



# Report and Recommendation of the President to the Board of Directors

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Project Number: 37494  
November 2005

Proposed Loan  
People's Republic of China: Hunan Roads  
Development III Project

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 1 November 2005)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1237
\$1.00	=	CNY8.0840

The exchange rate of the yuan is determined under a floating exchange rate system. In this report, a rate of \$1.00 = CNY8.277, the rate prevailing at project appraisal, was used.

## ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMDP	–	ethnic minorities development plan
FIRR	–	financial internal rate of return
FYP	–	five-year plan
HCD	–	Hunan Provincial Communications Department
HEPB	–	Hunan Environmental Protection Bureau
HHAB	–	Hunan Provincial Highways Administration Bureau
HPG	–	Hunan Provincial Government
ITS	–	intelligent transport system
LIBOR	–	London interbank offered rate
NTHS	–	National Trunk Highway System
O&M	–	operation and maintenance
PAM	–	project administration memorandum
PCR	–	project completion report
PPMS	–	project performance management system
PRC	–	People's Republic of China
TA	–	technical assistance
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital
WRDS	–	western region development strategy

## NOTES

- (i) The fiscal year of the Government and its agencies ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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## LOAN AND PROJECT SUMMARY

<b>Borrower</b>	People's Republic of China
<b>Classification</b>	<p>Targeting classification: General intervention</p> <p>Sector: Transport and communications</p> <p>Subsector: Roads and highways</p> <p>Theme: Sustainable economic growth</p> <p>Subthemes: Promoting economic efficiency and enabling markets, fostering physical infrastructure development</p>
<b>Environment Assessment</b>	Category A. An environmental impact assessment was undertaken. The summary was uploaded on the web site of the Asian Development Bank (ADB) on 31 May 2005.
<b>Project Description</b>	The Project will (i) construct a 64-kilometer (km) expressway across hilly and mountainous terrain; (ii) upgrade 129 km of local roads, improving access to 52 poor villages; and (iii) provide consulting services and training to enhance the quality of construction, the maintenance management system, the intelligent transport system, the safety of roads, and the project monitoring and evaluation system.
<b>Rationale</b>	<p>The Project is located in Xiangxi Autonomous Prefecture, one of the poorest areas in the country, located in northwest Hunan in mostly rural and mountainous territory with limited accessibility. The incidence of rural poverty is 30.1%. Eighty percent of the population lives in rural areas and ethnic minorities, mainly Tujia and Miao, account for some 77% of the population. The inadequate road infrastructure is a major cause of the area's high incidence of poverty: only two thirds of the villages are served by roads. Thus despite the region's economic potential, weaknesses in the road infrastructure stunt economic growth. The national highway (NR319), which runs parallel to the project expressway, is a combination of class II, III, and IV roads, with steep slopes, sharp turns, and low allowable speed. Congestion is a daily phenomenon because of the booming mining and agricultural processing industries. The road network in western Hunan needs to be improved to facilitate economic growth and to integrate poor, isolated area into the centers of economic growth.</p> <p>The Government adopted the western region development strategy (WRDS), a key theme of the 10th Five-Year Plan, to enhance economic development in the poor, western part of the country. The WRDS assigns high priority to road sector development as a way to promote economic growth and poverty reduction in the western region. The Project will support the WRDS by building a 64 km expressway from Jishou to Chadong, a link in the Changsha-Chongqing corridor, one of the eight high-priority western corridors included in the 10th Five-Year Plan. The trip from Jishou to Chadong by car on NR319 currently takes 4 hours. The project expressway, which will be 30 km shorter, will</p>

cut travel time to less than 1 hour. By lowering transport costs and improving the frequency and level of transport services, the Project is expected to spur economic activities, thereby helping reduce poverty in the area. The development of the road network in Western Hunan will help transfer the benefits of the eastern region's economic growth to the poor western region.

## Impact and Outcome

The Project will help promote sustainable economic growth and poverty reduction in Hunan province and the project area. It will achieve this by (i) enhancing road transport efficiency and safety; (ii) providing a link in the Changsha-Chongqing corridor, one of eight high-priority western corridors; and (iii) improving rural minority villages' access to income-generating opportunities and social services.

The Project involves (i) constructing a 64 km, access-controlled toll expressway from Jishou to Chadong, including a large suspension bridge (1.2 km), 13 tunnels (10.5 km in total), 36 extra large or large bridges (18 km in total), interchanges, toll stations, and service areas; (ii) upgrading 129 km of local roads to improve access to 52 poor villages in the rural minority area; (iii) promoting private sector participation through an operation and maintenance concession; and (iv) strengthening the Hunan provincial government's capacity of construction, road safety, project monitoring and evaluation, and asset management and maintenance by means of consulting services and training.

## Cost Estimates

The total cost of the Project is \$519.51 million equivalent, with a foreign exchange cost of \$263.98 million (50.8%) and a local currency cost of \$255.53 million equivalent (49.2%). The cost of the local road component is \$20.7 million. Of the \$208 million ADB loan, \$8.0 million will finance the local road component.

## Financing Plan

(\$ million)			
Source	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank Loan	208.00	0	208.00
Ministry of Communications	0	59.74	59.74
Hunan Provincial Government	55.98	38.60	94.58
State Development Bank	0	157.19	157.19
<b>Total</b>	<b>263.98</b>	<b>255.53</b>	<b>519.51</b>

Source: Asian Development Bank estimates.

## Loan Amount and Terms

A loan of \$208 million from the ordinary capital resources of the ADB will be provided under ADB's London interbank offered rate (LIBOR)-based lending facility. The loan will have a 25-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.75% per annum, and such other terms and conditions set forth in the draft loan and project agreements.

<b>Allocation and Relending Terms</b>	The ADB loan proceeds will be made available by the Borrower to Hunan province, which will onlend \$200 million to the project company 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. Hunan province will keep the balance of \$8.0 million to be used for the local road component and will bear the interest rate variation and foreign exchange risks for this amount.
<b>Period of Utilization</b>	Until 30 June 2012
<b>Estimated Project Completion Date</b>	31 December 2011
<b>Implementation Arrangements</b>	The project company will be the implementing agency responsible for the project expressway. The local road component will be implemented by the Hunan Provincial Communications Department.
<b>Executing Agency</b>	Hunan Provincial Communications Department (HCD)
<b>Procurement</b>	Goods and services financed by the ADB loan will be procured in accordance with ADB's <i>Guidelines for Procurement</i> . Civil works for the expressway will be procured through international competitive bidding. Procurement for the local roads financed by the \$8.0 million ADB loan will use local competitive bidding. Equipment will be procured through international competitive bidding. ADB approved advance action for the procurement of civil works in June 2005.
<b>Consulting Services</b>	The ADB loan will finance 47 person-months of international consulting services for (i) assisting with project management during the construction period; (ii) providing expertise in bridge construction, tunnel construction, road safety, traffic management, and asset management; and (iii) helping formulate a human resource development and training program. The international consultants will be recruited through a firm in accordance with ADB's <i>Guidelines on the Use of Consulting Services by Asian Development Bank and Its Borrowers</i> . HCD will engage and finance 3,700 person-months of domestic consulting services. Of the 3,700 person-months of domestic consulting services, 300 person-months will be allocated to the local road component to ensure proper design, supervision, and project management, as well as to train engineering staff. About 24 person-months will be allocated to monitoring the Project's socioeconomic and poverty impacts. The domestic consultants will be recruited in accordance with government procedures.
<b>Project Benefits and Beneficiaries</b>	The expressway will take 3 hours off the travel time between Jishou and Chadong. A better road network will promote economic growth in the area and integrate poor, isolated regions with the centers of economic growth. Once linked to the major

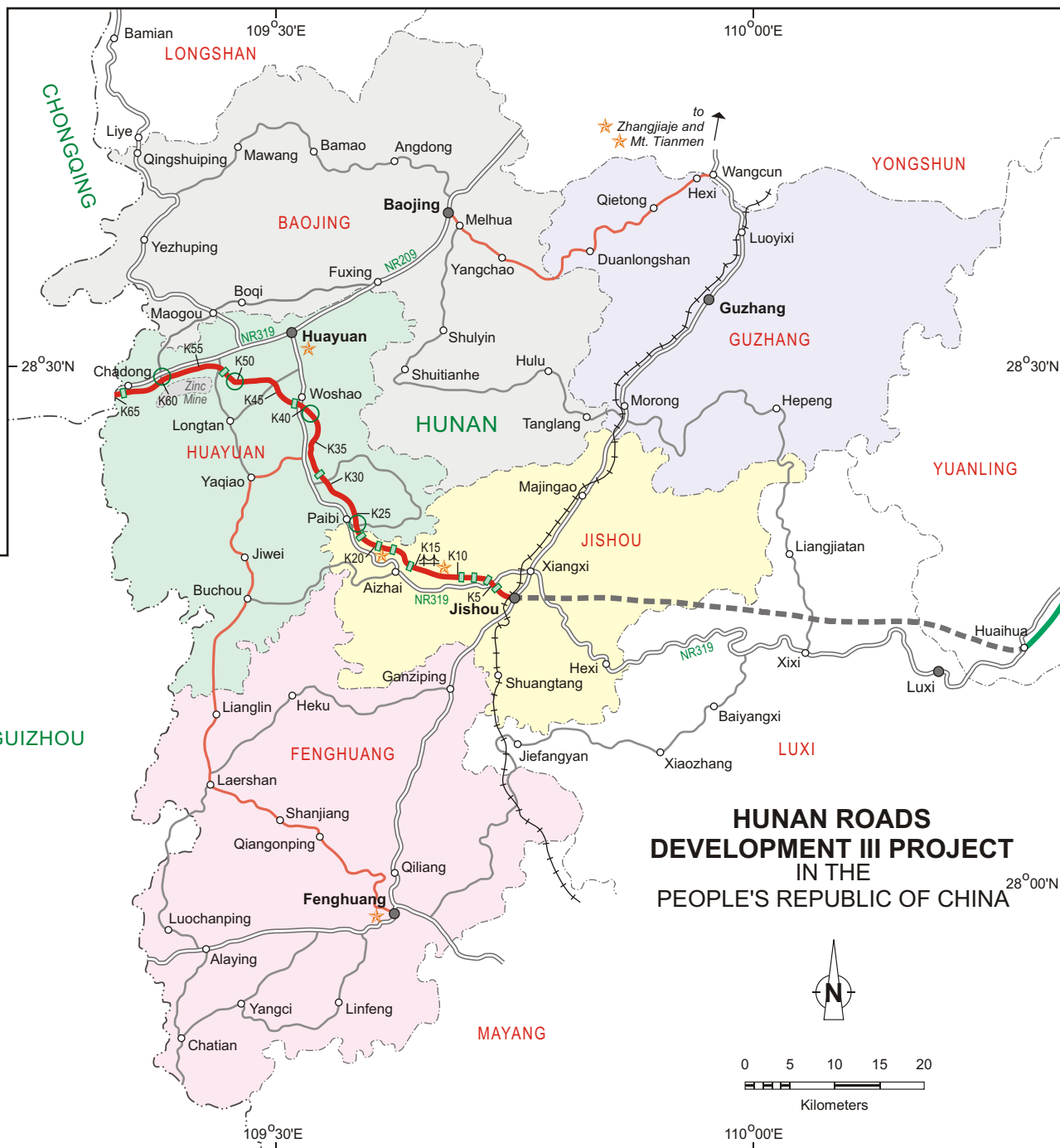
road network, the improved local roads will facilitate the spread of the expressway's benefits to the rural economy. Improved transportation will increase income opportunities from cash crop farming or seasonal work involving migration, increase contact with urban centers, and make trips to markets and social services easier.

The project expressway will directly benefit road users, such as transport providers, bus and truck operators, passengers, traders, government officials, and the private sector in general. Rural households in the project area are also a beneficiary group. Farmers will be in a position to increase their agricultural incomes through better access to markets. The Project will boost tourism in the project area, benefiting the poor in the city of Jishou and the counties of Huayuan, Guzhang, and Fenghuang. The economic internal rate of return for the Project is estimated at 19.1% and the financial internal rate of return for the expressway component is estimated at 5.5%, higher than the 2.8% real weighted average cost of capital.

## **Risks and Assumptions**

The Project is not expected to be subject to any significant technical risks. The Project has been formulated to reduce potential technical, economic, financial, and social risks. The main technical risks are associated with the construction of a large suspension bridge and the 13 tunnels. To mitigate the risks, international consultants have reviewed the proposed design and construction methods. 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 consultants for timely identification of technical problems and implementation of corrective measures. HCD has proven experience and has performed satisfactorily in implementing internationally financed projects. The financial risk associated with the construction and operation of the expressway will depend on the level of traffic, the costs of construction, the ability of the commercial management, and the toll level. To mitigate the financial risks, the project company will build up a commercial business environment for expressway operations, and the project expressway will receive substantial injections of equity from the central and provincial governments. The social risks include resettlement, HIV/AIDS infection, and impacts on ethnic minority communities associated with the Project. Appropriate mitigation measures are in place in the resettlement plan and ethnic minorities development plan.





- Provincial Capital
  - Prefecture Capital
  - Town
  - Interchange
  - ▬ Tunnel/Bidge
  - ⚙ Suspension Bridge
  - ★ Scenic Spot
  - NR319 Road Number
  - Project Expressway
  - Project Local Road
  - Ongoing ADB-Financed Expressway
  - Completed Expressway
  - Ongoing/Future Expressway
  - National/Provincial Road
  - County Road
  - Railway
  - River
  - Prefecture Boundary
  - Provincial Boundary
- Boundaries are not necessarily authoritative.

## **I. THE PROPOSAL**

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Hunan Roads Development III Project. The design and monitoring framework is in Appendix 1.

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

### **A. Performance Indicators and Analysis**

2. The PRC has achieved rapid economic growth and poverty reduction in recent decades. Gross domestic product has grown more than 9% per year since the 1980s, and the incidence of rural poverty fell from 33% in 1978 to just 2.8% in 2004. The PRC's sustained economic growth has resulted in an unprecedented expansion in traffic between and within provinces. In addition, the economy's changing structure and increasing diversification have altered the pattern of transport demand. The demand for road transport has outpaced that for other modes of transport. The movement of goods and passengers by road, which as a means of transport is more flexible and responsive to the needs of a market economy than other modes of transport, is increasing rapidly.<sup>1</sup> The shift in demand also reflects the loosening of anticompetitive restrictions in the road transport industry. Large investments in automotive manufacturing and the country's rapid economic growth spurred the expansion of vehicle fleets at a pace that will likely be maintained in coming years.

3. Propelling the country's robust growth and drastic poverty reduction were massive investments in roads. The Government has made major efforts to increase the country's road capacity to meet the growing demand for improved access to markets and services. At the heart of the development of the road network is the National Trunk Highway System (NTHS), a 35,000-kilometer (km) system of interprovincial expressways and high-class highways (target completion: 2007). The NTHS will be complemented by the development of a network of national, provincial, county, and township roads. During the 10th Five-Year Plan (FYP) (2001–2005), the Government (i) accelerated the construction of a network of expressways and high-class highways, giving priority to five north-south and seven west-east sections of the NTHS; (ii) started the construction of highways in the western region totaling 18,000 km, including the eight high-priority western corridors<sup>2</sup>; (iii) targeted opening about 1.95 million km of highways to traffic, with expressways accounting for 35,000 km; and (iv) began to implement the 85,000 km national expressway network plan, slated for completion in 2040, with an annual investment of CNY100 billion to CNY150 billion.

4. As a result, the country's highway network grew from 1.16 million km in 1995 to 1.86 million km in 2004, for an average annual increase of 6%. Of this, 1.52 million km were classified. The total length of expressways increased from 147 km in 1988 to 34,287 km in 2004, a more than 100-fold expansion. Class I highways increased from 196 km in 1980 to 33,522 km in 2004, or 29% per year on average. Class II and above highways accounted for 299,524 km, or 19.7% of the total length. County, township, and village roads, which the Ministry of

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<sup>1</sup> Between 1990 and 2004, road traffic grew by about 9.0% per year for passenger traffic, reaching 876.5 billion passenger-kilometers, and by 6.0% per year for freight, reaching 759.7 billion ton-km. In Hunan, road passenger traffic grew by 6.4% per year and freight grew by 9.7% per year during the same period. In 2004, road traffic accounted for 53.7% of the PRC's total passenger traffic and 11.4% of its total freight traffic.

<sup>2</sup> These include Altai-Hongqilafu, Xi'ning-Korla, Yinchuan-Wuhan, Arongqi-Behai, Lanzhou-Mohan, Xi'an-Hefei, Changsha-Chongqing, and Chengdu-Zhangmu.

Communications classifies as rural roads, totaled 2.9 million km in 2004.<sup>3</sup> Details of a road sector analysis are in Appendix 2.

5. Even though rural roads play a huge role in poverty reduction, the rural road network, which accounts for 85% of the country's total road network of 3.3 million km, is underdeveloped in terms of both extent and quality. Thus the 30 million rural poor face significant challenges in relation to transport. Many of them live in isolated villages, which increase their transportation costs, thereby restricting their access to basic goods and services. Most rural roads, especially in the western region, are in poor condition because of deficiencies in design and construction, inadequate maintenance, and damage caused by overloaded vehicles. The roads' technical standards are low: only 11% are class III roads or above. Village roads are even worse, with merely 2% being rated as class III or above. Only 20% of county roads, 15% of township roads, and 9% of village roads are paved. About 71% of rural roads are dirt roads, making them highly vulnerable to bad weather. As a result, many townships and villages still depend on earth tracks that have no drainage system, making them unsuitable for motorized traffic and impassible during the rainy season. This limitation prevents the rural poor from taking advantage of job opportunities generated by economic growth.

6. Aware of the importance of improved access to reducing poverty, the Government has been pouring funds into rural road construction. During the 10th FYP, it has constructed or upgraded approximately 72,000 km of rural roads at a cost of CNY60.9 billion. By 2010, paved roads will link all villages in the eastern region, 80% of villages in the central region, and 90% of villages in the western region. To this end, the Government plans to invest CNY100 billion more in rural roads during the 11th FYP (2006–2010).

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

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

7. Despite the huge amount of investment, the road network still does not provide access to large parts of the country, particularly the poorer inland regions, and is inadequate to support sustainable economic growth. Roads built to a high standard (above class II) account for only 19.7% of the total network. The remaining 20% are medium- to low-grade paved roads and gravel roads (para. 5). 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.<sup>4</sup>

8. Hunan, located in the middle reaches of the Yangtze River, is bordered by Jiangxi to the east, Chongqing and Guizhou to the west, Guangxi and Guangdong to the south, and Hubei to the north. In 2004, the province's per capita gross domestic product was CNY7,546, or 83% of the national average. The Project is located in Xiangxi Autonomous Prefecture in northwest Hunan, and is one of the poorest areas in the country. Located mostly in rural and mountainous territory, accessibility is limited. The incidence of rural poverty is 30.1%. The project area consists of one city and four counties, with 80% of the population living in rural areas. Ethnic minorities, mainly Tujia and Miao, account for some 77% of the population. The prefecture possesses water resources, mineral deposits, coal reserves, fertile soil, and tourism potential.<sup>5</sup>

<sup>3</sup> Of the total rural roads, 479,372 km are county roads, 945,180 km are township roads, and 1,473,534 km are village roads.

<sup>4</sup> The shortage of adequate road networks has thus hindered economic growth and regional development in the PRC.

<sup>5</sup> Mineral resources are abundant: more than 50 kinds of minerals, including coal, iron, and manganese, have been discovered in 480 mines.

Its major agricultural outputs are citrus fruits, corn, ramie, tea, rice, and tobacco. The leading industries, most of which are in Jishou city, the prefecture's capital, are coal, agricultural and chemical processing, power, machinery manufacture, construction materials, and textiles.

9. The area's remoteness and inadequate road infrastructure are among the main causes of the area's high incidence of poverty. Only two thirds of villages are served by roads. While demand for the prefecture's products from other provinces has been increasing continuously, the weaknesses in the road infrastructure are hindering economic growth in the project area and in Hunan. The national highway (NR319), which runs parallel to the project expressway, is a combination of class II, III, and IV roads, with steep slopes, sharp turns, and low allowable speed. Congestion is a daily occurrence because of the booming mining and agricultural processing industries. Traffic on NR319 has grown by about 7.3% per year in recent years, and along several stretches will exceed the road's capacity by 2008. Improvement of the road network in western Hunan is needed to facilitate economic growth and to integrate the poor, isolated regions of the country with the centers of economic growth.

10. Poor road conditions have resulted in inadequate and unaffordable transport services in the area. The poor quality of the roads deters licensed bus and truck operators from plying the routes to townships and villages. As a result, many villages and townships 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. Thus villagers have to rely on informal means of transport, such as bicycles and motorized tricycles. Because informal means of transport are constrained to local services between villages and townships, it has limitation to replace the formal transport system. For selling their products, the rural poor thus often rely on traders who drive to villages with a stronger bargaining power.

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

11. The Government's strategy for road development is to construct expressways to expand the NTHS and link all cities with populations of more than 500,000 and develop secondary roads, particularly those that will connect to rural markets. The Government has also adopted the western region development strategy, a key theme of the 10th FYP, to enhance economic development in the western part of the country, where most of the poor reside. The strategy, which aims to reduce the disparity between western and coastal regions, assigns high priority to road sector development as a way to promote economic growth and poverty reduction in the western region.

12. The Asian Development Bank's (ADB's) operational strategy in the PRC's road sector supports (i) the construction of roads that connect major growth centers with hinterland economies; (ii) the integration of the network so that the NTHS is supported by a system of local roads, particularly those that provide access to poor areas; (iii) the delivery of adequate and affordable transport services; (iv) the promotion of road safety and the reduction of vehicle emissions; (v) the strengthening of institutions to increase financial and managerial efficiency in expressway operation; (vi) the adoption of appropriate pricing policies to optimize road transport capacity; and (vii) the use of 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. The proposed Project is consistent with the PRC's development priorities and ADB's strategy.

## **3. Opportunities**

13. The Project will support the western region development strategy by building a 64 km expressway from Jishou to Chadong, a link in the Changsha–Chongqing corridor, one of the

eight high-priority western corridors included in the 10th FYP.<sup>6</sup> The trip from Jishou to Chadong by car on NR319 currently takes 4 hours. The project expressway, which will be 30 km shorter, will cut travel time to less than 1 hour. By lowering transport costs and improving the frequency and level of transport services, the Project is expected to spur economic activities and inter-regional trade, thereby helping reduce poverty in the project area. The development of the road network in Western Hunan will help transfer the benefits of the eastern region's economic growth to the poor western region. A local road improvement program was integrated into the Project to expand the road network in rural minority villages. The integrated approach will help spread the expressway's benefits to the poor.

14. The evaluations of several completed road projects financed by ADB have confirmed the impacts of road investments on poverty reduction.<sup>7</sup> Several ADB studies have also affirmed the relevance of ADB's strategy,<sup>8</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 technical assistance (TA) for Socioeconomic Impacts of Road Projects<sup>9</sup> confirmed the validity of the road portfolio's geographic focus: the poorer western interior provinces. The TA showed that complementary investments in local roads strengthen the impact of expressway investments. As such, ADB has expended rigorous efforts to identify road projects that have a tight focus on poverty.

15. 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 31 loans totaling \$6.2 billion to finance 4,391 km of expressways and 8,237 km of associated local road networks. As of 1995, local 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, 18 have already been completed and are open to traffic. ADB has also supplied 54 TA packages totaling \$28.3 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 nongovernment financial resources. The World Bank and the Japan Bank for International Cooperation have provided about \$6.6 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 3).

#### **4. Lessons Learned**

16. The Hunan Provincial Communications Department (HCD) has had experience as an executing agency for five externally financed road projects, including two projects financed by

<sup>6</sup> These include Altai–Hongqilafu, Xi'ning–Korla, Yinchuan–Wuhan, Arongqi–Behai, Lanzhou–Mohan, Xi'an–Hefei, Changsha–Chongqing, and Chengdu–Zhangmu.

<sup>7</sup> 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.

<sup>8</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.

<sup>9</sup> ADB. 2002. *Technical Assistance to the People's Republic of China for Socioeconomic Assessment of Road Projects*. Manila.

ADB.<sup>10</sup> The operation and maintenance (O&M) of the first ADB-financed expressways was awarded as a concession to a company in 1998, a move that introduced sound business practices to Hunan's expressway sector. However, an important lesson learned from this Project<sup>11</sup> was that concessions to private companies should be awarded through transparent competitive bidding to maximize the benefits of the concession to efficient expressway operation. Other lessons include (i) the need for traffic forecasts to reflect rapid economic growth, thereby avoiding expensive road widening within the first few years of operation; (ii) the advantages of a participatory approach to project preparation; (iii) the benefits of a well-coordinated resettlement schedule, preceded by consultations with the affected parties before their relocation; (iv) the advantages of using road safety audits in designing and constructing expressways; and (v) the need for careful geological investigation during the design stage to minimize unnecessary contract variations. All these issues have been taken into account during project preparation. Due attention has been given to the adequacy of the O&M framework to ensure that the concession is reasonably priced by awarding it through transparent bidding (para. 32). Consultations with affected villagers were emphasized from the start, and international consulting inputs for the supervision of civil works were included to ensure a careful review of geological investigations for the Project.

17. Performance reviews of completed road projects have concluded that all loans to the road sector in the PRC have been or are being implemented satisfactorily.<sup>12</sup> Of seven completed projects, six were rated as generally successful and one was rated as partly successful. The performance audit reports for three road projects concluded that they were either highly successful or successful.<sup>13</sup> The lessons gleaned from previous ADB-financed road projects are reflected in the design of the Project. To avoid delayed loan effectiveness caused by delays in procurement, a tendering company was recruited to prequalify civil works contractors. ADB's procurement guidelines and requirements, including anticorruption provisions, were discussed extensively during appraisal. Emphasis was put on the need to (i) strictly follow ADB's mandatory bidding documents, (ii) evaluate bids according to ADB-approved evaluation criteria, and (iii) substantiate clearly the conclusions of the bid evaluation.

## 5. Policy Dialogue

18. **Transport Services in the Project Area.** The extent to which the rural poor benefit from a road project depends on their access to reliable and affordable transport services. Adequate transport services provided on a competitive basis are a prerequisite for spreading the Project's benefits to the rural poor, especially those who are currently beyond the reach of road transport services. During project preparation, due attention was given to the delivery of efficient, affordable, and sustainable transport services in the project area. The TA survey indicated that when roads are upgraded, transport services improve shortly thereafter and the frequency of villagers' trips to local markets and towns increases significantly.<sup>14</sup> The improvement of local roads will thus spur transport service providers to improve transport services. Further, with

<sup>10</sup> One is the Hunan Expressway Project (approved in 1993), under which the Changsha–Xiangtan and Changsha–Yongnan sections were constructed (open to traffic in 1996). The other is the Hunan Roads Development II Project (approved 2004), under which the Changde–Huaihua section (173 km) is under implementation.

<sup>11</sup> ADB. 2000. *Project Completion Report on the Hunan Expressway Project*. Manila.

<sup>12</sup> ADB. 2001. *People's Republic of China Procurement Review 2001*. Manila; ADB. 2001. *People's Republic of China Portfolio Performance Review in the Road Sector*. Manila.

<sup>13</sup> ADB. 2000. *Project Performance Audit Report on the Shenyang–Benxi Highway and Jilin Expressway Projects in the People's Republic of China*. Manila; ADB. 2001. *Project Performance Audit Report on the Heilongjiang Expressway Project in the People's Republic of China*. Manila.

<sup>14</sup> ADB. 2004. *Technical Assistance to the People's Republic of China for Preparing the Hunan Roads Development III Project*. Manila.

increased competition among transport service providers, poor rural farmers who rarely use roads will also benefit from improved transport services by way of higher farm-gate prices for their cash crops and more frequent visits from extension and health personnel (including veterinarians) and public servants and officials.

19. Expanding access to transport services is an integral part of Hunan's plan for transport services. Xiangxi Autonomous Prefecture,<sup>15</sup> where the Project is located, has only one class II bus terminal in Jishou city, and more than 80% of townships do not have even rural bus stations. To enhance the sustainable delivery of transport services, the prefecture has implemented a plan to construct class I–IV bus terminals.<sup>16</sup> A class I bus terminal is being constructed in Jishou and is scheduled to open in 2006. The construction of class II bus terminals in five counties is also under way and at least one class II bus terminal will be built in each of the three remaining counties during the period of the 11th FYP. The prefecture aims to build a class V rural bus station in each village by 2015, 15 of which will be completed in the project area by 2007. HCD agreed to implement these facilities in tandem with the Project to ensure the efficient provision of transport services when the project roads have been built (Appendix 4).

20. **Small Business Development Opportunities.** Basic prerequisites for developing small businesses in the project area are generally met. Active secondary and tertiary markets and microfinance schemes for small businesses are available under provincial programs. Several poverty reduction programs are being implemented either by the government or multilateral assistance agencies. These programs will complement each other and provide a good basis for setting up small businesses. In the project area, a wide assortment of businesses has already been established to provide basic necessities for local communities and travelers.<sup>17</sup> When roads are improved, existing enterprises are expected to expand further their businesses. The TA survey shows that the current trend evinces an inherent entrepreneurial spirit among local residents who, if given the opportunity, are likely to establish commercial enterprises. A number of factories are located along NR319, an indication that the proposed expressway may attract larger commercial establishments to the vicinity. With the improved road network in the area, the following sectors were identified as potential sectors for small business opportunities: (i) agriculture and agro-industry, (ii) herbal medicines and handicrafts, and (iii) community-based tourism and distribution facilities.

21. Under the TA, a strategy was prepared to develop small businesses and commercial activities that includes (i) developing new community-based enterprises, (ii) building roadside stations as focal points for small businesses, (iii) creating economic zones for small businesses, and (iv) establishing a cultural zone for minorities where local minority communities can develop their entrepreneurial activities. Assistance is needed to channel local people into potential areas of business and commercial opportunities. HCD will ensure that assistance, such as the provision of microfinance and entrepreneurial training, will be provided through provincial poverty reduction programs (Appendix 5).

22. **Private Sector Participation.** In the PRC, the private sector has been involved in road projects through cooperative joint ventures, securitization, revenue bond financing, and build-operate-transfer contracts. In line with ADB's private sector development strategy, Hunan has

<sup>15</sup> The prefecture comprises 8 counties, 218 townships, and 2,664 villages.

<sup>16</sup> A bus terminal is classified according to its daily passenger handling capacity. A class I terminal handles more than 10,000 passengers per day, a class II terminal handles 5,000 to 10,000 passengers, and a class V terminal handles up to 500 passengers.

<sup>17</sup> Each kilometer of road averages about four businesses. One local road to be included in the Project has about six businesses per kilometer.

actively diversified highway financing: to date, the private sector is involved in five expressways.<sup>18</sup> Except for the Changsha–Xiangtan West section, which was implemented using a build-operate-transfer method, the other four sections with private sector participation have tapped the private sector for O&M through concession agreements. For the project expressway, the private sector will also be involved in O&M through a concession when the financial requirement is met (para. 32).

23. **Road Safety.** Road safety is a serious issue in the PRC. In 2004, 41 deaths occurred per 10,000 vehicles, which is high by international standards. The Ministry of Public Security is committed to reducing accidents through improved vehicular safety, driver training, and traffic management. The Road Traffic Safety Law went into effect in May 2004. A committee was established to develop and implement special measures that would enforce nationwide regulations on overloaded trucks, including putting axle load limits on roads. HCD and the Hunan Public Security Bureau are working together to fulfill the requirements of the new law and enhance road safety. At least 6 months prior to the opening of the expressway, HCD will (i) implement a road safety action plan—with the help of an international consultant—for the safe operation of the expressway; and (ii) ensure, in collaboration with Hunan Public Security Bureau, that a team of bureau personnel will patrol the expressway and enforce the new law and regulations. The Project's major contribution to road safety will be the application of high construction standards to the expressway to reduce accidents in the corridor. An international road safety specialist will be engaged for 2 months under the Project to help HCD develop the road safety action plan and check designs and safety aspects of the project roads (Appendix 6).

24. **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. Hunan has vehicle emission standards, and the Hunan Environmental Protection Bureau (HEPB) regularly tests all types of vehicles. Meanwhile, the Project will have positive impacts on air pollution, as emissions from vehicles along the project roads are expected to be lower because of better traffic flows as a result of improved road conditions. Upon completion of the Project, sulfur dioxide emissions from vehicles on the project roads are estimated to be 20% lower than before the Project. Likewise, nitrogen oxides emissions will be 12% lower than before the Project and carbon dioxide emissions will be 20% lower. At least 6 months prior to the opening of the expressway, HCD will provide ADB with (i) the regulations for vehicle emission limits and the penalties for violating emission standards; and (ii) the latest government plan to improve air quality in Hunan, including cleaner fuel programs. With the assistance of consultants, HCD and HEPB will develop an action plan to control vehicle emissions in the area and implement it accordingly (Appendix 6).

### III. THE PROPOSED PROJECT

#### A. Impact and Outcome

25. The Project will help promote sustainable economic growth and poverty reduction in Hunan province as a whole and the project area in particular. It will achieve this by (i) enhancing

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<sup>18</sup> The five sections with private sector participation are Changsha–Xiangtan, Changsha–Yongan, Xiangtan–Hengyang, Changsha–Xiangtan West, and Changsha–Yiyang. Of these, Changsha–Xiangtan, and Changsha–Yongan were funded by ADB (footnote 9).



road transport efficiency and safety; (ii) improving the road transport network by building a section from Jishou to Chadong in the Changsha–Chongqing western corridor, one of eight high-priority western corridors; and (iii) improving rural minority villages' access to income-generating opportunities and social services.

## **B. Outputs**

26. The Project comprises (i) the construction of a 64 km, access-controlled toll expressway from Jishou to Chadong, including a large suspension bridge (1.2 km), 13 tunnels (10.5 km in total), 36 extra large or large bridges (18 km in total), interchanges, toll stations, and service areas; (ii) the upgrading of 129 km of local roads to improve access to 52 poor villages in the rural minority area; (iii) the promotion of private sector participation through the O&M concession; and (iv) the strengthening of the Hunan provincial government's capacity in construction, road safety, project monitoring and evaluation, and asset management and maintenance through the provision of consulting services and training.

## **C. Special Features**

27. **Integrated Design of the Local Road Component.** In line with ADB's policy dialogue with the Government, a local road improvement program was integrated into the Project to expand the road network in rural minority villages. The integrated approach will help spread the expressway's benefits to the poor. Better tie-ins between the expressway and local 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 two priority sections, selected from Hunan's road development plan in its local road component. The two sections total 129 km and serve 52 poor minority villages in the project area, particularly where access to township centers needs to be improved.

28. Of the ADB loan, \$8.0 million will be allocated to the local road component, which will. Both sections are currently unclassified roads, but will be upgraded to class III and IV roads. Some 929,000 people (69% of the population in the project area) will benefit from the Project, of which 389,100 in the poor minority villages will benefit from improved local roads.<sup>19</sup> The local 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. Some 300 person-months of domestic consultants will be allocated to the local road component to ensure proper design and supervision, project monitoring and evaluation, engineering staff training, and project management.

29. **Local Road Maintenance.** Adequate maintenance is crucial to ensure the sustainability of rural roads, a job for which local administrative units are responsible. During the TA, the following were examined: (i) planning of and standards for maintenance, (ii) funding sources, and (iii) monitoring of maintenance activities. The quality of rural roads does not seem to be systematically monitored by the higher authorities concerned. Maintenance planning often hinges on subjective assessments, mainly because of the local government's lack of resources

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<sup>19</sup> The section in Haoyuan county serves the Miao minority area and the section that links Baojing and Guzhang counties serves the Tujia minority area. The location of three of the four interchanges was determined in such a way that the benefits from the project expressway are made available to the rural minorities.

for maintaining its road networks. Local authorities draft plans for routine maintenance work, but periodic maintenance is rather budget-driven and lacks a systematic, preventive approach. Little dissemination of the activities or knowledge needed to monitor performance is apparent across counties. There is no official funding channel for the maintenance of township or village roads.<sup>20</sup> Therefore a reliable funding mechanism for maintaining and rehabilitating rural roads must be designed. Considering limited funds for maintenance, a simple method for evaluating and prioritizing maintenance works must also be established to streamline work programming and ensure effective fund use. Apart from the financial angle, local governments' maintenance efforts are often hampered by the lack of qualified technical and managerial personnel, training resources, and equipment.

30. During project preparation, an action plan was devised to strengthen local road maintenance and was agreed to with HCD. According to the plan, HCD will develop a sound road maintenance management system during project implementation. The system will (i) incorporate measures to minimize maintenance costs; (ii) include a modern method of evaluation and maintenance prioritization for efficient work programming and fund use; (iii) include a compilation of road inventories, together with basic condition data; and (iv) have a monitoring system to be used by local residents. Furthermore, HCD will encourage county governments to adopt competitive bidding to enhance efficiency when selecting maintenance contractors. A training program will be provided under the Project to strengthen the capacity of local government maintenance units (Appendix 7).

31. **Operation and Maintenance Concession.** Expressway O&M improves substantially when handled by the private sector. An O&M concession is an agreement between a government or a state enterprise and a private enterprise, whereby the private enterprise maintains the road according to agreed standards and collects tolls from users that finance the maintenance and reward the concessionaire. O&M concessions sidestep public sector budgetary constraints by securing toll revenues as a maintenance fund without requiring the funds to flow through the government's budgeting process and increase service efficiency by bringing in an experienced private sector concessionaire that can operate and maintain the project expressway at a lower cost than the government can. Under an O&M contract, the concessionaire assumes the traffic risk and, ultimately, the revenue risk as well.<sup>21</sup> O&M concession is therefore a feasible public-private sector partnering option since it distributes project risks reasonably between the government and the private sector.

32. When the Project expressway's operating-profit ratio exceeds 10%, HCD will use its best efforts to award an O&M concession to a private enterprise, through a competitive bidding. In particular, based on lessons learned from previous projects (para. 16), due attention will be given to enhance transparency in the bidding process for the concession, to optimize the gain of the concession to the efficiency in expressway operation. In this regard, HCD, with the help of an international consultant to be engaged under the Hunan Roads Development II Project, prepare the bidding documents and the O&M concession framework. The framework will specify the concession period and selection criteria, and ensure adequate pricing and transparent auctioning. HCD will submit the bidding documents and the concession framework to ADB for review by 30 June 2006.

<sup>20</sup> The counties are responsible for county and township road maintenance (mostly class IV and above), for which they use their road maintenance funds. However, villagers carry out the maintenance of village roads (below class IV), which account for two thirds of the roads in the prefecture.

<sup>21</sup> ADB. 2004. *Report and Recommendations of the President to the Board of Directors on Proposed Loans to the People's Republic of China for the Hunan Roads Development II Project*. Manila. Further details are presented in Appendix 5.

33. **Intelligent Transport System (ITS).** An expressway ITS<sup>22</sup> is being developed in Hunan, following the drafting by HCD of an ITS policy in 2002 using standards prepared by the national ITS Center. The ITS policy's objectives are to (i) introduce a network-wide toll system for all expressways in Hunan, (ii) reduce the time it takes to pay a toll, (iii) improve safety through enhanced electronic enforcement and monitoring, (iv) provide up-to-date information to travelers, (iv) provide assistance in emergencies, and (v) 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.<sup>23</sup> About 4% of the ADB loan (\$7.6 million) will be allocated to procure ITS equipment, and training in its use will be provided with the help of consulting services (Appendix 8).

34. **Asset Management.** Asset management must be developed to ensure the sustainability of the expressway and local road operations. During project implementation, HCD will prepare an asset management development plan, which 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. To facilitate the implementation of the plan, consultants will be hired to formulate 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. HCD will assign the Hunan Communications College to develop a training program to enhance the skills of provincial and local government staff to ensure sustainability of the operation of the expressway and local roads (Appendix 8).

35. **Stakeholder Consultations.** During preparation of the feasibility study, environmental impact 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. Over 3,450 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. 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. The consultation process was expanded to finalize the design and formulate appropriate compensation standards and rehabilitation measures for people displaced by land acquisition or house demolition. Villagers participated in the discussions and decisions on village resettlement (Appendix 9).

## D. Cost Estimates

36. The total cost of the Project is \$519.51 million equivalent, with a foreign exchange cost of \$263.98 million (50.8%) and a local currency cost of \$255.53 million equivalent (49.2%). The cost of the local road component is \$20.7 million. Of the \$208 million ADB loan, \$8.0 million is allocated for the local road component, with the remaining costs to be funded by the provincial

<sup>22</sup> The application of information technology to transport is referred to as an intelligent transport system.

<sup>23</sup> Equipment for the ITS includes a traffic control center, toll revenue management centers, toll system, communications system, traffic surveillance system, overloaded vehicle checking system, tunnel ventilation and safety, emergency service facilities, and so on.

and county governments. HCD has committed to ensure appropriate implementation of the local road component during the project period (Appendix 10).

**Table 1: Cost Estimates**  
(\$ million)

Item	Foreign Currency	Local Currency	Total Cost
<b>A. Base Cost<sup>a</sup></b>			
1. Expressway Civil Works	207.44	118.06	325.50
2. Expressway Equipment	7.64	10.07	17.71
3. Local Roads	12.41	8.28	20.69
4. Land Acquisition and Resettlement	0.00	31.96	31.96
5. Consulting Services and Training	1.51	4.78	6.29
6. Project Administration	0.37	20.95	21.32
7. Tax and Duties	0.00	9.88	9.88
<b>Subtotal (A)</b>	<b>229.37</b>	<b>203.98</b>	<b>433.35</b>
<b>B. Contingencies</b>			
1. Physical Contingencies <sup>b</sup>	12.45	12.36	24.80
2. Price Contingencies <sup>c</sup>	0.00	20.04	20.04
<b>Subtotal (B)</b>	<b>12.45</b>	<b>32.39</b>	<b>44.84</b>
<b>C. Interest During Construction</b>	<b>22.16</b>	<b>19.16</b>	<b>41.32</b>
<b>Total (A+B+C)</b>	<b>263.98</b>	<b>255.53</b>	<b>519.51</b>

<sup>a</sup> Environmental protection costs are included as follows: under civil works, \$4.7 million; under equipment, \$0.2million; and under training, \$0.7 million.

<sup>b</sup> Physical contingencies are computed at 7.0%.

<sup>c</sup> Price escalation is computed as zero for foreign exchange and at 3% per year for local currency.

Source: Asian Development Bank estimates.

## **E. Financing Plan**

37. The Government has requested a loan of \$208 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 25-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, a commitment charge of 0.75% per annum, 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.

38. The Ministry of Communications and the Hunan Provincial Government (HPG) will provide 30% of the project costs on a grant basis. The Ministry of Communications grant will amount to \$59.74 million and the HPG grant to \$94.58 million. The State Development Bank will provide a \$157.19 million loan on a 25-year term at an interest rate of 5.51%. The ADB loan proceeds will be made available by the Borrower to HPG, which will onlend \$200 million to the project company 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. Hunan province will keep the balance of \$8.0 million and use it for the local road component; 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 2: Financing Plan**  
(\$ million)

Source	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank	208.00	0	208.00
Ministry of Communications	0	59.74	59.74
Hunan Provincial Government	55.98	38.60	94.58
State Development Bank	0	157.19	157.19
<b>Total</b>	<b>263.98</b>	<b>255.53</b>	<b>519.51</b>

Source: Asian Development Bank estimates.

## F. Implementation Arrangements

### 1. Project Management

39. HCD will be the executing agency responsible for the overall implementation of the Project and direct implementation of the local road component. The project company will be the implementing agency and will coordinate and monitor the expressway's construction activities and operate the expressway. Its general manager, the project director, will be responsible for overall project management in relation to the expressway, the approval of contracts, and payments. HCD will implement the local road component through local communications bureaus. A project implementation unit established within the project company 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. In addition to its central office, the project company will have four toll stations and three maintenance centers. HCD has sufficient technical capability to implement the Project; however, its institutional capacity needs to be further strengthened in some areas such as the ITS and asset management and assistance will be provided under the consulting services.

### 2. Implementation Period

40. Preconstruction activities—detailed design, preparation of bidding documents, prequalification of contractors, and tendering and awarding of contracts—has begun in October 2005. Completion of the preconstruction activities is targeted for November 2006. Preliminary design was completed in April 2005 and detailed design will be completed in December 2005. The construction of the expressway is scheduled to start in December 2006 and the Project will be completed by December 2011. The implementation schedule is in Appendix 11.

### 3. Procurement

41. All ADB-financed procurement will follow ADB's *Guidelines for Procurement*. The main civil works will be divided into 18 packages, the pavement into 2 packages, and the equipment into 3 packages, all of which will be procured under international competitive bidding procedures (Appendix 12). Ancillary facilities, including the administration building and service areas building under domestic financing, and equipment for traffic engineering, will be procured using local competitive bidding. Procurement for the local roads will use local competitive bidding. The

international bidding will be conducted by a qualified tendering company with previous experience in externally funded projects. 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**

42. The Project will finance 47 person-months of international consulting services. Of the 47 person-months of international consultants, 36 will be for the supervision of the civil works, six will be for bridge construction, two each will be for road safety and traffic management and tunnel construction, and one will be for asset management. HCD will engage and finance 3,700 person-months of domestic consultants. Of the 3,700 person-months of domestic consulting services, 300 person-months will be allocated to the local road component to ensure proper design, supervision, and project management, as well as to train engineering staff. About 24 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. HCD 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**

43. The loan will be disbursed in accordance with ADB's *Loan Disbursement Handbook*.<sup>24</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**

44. HCD 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. HCD 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, HCD will establish an internal audit unit and will maintain it during implementation and operation of the Project. The unit will undertake

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<sup>24</sup> ADB. 2001. *Loan Disbursement Handbook*. Manila.

independent tests on day-to-day transactions, prior to reference to external auditors. HCD will make satisfactory arrangements for reporting implementation progress through quarterly progress reports. Within 3 months of completion, HCD will submit a project completion report to ADB.

## **7. Anticorruption**

45. ADB's Anticorruption Policy was explained to, and discussed with, HDC. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through HCD, 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*.<sup>25</sup> 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. Based on the recommendations of the July 2004 PRC Country Performance Portfolio Mission, ADB will organize a seminar on how to detect fraud and corruption during procurement in 2005.

46. In relation to the Project, HCD 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 HCD's Supervision Division is located in offices involved in project bidding, construction, and other operational activities; (iii) that briefings between HCD 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.

## **8. Project Performance Monitoring and Evaluation**

47. 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. A basic monitoring framework was constructed for the Project to permit a more definitive assessment of the actual benefits. HCD 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 three representative villages in the project area. The indicators were selected based on the findings of the ADB-financed TA for the Socioeconomic Assessment of Road Projects (footnote 8). 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 biennially for 5 years following completion. By December 2006, HCD 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. HCD and local governments have assured that adequate monitoring will be carried out in the selected communities (Appendix 13).

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<sup>25</sup> The Government has made significant efforts to combat corruption in the road sector. To date, 15 government officials from 10 provinces have been found to be involved in corruption. Information related to these corruption cases is in the public domain. According to the China National Audit Office, there is no evidence that any of the reported corruption was related to ADB-funded road projects.

## 9. Project Review

48. In 2008, ADB and HCD 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

49. The Project will increase the corridor's capacity to meet the demand for transport and reduce transport costs, travel time, and accident rates. It will provide employment opportunities both during and after construction and will be a conduit for increased economic growth and higher incomes. The local road component will help bring these benefits to the poorest communities in the project area. Traffic on the expressway is forecast to grow from 6,000 annual average daily traffic in 2010 to 12,650 in 2019, an average annual increase of 8%. After 2019, traffic growth is expected to slow down to 5% per year, reaching 21,350 annual average daily traffic by 2029. The traffic projections consider (i) the growth in traffic during the past 10 years, (ii) the traffic generated by expanded economic activities, (iii) the likelihood that NR319 traffic will be diverted to the expressway once the latter is operational, and (iv) the traffic survey results (Appendix 14).

### B. Economic Analysis

50. The Project's economic internal rate of return (EIRR) was estimated by comparing the project case with a base case involving the continued use and maintenance of NR319. Without the Project, congestion will worsen, increasing delays, vehicle operating costs, accidents, and deaths. The Project, with the shorter distance and travel time, safer design, and better road conditions, will reduce vehicle operating costs and accident risks along the corridor. The economic costs are the cost of capital, which includes physical contingencies, land acquisition, and resettlement, and the costs of operating and maintaining the project roads, which include replacing depreciated equipment. The economic benefits are (i) savings in vehicle operating costs resulting from the shorter distance and improved road conditions, (ii) time savings for road users, (iii) savings in road accident costs, and (iv) value-added gains from tourism in the project area that are attributable to the Project. The benefits generated from tourism development were measured by comparing the with project situation to the without project situation.<sup>26</sup> The costs and benefits of the Project were valued at 2005 economic prices. At 19.1% per year, the EIRR demonstrates the Project's economic viability, with vehicle operating cost savings accounting for most of the benefits (82%). The benefits of the local road component, while extremely important to the villages concerned, constitute a small percentage of the overall project benefits, reflecting the modest traffic levels on local roads. The results of the sensitivity analysis confirmed the robustness of the Project's economic viability. Changes in the key variables—construction costs, traffic growth, and benefits—did not significantly affect its viability, and the EIRR remained above the threshold of 12% per year. The EIRR was 17.7% for the expressway and 21.0% for the local road component (Appendix 15).

<sup>26</sup> Environmental benefits will also result from reduced vehicle emissions and noise, but these have not been included in the analysis for lack of a suitable evaluation methodology.



### C. Financial Analysis and Projections

51. The assumed toll rates for the project expressway are considered reasonable to attract sufficient traffic to meet the criteria for EIRR and financial rate of return (FIRR). Hunan has a toll policy for expressways governed by the Highway Law, with the following criteria: (i) toll levels on other expressways, (ii) affordability, (iii) advantages to the users of the expressway and alternative roads, (iv) historical and actual traffic flows, and (v) debt service ability. The project company, in consultation with ADB, will propose the toll rates for the expressway. HCD, the Hunan Finance Department, and the Hunan Price Bureau will evaluate the proposal and approve the toll rates. HCD will consult with ADB about the proposed initial toll rates 6 months before the opening of the expressway. HCD and the project company will review the toll annually and monitor actual traffic levels and financial performance.

52. Financial projections prepared for the expressway in accordance with ADB's *Guidelines for the Financial Government and Management of Investment Projects Financed by the ADB* assessed the financial viability and sustainability (Appendix 16). The projected financial statements indicate that financial revenues will be sufficient to absorb O&M costs, income taxes, and debt service. The financial evaluation of the expressway was computed using constant 2005 prices. The Project's cost estimates and financial projections in nominal terms were converted to real terms by adjusting for the projected effects of foreign and domestic inflation and currency fluctuations. The FIRR for the project expressway is estimated at about 5.5% after taxes.<sup>27</sup> This compares favorably with the weighted average cost of capital of 2.8%, also net of taxes. The expressway is considered to be both financially viable and sustainable. Sensitivity analysis indicates that the FIRR is robust under adverse conditions (Appendix 17).

### D. Poverty Reduction and Social Strategy

53. The project area covers one city and four counties, all of which are considered poor by either national or provincial standards. Also within the area are 1,381 villages, 600 of which are poor. Of the 1.4 million residents in the project area, 965,400 live in rural areas and 387,700 live in urban areas. Of the rural population, 343,400 (30.1%) are poor, with an annual per capita income of less than CNY900. Of the urban population, 46,200 (11.9%) are poor. The expressway will cut 3 hours off the journey time between Jishou and Chadong. Once linked to the major road network, the improved local roads will facilitate the spread of the expressway's benefits to the rural economy. Improved transportation will increase income opportunities from cash crop farming or seasonal work requiring migration, promote more contact with urban centers, and improve access to markets and social services.

54. The surveys indicate that the project expressway will directly benefit road users, such as transport providers, bus and truck operators, passengers, traders, government officials, and the private sector in general. Rural households in the project area are also a beneficiary group. Farmers will be in a position to increase their agricultural incomes through better access to markets, more competitive product and input prices, and cheaper transport costs. They will also have better access to social services and information and increased interaction with the outside world. Migration to nonfarm jobs, an important source of cash income for most rural households, will increase, as the expressway will facilitate movement to other cities and provinces. In relation to tourism, Huayuan county is a land of beautiful natural scenery and well-preserved ethnic minority traditions. Most of the attractions are in rural areas. In addition Fenghuang, which the

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<sup>27</sup> HCD will propose a toll of CNY5 for use of the suspension bridge, which needs to be approved by HPG. The FIRR was estimated assuming a toll of CNY5 for bridge users.

local road component will make more accessible, has one of the most beautiful small cities in PRC. The Project will therefore boost tourism in the project area, benefiting the poor in Jishou city and Huayuan, Guzhang, and Fenghuang counties (Appendix 18).

55. Better roads enhance people's quality of life by providing easier access to social services, for instance, by encouraging more teachers and doctors to work in rural areas. Improved roads cut transport costs and the time needed to travel to a health facility. The health impact will be reflected in lower mortality and morbidity rates. Upgraded roads also increase people's mobility. However, the construction of the expressway will increase the number of truck and bus drivers passing through communities, putting the residents at higher risk of acquiring sexually transmitted infections, including HIV/AIDS. The Center for Disease Control of the Hunan Provincial Health Department implements preventive measures and adopts tight health and hygiene standards. Such measures include providing education programs, distributing condoms to local residents, and monitoring any outbreaks and spread of disease. The center conducts regular inspections on construction sites to control sexually transmitted infections and maintain high standards of hygiene.<sup>28</sup> To reduce the risk of HIV/AIDS infection from the Project, the center will introduce preventive measures at the construction sites and catchment area. Its services include voluntary counseling and testing kits and education. In carrying out the civil works contracts, the Law on the Prevention and Treatment of Epidemic Disease will be followed. Targeted and broadly based advocacy and awareness programs will also be carried out in the project area.<sup>29</sup>

56. About 77% of the population in the project area is composed of ethnic minorities, predominantly Miao and Tujia (98% of the minorities). Around 60% of the ethnic population will benefit from the Project. An ethnic minorities development plan (EMDP) was prepared based on the Resettlement Plan and ongoing government policies and programs for ethnic minorities. The EMDP contains the necessary measures, such as income enhancement, to mitigate the Project's adverse impacts and ensure that its benefits flow directly to the ethnic minorities. The main issue to be tackled will be land acquisition and resettlement. About 84% of the people affected by land acquisition and resettlement will be minorities. Such impacts and the corresponding mitigating measures are also addressed in the Resettlement Plan. HCD has finalized the EMDP based on feedback from Xiangxi Autonomous Prefecture, relevant county and township level officials, and ADB. A summary of the EMDP is in Appendix 19.

57. The Project will give women greater access to information and jobs. Female migrant workers in search of work will find it easier to travel to distant provinces on the expressway. In relation to agriculture, women will also derive advantages from the Project, especially because it is they who handle most of the farm work. In addition, women will benefit from increased marketing opportunities (most fruit and vegetable sellers in local markets are women) and from better access to education and health facilities. The Project will enhance women's participation in planning and project monitoring and evaluation and in the implementation of other poverty reduction programs, particularly in the villages served by the local road component. Women are

<sup>28</sup> In addition, HPG established the Hunan Provincial AIDS Prevention and Control Committee, which includes officials from 32 provincial departments and 7 prefecture governments, to prevent outbreaks of the disease and effectively control its spread. To date, 7 cases have been found in the project area and 1,249 cases have been found in the province since 1995.

<sup>29</sup> HCD will ensure that contractors disseminate information on the risks of sexually transmitted infections and HIV/AIDS to their employees during project implementation, a requirement that will be included in the contract. Local public health offices will disseminate similar information to ethnic minorities, transport operators, and women in the project area in accordance with ongoing HIV/AIDS prevention efforts.

entitled to equal opportunity and pay in jobs under the PRC Labor Law and will receive preferential treatment in accordance with ADB's *Policy on Gender and Development*.

## **E. Land Acquisition and Resettlement**

58. The Resettlement Plan was prepared based on the preliminary design; 39 village surveys; 403 household surveys; local government statistics; and consultations with local officials, village leaders, and affected households. The expressway will directly affect 10 townships and 39 villages in Jishou city and Huayuan county. In the 39 villages, minority nationalities account for 84% of the population (Miao 74% and Tujia, 10%). About 351 hectares of land will be permanently acquired, affecting 9,000 people, of which 32% is paddy, 19% is dry land, 3% is land used to grow vegetable and orchards, and 44% is forestland. About 115 hectares of land will be temporarily used during the construction phase. Farmland acquisition will displace 3,105 people. Some 27,500 square meters of brick and wood houses and other structures will also be demolished, displacing 973 people.

59. The Resettlement Plan was formulated in accordance with the PRC's laws and local regulations and with ADB's *Policy on Involuntary Resettlement* and *Indigenous People's Policy*. The impact on the villages is modest; however, because 10-15% of the affected households are poor, special measures will be taken to assist vulnerable and other households at risk. Land acquisition will be completed by April 2006. House relocation will be completed ahead of time at a site within villages and just a short distance from the original area of residence. Compensation will be paid prior to the displacement of people or loss of land and will be invested in economic and social infrastructure so that farmers' livelihoods and living standards will improve. Economic rehabilitation strategies have been discussed with the 10 most seriously affected villages. The preliminary estimate for resettlement costs is \$32 million. A resettlement information booklet was distributed to the affected villages and households in June 2005 and the Resettlement Plan was uploaded on the ADB web site in October 2005. Based on the detailed design, the Resettlement Plan is to be updated and sent to ADB for approval by December 2005. The summary Resettlement Plan is included in Appendix 20.

## **F. Environmental Assessment**

60. ADB has classified the Project as environmental category A. The environmental impact assessment (EIA) report was prepared by HCD, under the supervision of HEPB, and was approved by the State Environmental Protection Administration in May 2005.<sup>30</sup> The EIA assessed the environmental impacts of the selected alignment of the expressway and the local road components and prescribed environmental protection and mitigation measures costing \$5.8 million.<sup>31</sup> The proposed alignment does not cross or impinge on any protected areas; there are no known rare or endangered species in the project area. The Project's major environmental impacts include soil and water conservation and erosion control. A soil erosion prevention plan was prepared separately from the EIA. To ensure that all potential adverse environmental impacts of the Project are mitigated, HCD will implement the environmental management plan. The environmental management plan will be incorporated in the bidding documents and contracts for civil works.

<sup>30</sup> The EIA for the stretch of the expressway between the sections of the Hunan Roads Development II and III projects was prepared as part of the EIA for the whole section from Changde to Huaihua during the preparation of the Hunan Roads Development Project II. It was approved by the State Environmental Protection Administration in November 2003. Approval of the EIA for the Chongqing section of the corridor is expected by 2005.

<sup>31</sup> A summary EIA was circulated to the ADB Board on 27 May 2005 and placed on the ADB web site on 31 May 2005. The Chinese version of the EIA was sent to the Project's field offices.

## G. Risks

61. The Project has been designed to reduce potential technical, economic, financial, and social risks. The main technical risks are associated with the construction of a large suspension bridge and the 13 tunnels. To minimize the risks, international consultants reviewed the proposed design and construction methods. 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. HCD has a proven track record and satisfactory performance in implementing internationally financed projects. 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. To control the financial risks, the project company will create a commercial business environment for expressway operations and the central and provincial governments will inject substantial equity into the project expressway. The social risks include resettlement, HIV/AIDS infection, and impacts on ethnic minority communities. Appropriate mitigation measures are in place in the Resettlement Plan and EMDP.

## V. ASSURANCES

### A. Specific Assurances

62. In addition to the standard assurances, the following specific assurances have been incorporated in the legal documents.

63. **Counterpart Financing.** The Government will take, and will cause HPG, through HCD, to take all necessary measures to ensure that (i) the project company (the Company) can successfully construct the project expressway, and (ii) the local roads construction and improvements are completed prior to the completion of the project expressway.

64. **Construction Quality.** HCD will ensure that (i) the Project is constructed in accordance with the Ministry of Communication's technical standards of highway engineering; (ii) the local roads under the Project are upgraded, constructed, and maintained in accordance with the national standards; and (iii) project construction supervision, quality control, and contract management are conducted in accordance with national standards and internationally accepted practices.

65. **Road Safety.** At least 6 months prior to the opening of the expressway, (i) HCD will, in coordination with an international consultant, develop and implement a plan, acceptable to HPG and ADB, for ensuring safe operation of road infrastructure facilities; and (ii) HPG will establish teams of traffic police personnel, in accordance with national and HPG standards, to patrol the project expressway and enforce the national laws and regulations. HCD shall utilize its traffic control and surveillance systems to implement road safety measures for the Project.

66. **Tolls.** At least 6 months prior to the opening of the expressway, HCD will propose the appropriate toll rates for the expressway in accordance with the Highway Law (which requires that toll rates be set at levels sufficient to fulfill the debt service obligations of the Project as well as maintain sound operation, management, and maintenance practices for the Project). For the first 3 years of full operation, HCD will review the toll structure and levels and report to ADB significant difficulties in meeting the principles established under the Highway Law.

67. **Financial Ratios.** HCD will ensure that the Company maintains a debt service coverage ratio of not less than 1.2 from the fifth year of full operation.

68. **Operation and Maintenance Concession.** HCD will use its best effort to award an O&M concession through competitive bidding equally open to all enterprises including the private enterprises when the project expressway's operating-profit ratio exceeds 10%. With the help of an international consultant, the executing agency will prepare the bidding documents and the operation and maintenance concession framework by 2005, which specifies the concession period and selection criteria, and ensures adequate pricing and transparent auctioning. HCD will submit the above mentioned concession framework to ADB by June 2006. It is understood that such a private firm will undertake all the obligations applicable to the Company with respect to the project expressway.

69. **Local Road Maintenance.** HCD will (i) prepare a local road maintenance action plan and implement it during the operation of the Project; (ii) establish the system during the Project for an efficient prioritization of road maintenance works; (iii) provide a training program under the Project to strengthen the capacity of local government maintenance units; and (iv) secure sustainable funding for the maintenance of the project local roads.

70. **Change in Operations.** In the event that HPG or the Company plan to (i) make any change in ownership of the Project facilitates; or (ii) make any sale, transfer, or assignment of HPG's or the Company's interest in the Project expressway; or (iii) lease out, or contract out, or otherwise modify the Company's responsibilities for operation and maintenance of the Project expressway, the Government, HPG, and the Company shall obtain ADB's consent at least 6 months prior to the implementation of such a plan.

71. **Axle Loads.** HCD, through the Company, will install vehicle axle-weighing equipment at selected points. Before opening the project expressway, the Company will submit to ADB the plan for operation of the vehicle weigh stations, including the prescribed axle-load limits and penalties for infringement.

72. **Financial Reporting.** During the construction period and for the first 5 fiscal years of commercial operation, the Company will submit to ADB certified copies of its annual accounts and financial statements, audited by external and qualified auditors appointed by HCD (all in English), within 6 months after the end of each relevant fiscal year. HCD will also establish and maintain during implementation and operation of the Project an internal audit unit, composed of full-time accountants, to undertake timely audits of project accounts in accordance with generally accepted accounting principles.

73. **Capacity Development.** The project company, in consultation with HCD, will prepare a human resource development plan. Before undertaking international training, the project company will prepare for ADB's concurrence a training plan, a program of workshops to be delivered at the project company by people trained internationally, and a list of training equipment and aids to strengthen the project company's domestic training programs.

74. **Environment.** The Company will ensure that (i) the Project is constructed and operated in accordance with national and local laws, ADB's environmental procedures and guidelines, and the EIA; (ii) any adverse environmental impacts arising from the Project are minimized by implementing the mitigating measures and environmental monitoring program presented in the EIA; and (iii) the implementation of the environmental management plan and any violation of

environmental standards are regularly reported to ADB in accordance with the specifications set forth in the EIA.

75. **Vehicle Emissions.** At least 6 months prior to the opening of the expressway, HPG will provide to ADB the HEPB emission standards and the penalties for infringement of such standards. HPG will ensure that through the relevant agencies, the HEPB vehicle emission standards, as well as the national vehicle emission standards, will be enforced.

76. **Land Acquisition and Resettlement.** HPG and HCD will ensure through the project company that land acquisition and resettlement are carried out promptly and efficiently following the resettlement plan agreed on with ADB, in line with the Land Administration Law and ADB's policies on involuntary resettlement (1995) and indigenous peoples (1998). HPG and HCD will ensure through the project company that implementation of the resettlement plan is monitored and evaluated and reported to ADB as required in the plan.

77. **Poverty Reduction.** HCD will cause the contractors involved in the Project implementation to maximize employment of local poor people who meet the job and efficiency requirements for the construction of the project facilities. Such workers shall be provided with adequate on-the-job training. HCD will monitor the impacts of the Project on poverty in accordance with the guidelines set forth in the project performance management system (PPMS).

78. **Ethnic Minorities Development.** HCD and local governments will implement the EMDP to ensure that ethnic minorities benefit from the Project at least equitably and in accordance with ADB's policy on indigenous peoples (1998), and that implementation of the EMDP will be monitored and evaluated by an independent agency.

79. **Transport Services.** HCD will ensure that adequate road transport services will be in place so that the Project's benefits filter down to the rural poor in the area. HCD will coordinate with other agencies to implement the plan. In particular, HCD will see to the implementation of the ongoing or planned public transport facilities projects of Xiangxi Autonomous Prefecture in tandem with the Project.

80. **Monitoring and Evaluation.** HCD and the Company will monitor and evaluate project impacts, with the assistance of the consultants, as specified in the PPMS, to ensure that the project facilities are managed effectively and the benefits, particularly to the poor, are maximized. HCD will (i) hire a qualified domestic institute to carry out the monitoring activities through competitive bidding by December 2006; (ii) ensure that the local governments, including local statistics offices, collect the data to measure the indicators in the PPMS prior to implementation, at completion, and biennially for 5 years thereafter, with the frequency as specified in the PPMS; and (iii) submit to ADB the reports summarizing the key findings of monitoring.

81. **Gender and Development.** The Company will follow ADB's *Policy on Gender and Development* during project implementation and will take necessary steps to encourage women living in the project area to participate in planning and implementing the Project, including causing the contractors on maximizing their employment of women in connection with the Project. HCD will monitor the Project's effects on women during project implementation.

82. **Health Risks.** HCD and the Company, in coordination with the appropriate agencies identified by the Government and the Center for Disease Control of the Hunan government, will

cause the contractors to disseminate information on the risks of socially and sexually transmitted diseases, including HIV/AIDS, to their employees during project implementation. HCD will cause the appropriate agencies to disseminate similar information to transport operators and to local communities living in the project area during project implementation and operation of the project facilities.

83. **Women and Child Labor.** The Company will ensure that all civil works contractors engaged under the Project (i) provide timely payment of wages and safe working conditions to all workers, including male and female workers (to be included in civil works contracts and monitored by the construction supervision consultant); (ii) provide women's employment, where appropriate, with equal pay; (iii) do not employ child labor in project activities, in accordance with the relevant PRC laws and regulations.

84. **Anticorruption.** HCD will ensure that (i) a supervisory body is established for prevention of undue interference in business practices and adequate resources are made available for its effective operation; (ii) a leading group of officials from the Supervision Division of HCD is located in offices involved in the bidding, construction, and other operational activities under the Project; (iii) briefings between HCD and the Prosecutor's Office are held on a regular basis with respect to sharing of information on or warning about detected corrupt practices; (iv) periodic inspections on the contractors' activities related to fund withdrawals and settlements are carried out; and (v) a dual signing system, in which the civil works contract winner also signs an anticorruption contract with the employer is introduced.

85. **Asset Management.** HCD will (i) prepare an asset management development plan, with the assistance of consultants, which will establish a computerized database system and promote the use of modern equipment; and (ii) provide a training program to enhance staff skills at provincial, county, and township levels.

## **B. Conditions for Disbursement**

86. The following will be conditions for disbursement of the portion of the loan proceeds relating to the project expressway: (i) the Government will certify to ADB that the on-lending Agreement, which shall include the terms and conditions as required in the Loan Agreement, has been executed and delivered on behalf of HPG and the Company and will become fully effective and binding upon the parties there to in accordance with its terms.

## **VI. RECOMMENDATION**

87. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and, acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement of ADB, I recommend that the Board approve the loan of \$208,000,000 to the People's Republic of China for the Hunan Roads Development III Project from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's LIBOR-based lending facility; a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board.

Joseph B. Eichenberger  
Vice President

17 November 2005

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<b>Impact</b> Sustainable economic growth and poverty reduction in Hunan province and the project area	<p>During 2010–2020, gross domestic product increases by 7% in Hunan province and 7.5%– to 8.0% in the project area</p> <p>Per capita rural incomes in the villages increase from CNY1,200 in 2005 to CNY2,700 in 2015</p> <p>The incidence of poverty in the project area falls from 30% in 2005 to 15% in 2015</p> <p>Middle school dropout rates are reduced by 10% by 2015</p> <p>Visits by doctors increase 20% by 2015</p> <p>The percentage of new or renovated houses in the villages increases from 6% of total houses in 2005 to 10% in 2015</p> <p>The cash crop area per capita increases from 0.4–0.7 mu(0.067 hectare)/person in 2005 to 0.8–1.3 mu/person in 2015</p> <p>In 5 years, the employment generated in the project area is 10% higher than in the control area</p> <p>Income from the nonfarm sector increases from 30% of total income in 2005 to 70% in 2015</p> <p>The number of rural enterprises grows 10% within 3 years</p> <p>The number of tourists visiting the project area increases by 30% by 2015</p> <p>Interprovincial and intraprovincial trade in the western regions increases by 10% within 3 years</p>	<p><i>Hunan Statistics Yearbook</i></p> <p>Village survey by consultants</p> <p>Statistics offices at the provincial and county levels</p> <p>Village survey by consultants</p> <p>Village survey by consultants</p> <p>Village survey by consultants</p> <p>Village survey by consultants</p> <p>Statistics offices at the provincial and county levels</p> <p>Household survey by consultants</p> <p>Statistics offices at the county level and village survey</p> <p>Statistics at the township and county levels, village survey</p> <p>Statistics offices at the provincial and county levels</p>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>Government investment projects implemented as planned.</li> <li>Complementary activities are implemented.</li> </ul>
<b>Outcome</b> Road transport efficiency is enhanced and improves safety in the project area  The Jishou–Chadong section of the Changsha-Chongqing western corridor is completed	<p>Traffic volume for the expressway increases from an average of 6,000 annual average daily traffic in 2010 to 12,650 in 2019</p> <p>Travel time between Jishou and Chadong is reduced to 1 hour</p>	<p>Collection of actual traffic data at the expressway through its auto-monitoring system by the Hunan Provincial Communications Department (HCD)</p> <p>Traffic counts and travel time survey for the expressway and local roads by HCD</p>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>Assumed economic growth rates materialize.</li> <li>Transport operators and drivers realize the benefits of using the expressway.</li> <li>HCD demonstrates implementation capacity.</li> </ul>



Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>The rural population in the project area has improved access to income-generating opportunities and social services</p>	<p>Reduced bus fares and freight charges by 10% by 2015</p> <p>The frequency of visits to township markets increases from 5 times/household/month in 2005 to 10 times/household/month in 2015</p> <p>The frequency of visits to villages by extension workers increases from 4–11 times every 6 months in 2005 to 8–15 times every 6 months in 2015</p> <p>The percentage of transport expenses of total expenses increases from 4.6-6.6% in 2005 to 8-12% in 2012</p> <p>The percentage of villages with paved road access increases from 65% to 90% by 2015</p> <p>Bus service availability increases from 50% of townships in 2004 to 100% by 2015</p> <p>The number of serious road accidents and fatalities in the project area is reduced by 20% by 2015</p>	<p>Monitoring of fares and rates by HCD</p> <p>Household survey by consultants</p> <p>Village survey by the consultants</p> <p>Household survey by consultants</p> <p>Monitoring of accessibility by local communications bureaus</p> <p>Monitoring of bus-related data by HCD</p> <p>County statistics Accident statistics from the Hunan Public Security Bureau and hospitals</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>Risk</b></p> <ul style="list-style-type: none"> <li>Local governments may not have sufficient budgets to implement the road development plan.</li> </ul> <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Rural transport service facilities are improved according to the government's plan.</li> <li>The nationwide road safety program is effectively implemented.</li> </ul>
<p><b>Outputs</b></p> <p>1. Road infrastructure and associated equipment and facilities improved along the expressway</p>	<p>Road capacity increased to 2,765 passenger car unit per hour at opening in 2010 by building a 64 kilometers (km) expressway</p> <p>Vehicle operating costs for a car reduced from CNY1.79 per vehicle-km in 2005 to CNY1.50 (constant price) per vehicle-km in 2015</p> <p>Safety audits implemented during design and construction</p> <p>Equipment procured and installed for road safety, toll collection, communications, and weigh stations</p> <p>Implementation of the plans for land acquisition and resettlement</p> <p>Acid rain pollutants (sulfur dioxide) and carbon dioxide emissions reduced by 20% by 2010</p> <p>Environment at the project site protected and adverse environmental impacts minimized by implementing mitigation measures</p>	<p>Project completion report (PCR)</p> <p>Direct measures of vehicle operating costs by HCD</p> <p>Progress reports and PCR</p> <p>Project administration memorandum (PAM), project reports, and PCR</p> <p>Regular monitoring by an independent institute engaged by HCD</p> <p>Environmental monitoring reports, PAM, and PCR</p>	<p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Construction of tunnels and the suspension bridge may be delayed because of their complexity.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>HCD may not implement the recommendations of the safety audits.</li> </ul> <p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Equipment procurement and installation are completed timely.</li> <li>Affected people are able to restore their living standards.</li> </ul> <p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>HCD and contractors are committed to implementing mitigation measures</li> </ul>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
2. Road infrastructure and associated facilities improved for local roads in the project area	The welfare of minorities protected and the Project's adverse impacts minimized by implementing an ethnic minorities development plan  Control of HIV/AIDS and health risks for construction workers and service providers  Road capacity increased to 850 passenger car unit/hour/direction for the class III Xiatuo section and to 800 passenger car unit/hour/direction for the class IV Qianxi section by 2009.	Monitoring reports of the ethnic minorities development plan, PAM, and PCR  Monitoring by the Hunan Provincial Health Bureau  PCR	<b>Risk</b> <ul style="list-style-type: none"><li>The capacity of the Health Bureau may be insufficient to implement mitigation measures.</li></ul> <b>Assumption</b> <ul style="list-style-type: none"><li>Quality facilities are completed in a timely fashion.</li></ul>
3. Private sector participation encouraged in the project expressway	An operation and maintenance concession awarded when the expressway meets the required financial performance	Midterm review missions and PCR	<b>Risk</b> <ul style="list-style-type: none"><li>Few private firms are interested in the expressway's operations.</li></ul>
4. Domestic capacity strengthened in project management, quality control, road maintenance management system road safety, and monitoring and evaluation	HCD staff will receive 47 person-months of international training  Local staff will receive training under management action plan to be prepared by 2007  Survey techniques are adopted to assess changes in work practices and behavior to measure the effectiveness of the capacity building Component	Midterm review missions and PCR  A report by the international consultants on the capacity building component	<b>Assumptions</b> <ul style="list-style-type: none"><li>Consultants are recruited in a timely fashion and perform well in providing training to HCD.</li><li>Trainees apply what they have learned.</li></ul>
Activities with Milestones			Inputs
1. Implementing and supervising expressway civil works	Civil works contracts awarded by December 2006 and completed by December 2011		Asian Development Bank: \$208 million
2. Installing equipment	Equipment procured by December 2011		Ministry of Communications: \$59.7 million
3. Implementing the Resettlement Plan	Resettlement completed by April 2006		HCD: \$94.6 million
4. Establishing a sound road maintenance management system	An action plan is prepared by 2007 and implemented before project completion		State Development Bank: \$157.2 million
5. Providing consulting and training services	Consultants are recruited by September 2006 and their work is completed by December 2011		
6. Conducting training programs	Training program completed by June 2012		
7. implementing and supervising the upgrading of the local roads	Civil works contracts awarded by July 2007 and completed by October 2009		

## ROAD SECTOR ANALYSIS

1. The road network in the People's Republic of China (PRC) was 1.86 million kilometers (km) long in 2004, an increase of 46,000 km from its length 2003. Of this, 1.52 million km were classified. Class II and above roads accounted for 299,524 km, or 19.7% of the total length. The road density increased from 12.1 km per 100 square km ( $\text{km}^2$ ) in 1995 to 19.4 km per 100  $\text{km}^2$  in 2004. In 2004, rural roads totaled 2.9 million km in 2004: 479,372 km are county roads; 945,180 km are township roads, and 1,473,534 km are village roads. Hunan's road network accounted for 4.7% of the country's total, with a length of 85,233 km. Of this, 39,691 km (46.6 %) were classified: 1,218 km of expressways (1.4%), 469 km of class I roads (0.6%), and 5,174 km of class II roads (6.1%). The road density in Hunan was 40.3 km per 100  $\text{km}^2$  in 2004, compared to the average of 51.6 km per 100  $\text{km}^2$  for the eastern and coastal provinces.

2. In 2003, the PRC's vehicle fleet totaled 24 million trucks, cars, and buses, and 72 million other motorized vehicles. The privately owned fleet of motor vehicles increased from 0.3 million in 1985 to 12.0 million in 2003. Modernization of the vehicle fleet will improve vehicle safety and reduce individual vehicles' fuel consumption and emissions. In 2004, Hunan had more than 43,000 bus operators, most of them small, private operators on routes shorter than 150 km. About 72,000 buses were registered, including 41,500 large buses with a total capacity of 816,200 seats, with average growth of 5.2% over the last 10 years. Road passenger traffic in Hunan, measured in terms of passenger-km, grew 6.4% per year between 1990 and 2004, slower than the national average of 8.6%. Road freight traffic, in ton-km, grew at 9.7% per year, compared with 3.3% per year for the PRC as a whole.

3. The Hunan Provincial Communications Department is responsible for regulating the road transport industry in Hunan by licensing drivers, vehicles, and intercity bus services. Freight transport is essentially deregulated; however, interprovincial bus routes require MOC approval. Private operations have increased, resulting in improved transport efficiency and quality of services and increased competition. Road transport tariffs are allowed within a range of plus or minus 20% of advisory tariffs set by the local government. This flexibility, coupled with ease of market entry, will facilitate the passing on to transport users of cost reductions resulting from improved road conditions.

4. Expenditures for highway infrastructure are financed from dedicated user charges, government grants, domestic bank loans and bonds, and foreign loans and investments. Two dedicated user charges, the road maintenance fee and the vehicle purchase fee, have provided much of the financing for the road sector. During the Ninth Five-Year Plan (1996–2000), the road maintenance fee and vehicle purchase fee provided 53% and 13%, respectively, of total road investments. The vehicle purchase fee was replaced by the vehicle purchase tax in 2001.

5. Road projects are designed by planning and design institutes at the provincial, prefecture, and county levels. MOC reviews the designs of high-standard roads and associated structures. Design institutes are staffed with well-qualified personnel. City and county highway bureaus have their own construction units to carry out minor projects within their administrative districts. Competitive bidding practices were mandated by the 1999 Tendering and Bidding Law. Road maintenance is well organized and implemented by expressway companies and highway administration bureaus.

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

**Table A2: Roads Sector Policy Reform Plan**

<b>Initiative</b>	<b>Current Status</b>	<b>Actions</b>	<b>Target Date</b>
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  Local road components are included in all expressway projects	Project identification and design assisted through technical assistance (TA) 3086-PRC: Regional Road Sector Study	Recommended investment packages taken up for the 10th Five-Year Plan (FYP)
		Project assistance provided to improve and finance provincial and county roads	Being implemented since 1995
		Poverty impact of transport projects assessed through TA 5947-REG: Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction	Completed in 2005
		Monitoring framework and indicators prepared under TA 3900-PRC: Socioeconomic Assessment of Road Projects ADB loans for expressway projects finance the local road component (\$12.5 million for the Hunan Roads Development II Project, and \$8.0 million for the Hunan Roads Development III Project) TA 4322-PRC: Poverty Impact of Area Wide Road Networks	Completed in 2004 Results of the TA adopted for designing a poverty monitoring system for ADB-financed road projects Being implemented in 2005–2010
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
		Assistance in developing the previous standards including transport efficiency, road safety, and environmental considerations provided through TA 2573-PRC: Review of Highway Design Standards	Completed in 1998
		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 2004: 107,077 in the PRC and 16,116 in Hunan province	Road safety program for Heilongjiang province prepared under TA 2177-PRC: Preparation of a Road Safety Program	Recommendations disseminated in 1999–2000
	Poor safety design, lack of attention to safe roads, inadequate traffic enforcement and driver training, and limited use of seat belts contribute to the poor safety record	Recommendations of TA 5620: Regional Initiatives in Road Safety adopted by the PRC Public awareness of road safety raised and the Ministry of Public Security's capacity strengthened in traffic safety, planning, and management under TA 3341-PRC: Capacity Building in Traffic Safety, Planning, and Management Safety audits to be carried out with assistance from consultants	Being implemented in 10th FYP  The new Traffic Safety Law became effective on 1 May 2004 and includes the mandated use of seat belts
			Prior to construction and opening of the Project

Initiative	Current Status	Actions	Target Date
4. Overloading of trucks	Overloading of trucks has adverse impacts on pavement conditions, traffic flow, and safety	An interministerial committee coordinated by MOC has been established to develop and implement special measures to enforce regulations on overloaded trucks nationwide	Implemented in 2004–2006
5. Vehicle emissions	Vehicle emissions are becoming a primary source of air pollution in major cities.	Leaded fuel banned for motor vehicles; European vehicle emissions standards adopted for all new vehicles	Completed in 2002; implemented by vehicle size in 2001–2005
	Vehicle inspection and monitoring program	Vehicle testing and monitoring promoted under TA 5937-REG: Action Plans for Reducing Vehicle Emissions Chongqing municipal vehicle emission reduction guidelines prepared and the relevant action plans developed	Implemented in 2002–2005  Recommendations being considered in Sichuan province
6. Road pricing	Tolls structured so that users pay for full cost recovery of toll roads in most provinces	Toll levels for ADB projects set to ensure cost recovery	Annual review of tolls
		Toll diversion manual disseminated under TA 3102-PRC: Toll Diversion Study	Adopted by MOC and applied to ADB-financed road projects in the PRC
7. Corporatization	A legal agreement between provincial communications departments and expressway companies is lacking	A model concession framework agreement prepared under TA 2592-PRC: Corporatization, Leasing, and Securitization in the Road Sector	A concession framework agreement will be signed between the Sichuan Provincial Communications Department and the project company by 31 December 2007
8. Operation and Maintenance (O&M)	Current practices do not take full advantage of benefits of expressway operations by the private sector	Expressway O&M will be separated from the provincial government's functions for the Jishou-Chadong expressway	O&M concession will be awarded when financial requirement is met
9. Financial mobilization	Financing requirements for road infrastructure investments are increasing	Results of TA 2409: Appraisal Methodologies and Restructuring Highway Financing in Hebei Province are under consideration	Implementation of recommendations during 10 <sup>th</sup> FYP
	Refinancing or leasing arrangements for selected road sections are in place in several provinces	Build-operate-transfer (BOT) guidelines and a feasibility study for a pilot project prepared under TA 2649-PRC: Facilitating the BOT Modality in the Highway Sector Assistance provided through TA 2592-PRC: Corporatization, Leasing, and Securitization in the Road Sector ADB-financed Jilin expressway company and Changyong expressway corporation securitized as part of stock listing	A pilot BOT road project is being implemented by the Government  Stocks listed in 1999

Source: Asian Development Bank estimates.

## EXTERNAL ASSISTANCE TO THE ROAD SECTOR

Table A3.1: Asian Development Bank-Financed Loans

No.	Loan Number	Loans	Express -way (km)	Local Road (km)	Loan Amount (\$ million)	Date Approved	PCR Rating	PPAR Rating
1	1082-PRC	Shanghai Nanpu Bridge	—	—	70	28 May 91	S	GS
2	1168-PRC	Shenyang–Benxi Highway	75	—	50	2 Jul 92	GS	S
3	1188-PRC	Shanghai Yangpu Bridge	—	—	85	17 Nov 92	HS	—
4	1261-PRC	Hunan Expressway	52	—	74	9 Nov 93	GS	—
5	1262-PRC	Jilin Expressway	133	—	126	9 Nov 93	GS	HS
6	1324-PRC	Heilongjiang Expressway	350	—	142	29 Sep 94	PS	S
7	1325-PRC	Yunnan Expressway	200	—	150	29 Sep 94	HS	—
8	1387-PRC	Hebei Expressway	200	179	220	28 Sep 95	HS	—
9	1388-PRC	Liaoning Expressway	110	203	100	28 Sep 95	GS	—
10	1470-PRC	Chongqing Expressway	89	—	150	27 Sep 96	S	—
11	1483-PRC	Shenyang–Jinzhou Expressway	192	291	200	19 Nov 96	HS	—
12	1484-PRC	Jiangxi Expressway	134	253	150	19 Nov 96	S	—
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	S	—
15	1641-PRC	Changchun–Harbin Expressway: Hashuang Expressway	101	—	170	27 Nov 98	S	—
16	1642-PRC	Changchun–Harbin Expressway: Changyu Expressway	161	—	220	27 Nov 98	S	—
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	Gansu Roads Development Project	231	470	300	13 Dec 04	—	—
31	2181-PRC	Central Sichuan Roads Development Project	244	678	600	22 Sep 05	—	—
<b>Total</b>			<b>4,391</b>	<b>8,237</b>	<b>6,163.5</b>			

— = not available, GS = generally satisfactory, HS = highly satisfactory, km = kilometer, PS = partly satisfactory, PRC = People's Republic of China, PCR = project completion report, PPAR = project performance audit report, S = satisfactory, U = unsatisfactory.  
Source: Asian Development Bank estimates.

Table A3.2: 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

No.	TA Number	Technical Assistance	Type	Amount (\$'000)	Date Approved
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 Gansu 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
<b>Total</b>				<b>28,331</b>	

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

**Table A3.3: Other Funding Sources**

No. of Loans	Organization	Road Length (km)	Loan Amount	
			Unit	Total
36	World Bank	6,726	\$ million	6,622
16	Japan Bank for International Cooperation	1,695	Yen million	219,036

Km = kilometer.

Source: Asian Development Bank estimates.

## **TRANSPORT SERVICES IN THE PROJECT AREA**

### **A. General**

1. Transport services are relatively well developed along NR319 in Jishou city, the capital of Xiangxi Autonomous Prefecture, but less so along the local road component in poor, mountainous, and underdeveloped areas in Baojing, Guzhang, Fenghuang, and Huayuan counties. While there is a class II bus terminal in Jishou city, more than 80% of townships in the area do not have even class V rural bus stations. Further many villages and townships have no direct access to bus service as operators are either reluctant to venture onto poor-quality roads or are not permitted to do so for safety reasons. Hunan transport administration division does not issue licenses to operate bus routes on unsafe roads.

2. It is operators who propose new bus routes, and local transport administration divisions do not undertake overall planning for the route network. The fares and routes of the formal bus system are regulated, which often results in inefficient services. Thus villagers have to rely on informal means of transport, such as baby-taxis, motorized-tricycles, and dual-purpose vehicles. Because informal transport services of local operators are limited to the routes plying villages and townships and/or local markets, it has limitation to replace the formal transport system.

### **B. Demand for Transport Services**

3. In the project area, although trucks and buses provide services to villages, the cost of travel is high. The people in the area thus mostly rely on informal transport services to travel to a town. The TA survey found that the average trip for the poor was longer than that for the non-poor because villages are far away from commercial centers. Such trips are costly for the poor and hence infrequent. As a result, the poor who are often limited to walking to nearby rotating village markets can sell their produce up to the amount that they can carry on their backs, or sell it to four-wheel drive-in traders who benefit through a buyer's market situation. Likewise, the poor are comparatively limited in traveling to buy farming inputs.

4. Most trips cover short distances: approximately 60% of all trips are to the nearest town and 33% are within the township. Trips to the county town are rare, with the average household making only 12 trips per year and the poorest group making less than two trips. The demand for long-distance travel is limited to migrant workers, who are employed in the coastal provinces and return home once a year. Most trips are for buying necessities, while only 16% are for agricultural marketing. Walking and bicycling are the major modes of transport for short-distance trips. As distance increases, so does the number of motorized trips: almost no trips are made on foot when the distance exceeds 6 kilometers. Indeed, even for extremely short journeys, a significant proportion of the population uses motorized transport. Vehicle ownership is low in the project area. According to the survey, the non-poor own an average of three vehicles per 100 households compared with none for both the poor and absolute poor. The non-poor also own an average of eight motorcycles per 100 households, compared with four for the poor.

### **C. Transport Services and Road Condition**

5. The area's inadequate and insufficient transport services are highly correlated with poor road conditions in the area. The TA survey revealed that transport services are more extensively available in areas with better roads, which makes travel to markets or social facilities easier and undertaken more frequently. In Jishou, where the road network is in better condition than in other places in the project area, transport services are relatively well developed. This



implied that transport services improve with the improvement of the road network. The operators who were interviewed confirmed their willingness to extend transport services where this would be profitable, and villagers who have experienced road upgrading have also confirmed that bus services were indeed extended after a road was upgraded. When roads are upgraded, transport services improve shortly thereafter and the frequency of villagers' trips to local markets, nearby townships, and towns increases significantly. The village survey also confirmed a close link between road access and the quality of transport service.

6. The villagers surveyed said that when roads were improved the quality of service did get better, while official fares and trucking rates did not decrease since licensed bus operators were often constrained in setting fares. In many cases, on the other hand, informal transport fares went down. The informal operators are based in townships and villages, and their fares are usually negotiable, tending to decrease when roads are improved.

7. The responses to the survey did not cite unaffordable transport services and insufficient credit as serious obstacles to changes in agricultural practices and a shift to nonagricultural businesses. Indeed, even the poor use vehicular transport for 30% of their trips. They viewed poor roads to be a key reason for inadequate and expensive transport services and infrequent visits from extension officers, veterinarians, health workers, and public servants. Thus improved local roads will thus spur both formal and informal transport service providers to render better transport services.

8. The demand for travel also increases significantly with improved roads mainly because of upgraded transport services, which eventually helps raise rural incomes and reduce poverty. The village survey indicated that the average number of trips in such areas is higher than in areas with less developed roads.

9. The interviews with villagers and county officials suggest that rural poor farmers who rarely use roads also benefit from improved transport services by way of higher farm-gate prices for their cash crops and more frequent visits from extension and health personnel and public servants and officials.

#### **D. Efforts to Expand the Provision of Transport Services**

10. Expanding access to transport services is an integral part of Hunan's plan for transport services. Xiangxi Autonomous Prefecture,<sup>1</sup> where the Project is located, has only one class II bus terminal in Jishou city, and more than 80% of townships do not have even rural bus stations. To enhance the sustainable delivery of transport services, the prefecture has implemented a plan to construct class I–IV bus terminals.<sup>2</sup> A class I bus terminal is being constructed in Jishou and is scheduled to open in 2006. The construction of class II bus terminals in five counties is also under way and at least one class II bus terminal will be built in each of the three remaining counties during the period of the 11th FYP. The prefecture aims to build a class V rural bus station in each village by 2015, 15 of which will be completed in the project area by 2007. HCD agreed to implement these facilities in tandem with the Project to ensure the efficient provision of transport services when the project roads have been built.

<sup>1</sup> The prefecture comprises 8 counties, 218 townships, and 2,664 villages.

<sup>2</sup> A bus terminal is classified according to its daily passenger handling capacity. A class I terminal handles more than 10,000 passengers per day, a class II terminal handles 5,000 to 10,000 passengers, and a class V terminal handles up to 500 passengers.

## SMALL BUSINESS DEVELOPMENT IN THE PROJECT AREA

1. The basic parameters for small business development are in place in the project area: literacy is reasonably high; even though most people are engaged in farming, a labor force is also available for commercially-oriented nonfarm activities;<sup>1</sup> and secondary and tertiary markets exist. Microfinance schemes are in place for supporting small businesses under provincial poverty programs or minority development programs. Various poverty reduction projects also support the development of small businesses, including two externally funded projects, one funded by the World Food Programme and International Fund for Agricultural Development's Agricultural Development Project and one by the Japan Bank for International Cooperation's Poverty Reduction Project. The existing programs complement each other and will provide a good basis for promoting small business development in the area through their focus on agricultural diversification for commercial purposes, construction of market facilities, and skills for self-employment.
2. Small businesses are fairly active in the project area. With improved roads, existing enterprises are expected to further expand their businesses. Each kilometer of road averages four businesses, and one of the local roads under the Project has about six businesses per kilometer. A wide assortment of businesses has been established that provide basic necessities for local communities and travelers. The technical assistance (TA) survey shows that the trend evinces an inherent entrepreneurial spirit among local residents who, if given the opportunity, are likely to set up commercial enterprises. A number of factories are located along NR319, an indication that the proposed expressway may attract larger commercial establishments to the vicinity.
3. Small businesses could focus on the following areas: (i) agriculture and agro-industry, (ii) herbal medicines and handicrafts; (iii) community-based tourism, eco-tourism, and cultural and heritage tourism based on the traditions of the ethnic minorities; (iv) service industries, such as services for through traffic; and (v) community-based distribution facilities and transport systems. The TA survey indicate that inadequate road infrastructure has been one of major barriers to developing small businesses in the area.
4. During the TA, a strategy was prepared to develop small businesses and commercial activities that includes (i) developing community-based enterprises such as gas stations, niche farming, eco-tourism and community-based tourism, herbal and homeopathic medicines, handicraft centers, hostels, and restaurants; (ii) building roadside stations as focal points for small business development; (iii) creating economic zones specifically targeting small businesses, which require government interventions to, for example, locate and group similar types of businesses; and (iv) creating an ethnic minority cultural zone, which would give local communities opportunities to display their cultures and traditions in a designated area as well as allow them to develop their entrepreneurial activities.
5. The TA also indicated that assistance is needed to channel local people into potential areas of business and commercial opportunities, such as entrepreneurial training that would make investments attractive. The Hunan Communications Provincial Department has ensured that such assistance will be provided through provincial poverty reduction programs.

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<sup>1</sup> Underemployment is significant during the nonfarm season.

## ROAD SAFETY AND VEHICLE EMISSIONS

1. Implementation of the Government's economic reform policies since 1978 has resulted in rapid economic growth and a persistent increase of the number of vehicles. The People's Republic of China will continue to experience a high rate of motor vehicle growth for many years to come. As such, the country is facing increasingly serious road safety and vehicle emissions problems, which inhibit economic and social development given their association with 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. Accident rates in the People's Republic of China are high compared with those in highly motorized countries and in many other developing countries. Road accidents and their resultant economic losses represent a substantial problem and require urgent attention by the authorities. According to national statistics,<sup>1</sup> in 2004 road traffic accidents resulted in 107,077 deaths and 460,864 injuries, with costs equivalent to 1–3% of gross domestic product. In Hunan in 2004, there were 16,116 accidents that killed 3,825 people and injured 18,377. To address the issue of road safety, 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 Hunan, the traffic police, which fall under the auspices of the Hunan 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 Hunan Provincial Communications Department (HCD) to consolidate interagency efforts.

3. Safety is one of the major factors that must be taken into consideration, along with, for example, mobility and economic and environmental impacts, in order to achieve balanced design standards for roads. The design of the expressway was chosen 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.

4. Controlling the overloading of vehicles is essential. With heavily loaded vehicles, road safety is affected 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 reducing front-end weight, road contact, and friction with the road surface. HCD will monitor operations in relation to overloaded vehicles and impose sufficient penalties on offenders to help reduce the risk of traffic accidents, pavement damage, and maintenance costs. An efficient penalty system will be in place to discourage operators from overloading. Typical penalties could include (i) the suspension of operators' driver's

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<sup>1</sup> Ministry of Public Security. 2004 accidents statistics.

licenses, (ii) the suspension of operators' goods licenses, (iii) a large fine, and (iv) the requirement that operators unload their vehicles and reload only to the allowable weight limit. HCD is currently using the *Handbook for Road Safety Audits*<sup>2</sup>, 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 Jishou–Chadong corridor.

5. An interdepartmental framework will be established under the Project to enhance road safety in the project area. While HCD will concentrate on engineering, road safety audits, black spot improvement, and operational issues pertaining to the expressway, the Hunan Public Security Bureau will deal with traffic law enforcement issues to create safer roads.

6. HCD will help develop a comprehensive road safety strategy in the project area in collaboration with the international road safety specialist. The strategy will seek to promote innovative ways to improve road safety by means of the following broadly based approach: (i) institutional strengthening to strengthen the provincial road safety committee, develop comprehensive action programs, promote awareness, set effective targets, and undertake monitoring; (ii) capacity building and human resources development to set up an efficient and uniform database and upgrade skills and knowledge; (iii) coordination to develop black spot programs, undertake accident prevention measures, foster the dissemination of knowledge about best practices, and set common targets and time frames; and (iv) promotion of effective cooperation among government and nongovernment organizations, the private sector, and community groups.

## **B. Vehicle Emissions**

7. Motor vehicle emissions are increasingly contributing to air pollution. The Government is taking significant measures to control emissions by regulating the automobile industry and enforcing an annual vehicle test and inspection and maintenance program. The new measures also set emissions and fuel efficiency targets and offer tax incentives for manufacturers of more environment-friendly cars. One aim is to reduce average fuel consumption by 15 percentage points between 2003 and 2010. Hunan is developing alternative fuels that could help reduce petroleum imports. A 300,000 ton per year ethanol plant has been proposed in Changde that would use corn and other grains as feedstock. The Sichuan–Hunan gas pipeline project is currently under construction. Natural gas will be provided for power generation, industrial fuel, commercial and residential users, and transport. HCD and the Hunan Environmental Protection Bureau (HEPB) are working on a plan to control vehicle emissions. Implementing such a plan will require the cooperation of a number of agencies, jurisdictions, and the community as well as government commitment. At least 6 months prior to the opening of the expressway, HCD will provide ADB with the latest government plan to improve air quality in Hunan, including cleaner fuel programs. With the assistance of consultants, HCD and HEPB will develop an action plan to control vehicle emissions in the area and implement it accordingly.

8. The Project will have positive impacts on air pollution, as emissions from vehicles along the project roads are expected to be lower because of better traffic flows as a result of improved road conditions. Upon completion of the Project, sulfur dioxide emissions from vehicles on the project roads are estimated to be 20% lower than before the Project. Likewise, nitrogen oxides emissions will be 12% lower than before the Project and carbon dioxide emissions will be 20% lower.

<sup>2</sup> ISBN 7-114-03743-0 published in October 2000.

## LOCAL ROAD MAINTENANCE

### A. Status

1. Hunan Provincial Highways Administration Bureau (HHAB) is responsible for the management, construction, improvement, and maintenance of all roads apart from expressways. For national, provincial and county roads (up to Class II highways), HHAB carries out maintenance of the roads. However, for county (Class III highways and below) and township roads, HHAB delegates maintenance 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 Xiangxi Prefecture, maintenance and management of the road network is the responsibility of the counties within the prefecture. Most road maintenance funds are used to maintain roads that are class III or above. Maintenance of unclassified roads (72% of the network) is carried out by local people using their own resources. Counties finance about 50% of their road maintenance requirements. In the prefecture, there are approximately 9,575 kilometers (km) of roads, of which 6,900 km are unclassified.<sup>1</sup> About 298 staff are involved in maintenance, and 759 farmers are paid CNY150 per month for part-time maintenance work. About 4,790 km of roads are maintained by counties, one third of which are maintained regularly (Table A7.1).

**Table A7.1: Basic Data**

	Road Access	Road Length	Funding	Road Condition
<ul style="list-style-type: none"> <li>• Xiangxi Prefecture (8 counties, 218 townships)</li> <li>• Staff: 298 staff and 759 part-time workers</li> </ul>	2,664 administrative villages	<ul style="list-style-type: none"> <li>• 9,575 km including 6,900 km of unclassified roads</li> <li>• 524 bridges</li> </ul>	<ul style="list-style-type: none"> <li>• Classified roads: funded by counties</li> <li>• Unclassified roads: funded by local people</li> </ul>	Poor

Km = kilometer.

Source: TA consultants estimates.

3. A local road component, comprising two sections totalling 129 km, was integrated into the Project to expand the road network into rural villages inhabited by ethnic minority groups. Conditions of the two local roads vary from poor to bad, and only minimal maintenance is being carried out (Tables A7.2 and A7.3).

**Table A7.2: Road Condition of the Local Roads**

Road	From	To	Surface Type	Condition	Existing Class	Proposed Class
Xiatuo	Fenghuang	Malichang	Gravel	Poor	IV	IV
Qianxi	Qianling	Hexi	Gravel	Poor	IV	III

Source: TA consultants estimates.

**Table A7.3: Users of the Local Road Sections**

Road	Length (km)	No. of Townships Served	Population Served	Rural %	Poor % (<900 Yuan)	Minority %	Pop/km Includes (side road)
Xiatuo	86.40	9	137,000	65	33.5	84	1,584
Qianxi	43.03	7	88,000	75	32.2	81	2,045
Total	129.44	16	225,000			54	873

Km = kilometer, Pop = population.

Source: TA consultants estimates.

<sup>1</sup> Paved roads total 2,310 km, of which 33 km have high grade pavement (cement concrete); 89 km, asphalt; and 1,708 km, sand gravel.

## B. Issues and Problems

4. Adequate maintenance is crucial to ensure the sustainability of rural roads. Local administrative units are responsible for such maintenance but the quality of rural roads does not seem to be systematically monitored by the higher authorities. There is no comprehensive planning for rehabilitation. Maintenance planning often hinges on a subjective assessment, mainly because of the local government's inability to maintain its road networks because of lack of resources. Between counties, there seems to be little cross-dissemination of knowledge to measure performance. While local authorities draft plans for routine maintenance work, periodic maintenance is rather budget-driven and lacks a systematic, preventive approach.

5. There is no official funding channel for the maintenance of township or village roads or system to enable provincial or central government to fund the development of rural roads. A reliable funding mechanism for maintaining and rehabilitating rural roads must be designed, with attractive incentives (including financial incentives) to help local governments to maintain their roads. Since funds for maintenance are limited, a simple evaluation and prioritization method for maintenance work must also be established to streamline work programming and make the most effective use of funds.

6. Apart from financial constraints, local governments' maintenance efforts are often hampered by a lack of qualified technical and managerial personnel, training resources, and equipment. Local governments must develop a capacity to contract out road maintenance. In tandem, start-up assistance must be extended to local road maintenance contractors in rural areas, and ways to generate employment for the rural poor must be identified. A suitable performance monitoring system must be put in place.

## C. Recommendation

7. During project preparation, an action plan (Table A7.4) was established to strengthen local road maintenance. The action plan was agreed with Hunan Provincial Communications Department (HCD). Following the plan, HCD will develop and implement a sound road maintenance management system during project implementation. 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. HCD will encourage county governments to adopt competitive bidding among maintenance contractors to enhance efficiency. A training program will be provided under the Project to strengthen the capacity of local government maintenance units.

**Table A7.4: Action Plan**

Activity	Requirements
<b>Classified Roads</b>	Develop a functional classification for the road system Determine the importance of each road in the overall road network Establish a road condition system Develop road maintenance work priorities Assign a cost for each activity and define overall cost
<b>Bridges</b>	Carry out the same process for the maintenance of bridges
<b>Unclassified Roads</b>	Provide basic funding and technical advice to help maintenance of unclassified roads Provide basic materials to the small communities
<b>Capacity Building</b>	Assign the Communications College to carry out capacity building and on-going training to enhance local capacity
<b>Fund</b>	Optimize the maintenance fund, and ensure the sustainability of the road networks

Source: TA consultants estimates.

## INTELLIGENT TRANSPORT SYSTEM AND ASSET MANAGEMENT

### A. Intelligent Transport System

1. The intelligent transport system (ITS) is a term that is widely used to refer to a wide range of technological solutions applied to the transport sector to optimize safety and efficiency. The solutions include safety and traveler information, enforcement, monitoring, and toll and revenue collection. An action plan was developed for the Project (Table A8.1) and will be implemented with the help of consultants. The ITS features of the Project include (i) one traffic control subcenter connected to the main provincial traffic control center for all expressways; (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 4% of the ADB loan (\$7.6 million) will be allocated to procure ITS equipment, and training in its use will be provided with the help of consulting services.<sup>1</sup>

**Table A8.1: ITS Action Plan for the Project**

Item	Recommendation	Comment
<b>Road Safety and Emergency Services</b>		
Targeted traffic enforcement	24-hour enforcement program	Integrated communications system and activities for all road safety and emergency amenities of the expressway
Road accident prevention measures	Accident investigation system using modern technology	
Integrated activities of emergency service agencies	24-hour emergency service facilities	
<b>Emergency Telephones</b>		
In immediate vicinity of major infrastructure	Provide telephones at key locations	To complement mobile phone communications
In areas of poor mobile phone reception	Provide telephones at 2-kilometer intervals along the expressway	To replace mobile phone communications
Other areas	As required	
<b>Surveillance</b>		
Fixed location video surveillance	Cameras with variable focal lengths; cameras that can be rotated, raised, and lowered; cameras to provide full coverage within tunnels, on bridges, and at intersections	To cover the various expressway operations and facilities; could also be integrated with vehicle speed, weight, and toll payment monitoring and enforcement at selected locations
Wind speed and direction	In location where roads are subject to high winds, particularly cross-winds	
<b>Speed Monitoring</b>		
Fixed location	Video monitors on gantries to photograph speeding vehicles	
<b>Overloaded Vehicle Control</b>		
Fixed location	Vehicles weighed at each expressway entrance point; overweight vehicles photographed	Fine or penalty options to be determined

<sup>1</sup> The ITS under the Project includes a traffic control center, toll revenue management centers, toll system, communications system, traffic surveillance system, overloaded vehicle checking system, tunnel ventilation and safety, emergency service facilities, and so on.

Item	Recommendation	Comment
<b>Toll Payment Monitoring</b>		
Fixed location	Vehicles not paying appropriate toll photographed	Fine or penalty options to be determined.
<b>Incident Management System</b>		
At high-risk locations, such as large tunnels	To interface with the general ITS	
Source: TA consultants estimates.		

## B. Asset Management

2. Asset management must be developed to ensure the sustainability of the expressway and local road operations. During project implementation, Hunan Provincial Communications Department (HCD) will prepare an asset management development plan, which 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. To facilitate the implementation of the plan, consultants will be hired to formulate an action plan comprising immediate, short-term, and medium-term measures (Table A8.2). HCD will assign the Hunan Communications College to develop a training program to enhance the skills of provincial and local government staff to ensure sustainability of the operation of the expressway and local roads.

**Table A8.2: Asset Management Development Action Plan**

Item	Recommended Measures
<b>1. Immediate (upon company formation)</b>	<p>To commit to introducing an asset management system that will achieve asset management outcomes equal to world best practice.</p> <p>To develop an organizational structure that recognizes the importance of high-quality asset management practices and skill levels.</p> <p>To introduce ongoing staff training program(s) in asset management. To assist in this, an amount has been included in the provisions for maintenance equipment and services to be procured under the Project to obtain suitable training aids.</p> <p>To procure (or develop), in conjunction with other expressway companies, an appropriate asset management database and asset management system (software and hardware) capable of recording key data, comparing asset conditions with asset trigger points, and providing high-quality information for effective management of maintenance activities.</p> <p>To define the expressway in terms of asset classes and asset types for data analysis and reporting purposes.</p>
<b>2. Short Term (before project completion)</b>	<p>To develop and introduce a systematic and dynamic asset monitoring regime, consistent with the data storage capability of the asset database and management information needs, taking into account national requirements and standards.</p> <p>To seek relaxation of or exemption from the restriction on employing contractors with less than 5 years' experience.</p> <p>To seek relaxation of or exemption from the technical specifications of maintenance for highways, subject to the company having in place an appropriate asset management system.</p>
<b>3. Medium Term (within 2–3 years of project completion)</b>	<p>To incorporate preventative maintenance plans within the overall asset management system.</p> <p>To use an optimum maintenance regime, rather than the current formula method, for the project company's maintenance budget.</p> <p>To share data with other expressway companies and organizations responsible for highway and road maintenance to further improve maintenance practices.</p>

Source: TA consultants estimates.



## PUBLIC CONSULTATIONS

Location	Date	Participants	No. of Participants	Purpose(s)	Main Issues Discussed/Concerns
Jishou and Huayuan	Nov. 2004	Representatives of local residents, schools and cultural units, and government agencies	101	Environmental impact assessment survey	<ul style="list-style-type: none"> <li>Attitude of the public to project construction</li> <li>Concerns about land acquisition and resettlement and compensation</li> <li>Concerns of the public about the environmental impacts of the Project</li> </ul>
Jishou	20 Nov. 2004	Consultants, county government and its sector agencies, including the poverty reduction office, minority affairs bureau, transport bureau, tourism bureau, highway bureau, public health bureau, planning bureau, women's federation, and traffic police	20	<ul style="list-style-type: none"> <li>Introduction of the Asian Development Bank (ADB) Project and its objectives</li> <li>Understanding of the development programs, including poverty reduction, women and development, local road planning, and HIV/AIDS prevention</li> <li>Understanding of public transport services</li> </ul>	<ul style="list-style-type: none"> <li>Role of the expressway in promoting local development</li> <li>Roadside stations</li> </ul>
Jishou	21 Nov. 2004	Visitors to central bus terminals	15		
Huayuan	23 Nov. 2004		15		
Guzhang	5 Jan. 2004	Consultants and county government and its sector agencies, including the poverty reduction office, transport bureau, planning bureau, and statistics bureaus	15	<ul style="list-style-type: none"> <li>Introduction of the ADB Project and its objectives</li> <li>Understanding the overall situation and the development programs of the project counties</li> <li>Understanding of local road situations</li> </ul>	<ul style="list-style-type: none"> <li>Role of the expressway and local roads</li> <li>Roadside businesses</li> </ul>
Baojing	6 Jan. 2004		15		
Fenghuang	7 Jan. 2004	Travelers along the local roads Visitors to one township in each county	10		
Jishou, Fenghuang, Baojing, Guzhang, and Huayuan	26 Dec. 2004–14 Jan. 2005	60 villages (531 households)	2,124	Community and household survey	Impacts of the project
Jishou, Huayuan	Jan.–Mar. 2005	39 village surveys 400 household surveys	120 800	Socioeconomic survey for resettlement planning	Economic conditions of those affected
Jishou, Huayuan	Mar. 2005	10 villages	100	Consultative meetings for village rehabilitation plans	Compensation and income restoration measures
Jishou, Huayuan	20–23 Mar. 2005	Prefecture government and its sector agencies County government Village meeting	70	Explanation of the ADB Project's resettlement	<ul style="list-style-type: none"> <li>Process and timing of resettlement</li> <li>Needs assessment</li> </ul>
Jishou, Huayuan	22–23 Apr. 2005	Prefecture government and its sector agencies Village meeting	60	<ul style="list-style-type: none"> <li>Discussion on feedback</li> <li>Impact of resettlement</li> </ul>	Local road maintenance and financing plan
<b>Total</b>		60 villages, 1 city, and 4 counties	3,465		

Sources: Hunan Provincial Communications Department and TA consultants estimates.

**COST ESTIMATES**  
(\$ million)

Item	Foreign Cost	Local Cost	Total Cost	ADB Financing
<b>A. Base Cost<sup>a</sup></b>				
1. Expressway Civil Works	207.44	118.06	325.50	156.24
a. Subgrade	16.32	16.45	32.77	12.29
b. Pavement	11.17	5.76	16.93	8.41
c. Bridge	133.90	50.03	183.93	100.85
(Suspension Bridge)	(67.23)	(2.57)	(69.8)	(50.63)
d. Interchanges	7.43	9.76	17.19	5.59
e. Tunnels	29.02	14.20	43.22	21.86
f. Others	9.60	21.86	31.46	7.23
2. Expressway Equipment	7.64	10.07	17.71	7.64
a. Equipment	7.64	0.00	7.64	7.64
b. Traffic Engineering	0.00	6.05	6.05	0.00
c. Ancillary Facility	0.00	4.02	4.02	0.00
3. Local Roads	12.41	8.28	20.69	8.00
4. Land Acquisition and Resettlement	0.00	31.96	31.96	0.00
5. Consulting Services and Training	1.51	4.78	6.29	1.51
a. Supervision and Domestic Training	1.13	4.78	5.91	1.13
b. International Training	0.38	0.00	0.38	0.38
6. Project Administration	0.37	20.95	21.32	0.00
a. Design	0.00	18.54	18.54	0.00
b. Supervision Station	0.00	0.74	0.74	0.00
c. Other Administration	0.37	1.68	2.04	0.00
7. Taxes and Duties	0.00	9.88	9.88	0.00
<b>Subtotal (A)</b>	<b>229.37</b>	<b>203.98</b>	<b>433.35</b>	<b>173.39</b>
<b>B. Contingencies</b>				
1. Physical Contingencies <sup>b</sup>	12.45	12.36	24.80	12.45
2. Price Contingencies <sup>c</sup>	0.00	20.04	20.04	0.00
<b>Subtotal (B)</b>	<b>12.45</b>	<b>32.39</b>	<b>44.84</b>	<b>12.45</b>
<b>C. Interest During Construction</b>	<b>22.16</b>	<b>19.16</b>	<b>41.32</b>	<b>22.16</b>
<b>Total (A+B+C)</b>	<b>263.98</b>	<b>255.53</b>	<b>519.51</b>	<b>208.00</b>

ADB = Asian Development Bank.

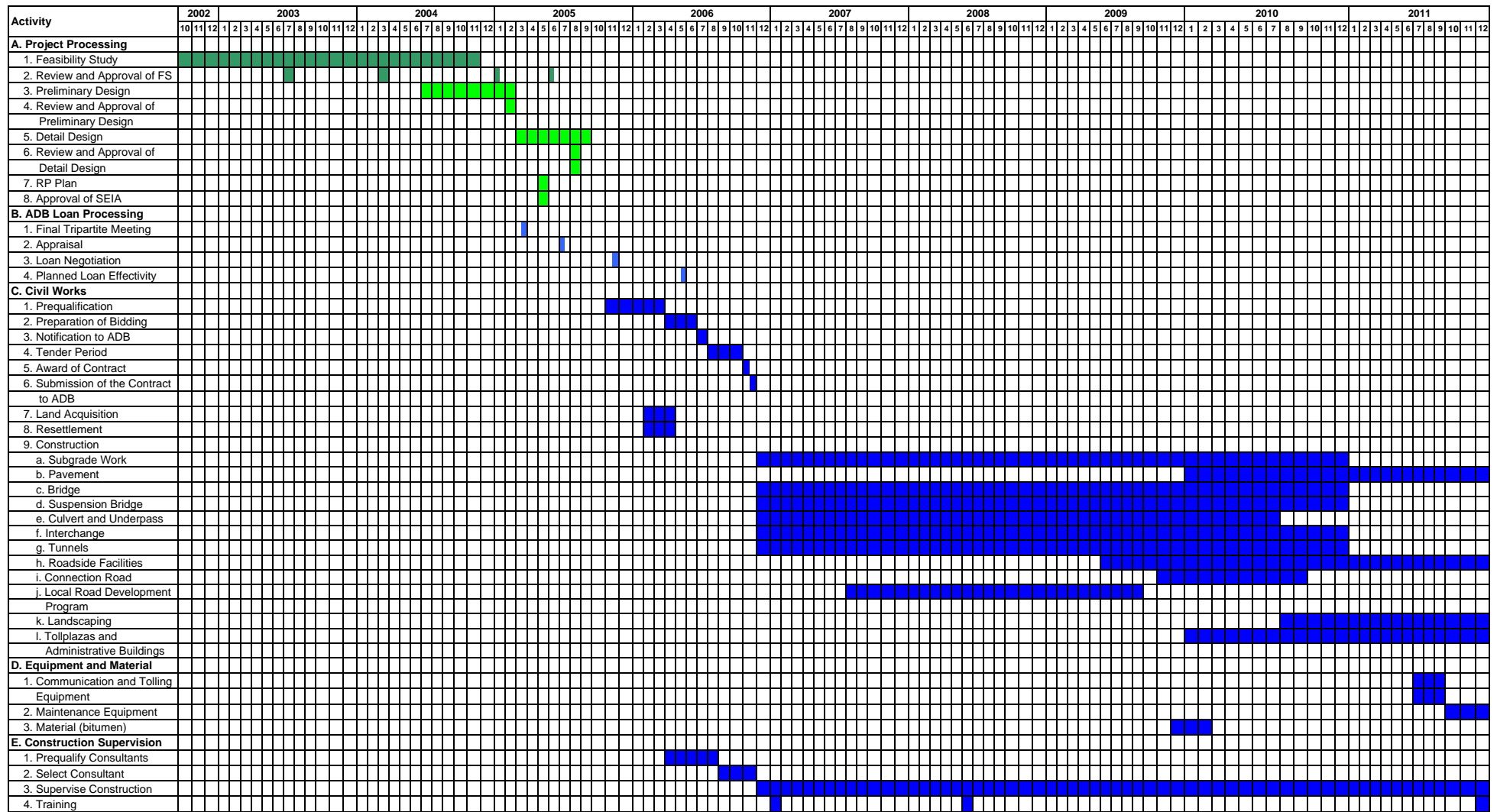
<sup>a</sup> Environmental protection costs are included as follows: under civil works, \$4.7 million; under equipment, \$0.2million; and under training, \$0.7 million.

<sup>b</sup> Physical contingencies are computed at 7.0%.

<sup>c</sup> Price escalation is computed as zero for foreign exchange and 13% per year for local currency.

Source: Asian Development Bank estimates.

# IMPLEMENTATION SCHEDULE



ADB = Asian Development Bank, FS = financial statement, RP = resettlement plan, SEIA = summary environmental impact assessment.  
Source: Asian Development Bank estimates.

## CONTRACT PACKAGES

No.	Start	End	Length (km)	Estimated Cost		Procurement Mode
				CNY (million)	\$ (million)	
A. Earthwork						
1.	C1	K0+000-K3+300	3.3	129	15.6	ICB
2.	C2	K3+300-K5+100	1.8	117	14.2	ICB
3.	C3	K5+100-K7+950	2.9	138	16.7	ICB
4.	C4	K7+950-K10+595	2.6	111	13.4	ICB
5.	C5	K10+595-K14+044	3.4	136	16.5	ICB
6.	C6	K14+044-K15+210	Installation	270	32.6	ICB
7.	C7		Manufacture	296	35.8	ICB
8.	C8	K15+210-K18+650	3.5	126	15.2	ICB
9.	C9	K18+650-K21+620	3.0	121	14.6	ICB
10.	C10	K21+620-K24+600	3.0	103	12.5	ICB
11.	C11	K24+600-K29+800	5.2	113	13.7	ICB
12.	C12	K29+800-K33+400	3.6	123	14.9	ICB
13.	C13	K33+400-K37+800	4.9	131	15.8	ICB
14.	C14	K37+800-K44+400	6.6	120	14.5	ICB
15.	C15	K44+400-K47+400	3.0	115	13.9	ICB
16.	C16	K47+400-K52+050	4.7	100	12.1	ICB
17.	C17	K52+050-K58+930	5.1	127	15.4	ICB
18.	C18	K58+930-K65+363.602	6.6	131	15.8	ICB
Subtotal (A)				2,507.5	303.2	
B. Pavement						
1.	P1	K0+000-K37+80	38.2	100	12.1	ICB
2.	P2	K37+800-K65+363.602	26.0	84	10.2	ICB
Subtotal (B)				184	22.3	
C. Equipment						
1.	E1	Traffic Control, ITS and othres		30	3.6	ICB
2.	E2	Tunnel Venturation and other		34	4.1	ICB
3.	E3	Highway Management Equipments		2	0.2	IS
Subtotal (C)				62	7.6	
D. Traffic Engineering						
1.	T1	Signs and Marks		10	1.2	LCB
2.	T2	Guardrail and Antidizzling Board		27	3.2	LCB
3.	T3	Ducting and Cable		13	1.6	LCB
Subtotal (D)				50	6.0	
E. Ancillary Facilities						
A1				33	4.0	LCB
Subtotal (E)				33	4.0	
F. Local Roads				171	20.7	LCB
Total				3,539	363.9	

ICB = international competitive bidding, IS = international shopping, km = kilometer, LCB = local competitive bidding.

Source: Asian Development Bank estimates.

## 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 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 nonfarm job opportunities and the potential for increased wages. Better roads reduce transaction time and costs, thereby spurring commercial activities. In turn, higher incomes boost local people's demand for transport and the movement of local goods and services. These are the benefits that trickle down to local people over time. Even the rural poor who rarely use roads 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. Based on the findings of an ADB technical assistance, a standard monitoring framework and a set of monitoring indicators were designed to measure the actual benefits definitely (Table A13.1). These indicators were chosen in a way to assess the hypothesized flow of project benefits (paras. 1–2).

**Table A13.1: Monitoring Framework: Indicators and Mechanism**

Timing of Benefits or Outcomes	Monitoring Indicators	Monitoring Mechanism
<b>A. Immediately Upon Project Completion</b>		
Reduced travel time	Travel time to county center	Village survey
<b>B. Short-Term (within 1–3 years)</b>		
1. Lower transport costs	Increased traffic volumes along the corridor	Local statistics
	Bus and freight fares	Village survey
2. Improved transport services	Villages with bus services	Village survey
	Bus frequency to villages	Village survey
3. Changes in producer prices	Fertilizer prices	Household survey
4. Increased economic activities	Vehicle ownership	Village survey
	Transport expenses	Household survey
	Frequency of visits to markets	Household survey
	Increased trade in the region	Local statistics
5. Increased access to social services	Travel time to the nearest school and clinic	Village survey
	school dropout rates (boys, girls)	Village survey
	Frequency of visits by doctors	Village survey
<b>C. Medium-Term (within 3–5 years)</b>		
1. Developed nonfarm sector	Income from nonfarm sector	Household survey
	Number of small business enterprises	Village survey
	Income from tourism (restaurants, etc.)	Household survey
	Number of tourists in the area	County statistics
2. Increased agricultural extension services	Cash crops (percentage of total crops)	Household survey
	Frequency of visits by agricultural technicians	Village survey
3. Increased rural incomes	Number of new or renovated houses	Village survey
	Rural income	Statistics/village survey
4. Reduced poverty incidence	Poverty rate	Village level

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

4. Monitoring will focus on a few representative communities in the project area, a useful exercise in accumulating knowledge on how benefits flow to local people. Because this pilot approach will greatly narrow down the scope of monitoring, local authorities are expected to undertake adequate monitoring more readily. During project preparation, three villages in three townships in Huayuan county were selected as the pilot sites: Shaping village (Malichang township), Jisi village (Jiwei township), and Nongke village (Daheping).

### C. Implementation of Monitoring

5. The Hunan Provincial Communications Department (HCD) concurred with the monitoring framework and the set of indicators for monitoring the Project's performance. During project preparation, the baseline values for the indicators were specified to the extent available (Table A13.2) and will be further updated by HCD, where necessary. HCD and local governments have ensured that monitoring in the selected communities will be adequate. HCD will measure the indicators for project evaluation on project inception, completion, and biennially for 5 years after completion. HCD will hire an independent, qualified institute for 24 person-months for surveys, analysis, and reporting. The preliminary estimate for the cost of monitoring is \$120,000. Reports summarizing the key findings of monitoring will be submitted to the Asian Development Bank.

**Table A13.2: Baseline Data of the Monitoring Indicators**

Baseline Data/Indicators	Malichang Township			Jiwei Township			Daheping Township		
	TS	Shaping	HH	TS	Jisi	HH	TS	Nongke	HH
Distance to township center		2			1.5			0.5	
Increased traffic volumes along the corridor									
Bus and freight fares									
Villages with bus services (%)	39			40			10		
Bus frequency to county center (buses/day)	many			4			6		
Fertilizer input (%)			14.1			8.1			18.6
Vehicle ownership (vehicles/1,000 people)	11.7	8.3		4.3	6.7		10.9	18.5	
Transport expenses (%)			6.6			4.6			4.7
Frequency of visits to county markets									
Frequency of visits to township markets <sup>a</sup>		3			5			5	
Dropout rates from middle school (boys, girls)									
Frequency of visits by doctors (number per 6 months)									
Income from nonfarm sector (%)			32			9			72
Number of nonfarm enterprises									
Income from tourism (restaur'ts, etc.)									
Number of tourists									
Cash crops									
Orchards (mu/person)	0.1		0.39	0.13	0.64	0.58	1.07	0.71	0.58
Vegetables (percentage of arable area)	14.5			14.7			34		
Frequency of visits by agricultural technicians (no. per 6 months)		2			4			11	
No. of new or renovated houses (%)		6.2			6.1			6.9	
Rural income (CNY) per year	1,279	1,124		1,266	1,290		1,213	1,140	
Poverty rate (%)	34.1	36		40.1	34		44.1	24	

HH = household, No. = number, restaur'ts = restaurants, TS = township.

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

Sources: Asian Development Bank estimates; and ADB. 2004. *Technical Assistance to the People's Republic of China for Preparing the Hunan Roads Development III Project*. Manila.

## TRAFFIC FORECASTS

1. The 64-kilometer (km) expressway is a section of the Changsha-Chongqing corridor, one the eight high-priority western corridors in the 10th Five-Year Plan. It connects cities of Jishou and Chadong in west Hunan with Changsha (capital of Hunan) to the east, Hubei to the north, Chongqing Municipality and Sichuan to the north-west and Guizhou to the west. With the completion of this Project, the Changsha-Chongqing corridor will become a major artery for the regional transport network, connecting with national and provincial roads. The project expressway will be built in parallel to national road (NR319), a combination of class II, III, IV roads. NR 319 has pavement in poor condition over roughly 60% of its length with steep slopes and sharp turns, and suffers from frequent flooding and intrusions by nonmotorized traffic. Congestion along NR 319 is a daily phenomenon due to booming mining and agricultural processing industries. Two local roads are the 86 km Xiatou section in Huayaun county and the 43 km Qianxi section in Baojing county. The Xiatuo section, a major north-south road in rural areas with heavy traffic and commercial activities, will connect an interchange of the project expressway. The Qianxi section, through NR 209, provides a short-cut from the mining and industrial areas in Baojing and Huayuan counties to a railway station in Guzhang county.

2. Traffic count surveys were undertaken in December 2004 during the TA for both the expressway and local roads components to refine the origin-destination (O-D) surveys carried out in 2002 under the feasibility study. Forty eight-hour classified traffic counts were done at key locations along the NR319 and the two local roads. Forecast passenger and freight vehicle O-D matrices for several years were developed from the 2004 base year matrices by applying projections of gross domestic product (GDP) and estimated elasticities of transport demand with respect to GDP growth. In the first few years, trips are predicted to grow at around 9%.

3. Based on forecast economic growth in the project area as well as historical trends in traffic growth, the traffic projections were developed which also take account of potential generated and diverted traffic as a result of: (i) the additional traffic generated by the Project through enhanced development opportunities; (ii) traffic diverted from the rail network in the project area; and (iii) potential diversion of traffic as a result of tolling of the expressway. A proportion of diverted traffic from railway was assumed at 1% for passenger and 2% for freight.

4. The Project will increase the corridor's capacity to meet the demand for transport and will reduce transport costs, travel times, and accident rates. It will provide employment opportunities both during the construction period and thereafter and will be a conduit for increased economic growth and improved incomes. The local roads component will help ensure that these benefits reach the poorest communities. Traffic on the expressway is forecast to grow from 6,000 to 12,650 average annual daily traffic in 2010, when the expressway will open, to 11,500 to 14,000 in 2019 and 17,000 to 21,350 by 2029. On the project local roads, traffic is forecast to grow from between 1,600 and 2,000 average annual daily traffic in 2010 to 2,500 to 3,000 in 2019 and 3,900 to 4,200 in 2029 (Table A14).

**Table A14: Traffic Forecast, Average Annual Daily Traffic, Selected Years**

Year	Expressway	NR319	Local Road 1	Local Road 2
2009	6,000	2,392	1,970	1,603
2014	8,527	2,643	2,305	1,875
2019	12,645	2,904	2,941	2,509
2024	16,743	3,547	3,578	3,203
2029	21,345	4,317	4,148	3,896

Sources: Feasibility Study and TA consultants estimates.

## ECONOMIC ANALYSIS

1. The proposed project comprises a 64-kilometer (km), access controlled expressway between Jishou and Chadong and the upgrading of two local roads. The two local roads are key local roads that connect villages with village roads, many of which have already been upgraded. The Xiatuo section, an 86 km south–north route running from Fenghuang county to Huayuan county, will be linked directly with the project expressway. The other one, the Qianxi section, a 43 km east-west route, will provide a shorter route from the mining and industrial areas in Huayuan and Baojing to the railway station in Guzhang. The Project is located in Xiangxi Autonomous Prefecture, which has a population of 2.6 million. The Zhiliu railway traverses five of the prefecture's counties and Jishou city, an important goods collection and distribution center. The prefecture is rich in water resources, mineral deposits, coal reserves, fertile soil, and tourism potential. Reserves of barium, manganese, coal, limestone, gypsum, and dolomite stimulate the development of ancillary industries. There are also significant prospects for the development of food processing, herbal medicine manufacturing, and mushroom production.

2. The Project will be implemented over 4 years. The economic analysis covers the following 20 years of full operation. The economic internal rate of return (EIRR) of the project expressway was estimated by comparing the project case with a base case involving the continued use and maintenance of the existing road, NR319. Without the Project, congestion levels would increase, causing delays and increasing vehicle operating costs (VOCs), and accident rates would rise. The Project, with its reduced travel distance and travel time, safer design, and better road conditions, will reduce VOCs and accident risks along the corridor.

3. Economic evaluation was undertaken using 2005 prices. The prices were expressed in yuan using the domestic price numeraire with a shadow exchange rate factor of 1.01 for foreign exchange effects. A shadow price was used to put an economic value on the wages paid to unskilled labor, but not on the wages paid to skilled labor, because no skilled worker surplus exists. A shadow wage rate factor of 0.67 was used to convert the financial wage rate to an economic opportunity cost of labor. The economic costs include (i) the capital cost, including physical contingencies, land acquisition and resettlement, and environmental mitigation costs; and (ii) the costs of operating and maintaining the expressway, including the costs of replacing depreciated equipment. The land acquisition and resettlement costs were based on their opportunity costs, that is, the agricultural output forgone and the re-siting of displaced activities.<sup>1</sup>

4. The economic benefits include (i) savings in VOCs resulting from the reduced travel distance and improved road conditions, (ii) savings in the value of passengers' time and of freight tied up in transit, (iii) savings resulting from fewer accidents, and (iv) value-added of tourism in the project area that is attributable to the Project. The last item was measured as the benefits generated from the development of tourism by comparing the with project situation to the without project situation. Reduced VOCs are the main source of economic benefits for the Project. The expressway shortens the route by about 30 km. Traffic using the expressway would enjoy higher speeds on a smoother road with better vertical and horizontal alignment, less congestion, and a shorter journey distance. Traffic remaining on the alternative NR319 route would also benefit from a reduction in traffic volume and congestion. All these changes affect vehicle speeds and VOCs, which were estimated for all types of vehicles likely to use the corridor. For savings in VOCs, estimates were assessed for both motorized transport and informal means of motorized transport (such as motorcycles, tractors, and 3-wheel vehicles). Savings in travel time will occur both on the project expressway and existing roads. Work-

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<sup>1</sup> The economic opportunity costs of land were assumed to be equivalent to the replacement value of farmland, which was calculated for land compensation. No additional opportunity cost for land was assumed, because all the land is in rural areas.



related travel time was evaluated for private vehicles and buses. The economic cost of accidents was estimated in terms of direct property damage and forgone income. The EIRR for the expressway component is estimated at 17.7%, indicating that the Project is economically viable, with a net present value of CNY1.7 billion.

5. The costs of the local component include capital costs and operation and maintenance costs. The economic benefits include (i) savings in VOCs resulting from the reduced travel distance and improved road conditions, (ii) savings in the value of passengers' time and of freight tied up in transit, (iii) savings resulting from fewer accidents, and (iv) value-added of tourism that is attributable to the Project. Transport cost savings will accrue to traffic on the improved roads through VOCs. The two local roads have a combined EIRR of 21.0% per year, with a net present value of CNY140 million.

6. Based on the combined economic cash flows during 2011–2030, the Project as a whole generates an EIRR of 19.1% with a net present value of CNY2.2 billion, indicating that it is economically viable. The savings in VOCs from the expressway top the list of benefits, accounting for 82%, followed by accident cost savings (9%). The benefits of the local roads, while important to the villages concerned, account for 7.6% of the total benefits (Table A15.1).

7. The results of sensitivity analysis confirm the robustness of the Project's economic viability: changes in the key variables—construction costs, benefits, and a 1-year delay in project completion—do not significantly affect its economic viability. The sensitivity analysis indicates that even with a 30% increase in project costs, the EIRR remains comfortable at 15.6%. When benefits decrease by 20%, costs increase by 20% in parallel with a 1-year delay, the EIRR falls near to the cutoff rate of 12% (Table A15.2).

**Table A15.1: Economic Internal Rate of Return, 2007–2030**  
(constant 2005 economic prices, domestic price numeraire, CNY million)

Year	Cost					Benefits						Net Benefits
	Civil Works	Other <sup>a</sup>	O&M	Local Roads	Total Costs	VOC Savings	Time Savings	Accident Savings	Other	Local Roads	Total Benefits	
2007	652.8	409.8		40.4	1,102.9					0.0	0.0	-1,102.9
2008	783.3	151.0		54.2	988.6					0.0	0.0	-988.6
2009	783.3	155.6		54.2	993.2					0.0	0.0	-993.2
2010	391.7	0.8		12.6	405.1					0.0	0.0	-405.1
2011			8.3	0.8	9.1	563.3	39.5	64.8	15.2	28.3	711.1	702.0
2012			8.4	0.8	9.1	597.2	41.9	68.7	16.7	41.9	766.3	757.1
2013			8.5	0.8	9.2	632.9	44.4	72.8	18.3	40.6	809.1	799.8
2014			8.5	0.8	9.3	670.9	47.0	77.2	20.2	46.5	861.8	852.5
2015			8.6	0.8	9.4	711.2	49.9	81.8	22.2	49.0	914.1	904.6
2016			8.7	0.8	9.5	753.9	52.9	86.7	24.4	52.2	970.1	960.6
2017			8.8	0.8	9.6	799.1	56.0	91.9	26.8	55.6	1,029.5	1,019.9
2018			31.9	0.8	32.7	847.0	59.4	97.4	29.5	59.3	1,092.7	1,060.0
2019			9.0	0.8	9.8	891.1	62.5	102.5	32.5	63.2	1,151.8	1,142.0
2020			9.1	0.8	10.0	937.4	65.7	107.8	35.7	67.5	1,214.1	1,204.2
2021			9.3	0.8	10.2	986.2	69.1	113.5	39.3	71.4	1,279.5	1,269.3
2022			9.5	0.9	10.3	1,037.4	72.7	119.4	43.2	75.6	1,348.4	1,338.0
2023			9.7	0.9	10.5	1,091.4	76.5	125.6	47.6	80.1	1,421.1	1,410.6
2024			9.9	0.9	10.7	1,148.1	80.5	132.1	52.3	84.9	1,497.9	1,487.1
2025			10.0	0.9	10.9	1,207.8	84.7	139.0	57.5	90.0	1,579.0	1,568.0
2026			35.1	0.9	35.9	1,270.6	89.1	146.2	63.3	94.8	1,664.0	1,628.1
2027			10.2	0.9	11.1	1,336.7	93.7	153.8	69.6	100.0	1,753.9	1,742.7
2028			10.4	0.9	11.3	1,479.3	103.7	170.2	76.6	105.6	1,935.4	1,924.1
2029			10.6	0.9	11.6	1,479.3	103.7	170.2	84.2	111.6	1,949.1	1,937.5
2030			10.8	0.9	11.7	1,137.6	79.8	130.9	92.7	118.0	1,558.8	1,547.1
<b>Net present value = 2,225 EIRR = 19.1</b>												

O&M = operation and maintenance, VOC = vehicle operating cost.

<sup>a</sup> Land acquisition and resettlement costs, environmental mitigation costs.

Source: Asian Development Bank estimates.

**Table A15.2: Sensitivity to Changes in Economic Benefits and Costs**

Scenario	EIRR (%)	NPV (CNY million)	Switching Value (%) <sup>a</sup>
1. Base case	19.14	2,225	
2. Benefits reduced by 20%	16.12	1,189	12.6
3. Benefits reduced by 30%	14.49	688	-
4. Costs up 20%	16.64	1,627	29.2
5. Costs up 30%	15.64	1,345	17.9
6. Traffic reduced by 20%	16.37	1,272	
6. Traffic reduced by 30%	14.90	812	11.5
7. Implementation delay of 1 year	16.82	1,563	NPV declines by 21%
8. Costs up 20%, implementation delay of 1 year	14.75	998	NPV declines by 46%
9. Benefits reduced by 20%, costs up 20%, implementation delay of 1 year	12.36	122	NPV declines by 95%

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

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

Source: Asian Development Bank estimates.

## FINANCIAL PERFORMANCE AND PROJECTIONS OF THE PROJECT EXPRESSWAY

1. The Projected financial statements of the proposed Project were prepared in current terms for 2007-2030 in accordance with the Asian Development Bank's (ADB's) *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB*. Construction will be completed in December 2010 and the first year of full operation will be 2011. The local inflation rates were assumed at 3% during the projection period. The domestic cost escalation factor for the People's Republic of China is 3%. The price escalation for foreign exchange was assumed to be zero. The cost estimates are presented in current terms taking into account the potential impacts of domestic and international inflation.

2. Operating revenues from tolls were projected based on forecast of future traffic and a base toll rate of CNY 0.35 per passenger car per kilometer (km). Corresponding tolls for other vehicle types are CNY 0.40 for a light truck; CNY 0.70 for a small bus or medium-sized truck; CNY 1.00 for a large bus or truck; and CNY 1.30 for an articulated truck or a trailer.<sup>1</sup> The toll charges are assumed to increase in current terms once every 5 years to keep up with inflation. Given the complexity of the civil works, the capital cost of the Project is much higher than for other expressway projects.<sup>2</sup> As such, a toll of CNY5 will be charged for use of the suspension bridge.

3. Annual incremental operation and maintenance costs were calculated based on 2005 prices as follows: (i) toll operation costs were estimated at 150 staff with annual salary costs of CNY 25,000 per employee; (ii) administration costs were assumed to be CNY3.75 million per year, with an annual increase of 3%; and (iii) maintenance costs were estimated at CNY40,000 per km per year for routine work and CNY1.0 million per km for periodic work. Period maintenance was scheduled for 2018 and 2026. Applicable business taxes at a rate of 5.5% are charged on revenue. Corporate income tax at 15% is paid on income after deducting business taxes, depreciation and interest charges, operating expenses, and any prior year losses carried forward.

4. An ADB loan, a loan from State Development Bank, and grants from the Ministry of Communications and the Hunan Provincial Government are expected to cover project financing. The ADB loan amounts to \$208 million, with standard ordinary capital resources terms of a 25-year utilization period and a 5-year grace period. The grants from the Ministry of Communications and the Hunan Provincial Government amount to 30% of project costs, which will be viewed as project equity. The State Development Bank will provide CNY1,300 million, with a 25-year repayment period at an interest rate of 5.51%. An estimated 5% of passenger cars were considered to be exempt from paying tolls.

5. Projected financial statements are presented in Table A16. The projected financial statements indicate that the revenues are adequate to cover operation and maintenance costs; however, net income is negative in the first 5 years of operation because of high depreciation costs and high interest payments. The cash flow projections show a positive cash flow throughout the project period. The financial projections indicate that operational efficiency is satisfactory and the debt-service coverage ratio of more than 1.2 is achievable from the fifth year of operation. The debt-to-equity ratio will be less than 65:35 for the first year and will gradually improve thereafter.

<sup>1</sup> The assumed toll rates are consistent both with trends of Hunan practice and tolls on the existing expressways.

<sup>2</sup> The per km cost for the project expressway is \$6.1 million, much higher than the \$2.4 million for projects in flat areas, or even the \$5.1 million for projects in mountainous area, mainly because of the complexity of the civil works. Of the 64 km expressway, tunnels, large bridges, and a suspension bridge account for 30 km: 13 tunnels (10.5 km), 36 extra large and large bridges (18 km), and a suspension bridge (1.16 km). Without the suspension bridge, the per km cost is \$4.8 million, roughly equal to the average cost in mountainous areas.

**Table A16: Projected Financial Statements for the Jishou–Chadong Expressway, Selected Years**  
(current CNY million)

Item	1 2007	2 2008	3 2009	4 2010	5 2011	6 2012	7 2013	8 2014	9 2015	10 2016	15 2021	20 2026	24 2030
<b>Income Statement</b>													
Operating Revenues													
Toll Revenues					200	238	252	267	294	311	481	722	1,010
<b>Total Revenues</b>					<b>210</b>	<b>262</b>	<b>277</b>	<b>293</b>	<b>323</b>	<b>342</b>	<b>529</b>	<b>795</b>	<b>1,111</b>
Net Revenue after business tax					203	254	262	277	306	323	500	751	1,050
Operation and maintenance													
Depreciation					425	383	345	311	281	253	157	86	57
Total Operating Expenses					435	395	358	324	295	268	176	111	88
<b>Net Operating Income</b>					<b>(232)</b>	<b>(141)</b>	<b>(96)</b>	<b>(47)</b>	<b>11</b>	<b>55</b>	<b>324</b>	<b>640</b>	<b>962</b>
Less: Interest Expenses					162	161	157	152	148	143	115	78	42
<b>Net Income After Corporative Tax</b>					<b>(395)</b>	<b>(302)</b>	<b>(252)</b>	<b>(200)</b>	<b>(137)</b>	<b>(88)</b>	<b>141</b>	<b>376</b>	<b>617</b>
<b>Operating Profit Ratio</b>					<b>(111%)</b>	<b>(54%)</b>	<b>-34%</b>	<b>(16%)</b>	<b>3%</b>	<b>16%</b>	<b>48%</b>	<b>57%</b>	<b>59%</b>
<b>Cash Flow Statement</b>													
Net Cash Inflows from Operations					28	80	93	111	143	165	297	462	673
Asian Development Bank Loan	430	516	516	258									
Ministry of Communications Grant	221	265	265	132									
Domestic Bank Loan	354	425	425	212									
Hunan Provincial Government	202	242	242	121									
Subtotal Cash Inflow	1,206	1,448	1,448	782	28	80	93	111	143	165	297	462	673
Construction Costs	1,206	1,448	1,448	724								117	
Principle Repayment					28	82	86	90	95	100	128	165	
Subtotal Cash Outflows	1,206	1,448	1,448	724	28	82	86	90	95	100	128	281	201
Net Cash Flows					0	(2)	7	21	47	65	169	180	471
<b>Debt-Service Coverage Ratio</b>					<b>1.80</b>	<b>1.00</b>	<b>1.03</b>	<b>1.09</b>	<b>1.20</b>	<b>1.27</b>	<b>1.70</b>	<b>2.23</b>	<b>2.95</b>
<b>Balance Sheet</b>													
Current Assets					63	62	69	90	139	205	871	2076	3826
Accumulated Fixed Assets					4,826	4,971	5,120	5,273	5,431	5,594	6,583	7,632	8,717
Total Assets	1,206	2,654	4,102	4,886	4,464	4,225	4,036	3,900	3,826	3,802	4,478	6,267	8,691
Long-term Loans	784	1,725	2,666	3,137	3,109	3,027	2,941	2,851	2,756	2,656	2,075	1,329	582
<b>Debt-Equity Ratio</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>64</b>	<b>70</b>	<b>72</b>	<b>73</b>	<b>73</b>	<b>72</b>	<b>70</b>	<b>46</b>	<b>21</b>	<b>7</b>

Source: Asian Development Bank estimates.

## FINANCIAL ANALYSIS OF THE PROJECT EXPRESSWAY

1. A financial evaluation has been undertaken in accordance with the Asian Development Bank's (ADB's) *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB*. A financial internal rate of return (FIRR) was calculated based on the Project's capital cost, the most recent traffic forecasts, and the proposed toll rates. Sensitivity tests were conducted by varying the project costs, traffic volumes, and toll rates and combinations of these factors. The financial evaluation was computed over 4 years of construction and 20 years of operations. The calculations are in constant 2005 prices.
2. The local inflation rates were assumed at 3% during the projection period. The domestic cost escalation factor for the People's Republic of China is 3%. The price escalation for foreign exchange was assumed to be zero. The cost estimates are presented in current terms taking into account the potential impacts of domestic and international inflation.
3. Hunan province is applying unified toll rates to all expressways according to the provincial government's policy. The toll rates were developed based on the Hunan Provincial Government's toll road policies, affordability for road users, and neighboring provinces' toll rates. For the purpose of the FIRR calculation, existing toll rates in Hunan have been used and held constant throughout the calculation period. The project capital cost is much higher than for other expressway projects in Hunan province because of the difficult geographic and geological conditions. A special toll of CNY5 per vehicle will be charged for traffic crossing the suspension bridge. Applicable business taxes at a rate of 5.5% are charged on revenue. Corporate income tax at 15% is paid on income after deducting business taxes, depreciation and interest charges, operating expenses, and any prior year losses carried forward.
4. The major assumptions used for calculation of the FIRR are the following: (i) all calculations are made in 2005 prices, covering 2007 to 2030; (ii) capital costs include all incremental capital expenditures related to the construction and equipment for the expressway, but exclude price contingencies and interest during construction; (iii) operating and maintaining costs include all annual incremental expenses incurred in operating the expressway, but exclude depreciation and debt repayment provisions; (iv) operating revenues from toll used in financial projections are also adjusted to 2005 prices; and (v) the residual value of the project capital cost was estimated to be 50% after 20 years of operation.
5. The weighted average cost of capital (WACC), after tax, in real terms was calculated at 2.8%, using estimated capital mix and costs of funds. Costs have been considered as follows: (i) the applicable 10-year fixed swap rate plus a provision for ADB's spread of 0.60% was used for ADB debt; (ii) the estimated interest costs of 5.76% per annum is used for the domestic loan funds; and (iii) the cost of equity was assumed to be 8.00%. The cost of debt was also adjusted to reflect the impact of income of 15%.
6. The FIRR, computed after tax, is calculated at 5.5% (Table A17.1). This compares favorably with the WACC of 2.8%. The Project is considered financially viable and sustainable. Sensitivity tests indicate conditions causing the Project's viability to fall below WACC are unlikely to occur. The results of the sensitivity tests are in Table A17.2.

**Table A17.1: Financial Evaluation of the Project, 2007–2030**  
(CNY million)

Year	Cost			Revenue			Business Tax	Cash Flow Before Tax	Corporate Tax	Cash Flow After Tax	
	Capital	Maintenance	Operation	Total	Toll	Nontoll					Total
2007	895.8			895.8					(895.8)		(895.8)
2008	1075.0			1075.0					(1075.0)		(1075.0)
2009	1075.0			1075.0					(1075.0)		(1075.0)
2010	537.5			537.5				0.0	(537.5)	0.0	(537.5)
2011	0.0	1.3	7.5	8.8	211.1	10.6	221.7	12.2	200.7	0.0	200.7
2012		2.6	7.7	10.3	223.2	22.3	245.5	13.5	221.7	0.0	221.7
2013		2.6	8.0	10.5	236.0	23.6	259.6	14.3	234.7	0.0	234.7
2014		2.6	8.2	10.8	249.5	24.9	274.4	15.1	248.5	0.0	248.5
2015		2.6	8.4	11.0	275.8	27.6	303.4	16.7	275.7	0.0	275.7
2016		2.6	8.7	11.3	291.6	29.2	320.8	17.6	291.8	0.0	291.8
2017		2.6	9.0	11.5	308.3	30.8	339.1	18.7	308.9	0.0	308.9
2018	64.6	2.6	9.2	76.4	325.9	32.6	358.5	19.7	262.4	16.2	246.2
2019		2.6	9.5	12.1	344.5	34.5	379.0	20.8	346.1	35.1	311.0
2020		2.6	9.8	12.4	371.9	37.2	409.0	22.5	374.2	56.3	317.8
2021		2.6	10.1	12.7	389.7	39.0	428.7	23.6	392.5	74.6	317.9
2022		2.6	10.4	13.0	408.5	40.8	449.3	24.7	411.6	117.9	293.7
2023		2.6	10.7	13.3	428.1	42.8	470.9	25.9	431.7	134.6	297.1
2024		2.6	11.0	13.6	448.7	44.9	493.5	27.1	452.8	151.2	301.6
2025		2.6	11.3	13.9	481.6	48.2	529.7	29.1	486.7	173.1	313.5
2026	64.6	2.6	11.7	78.9	504.7	50.5	555.2	30.5	445.8	193.6	252.2
2027		2.6	12.0	14.6	529.0	52.9	581.8	32.0	535.2	252.0	283.2
2028		2.6	12.4	15.0	554.4	55.4	609.8	33.5	561.3	266.7	294.5
2029		2.6	12.8	15.4	581.0	58.1	639.1	35.2	588.6	286.6	302.1
2030	(1856.3)	2.6	13.2	(1840.5)	608.9	60.9	669.8	36.8	2473.5	311.5	2162.0
FIRR before taxes = 7.10%								FIRR after taxes = 5.48%			
WACC = 2.8%											

FIRR = financial internal rate of return, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

**Table A17.2: Sensitivity to Changes in Financial Factors**

Case	FIRR (%)
Base Case	5.48
Capital cost up by 10%	4.87
Capital cost up by 20%	4.35
Capital cost down by 10%	6.19
Revenues decrease by 10%	4.52
Revenues decrease by 20%	3.48
O&M costs increase by 20%	5.44
10% increase in capital costs, 20% increase in O&M costs, 20% decrease in revenues	2.95

FIRR = financial internal rate of return, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

## SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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#### Contribution of the sector or subsector to reduce poverty in the People's Republic of China:

The project expressway from Jishou to Chadong, which will be 30 km shorter, will cut travel time to less than 1 hour. By lowering transport costs and improving the quality of transport services, the Project is expected to spur economic activities and inter-regional trade, thereby helping reduce poverty in the project area. The development of the road network in western Hunan will help transfer the benefits of the eastern region's economic growth to the poor western region. The improvement of local roads has been integrated into the Project to spread the benefits of the expressway over a wider cross-section of poor communities. The integrated approach will improve the rural poor's mobility, and thus their access to economic opportunities, helping to raise their incomes.

### B. Poverty Analysis

**Poverty Classification:** General intervention

#### What type of poverty analysis is needed?

The project area covers one city and four counties, all of which are considered poor by either national or provincial standards. The Project will directly benefit 1.3 million local residents, of which 0.9 million (72%) live in rural areas. The Project 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 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. 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. These are the benefits that trickle down to local people over time. Even the rural poor who rarely use roads also benefit from improved roads through more and cheaper goods and services and increased economic opportunities. These are the Project's indirect effects. Using the adequate monitoring framework and mechanism, actual impacts on poverty will be assessed.

### C. Participation Process

**Is there a stakeholder analysis?** ☒ Yes ☐ No

A stakeholder consultation and analysis was done during project preparation and the roles of all stakeholders were well defined. The Hunan Provincial Communications Department (HCD) is the executing agency. The local governments and communities will implement the Resettlement Plan, and organize local labor to build the expressway. With support from HCD, local governments will upgrade township roads. Public consultation raised the level of awareness and garnered local support. These processes enabled local stakeholders to express their opinions and to make relevant suggestions for the design of the expressway and local roads. Intensive consultations were undertaken with poor rural women and representatives of minority populations. To further consider poor women and minorities, the participatory activities will continue during project implementation.

**Is there a participation strategy?** ☒ Yes ☐ No

The contractors will hire rural villagers including unskilled workers in the project area. Before the alignment was finalized, local government officials and villagers were consulted to minimize losses of high-quality arable land and structures. Township governments and community organizations will be involved in the implementation of the economic rehabilitation component of the Resettlement Plan.

### D. Gender Development

#### Strategy to maximize impacts on women:

Young women account for 39% of total migrants from the surveyed communities. Of all 126 women consulted, 82% were satisfied about their current status, 5% were unsatisfied, and 13% were unclear. Of the minority women consulted, 90% were satisfied with their current status. In general, the project is gender neutral and will not have an

adverse impact on women. Women and children will benefit substantially from the local roads for access to schools, markets, and health care and other social services. As part of the participation strategy, priority will be given to women for direct and indirect project benefits, which are included in the ethnic minorities development plan. Gender disaggregated indicators will be monitored in the project performance management system.

Has an output been prepared? ☐ Yes ☒ No

#### E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The Resettlement Plan has been prepared and will be updated based on a detailed measurement survey. An information booklet was circulated among affected communities and households. The Resettlement Plan was uploaded in the Asian Development Bank web site.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
<b>Affordability</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The socioeconomic survey found that most local people could generally afford the transport services. With improvement of the local roads, more transport services at lower cost will be available to the poor.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Labor</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	During project implementation, civil works contractors will maximize the employment of local poor people who meet the job and efficiency requirements for construction of the project roads. Such workers will be trained on the job. HCD will ensure that civil works contractors comply with all applicable labor legislation. 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.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Indigenous Peoples</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Of the project beneficiaries, 77% are minorities (Miao and Tujia), who live in harmony with the Han. Land acquisition will affect 1,794 minority households (84% of all those affected), and 187 ethnic minority households will be affected by house destruction. Of the minority households affected, 86.0% are Miao and 13.3% are Tujia.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Once local roads are upgraded, the number of traffic accidents will increase. All four counties involved are going to position police teams on the two roads. Few cases of HIV/AIDS were found in the project counties; however, people could be exposed to HIV/AIDS during construction. Therefore in accordance with the Law on the Prevention and Treatment of Epidemic Disease, county centers for disease control will take measures to prevent the spread of HIV/AIDS and other sexually transmitted infections. HCD and the contractors will support the centers in adopting prevention measures for workers and local communities during construction and for transport operators and truck drivers during operation.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No



## SUMMARY ETHNIC MINORITIES DEVELOPMENT PLAN

1. The project area covers one city and four counties, all of which are considered poor by either national or provincial standards. Some 600 of 1,381 villages are poor, and minorities account for almost 100% of the total population of these villages. Members of the Tujia and Miao minorities account for 74% of the total population affected by the Project. Consultations with 126 rural women from 15 villages indicated that 82% of them are satisfied with their current social economic status and only 5% of them are unsatisfied. In the villages surveyed, women are more dominant in household decision making than men, indicating that minority women have a good social position in their families. Temporary in-migration of ethnic minorities is common, especially to work in the mining industry. However, the current citizenship registration system and rural land tenure system do not permit migration to rural areas. Therefore the minority townships will not be affected by in-migration.

2. Surveys identified 1,794 ethnic minority households that will be affected by land acquisition (84% of all those affected). Three of the four interchanges were included to connect the project roads to the rural minority townships. The Project will directly benefit 0.93 million local residents, of which 0.73 million are minorities. Local residents, mostly minorities, have expressed a desire to receive training in appropriate agricultural techniques to take advantage of new cash cropping strategies and to receive support for opening small businesses. The plan to address their needs, while referred to as the Ethnic Minorities Development Plan (EMDP), was prepared to safeguard all those affected in the project area regardless of their ethnic identity. Adequate provisions to enhance the economic conditions of vulnerable groups have been integrated in the Project's design and provisions for special mitigation measures have been included in the Resettlement Plan. To mitigate possible adverse impacts and enhance positive impacts on the minorities, the government will implement measures shown in Table A19.

**Table A19: Mitigation Measures**

Proposed Actions	Targets	Year	Budget (CNY million)	Source
<b>Protection from Disturbances Arising from Construction Activities</b> Prohibiting night construction Building pedestrian crossings, overpasses and underpasses, and culverts Reconstructing damaged irrigation and/or drainage systems	More than 50,000 people More than 50 villages, including 39 villages affected by land acquisition and resettlement	2007–2010	0 30 50	The Project
<b>Awareness and Prevention of HIV/AIDS and Sexually Transmitted Infections</b> Health clinics near construction camps Prevention posters Education programs through media channels and clinics Distribution of condoms	In all construction camps and nearby villages, especially among women and ethnic minorities	2007–2010	0.1 0.1 0.1 0.5	Hunan Provincial Health Department, Hunan Provincial Communications Department (HCD), and local governments
<b>Resettlement</b> Full compensation Special support to vulnerable groups	39 villages	2005– 2006	150 1.84	Resettlement Plan

Proposed Actions	Targets	Year	Budget (CNY million)	Source
<b>Income Recovery for Those Affected by Resettlement</b> Receive support from local governments and village cadres when assistance is requested Priority given to training, adult education, and construction employment opportunities	Those affected by resettlement, especially the 10 seriously affected villages	2005–2007	0 0.2	Resettlement Plan
<b>Road and Traffic Safety</b> Repositioning of the number two police traffic team of Huayuan county from Malichang to Jiwei township Provision of traffic police teams on local roads in all counties Constant patrolling on market days in rural towns Road safety education programs Strict implementation of traffic regulations	Local people residing in communities along NR319 and local roads Drivers on NR319 and local roads	2006 onward	0.1 0.5 0 0.2 0	Provincial and county police traffic teams
<b>Poverty Reduction Interventions</b> Technical training on fruit and animal production Distribution of market information Educational, medical, and water supply facilities in Fenghuang and Baojing Multipurpose complex (market, restaurant, and transport center) in Yaoyou township	Microcredit, at least 20% of which will be targeted to female and ethnic minority borrowers	2006 onward	25.0 1.0 25.0	Local governments Local governments financed by the Japan Bank for International Cooperation Japanese Embassy in the People's Republic of China
<b>Tourism Development</b> Announcement of the opening of local road sections on tourism web sites Construction of tourism infrastructure Promotion of tourism resources	Counties within the project area Tourists and tourism agents	2006 onward	0 1,000 5	Local governments
<b>Farmland Reclamation and Reforestation</b> Land reclamation Reforestation	39 villages	2006–2008	27.03 6.69	Provincial Land Bureau Provincial Forestry Bureau
<b>Improved Transport Services</b> Construction of Jishou bus terminals 40 township bus stations Enhanced competition among service providers	Rural households in the project area of which 85% are minorities and 33% were poor (in 2003)	2006–2010	47.91 30 0	HCD and local governments
<b>Construction of Local Roads</b> Two intercounty roads 400 kilometres of county-township roads	County and township governments and communities along the roads	2006–2010	240 200	The Project HCD and local governments
<b>Employment of Unskilled Minorities for</b> Constructing the expressway Improving 129 kilometers of local roads	Priority given to local labor and vulnerable people. Target of 80% female employment for landscaping work and 75% local labor for unskilled work	2006–2010	Included in civil works contracts	The Project The Project, HCD, and local governments

Source: Hunan Provincial Communications Department estimates.

## SUMMARY RESETTLEMENT PLAN

1. The 64-kilometer (km) project expressway and its 5.9 km connector road will directly affect 39 villages and 10 townships in Jishou city and Huayuan county. The two local roads (43 km and 86 km) will affect four counties. The field survey indicated that the project expressway and connector road will require 351 hectares of land to be permanently acquired, of which is 32% is paddy, 19% is dry land, 3% is planted with vegetables or orchards, 44% is forestland, and 2% consists of other types of land. Based on the amount of per capita farmland in the affected villages, the land acquisition is equivalent to the complete loss of farmland for 3,105 people. About 115 hectares of land will be used temporarily during the construction phase. The number of rural people whose houses will be demolished is 973, with total floor space of their houses amounting to 27,491 square meters. For the local roads, the impact will be small because existing alignments will be upgraded. Land acquisition and resettlement impacts were minimized by aligning the expressway away from densely populated areas and avoiding irrigated land and production facilities based on consultations with local officials and affected people.

2. The Resettlement Plan was prepared by the Hunan Provincial Communications Department (HCD) with the help of technical assistance consultants. The Resettlement Plan was based on the preliminary design and socioeconomic surveys covering 400 households and 39 village-level interviews. The surveys revealed that 84% of the affected households are ethnic minorities, mostly Miao. Consultations were conducted with the affected people and their comments and suggestions were reviewed to ensure that any concerns are addressed. The draft Resettlement Plan has been reviewed by the affected city and counties and by the Asian Development Bank (ADB), and these comments have been incorporated into the Resettlement Plan. After the detailed design approval by HCD, a detailed survey will be carried out to determine the precise number of people and assets affected. Changes and related cost adjustments will be included in an updated Resettlement Plan and submitted to ADB for approval prior to the commencement of compensation and land acquisition.

3. For people unavoidably affected by the Project, the resettlement objective is to ensure the attainment of equal or better livelihoods and living standards in line with the Land Administration Law (1998) and ADB's *Policy on Involuntary Resettlement* (1995) and *Policy on Indigenous peoples* (1998). The Resettlement Plan stipulates eligibility and entitlement provisions for those losing land, houses, and income and provides relocation and economic rehabilitation measures and strategies. HCD will ensure that the resettlement entitlements are provided to the people affected prior to ground clearance and the commencement of demolition. Land compensation and resettlement subsidies will be paid to affected village groups or individuals. Housing compensation and compensation for young crops and other assets will be provided directly to people losing those assets.

4. Sites for relocation should be selected in line with the plans for income restoration and overall township plans. Generally there are three options for selecting sites for residential resettlement: (i) for villages where only several households are involved in house relocation, the new housing sites will be selected in the same village or land-owning group as agreed with the affected households; (ii) if more households have to be relocated, a site suitable for a cluster of houses will be selected keeping farmers' preferences in mind; and (iii) for households that wish to move to towns, both the township government and villages will consider the requests.

5. Proposed income rehabilitation measures are to (i) incorporate the resettlement into local economic development programs, such as production development or irrigation system

improvement and expansion; (ii) facilitate cash crop production, animal husbandry, and fish farming; (iii) establish small businesses based on local resource endowments; and (iv) provide income insurance to households with elderly members. Detailed needs for farmers to enhance their working skills have been analyzed by means of the socioeconomic survey and relevant training has been included in the Resettlement Plan. For vulnerable groups, the Project will provide a special social assistance fund to secure their livelihoods and living conditions.

6. HCD will be responsible for the general administration of the Project. A Project Resettlement Office will be set up to coordinate, monitor, and supervise land acquisition and resettlement. Resettlement organizations will be established at the prefecture, city, and county levels. Each affected township will have a resettlement office. Resettlement and land acquisition costs for the Project are estimated at CNY264 million (\$31.96 million). Some adjustments in the budget are expected following the detailed measurement survey.

7. At various stages, affected people have been consulted about the likely impacts of the Project. The stakeholders consulted include (i) heads of households that will be affected, (ii) village heads and villagers' representatives, (iii) local government agencies and departments, and (iv) women and vulnerable groups. Two public hearings are planned by the Hunan Land and Resources Department, one to adjust the Land Use Plan and a second to fix compensation rates based on the detailed measurement survey. Consultation will continue throughout the implementation period. HCD organized public consultation meetings in the affected villages. Key findings indicated full support for the Project. Some of the concerns raised have been addressed by adjusting the design and improving compensation and resettlement measures and entitlements. Those affected were provided with a resettlement information booklet in June 2005. In the case of grievances, all complaints will be processed based on Government Regulation Number 431 on Grievance and Redress, which came into effect on 1 May 2005.

8. The Resettlement Plan includes internal and external monitoring systems. The Project Resettlement Office and local resettlement offices will be responsible for internal monitoring to ensure the timely and satisfactory implementation of land acquisition and resettlement activities according to the Resettlement Plan. Reporting will be quarterly and a resettlement completion report will be prepared. The reports will be sent to ADB in a timely manner to keep ADB closely informed of progress and any substantive changes.

9. An independent institute or organization will be contracted to carry out the external monitoring and evaluation. The tasks include (i) reviewing and verifying the compensation payments; (ii) ascertaining the status of land acquisition and compensation payments; (iii) assessing the compensation disbursement procedure; (iv) appraising the grievance procedure; (v) determining recipients' satisfaction with the entitlements and compensation; and (vi) assessing the efficiency, effectiveness, impact, and sustainability of the resettlement to draw lessons for future resettlement implementation, formulation, and planning. The external monitoring will be carried out every six months in the first two years and then annually for two years or until resettlement has been successfully completed. The external monitoring and evaluation reports will be sent to HCD and ADB simultaneously.