed opening are,

by themselves, the single most beneficial changes, though neither eliminates initial cash flow difficulties.

**Table A19-7: Results of sensitivity tests**

<b>Test</b>	<b>Min ADSCR</b>	<b>Peak short term borrowings CNY billion</b>	<b>Return on net assets</b>
Base case	0.48	0.6	4.6
No ramp up	0.82	0.2	4.7%
CNY appreciation of 10 percent	0.50	0.5	34.6%
CNY appreciation of 20 percent	0.51	0.4	4.6%
Traffic reduced by 10 percent	0.43	0.8	3.7%
Opening delayed by a year	0.53	0.8	4.2%
Costs increased by 10 percent	0.48	0.6	3.8%
All the above	0.47	0.6	2.7%

Source: consultants' estimates

14. Table A19-8 shows sensitivity to changed toll levels. They confirm a sharp deterioration at toll rates below the base level. At 1.25 x the base toll rate – the toll rate that produced the greatest FIRR (see Table A19-3) – performance is a little better: the financing gap plugged by short term borrowings is reduced considerably but debt service cover remains very poor.

**Table A19-8: Toll sensitivity**

<b>Toll scenario</b>	<b>Min ADSCR</b>	<b>Peak short term borrowings CNY billion</b>	<b>Return on net assets</b>
Base x 0.5	0.25	4.7	0.4
Base x 0.75	0.37	1.5	2.6
Base x 1.0 (base case)	0.48	0.6	4.6
Base x 1.25 (max FIRR)	0.50	0.4	5.6
Base x 1.5	0.40	0.8	3.4

Source: consultants' estimates

**Annex 19A: Pro forma Financial Statements (CNY million)**

	CNY million in year (current prices)														
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>A Pro forma income and expenditure statement</b>															
Toll revenue	0.0	0.0	0.0	0.0	0.0	290.7	426.9	587.6	647.1	712.5	725.7	799.2	880.0	969.1	1,067.2
Non-toll revenue (advertisements, etc)	0.0	0.0	0.0	0.0	0.0	9.7	14.2	19.6	21.6	23.8	24.2	26.6	29.3	32.3	35.6
Interest income on cash balances	0.0	(.0)	(.0)	(.0)	.0	0.1	0.1	0.2	0.2	0.3	1.2	2.2	4.5	8.3	12.7
<i>less: taxes on turnover (business, education and construction taxes)</i>	0.0	0.0	0.0	0.0	0.0	16.8	24.7	34.0	37.4	41.2	42.0	46.2	50.9	56.1	61.8
<b>Total revenue</b>	0.0	(.0)	(.0)	(.0)	.0	283.6	416.4	573.4	631.4	695.3	709.1	781.8	863.0	953.6	1,053.7
<b>Total operating expenses</b>	0.0	0.0	0.0	0.0	0.0	11.1	10.7	11.4	41.9	47.0	52.4	58.2	67.8	78.1	89.2
<b>Pre tax operating profit/(loss) before capital charges</b>	0.0	(.0)	(.0)	(.0)	.0	226.0	273.0	405.0	531.5	584.4	642.9	650.9	714.0	784.9	864.5
Depreciation charge	0.0	0.0	0.0	0.0	0.0	309.4	309.4	309.4	309.4	309.4	309.4	309.4	309.4	309.4	309.4
Interest charges: long term debt	0.0	0.0	0.0	0.0	0.0	371.6	359.8	347.2	333.9	319.8	304.8	288.9	272.1	254.3	235.4
Interest charges: short term debt	0.0	0.0	.0	.0	.0	0.1	15.5	25.2	28.5	29.2	29.2	29.2	29.2	29.2	26.7
<b>Pre tax operating profit/(loss) after capital charges</b>	0.0	(.0)	(.0)	(.0)	(.0)	(408.2)	(279.6)	(150.3)	(87.3)	(15.4)	7.5	86.4	174.1	271.6	384.9
Corporate income (profit) tax	0.0	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)	131.4
<b>Post tax operating profit/(loss)</b>	0.0	(.0)	(.0)	(.0)	(.0)	(408.2)	(279.6)	(150.3)	(87.3)	(15.4)	7.5	86.4	174.1	271.6	384.9
<b>B Pro forma balance sheet</b>															
Assets															
Current assets	()	()	()	()	3	3	10	12	13	58	111	227	414	633	754
Net fixed assets	983	2,920	5,319	7,978	10,666	10,357	10,047	9,738	9,429	9,119	8,810	8,500	8,191	7,882	7,632
<b>Total assets</b>	983	2,920	5,319	7,978	10,669	10,360	10,058	9,750	9,442	9,177	8,921	8,727	8,605	8,515	8,386
Liabilities and equity															
Current liabilities	0				3	299	486	551	565	565	566	566	566	520	340
Long term debt	627	1,821	3,232	4,724	6,153	5,955	5,746	5,524	5,289	5,039	4,775	4,495	4,198	3,883	3,549
Equity	356	1,100	2,087	3,254	4,513	4,105	3,826	3,675	3,588	3,573	3,580	3,667	3,841	4,112	4,497
<b>Total liabilities and equity</b>	983	2,920	5,319	7,978	10,669	10,360	10,058	9,750	9,442	9,177	8,921	8,727	8,605	8,515	8,386
<b>C Pro forma cash flow statement</b>															
Sources of funds															
Internal cash generation	0.0	0.0	0.0	0.0	0.0	274.5	405.7	532.6	584.8	643.3	651.0	714.4	785.4	865.0	957.0
External financing	982.6	1,937.7	2,398.2	2,659.4	2,691.0	295.0	186.6	63.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total sources of funds</b>															
Application of funds															
Construction of expressway	982.6	1,937.7	2,398.2	2,659.4	2,688.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0
Debt service	0.0	0.0	0.0	0.0	0.0	569.3	584.6	594.3	597.6	598.4	598.4	598.4	598.4	645.7	775.9
Distributions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.3	180.0
<b>Total application of funds</b>	982.6	1,937.7	2,398.2	2,659.4	2,688.3	569.3	584.6	594.3	597.6	598.4	598.4	598.4	598.4	692.9	1,015.8
<b>Cash flow surplus (deficit)</b>	0.0	0.0	0.0	0.0	2.7	0.2	7.6	1.3	1.4	44.9	52.6	116.0	187.0	172.1	-58.8

**Annex A19-10: Financial Internal Rate of Return (Constant CNY million)**

Year	Capital investment	Operating & maintenance costs	Average toll in CNY/pcu-km	Gross revenue	Business tax	Net cash flow	Corporate income tax	Net cash flow after corporate income tax
2007	874					(874)		(874)
2008	1,666					(1,666)		(1,666)
2009	1,969					(1,969)		(1,969)
2010	2,082					(2,082)		(2,082)
2011	1,994					(1,994)		(1,994)
2012		9.0	.65	254	14.2	231		231
2013		9.4	.65	363	20.3	334		334
2014		33.6	.65	487	27.2	426		426
2015	452	36.6	.65	521	29.2	4		4
2016		39.7	.65	558	31.3	487		487
2017		42.9	.60	553	31.0	479		479
2018		48.7	.60	593	33.2	511		511
2019		54.5	.60	635	35.5	545		545
2020		60.5	.60	680	38.1	581		581
2021	60	64.3	.60	728	40.8	563		563
2022	150	65.5	.57	749	41.9	491	96	395
2023		66.6	.57	785	43.9	674	120	554
2024		67.8	.57	823	46.1	709	141	567
2025		69.1	.57	862	48.3	745	162	583
[2026		70.4	.57	904	50.6	783	183	600
2027		71.7	.57	947	53.1	823	205	618
2028		73.1	.57	993	55.6	864	257	608
2029		74.5	.57	1,041	58.3	908	278	630
2030		76.0	.57	1,091	61.1	954	299	655
2031		77.6	.57	1,144	64.1	1,002	322	680
2032	(4,960)					4,960		4,960
PV at 12%:								
						FIRR pre income tax:	FIRR post income tax:	
						4.4%	3.6%	

**SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY**

**A. Linkages to the Country Poverty Analysis**

<p><b>Is the sector identified as a national priority in country poverty analysis?</b></p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p><b>Is the sector identified as a national priority in country poverty partnership agreement?</b></p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p><b>Contribution of the sector or subsector to reduce poverty in the People’s Republic of China:</b></p> <p>Social indicators have continued improving in PCR and in the aggregate poverty has inched downward. In 2005 PRC was ranked as the world’s fourth largest economy and third among trading nations. However, although PRC is one of the leading industrial engines of the global economy, its GDP per capita in 2005 was still a modest \$1,730. In 2005 PRC still had an absolutely poor population of 26.1 million and a low income population of 49.8 million. PCR’s 11th FYP promulgated in March 2006 has a stronger emphasis on rural development with a pledge to increase farmers’ incomes and enhance public services in the countryside.</p> <p>ADB’s Country Program Strategy (CPS) for 2007-2008 seeks to promote sustainable economic growth and reduce poverty with the transport sector dominating ADB’s operations in the PRC. The project directly contributes to these objectives by improving road transport efficiency and improving the access of rural villages to income-generating opportunities and social services. Less developed and poor areas will have improved connectivity as a result of expressway and rural road improvements which will help create the conditions necessary for developing local resources and generating employment to raise living standards.</p> <p>The CPS and ADB’s Greater Mekong Regional Cooperation Strategy and Program Update (2006-2008) supports the harmonization of cross-border trade and transport infrastructure improvements. The project will directly contribute to this through road improvements and bus stations at the border with Vietnam. This will promote regional cooperation by improving cross-border trade, transport services and livelihoods of the poor living in the border area. It will also contribute to the efficient development of the GMS by strengthening connectivity between the neighboring countries, reducing transport bottlenecks and increasing competitiveness.</p> <p>The project is also aligned with ADB Poverty Reduction Strategy (PRS). In order to achieve greater effectiveness the PRS focuses on aligning ADB operations with a country’s own poverty reduction strategy and the fostering of partnerships. Accordingly, the project social and poverty interventions have been prepared in the context of Guangxi’s poverty alleviation and development plans</p>	

**B. Poverty Analysis**

**Poverty Classification:** General intervention

<p><b>What type of poverty analysis is needed?</b></p> <p>The project area covers one district and 7 counties. It has a population of 2.3 million with a poverty rate of 28 percent and 7 percent of people are in absolute poverty. Ethnic minorities comprise 80 percent of the project area population and 32 percent of these people are poor.</p> <p>The road improvements will lead to lower transport costs, improved transport services and improved access to markets and social services, increased competitiveness, expansion of economic opportunities, diversification of rural livelihoods, and poverty reduction. Farmers will benefit from reduced transport costs, better access to markets, increased opportunities for diversification and increase competition for their products leading to increased incomes. This will promote diversification and significantly enhance the impact of local development programs on farmer’s incomes and community development. The project will increase economic development in the area and the growth of off-farm income opportunities so needed to counter significant underemployment. Improved accessibility from better transport services on better roads linked with an upgraded arterial network will open new opportunities and prospects for factories and agro-processing plants that were not there before hand. Tourism is just starting to develop in the project area and investors are keenly aware of the need for better road access. Construction of the expressway and local roads will directly create employment for local people including local women.</p> <p>The expressway and rural road improvements will help establish better transport services providing improved efficiency and affordability of rural passenger services thereby increasing services to poor villages. Both poor and non-poor will travel more in response to increased access, lower transport costs and time savings. The program of bus stations and associated route improvements will help provide better access to jobs, markets, health care, schools and other services and will increase the range of goods and services available in the community.</p> <p>Road improvements and bus stations at the border with Vietnam will facilitate cross-border trade, much of which is undertaken by small scale traders, many of who are poor women. The improved roads and more open border between China and Vietnam will also help to boost tourism development.</p>
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Rural road improvements will provide better year round access for more isolated communities (Longlin, Xilin and Leye), help to develop these communities and encourage more medical staff and primary school teachers to work there. The improved project roads and transport services will increase attendance at secondary schools and high schools that are located in townships.

### C. Participation Process

#### Is there a stakeholder analysis?

Yes **X**

No

Project surveys and community participatory consultations were carried out in preparing of the poverty and social strategy with priority given to rural areas, especially poverty-stricken villages and ethnic minority villages. This provided an understanding of the concerns and constraints facing farmers and gave villagers the opportunity to express transport related concerns and opinions of both positive and negative impacts arising from the project. In total 979 local residents living in the project area were surveyed and another 350 directly participated in consultations. According to local residents, the greatest benefits will be increased economic development in the area resulting in increased income sources and more job opportunities. Farmers had a keen understanding of the direct link between transport costs and farm profit margins and expected lower freight costs and improved access to benefit them directly. People also placed a good degree of emphasis on a cleaner environment with less dust and easier and faster transport in general. Residents also stated improved roads would provide better access for children traveling to schools and would improve road safety.

#### Is there a participation strategy? Yes **X** No

A participatory disclosure and planning workshop to present the EMDP to provincial, county and township representatives of key government agencies will be held in February 2007. The workshop will allow fine tuning of the EMDP and give GCD the opportunity to form partnerships for implementing the EMDP.

Before the alignment is finalized, local government officials and villagers will be consulted to minimize losses of high-quality arable land and structures. Township governments and community organizations will be involved in the implementation of the Resettlement Plan and EMDP. A Consultation and Participation Plan has been prepared for the EMDP (Annex 1) and for the RP.

### D. Gender Development

#### Strategy to maximize impacts on women:

Rural women participate actively in agricultural production in the project area and together with childcare, care of the elderly, animal care and household chores, results in heavy workloads for women. Local programs to improve rural household living conditions, such as biogas systems and sanitation and drinking water facilities, have brought benefits to women, particularly to poor women in mountain communities. Nevertheless, female illiteracy is considerably higher than male illiteracy and women's health situation, especially in mountain communities, is poor

In general, the project is gender neutral and will not have an adverse impact on women. Poor women and children will benefit from easier transport, time savings and improved access to medical facilities and other social, and from a general improvement in their quality of life. Women will also benefit from greater access to information and jobs, including migrating women, and increased opportunities for selling and buying goods at local markets. Women will gain employment during the construction of road improvements. Specific outputs of the project targeting women have been included in the EMDP and the RP. These include:

- 70 percent of landscaping jobs for women during expressway construction;
- Women will be a target group within the Control and Transmissible Diseases component of the EMDP;
- A Human Trafficking Prevention component has been included in the EMDP;
- Micro credit will be targeted for poor ethnic minority women for agriculture diversification and small business development;

**E. Social Safeguards and Other Social Risks**

<b>Item</b>	<b>Significant/ Not Significant/ None</b>		<b>Plan Required</b>
<b>Resettlement</b>	Significant X Not significant None	Resettlement Plans have been formulated for the expressway and local roads components of the project and a Resettlement Framework has been prepared for the village roads and bus stations that will ensure adequate compensation for affected people. A special fund of 1 percent of the total resettlement cost will be used to provide necessary help for the vulnerable people. Vulnerable people include the elderly, disabled, household headed by women, extremely poor households, and Yao people. In addition, the people affected by the land acquisition and resettlement of the project will be offered training in livelihood restoration and agricultural techniques. Resettlement organizations at all levels will include staff that are members of minority nationalities. Ethnic minorities and their representatives have participated in resettlement consultations and this participation should continue throughout the resettlement process.	Full X Short None
<b>Affordability</b>	Significant Not significant x None	With improvement of the local roads, more transport services at lower cost will be available to the poor.	Yes <b>No X</b>
<b>Labor</b>	Significant x Not significant None	GCD will ensure that project construction contracts include clauses to encourage local employment for construction and maintenance. GCD will ensure that employment opportunities are announced to local communities and will also ensure that contractors conform with appropriate labor laws and standards. GCD will monitor the use of local labor and appropriate labor laws and standards within the first 3 months of the commencement of each construction contract and take appropriate action to improve the employment and compliance if needed.  Contract documents will include clauses, prohibiting child labor for construction and maintenance activities, ensuring equal pay for men and women for work of equal value, and requiring a timely payment for workers on a monthly basis.	Yes No X
<b>Indigenous Peoples</b>	Significant X Not significant None	Ethnic Minorities account for 80 percent of the total population and have a disproportionately high share of the poor population comprising 82.8 percent of the total poor and 87.7 percent of the absolute poor. The poverty rate among ethnic minority people alone is 32 percent (28 percent for the whole population). They are less literate than the Han population and a greater proportion of ethnic minority people live in mountainous areas where conditions are harsher.  Ethnic minority people will benefit from the project. However, social risks arising from the project have been identified and mitigating measures are required under the loan agreement. An EMDP has been prepared for the	<b>Yes X</b> No

Item	Significant/ Not Significant/ None		Plan Required
		<p>project containing adequate provisions for special mitigation measures as well as measures to enhance project benefits.</p> <p>Although this plan is referred to as an EMDP, it is prepared to better safeguard all the population of the project area, regardless their ethnic identities. The includes the following:</p> <p><b>Control of Transmissible Diseases:</b> The project will ensure that an action plan for the control transmissible diseases is undertaken for the construction of the expressway and rural roads. The action plan will include both a component for the control of HIV/AIDS/STI and Hepatitis C and a component to control outbreaks of typhoid, encephalitis, malaria, tuberculosis and hepatitis C during construction activities. Prevention of Human Trafficking: As part of the loan agreement, GCD will take specific action to ensure that appropriate information on the risk of human trafficking is provided to the communities along the expressway and rural roads, with special attention to the border area, and that a plan to monitor the impact of the project on human trafficking is established. GCD will seek an agreement with local Public Security Departments and WF groups to ensure that awareness and prevention activities are undertaken in the project area with particular attention to the Jingxi border area. GCD should also work through these agencies to access monitoring information on human trafficking and ensure the project does not negatively impact on human trafficking..</p> <p><b>Protection of Communities from Construction Disturbances:</b> GCD will ensure that construction contracts contain clauses to prohibit night time construction and ensure the restoration of damaged to irrigation and drainage systems caused be construction activity and the building of pedestrian crossing, over/under passes and culverts. Construction contracts will contain penalty clauses for contractors that pollute surface drinking water or leave damage or debris behind.</p> <p><b>Assurances For Local Employment and Appropriate Employment Standards:</b> The project will ensure that construction contracts include clauses to encourage local employment for construction and maintenance and that employment opportunities are announced to local communities. GCD will monitor the use of local labor and appropriate labor laws and standards within the first 3 months of the commencement of each construction contract and take appropriate action to improve the employment levels and compliance if needed.</p>	
		<p><b>Linking Road Improvements to Government Poverty Alleviation Programs:</b> Current government programs to reduce poverty in the project area will be ongoing throughout the life of the project. encephalitis, malaria, tuberculosis and hepatitis C during construction activities. Prevention of Human Trafficking: As part of the loan agreement, GCD will take specific action to</p>	

Item	Significant/ Not Significant/ None		Plan Required
		<p>ensure that appropriate information on the risk of human trafficking is provided to the communities along the expressway and rural roads, with special attention to the border area, and that a plan to monitor the impact of the project on human trafficking is established. GCD will seek an agreement with local Public Security Departments and WF groups to ensure that awareness and prevention activities are undertaken in the project area with particular attention to the Jingxi border area. GCD should also work through these agencies to access monitoring information on human trafficking and ensure the project does not negatively impact on human trafficking.</p> <p><b>Micro-Credit:</b> PADO is currently supporting micro-credit for poor farmers to diversify and expand farming activities and to start up small businesses. The construction tax from the project will be paid to each county in accordance with the construction work undertaken in each. In total this will amount to 242.6 million Yuan in additional tax collected at the county level due to the project. It is recommended that GCD seek an agreement with county governments to use 40 million (16.4 percent) of the construction tax to increase the number of micro-credit loans available to poor ethnic minority villages.</p>	
<p><b>Other Risks and/or Vulnerabilities</b></p>	<p>Significant</p> <p>Not significant X</p> <p>None</p>	<p>HIV/AIDS has been identified as a potential risk. The project will ensure that an action plan for the control transmissible diseases is undertaken for the construction of the expressway and rural roads. The action plan will include both a component for the control of HIV/AIDS/STI and Hepatitis C and a component to control outbreaks of typhoid, encephalitis, malaria, tuberculosis and hepatitis during construction activities.</p> <p>As part of the loan agreement, GCD will take specific action to ensure that appropriate information on the risk of human trafficking is provided to the communities along the expressway and rural roads, with special attention to the border area, and that a plan to monitor the impact of the project on human trafficking is established. A TA will also support the implementation of these measures</p> <p>All social risks have been addressed in the EMDP and RPs</p>	<p>Yes X</p> <p>No</p>

See Volume 4, EMDP for further details.

## Summary Ethnic Minority Development Plan

1. Introduction. An Ethnic Minorities Development Plan (EMDP) has been prepared to ensure equitable sharing of project benefits and to mitigate adverse social risks on ethnic minority communities in the Project Area. Adequate provisions to enhance economic conditions of minority groups have been integrated in Project design. Special mitigation measures have also been included in the Resettlement Plans and Environmental Management Plan to help ensure that ethnic minorities adversely affected will also benefit from the Project. Government policies and programs for minorities further help protect and enhance benefits. The EMDP is based on relevant PRC laws and regulations and on ADB's Policy on Indigenous Peoples.
2. Project Description. The proposed Project comprises (i) the construction of a 177 km, access-controlled toll expressway from Baise to the border with Guizhou province, including toll stations, and service areas; (ii) the upgrading of 310 km of rural roads to improve access to 275 villages in the rural poor areas and improve access to border areas; (iii) construction of about 750 km of access roads to poor and minority villages, and (iv) construction of 50 township passenger transport stations. The Project will benefit 2.3 million residents in the Project Area of which 80% belong to ethnic minority groups.
3. Socioeconomic Characteristics. The project area is a minority area inhabited predominantly by Zhuang people. There are also some Miao, Yao, and smaller numbers of Mulao, Gelao and Yi minorities. Han are mainly living in urban centers. Six of the eight counties are designated as national poverty counties. The rural poverty incidence is 30% and the rate for ethnic minorities is 36%. The Yao and Miao tend to be the poorest and most vulnerable because they live in remote mountain areas, have lower education levels, and limited non-farming skills.
4. Project Benefits and Impacts. As result of the project, ethnic minorities can take advantage of road improvements to increase higher value agriculture products, seek migrant labor opportunities, promote tourism and have better access to health care, education, and technology extension. However, there are some risks for ethnic minority groups including resettlement, construction related disturbances, HIV/AIDS and other transmissible diseases, and difficulties to gain construction employment due to low education or lack of skills. Also, some villages may not benefit due to being located in remote mountainous areas. Ethnic minorities who live along the expressway corridor will benefit directly from the project. Others will benefit from the rural road improvements and township passenger stations. In addition, GCD will take measures to mitigate social risks and enhance project benefits and the local government has agreed to undertake development activities in and complementary manner. These measures are included in the ethnic minorities development plan (EMDP). Special measures will be targeted at women.
5. Action Plan and Budget. The EMDP has been formulated based on the field surveys, focus group discussions and consultation meetings with government agencies. The measures are categorized into three types: (i) measures to enhance direct project benefits; (ii) social risk mitigation measures; and (iii) complementary measures by local government. The first two are under the direct responsibility and implementation control of GCD, although collaboration with other agencies is required. The third type is under the responsibility and implementation control of other government agencies, but involves collaboration with GCD. There are specific budgets for the first two types which are generally part of the Project cost. The third type relies on other government agencies budgets. Table A17.1 provides the proposed actions to be implemented under this EMDP.

6. Consultation and Disclosure. At various stages, affected people have been consulted about the likely impacts of the Project. The stakeholders consulted include (i) beneficiary and affected households, (ii) village heads and villagers' representatives, (iii) local government agencies, and (iv) women and vulnerable groups. In February, a consultation meeting was held with senior government officials in Baise City to discuss the draft EMDP and reach consensus on the proposed measures. The EMDP will be submitted to ADB for review and approval, and uploaded to ADB website. The final EMDP will then be disclosed to the targeted townships and villages. More intensive consultation and participation will take place during implementation.
7. Implementation Arrangements. GCD and Baise City Government will be responsible for implementing the EMDP; the Guangxi Ethnic Affairs Commission and its county level offices will monitor and evaluate implementation. Implementation arrangements for the EMDP have either been integrated into the overall Project management, or are part of ongoing government programs. Other key agencies for implementation include the Center for Disease Control, Poverty Alleviation & Development Offices, County Communications Bureaus, Labor Bureaus, Tourism Bureaus and All China Women's Federation (ACWF).
8. Monitoring and Reporting. Monitoring and evaluation of the EMDP is necessary to ensure that EMDP is implemented properly and meets the objectives specified, particularly compliance with ADB's social safeguard policy. GCD will be responsible for internal supervision and monitoring, with assistance from local government agencies; a summary of progress, will be included in the Quarterly Progress Reports submitted to ADB. In addition, an independent monitor will be contracted by GCD to carry out the external monitoring and evaluation, and prepare annual monitoring reports for submission to GCD and ADB until the completion of the Project. Reports will assess each activity and provide recommendations for follow-up by the GCD. The terms of reference and monitoring indicators are set out in the full EMDP; data and analysis will be disaggregated by minority group and by gender, where applicable. The ADB midterm review will pay special attention to ethnic minority groups, and will review all monitoring reports. Adjustments, if necessary, will be made during the project to better meet ethnic minority needs.

**Table A21.1 Ethnic Minority Development Plan (Draft)**

Proposed Action	Targets	Lead/Supporting Agencies Involved	Timing	Funding Requirements (Yuan) /Source	Monitoring Indicators
<b>PROJECT BENEFITS</b>					
<b>1. Improved Transport Services</b> 1.1 Construction of 177 km expressway, service centers and interchanges 1.2 48 Class V Bus Stations 1.3 2 Class III Bus Stations 1.4 Policies allowing flexibility in routes and schedules	Rural households in 26 townships, 80% minority population and 32%poor	GCD, counties and district government	2007 - 2012	1.1 10.1 billion 1.2) 1.3) 35.05 million - project 1.4 0	No. of bus stations No. of new bus services Passenger fares and freight rates Frequency of travel % of household income spent on transport
<b>2. Improvement of Rural Roads</b> 328 km of rural roads 750 km village roads	Poor and ethnic communities along the road	counties and district government, transport bureaus	2007 - 2012	788 million - project	No of roads improved/constructed Local road investment
<b>3. Local Employment</b> 3.1 Expressway construction Unskilled and skilled labor employment for ethnic minorities 3.2 Construction of local roads and village roads 3.3 Training of 300 local labors to advance hem to skilled labor	70 percent of unskilled laborers including women sourced locally – 9,380, and 300 skilled laborers through the expressway 6,000 local jobs including women through the construction of rural and village roads, village roads, and bus stations Provide advanced training to 300 local labors in Youjiang, Tianlin, and Longlin	GCAB and Contractors	2007-2009	3.1 - Y135 million for unskilled labors & Y8.6 million for expressway (unskilled labor earns 40 Yuan/day, and skilled labor earns 2,400 Yuan/month) 3.2 - 80 million for local and village roads 3.3 – local government	No. of ethnic minorities and vulnerable employed No. of local women employed No. of ethnic minorities employed for catering services and other local services for construction No. of local labors trained for skilled work
<b>4. Linking Road Improvements with Government Alleviation Programs</b>	Ethnic Minority people in poverty villages Agreements with relevant agencies Harmonization of road improvements with poverty programs Selection of village roads linked to poverty reduction interventions Equipment & training for constructing and maintaining village roads	GCD and PADO/County of Bureaus of Commercial Management	2007- 2012  Agreements should be in place prior to commencement of civil works	Project and 5 – Year Local Government Plans	Agreements between GCD, PADO and other agencies to maximize project impacts Number of cases/examples of linked programs GDC Report on Cooperation /Coordination and Impact PADO evaluation reports PPMS Participatory community meetings
<b>MITIGATING MEASURES</b>					
<b>1. Control of Transmissible Diseases</b> 1.1 Control of HIV/AIDS/STI - Advocacy, Information and education campaigns at construction camps, communities, bus stations and transport centers	All construction camps and villages along the road  Target to prevent or reduce outbreaks of transmissible diseases as compared to past construction projects	Guangxi and baise Center for Disease Control Center (BDCC)  Health Department, and Construction	2007 - 2012	1.1 0.65 million - project and local government  1.2 0.4 million - project and local government	1.1- No. of clinics No. of community meetings No. of poster/brochures No. of TV/radio announcements No. tests No. of HIV/AIDS /STI/HVC infections

Proposed Action	Targets	Lead/Supporting Agencies Involved	Timing	Funding Requirements (Yuan) /Source	Monitoring Indicators
<ul style="list-style-type: none"> <li>- Inform workers of availability of HIV/AIDS and STI testing clinics</li> <li>- Monitoring by CDC</li> <li>1.2 Control of typhoid, cephalitis, malaria and hepatitis would include:               <ul style="list-style-type: none"> <li>- Screening and testing for transmissible diseases</li> <li>- Monitoring of biological media for transmissible diseases (rat types and density, mosquito types and density).</li> <li>- Advocacy, information &amp; education campaigns for migrant workers, and implement quarantine for malaria</li> <li>- Monitoring of drinking water in construction and resettlement sites</li> </ul> </li> <li>1.3 Animal disease control</li> </ul>	Install vaccination equipments in boarder areas	Contractors (refer to bidding documents)  Cross border Vaccination Agency		1.3 Local Government	Independent monitoring report  1.2- No. of monitoring sites Frequency of monitoring No. of cases of typhoid, encephalitis, malaria and hepatitis No of community meetings  1.3 – Number of installed vaccination equipments
<b>2. Prevention of Human Trafficking</b> Monitoring of human trafficking in each county	All counties with special attention to Jingxi Target to reduce the number of trafficking cases Special targeting toward women	Public Security Bureau (PSB) and Women's Federation (WF)/GCD, GCIAB	Action Plan must be in place prior to the start of civil works 2007 - 2012	0.5 million - PSB, WF	Agreement with PSB PSB monitoring reports Reduction in number of reported cases of trafficking No. of community meetings/ awareness session
<b>3. Protection of Communities from Construction Disturbances</b> 3.1 Prohibit night time construction 3.2 Restoration of damaged to irrigation and drainage systems 3.3 Building of pedestrian crossing, over/under passes and culverts. 3.4 Fines for polluting surface drinking water or leaving damage or debris behind	All construction camps and villages along the road  Target to include clauses in all construction contracts	GCIAB and Contractors	2007 – 2010  Monitoring must begin within first 3 months of commencement of civil works	3.1 - 0 3.2 - 30 3.3 - 40	GCAB monitoring reports Working hours No of pedestrian crossing and over/ under passes Length of irrigation and drainage canals No of instances of pollution, damage and debris left No of fines No of community meetings
<b>4. Resettlement</b> 4.1 Full compensation 4.2 Special fund for vulnerable people 4.3 Forestry recovery 4.4 Arable land recovery 4.5 Income recovery for resettlement affected people (e.g., agricultural and non-agricultural training for livelihood restoration)	Resettlement affected people	City Resettlement Coordination Group and GCAB/ Agricultural Bureau. Livestock Bureau, Forestry Bureau, Labor Bureau, Land Resource Bureau, PADO, Ethnic Minority Affairs Bureau	2007 - RP must be agreed and implemented prior to commencement of civil works 2007- 2009 - Support plan must be agreed and implemented	4.1 - 474.8 million – RP 4.2 - 10 million – RP 4.3 - 41.3 million – RP 4.4 – 29.85 million- RP 4.5 – training budget provided by local government	No. of ethnic minorities affected by ethnicity Amount of funding disbursed and number of affected people provided with funding No. of ethnic minority APs provided with assistance Types of training available No. of attendees in courses No. of community meetings for training

Proposed Action	Targets	Lead/Supporting Agencies Involved	Timing	Funding Requirements (Yuan) /Source	Monitoring Indicators
<b>III. LOCAL GOVERNMENT COMPLEMENTARY POVERTY REDUCTION MEASURES</b>					
<b>1. Agricultural Industry Development</b>	Poor villages – link with the village road program	PADO/Ethnic Affairs Bureau, Bureau of Agriculture, Bureau of Animal Husbandry	On-going	Funded under local government programs	PADO and other government agency plans, reports and evaluations
<b>2. Small Business Loans and Micro-Credit</b> 2.1 Loans to affected businesses and ethnic minority entrepreneurs for agro-business, service sector and tourism 2.2 Micro-Credit loans to poor ethnic minorities	Agreement with Counties to use construction tax for guarantee of micro credit Target toward the small business in Longbang and Yuexu, and the alignment of G324 20,000 additional loans of 2000 Yuan for poor ethnic minority people, focused on poor women	Baise City Government and City RCC/GCAB, PADO, and other financial institutes	2007 – 2012 Agreements should be in place prior to commencement of civil works	40 million of guarantee (16.4 percent of 242.6 million Yuan) – construction tax	No. of loans No of loans to poor women % Increase incomes of poor
<b>3. Capacity Building / Human Resource Development</b>	Provide technical trainings in the poor villages, including women	PADO, Department of Labor, Training Institutions	On-going	Funded under local government programs	PADO and other government agency plans
<b>4. Promotion of Labor Migration</b>	Poor villages and individuals, including women	PADO, Department of Labor, Training Institutions	On-going	Funded under local government programs	PADO and other government agency plans
<b>5. Tourism Development</b> 5.1 Provide trainings to ethnic minorities on hosting tourists 5.2 Planning the tourism routes 5.3 Disseminate tourism information at bus stations	Make local ethnic groups can generate income from tourism development	City and County Tourism Bureau/GCAB	On-going	Funded under local government programs	Tourism Bureau and other government agency plans

See Volume 4, Supplementary appendix 18 for further details.

## **SUMMARY RESETTLEMENT PLAN**

### **A. Status of the Resettlement Plan**

1. The proposed Western Guangxi Roads Development (Longlin-Baise Expressway) Project includes the construction of (i) a 177.5 km expressway from Longlin County (Guizhou Province border) to Baise City (Youjiang District), with its connector roads with a length of 21.8 km, (ii) a rural roads component comprising 6 sections with a total length of 310 km (iii) upgrading 750km of village roads to Class IV, and (iv) 50 township bus terminals. One Resettlement Plan (RP) covers the expressway and related connector roads, interchanges, toll stations, and service areas. Other RPs cover components (ii), and a Resettlement Policy Framework and Procedural Guidelines addresses components (iii) and (iv) that involve land acquisition and resettlement. Prior to commencement of land acquisition and house demolition, GCD will update all RPs based on detailed measurement survey and submit them to ADB for approval. During project construction, if there is significant material change in project scope or other causes, the RPs will be revised, disclosed to APs and submitted to ADB for approval prior to commencement of such changes.

### **B. Scope of Land Acquisition and Resettlement**

#### **1. Expressway Component**

2. Since 54.3 km (31 percent of the expressway length) is bridges and tunnels, the Project impacts on land and houses are reduced. The proposed expressway and its connector roads will affect 10 townships and 35 administrative villages in Longlin County, Tianlin County, and Youjiang District of Baise Municipality. According to the preliminary design, 22,130 mu of land will be acquired, of which about 38 percent is farmland (comprising 13 percent paddy field, 13 percent dry land and 11 percent orchard), and 42 percent is forest land. The remaining land is 13 percent is wasteland, and 6 percent other.
3. Along with land acquisition, 140,422 square meters of houses will be demolished. About 59% of houses are made of brick concrete, and 25% are brick timber structures. Among those, 3 enterprises will be affected, including a gas station, an abandoned collective shop, and Nanle highway maintenance station. The relocation will provide an opportunity to improve current housing conditions for relocated households. Most of these households will be moved a short distance to another site within their original group or village. Other project affected assets include telecommunications lines and electrical power lines, irrigation systems, roads, sheds, walls, graves and scattered trees. All land, housing and other assets will be compensated at replacement value.
4. Based on the Chinese standard for impact assessment, the land acquisition impact is equivalent to 3,990 persons in 962 households who totally lose their cultivated land. Assuming on average the affected households will lose one-fifth of their landholdings, the land acquisition could affect 4,810 households. The house relocation will affect 1,390 households. Since the households affected by house demolition would also lose part of their cultivated land, then the total directly affected population is 19,952 persons in 4,810 households.

#### **2. Rural Roads and Transport Service Components**

5. According to the detail design of, the 47-km Jingxi to Longbang Class II Road and the feasibility study report of the two small border roads they will affect one county, 4 townships and 17 administrative villages and will acquire 2,055 mu of land, including 38 percent paddy field, 20 percent dry land, 2 percent cash forest land, and 22 percent shrub forest land. It will also demolish 4,885 square meters of brick concrete houses and 4,340 square meters of brick timber houses. The total people actually affected by land acquisition will be 1,340 households or 6,020 people, and those affected by house demolition will be 95 households

or 427 people. The 37-km Napo to Dingye Class II will affect one county, 3 townships and 8 administrative villages will acquire 1,262 mu of land, including 15 percent paddy field, 38 percent dry land, 13 percent forest land and 45 percent waste land. It will also demolish 700 square meters of brick concrete houses and 300 square meters of brick timber houses. The total people actually affected by land acquisition will be 806 households or 2,890 people, and those affected by house demolition will be 10 households or 36 people. The 117-km Tianlin to Leye Class III and IV Road will affect 2 counties, 4 townships and 17 administrative villages and will acquire 613 mu of land, including 22 percent paddy field, 38 percent dry land, 12 percent vegetable and orchard land, 6 percent forest land and 22 percent waste land. It will also demolish 5,200 square meters of brick timber houses. The total people actually affected by land acquisition will be 193 households or 868 people, and those affected by house demolition will be 52 households or 233 people. The 106-km De'e to Shali Class III and IV Road will acquire 327 mu of land, including 2.5 percent paddy field, 24 percent dry land, 55 percent forest land and 15 percent waste land. It will also demolish 5,200 square meters of brick timber houses. The total people actually affected by land acquisition will be 96 households or 413 people, and those affected by house demolition will be 21 households or 90 people. The selection of the 750 km of the village road upgrading and the potential resettlement impacts will be determined during project implementation.

### **C. Policy Framework and Entitlements**

6. The resettlement objective is to achieve equal or better income and living standards in line with the PRC Land Administration Law (1998), State Council Document No. 28, and the ADB's Policy on Involuntary Resettlement. The GCD will ensure that any people losing land, housing, other assets or income sources will be assisted to fully restore their income and living standards. According to the policy and basic socioeconomic conditions among project counties, land compensation standards have been established based on 11 to 21 times the average annual output value (AAOV). However, the AAOV are going to be updated based on detailed survey, so the actual compensation rates are not yet available. For the draft RP, the compensation rates are estimated to range from CNY10,980 to 22,449 per mu for paddy field; CNY9,251 to 18,140 per mu for dry land; CNY20,900 to 46,260 per mu for vegetable land; CNY13,966 to 17,626 per mu for orchard; CNY31,317 to 36,883 per mu for fish pond; CNY7,569 to 8,163 per mu for cash forest land; CNY6,728 to 7,256 per mu for timber forest land; and CNY841 to 907 per mu for waste land. Green crops will be compensated based on 0.5 times AAOV except for sugarcane land, which is based on 1 time AAOV. Those people losing land temporarily during construction will receive a payment equivalent to production value foregone for the period of loss, which is expected to be 2 years. The land used temporarily will also be restored by the contractor to the original condition; the contractors will deposit funds with Baise City Land and Resources Office (BL&RO) to ensure this restoration is completed properly.
7. For demolished structures, replacement value will be provided to the affected households based on compensation rates adopted in Baise City, which is CNY400 per square meter for brick concrete structure, and CNY280 per square meter for brick timber structure. Those losing housing will be able to acquire new housing sites with their existing group or village, and close to a road. All sites will be provided with water supply, electricity, telephone and TV cable, where available. There will be no reduction in house compensation for depreciation, and people can salvage materials from their old houses.

### **D. Resettlement Strategy**

8. Efforts to minimize resettlement effects have been made based consultations with local officials during the setting of the alignment for the feasibility study and preliminary design, which avoids towns and large clusters of rural housing. The final alignment will be optimized to avoid large losses of housing and high yield paddy field, vegetable land, and fruit gardens.

For those unavoidably affected, the resettlement strategy is to replace losses of housing, land, other assets, infrastructure and income.

9. In the project area, the per capita land holding is between 1.01 (Jingxi County) and 1.96 (Tianlin County). Therefore, the land acquisition for the alignment, particularly at the interchanges, will have relatively significant impact on the income and livelihood of the affected people, especially since many households are poor. To mitigate such impacts, various rehabilitation measures have been proposed. Detailed resettlement and rehabilitation plans for those seriously affected villages will be developed and included in the updated RP for the expressway component. Based on consultations, most affected persons (APs) prefer to get cash compensation directly. The cash will be used to expand businesses, improve animal husbandry and cash crops, and provide income security until they find outside work. It is also recognized that new employment and income generation opportunities would arise during construction and after the expressway is completed.
10. GCD will ensure that the resettlement entitlements are provided to the people affected prior to the ground clearance and demolition commencement. Land compensation and resettlement subsidy will mainly be paid directly to the affected families through bank notes. Housing compensation and compensation for young crops and other assets will also be provided directly to people losing those assets. The relocated families will receive moving allowances and temporary housing allowances. Compensation for infrastructure will be paid to the concerned government departments for restoration. Also, expressway contractors will give priority to affected households in the allocation of unskilled jobs during construction.

#### **E. Institutional Arrangements**

11. GCD will assume the overall responsibility for implementing resettlement according to the approved RPs. For the expressway component, a Resettlement Division within the Longlin-Baise Expressway Construction Headquarters will be directly responsible to coordinate the planning, implementation, financing and reporting of land acquisition and resettlement for the expressway and connector roads. A prefecture-level resettlement leading group and resettlement office was established in Baise on October 20, 2006. Offices will also be set up in all the relevant counties, and staff will be assigned in all affected townships and villages to implement resettlement. The county land & resources offices will take the primary responsibility for the resettlement consultation, implementation and timely delivery of entitlements, with assistance from concerned townships and villages.

#### **F. Vulnerable Groups**

12. In this project area, many of the affected people are poor and predominantly Zhuang nationality. For economically vulnerable people, including elderly living alone, disabled, household headed by women, and poverty households, the Project will provide additional training and physical support. The affected households include those due to the current vulnerability or facing severe impacts and risks caused by land acquisition and resettlement. The specific type of assistance will be determined according to the actual condition and their needs during detailed measurement survey, and included in the updated RP. In severely affected poverty villages, some funds could be provided to upgrade schools or clinics. For these measures, GCD has agreed to a budget of one percent of basic resettlement fees.

#### **G. Consultation and Grievance Redress**

13. The 2004 Land Law requires disclosure and consultation with APs. Affected villages have been notified about the key elements of the RP during meetings and interviews. Resettlement information will be disclosed through newspapers to all affected persons by the middle of March 2007. During detailed resettlement planning, there will be further notifications and consultations to discuss specific impacts and how they will be addressed.

In case of grievance, all complaints will be processed based on the Government Regulation Number 431 on Grievance and Redress. People affected can submit their oral or written complaint first to the village committee or the township resettlement team. If their complaint is not settled in two weeks, they can seek redress at the county resettlement office, within one month. If still unresolved within two weeks, the Project owner will try to achieve a solution. The final redress would be sought, if necessary, in the civil courts, in accordance with the Civil Procedures Act.

## **H. Monitoring and Reporting**

14. The plan for internal and external monitoring and evaluation is included in the RPs. GCD will engage a qualified domestic monitor to carry out independent resettlement monitoring and evaluation. The monitor will ascertain whether APs have (i) received their full entitlements on time and (ii) fully restored their livelihoods, income levels and living standards. The monitor will conduct a baseline survey prior to resettlement, semi-annual investigations during resettlement and annual survey updates for two years after the completion of resettlement. The household survey will include a representative number of those severely affected by loss of land, those losing housing, and those classified as economically vulnerable. The monitor will provide ADB and GCD with copies of the monitoring and evaluation reports twice a year during resettlement implementation and once a year after resettlement completion.
15. For the expressway component, an internal monitoring and reporting system will be established in the Resettlement Division of the Longlin-Baise Expressway Construction Headquarters. The Baise Resettlement Office will report regularly to the Longlin-Baise Expressway Construction Headquarters, who in turn will report to ADB on the progress of land acquisition and resettlement through quarterly progress reports. After completion of land acquisition and resettlement, they will prepare a resettlement completion report for submission to ADB and GCD. Also, the Guangxi Provincial Audit Department will prepare a resettlement audit at the completion of the project; GCD will provide a summary of this audit to ADB prior to PCR mission. For the other project components, internal monitoring will be done by GCD and the land & resources bureaus; progress will be reported to ADB every six months.

## **I. Resettlement Cost and Implementation Schedule**

16. For the Expressway, the total resettlement budget estimate is CNY 523.6 million, and for the 6 rural roads the total resettlement budget estimate is CNY 58 million and for other components, the resettlement budget estimate is CNY 8 million. The total resettlement cost for the Project is thus CNY 590 million (\$76 million).. This includes compensation for land, housing, other assets, moving allowances, assistance for vulnerable groups, infrastructure, administration, taxes, monitoring and evaluation, and contingencies. GCD will guarantee to supplement the resettlement budget, as may prove necessary, to meet any shortfall which emerges in achieving the resettlement objectives.
17. The resettlement implementation schedule has been prepared based on the Project construction timetable agreed by GCD and ADB. It is planned that land acquisition and housing demolition for the expressway component would commence by June 2007. For the other project components, some implementation will commence about mid 2007; village roads will commence in 2008.
18. GCD will update these RPs and ensure that (i) resettlement impacts are accurately quantified, (ii) detailed mitigation measures formulated, where necessary, (iii) new information is disclosed to affected persons, and (iv) the updated RPs are submitted to ADB for concurrence prior to commencement of land acquisition or demolition.

## **CORPORATIZATION AND ORGANIZATIONAL STRUCTURES**

### **A. CORPORATIZATION**

1. Currently, two internal bureaus cover GCD's principal expressway responsibilities. The Infrastructure Construction Administration Bureau (GCIB) administers construction of expressways, which are, in most instances, handed over to the Expressway Administration Bureau (GEAB) on completion for operations and maintenance. GEAB in turn has three (and potentially four if the Southwest Expressway Management Office is formally established) geographically defined administrative divisions.
2. GCD has decided to change this structure. It proposes to consolidate construction and operation in a single body, recruiting staff from the GCIB and the GEAB. The single body is to be called the Guangxi Communication Investment Group (GCIG). Initially this body will be commercialized, with a view to corporatization later. There are attractions in combining construction with the operating divisions to make one corporate body with resources and expertise to cover the full delivery process from award and supervision of construction contracts through to expressway operation. Potentially, the advantages of consolidation of operations are (i) economies of scale in the use of plant, survey equipment and staff, (ii) ability attract better staff and (iii) the ability to pool toll revenues: this produces an entity that is financially more stable and creditworthy.
3. GCD's strategy is endorsed. Detailed recommendations on the structure within GCIG are set out in Supplementary Appendix 8. Put briefly, it is recommended that (i) construction be kept separate from operations and (ii) there should be a single operating entity, which should itself ultimately become corporatized and should not keep large, long term liabilities on its balance sheet.
4. It is recommended that the following action plan be implemented. (what follows works from an assumption of corporatization that would follow commercialization). A suggested roadmap is set out below.
  - 1. Policy and legal:**
    - a. Draft and agree scope of business**

5. GCIG's statement of scope of business, to be included in its letter of registration and articles of association, must be clearly and unambiguously defined and endorsed by GCD. This should refer to expressway construction, management and the negotiation and undertaking of toll road operation and maintenance contracts, with no restriction on location);
    - b. Prepare and agree arrangements for corporate governance**

6. Company law specifies that a company wholly owned by a state entity shall have between three and nine directors, including a representative of the employees of the company. The board should have nine directors, to include externally recruited and invited directors to demonstrate commitment to full corporate governance from the outset, even though at least initially the shares are wholly owned by GCD.
    - c. Prepare articles of association**
    - d. Register company**
  7. Registration must be with the State Industries & Commercial Administration Bureau, and throughout the above steps it will be important for GCD to liaise with this bureau as well as with MOC, to ensure full commitment to the process.); and

**e. Transfer of assets**

8. GCD must decide which of the existing roads under its jurisdiction will be transferred to GCIG. It is proposed that all the expressways apart from BOTs should be, but this may not be possible or appropriate.

**2. Organizational and resource development**

- a. Specify required corporate structure suitable for independently managed joint stock company;
- b. Prepare job specifications, grades and remuneration packages for all positions;
- c. Recruit staff by competitive selection from, initially, GCIB and GEAB and then externally;
- d. Set up training programs;

9. The need for staff development and training should be assessed, within the context of GCD's aim that GCIG develops a core of professional expertise and entrepreneurial capability and thereby establishes itself as a leading expressway company. Training programs should be developed across the company and consideration should be given not only to internal training but also to secondment of the most able and key staff for advanced training in the PRC or elsewhere, including secondment to successful international expressway operators.

- a. Invite prominent business professionals to join GCD nominees on shareholders' supervisory board

**3. Financial and administrative**

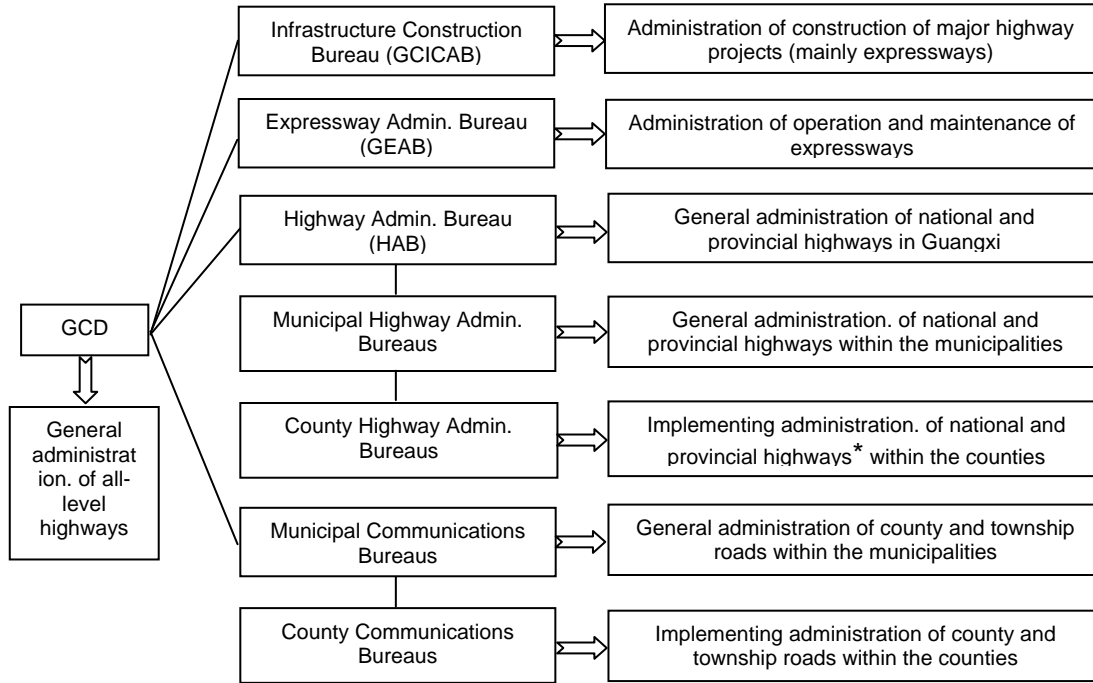
- a. Set up corporate financial and accounting systems
- b. Agree and arrange valuation and transfer of assets and liabilities
- c. Make inter-entity agreements
- d. Set up management information system

Loan approval period	Loan implementation period	Operational period (from 2012)
<b>Component 1 - Preparation for formation of GCIG</b>		
Policy and legal	Draft and agree scope of business Prepare and agree arrangements for corporate governance Articles of association Register company with State Industries & Commercial Administration Bureau Transfer expressway assets	
Organisational and resource development	Job descriptions, grading, remuneration packages Staff recruitment and training programs	
Financial and administrative	MIS Inter-entity trading Financial management systems	
<b>Component 2 - Commercialization of GCIG</b>		
	Commercialisation of construction and operating divisions: <ul style="list-style-type: none"> <li>- definition of aims and objectives</li> <li>- efficiency incentives</li> <li>- investment strategies</li> </ul>	
<b>Component 3 - Corporatization of GCIG Guangxi III construction division</b>		
	Guangxi III PMO phased out Guangxi III limited liability construction company formed as subsidiary of GCIG <ul style="list-style-type: none"> <li>- shareholders' agreement</li> <li>- articles of association</li> <li>- registration</li> </ul>	
<b>Component 4 - Corporatization of operating division</b>		
	Province-wide limited liability expressway operating company formed, initially as subsidiary of GCIG <ul style="list-style-type: none"> <li>- inter-entity financial agreement with Guangxi III construction company</li> <li>- shareholders' agreement</li> <li>- articles of association</li> <li>- registration</li> </ul>	
<b>Component 5 - Securitization of net toll revenues</b>		
		Within five years of opening re-forecast net toll revenues to ascertain suitability for securitization

**B. EXISTING ORGANIZATION STRUCTURES**

10. The structure of the existing organizations involved in road transport in Guanxi are set out below.

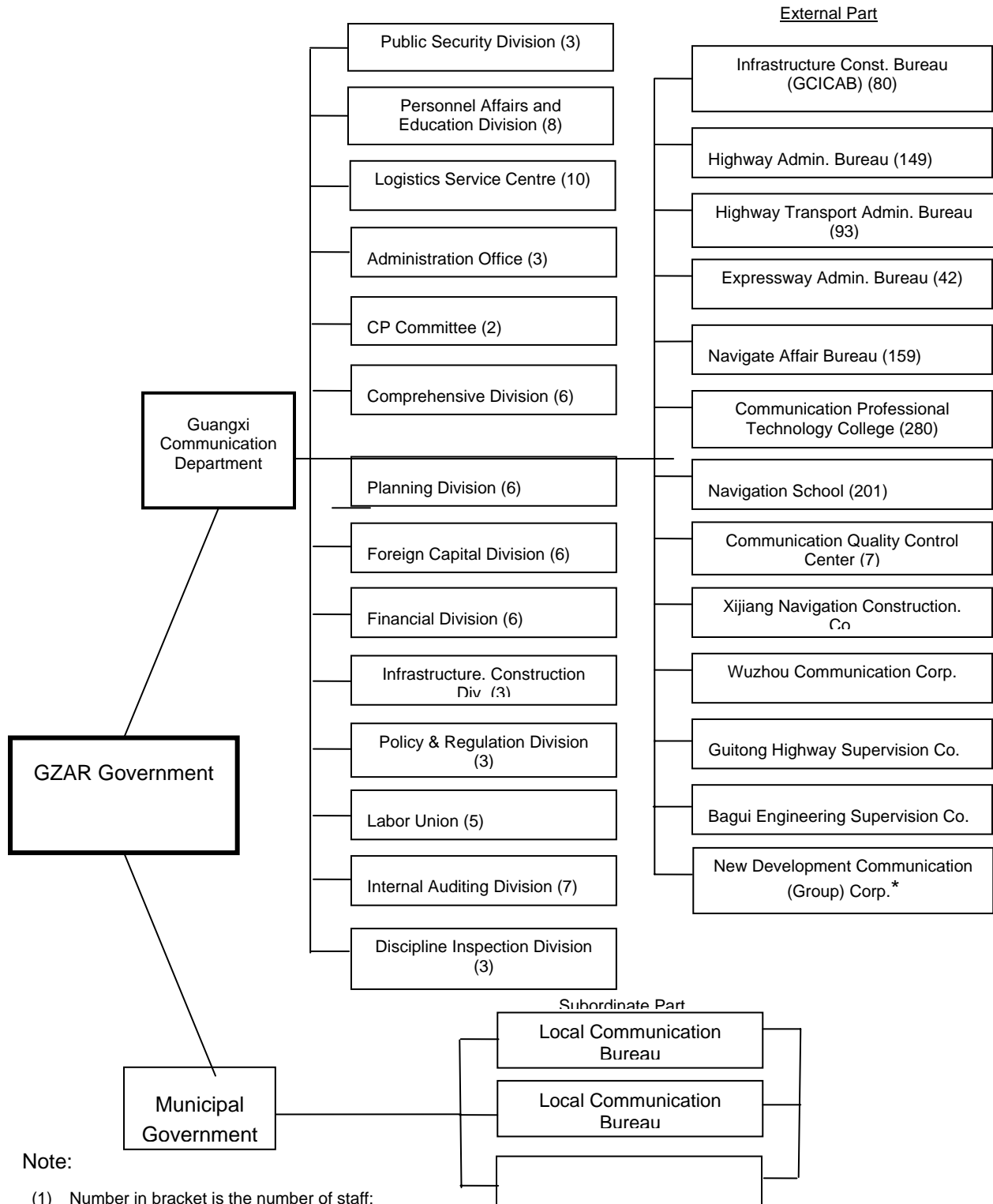
**A23-1: Division of Highway Administration Responsibilities in Guangxi**



Note:

\* Some important county roads are also administrated by municipal

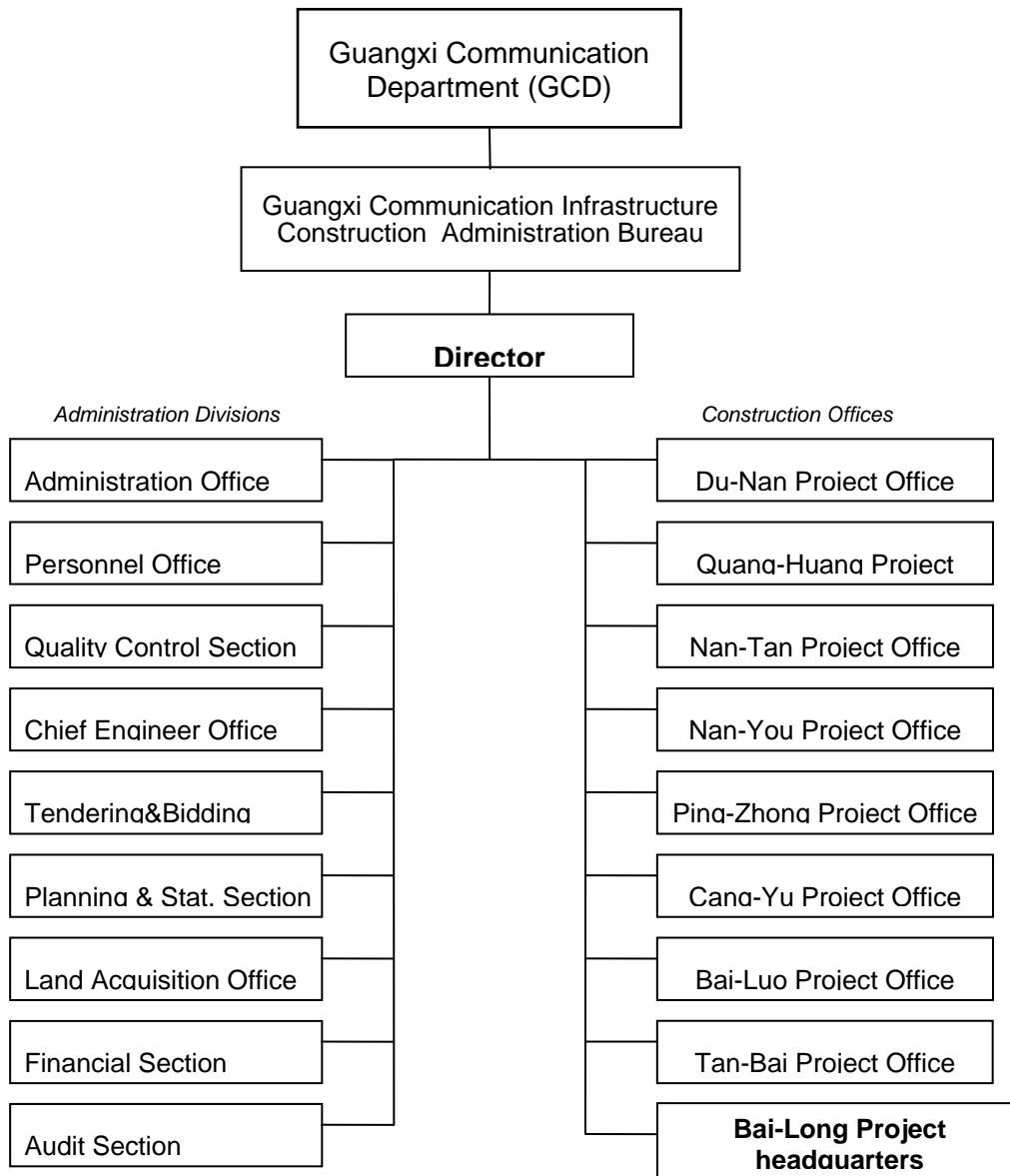
**Table A23-2 GCD Organization Chart**



**Note:**

- (1) Number in bracket is the number of staff;
- (2) \* New Development Communication (Group) Corp. is composed of Highway Bridge Corp, Auto-industry Sale Co., Communication Material Co., Navigation Engineering Division and

**Table A23-3 Organization Chart for GCICB**



**Table A23-4 Organization of GEAB**

