

ASIAN DEVELOPMENT BANK

RRP: BAN 32223

**REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN
TO THE
PEOPLE'S REPUBLIC OF BANGLADESH
FOR THE
ROAD NETWORK IMPROVEMENT AND MAINTENANCE PROJECT**

September 2002

CURRENCY EQUIVALENTS

(as of 31 August 2002)

Currency Unit	–	taka (Tk)
Tk1.00	=	\$0.02
\$1.00	=	Tk57.85

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
ARMP	–	annual road maintenance plan
BRTA	–	Bangladesh Road Transport Authority
BRTC	–	Bangladesh Road Transport Corporation
CNG	–	compressed natural gas
DFID	–	Department for International Development (UK)
DMC	–	developing member country
DOE	–	Department of Environment
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
GDP	–	gross domestic product
HDM	–	Highway Design and Maintenance Standards Model
IEE	–	initial environmental examination
MOC	–	Ministry of Communication
NGO	–	nongovernment organization
NRSC	–	National Road Safety Council
OPEC Fund	–	Organization of Petroleum-Exporting Countries Fund for International Development
RDSC	–	Road Design and Safety Circle
RHD	–	Roads and Highways Department
SEC	–	Social and Environmental Circle
TA	–	technical assistance
VOC	–	vehicle operating cost

NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2000 ends on 30 June 2000.
- (ii) In this report, “\$” refers to US dollars.

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LOAN AND PROJECT SUMMARY

Borrower	The People's Republic of Bangladesh
Classification	Thematic – Economic Growth Poverty – Poverty Intervention
Environmental Assessment	Category B An initial environmental examination was undertaken, and a summary is provided as an appendix.
Project Description	The Project is to improve regional and feeder roads to strengthen integrated road networks in the northwest and the center-north regions in Bangladesh where the level of poverty incidence is known to be highest. The Project will also improve periodic and routine road maintenance by securing appropriate Government budget for maintenance and by promoting private sector participation in road maintenance.
Rationale	The Asian Development Bank (ADB) has assisted with road sector development in Bangladesh, focusing largely on completion of five strategic road transport corridors. Other major financiers, including the World Bank and bilateral sources, have also focused on strengthening strategic corridors. These coordinated efforts contributed considerably to meeting the growing demand for roads by linking strategic areas in Bangladesh through strategic corridors. With the completion of key strategic road connections, more emphasis should now be given to development of an integrated road network to link the rural poor to economic opportunities. Compared with national and regional roads, type A feeder roads, which are mostly used by rural farmers to access markets or social facilities, have only 60-65 percent pavement ratio. Because of the poor condition of feeder roads, rural farmers' connection to national roads is constrained, and consequently their access to markets or education or health facilities, which are located in commercial centers connected by national roads, is limited. There is need for complementary improvement of national, regional, and feeder roads to develop an integrated road network to link the rural poor to economic opportunities.
Objectives	The Project will help the Government achieve poverty reduction through economic growth by improving transport efficiency and strengthening integrated road networks that effectively link national, regional, and feeder roads. The Project will (i) improve subnational roads to provide rural farmers with better access to markets, social services, and employment opportunities; (ii) secure Government resources

for periodic road maintenance; (iii) promote private sector participation in road maintenance; and (iv) improve road safety.

The Project will (i) reconstruct 47 kilometers (km) of regional roads and 127 km of type A feeder roads; (ii) support periodic maintenance of 400 km of roads; (iii) support routine road maintenance through performance-based contracts; (iv) improve black spots and conduct education and public campaigns for road safety; and (v) provide consulting services for project management, construction supervision, preparing and supervising performance-based road maintenance contracts; and conduct a feasibility study for privatizing the Roads and Highways Department's (RHD's) maintenance equipment and workshops, road safety improvement, and detailed designing for Road Network Improvement Maintenance Project II.

Cost Estimates

The total cost of the Project is estimated at \$122.9 million equivalent comprising foreign exchange of \$49.4 million and local currency of \$73.5 million equivalent.

Financing Plan

Source	Foreign Exchange	Local Currency	Total Cost	(\$ million)
				Percent
ADB-ADF	43.7	21.3	65.0	52.9
Government	0.0	47.9	47.9	39.0
OPEC Fund	5.7	4.3	10.0	8.1
Total	49.4	73.5	122.9	100.0

ADB = Asian Development Bank, ADF = Asian Development Fund, OPEC = Organization of Petroleum-Exporting Countries.

Loan Amount and Terms

The proposed ADB loan from ADB's Special Funds resources is equivalent in various currencies to SDR 48,964,000 [\$65.0 million]. It will have a term of 32 years, including a grace period of 8 years, with an interest charge of 1% per annum during the grace period, and 1.5% per annum thereafter.

Period of Utilization

Until 30 September 2007

Estimated Project Completion Date

31 March 2007

Executing Agency

Roads and Highways Department

Implementation Arrangements

The Project will be implemented by a project management unit headed by an additional chief engineer/project director. The project director will report to the chief engineer of RHD and will

be supported by two executive engineers as project managers responsible for day-to-day implementation of the Project. The project director will have overall responsibility for the periodic road maintenance component, including overseeing subproject selection under the annual road maintenance plan using the Highway Design and Maintenance Standards Model (HDM), procurement, monitoring and reporting, and acting as project coordinator for performance-based maintenance contracts.

Procurement

All civil works contract packages will be procured in accordance with ADB's *Guidelines for Procurement* following international competitive bidding procedures, except for civil works contracts for the ADB-financed road maintenance component, which will follow local competitive bidding procedures.

Consulting Services

Consulting services will be required for supervising civil works for the road improvement and the periodic road maintenance components. An international consulting firm will undertake supervision in association with domestic consultants. In addition to contract supervision, the consultants will (i) design performance-based road maintenance and implement supervision maintenance; (ii) assess safety for existing roads, develop a black spot improvement plan, and procure and supervise civil works; and (iii) make a feasibility study for privatizing of RHD's maintenance equipment and workshops. Consulting services will also be required for preparing a detailed design for the proposed Road Network Improvement and Maintenance Project II. The consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for engaging domestic consultants.

Project Benefits and Beneficiaries

The direct and quantifiable benefits of the project consist of savings in vehicle operating costs (VOCs) to normal and diverted traffic, where applicable, and savings in time. Nonquantifiable benefits include greater comfort for passengers and reduced damage to cargo. Indirect benefits are those arising from the secondary effects of the reduction in VOCs and time costs, which lead to increased economic activities. These benefits have been estimated in the form of generated passenger and cargo traffic.

The beneficiaries are the various categories of road users: owners/operators of buses and trucks, passengers, cargo owners, and the population in the area of influence in general. Benefits in the form of lower VOCs enjoyed by vehicle owners/operators are expected to be distributed widely among

the various stakeholders, as the conditions in the transport industry are competitive.

Analysis of the project effects on road users, construction workers, the Government, and lenders shows the distribution of benefits among road users and incorporates the negative or positive effects on (i) the Government and the economy in general (a negative effect) by way of the subsidy the government provides to road users by funding part of the construction cost and the loss of tax revenue it incurs as a result of savings in VOCs; (ii) lenders who also provide a subsidy to road users as a result of the concessional loan terms; and (iii) construction workers who gain because the salaries earned are higher than the opportunity cost of their labor. When gains and losses of all parties are netted, the analysis reveals that Tk3.74 billion of the total gains of Tk7.02 billion accrues to the poor, with the poverty impact ratio of 0.53.

Risks and Assumptions

The main risk in the road improvement component is the nonsustainable benefit streams from the investment due to inadequate maintenance and truck overloading. This risks factor will be addressed by incorporating a project component that will secure a Government budget for road maintenance and undertaking policy dialogue to improve axle-load control.

The notable project risk concerns contracting out of routine road maintenance based on the performance-based contract. Local private contractors may be unfamiliar with the new performance-based maintenance contract. The contract may be poorly designed and thus fail to provide the right incentives or penalties to the contractors. This risk will be addressed by providing consulting services for designing the performance-based contract and monitoring the performance of the contractors.



I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan to the People's Republic of Bangladesh for the Road Network Improvement and Maintenance Project; and (ii) proposed administration of a loan for the Project to be provided by the OPEC Fund for International Development (OPEC Fund).

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

A. Performance Indicators and Analysis

2. The transport system in Bangladesh is extensive and diversified, comprising about 140,000 kilometers (km) of roads, 2,700 km of railroads, 5,970 km of perennial and seasonal waterways, two major seaports, and seven airports. The primary road network connecting national and regional roads and type A feeder roads comprises 20,800 km,¹ while the secondary roads including rural and type B feeder roads total 115,000 km. National and regional roads and type A feeder roads are administered by the Roads and Highways Department (RHD) within the Ministry of Communication (MOC). Rural and type B feeder roads are administered by the Local Government Engineering Department (LGED) within the Local Government Division.

3. The performance of the road sector has consistently improved in the past decades aided by extension of the road network and a rapid increase in demand for road transport. The demand increased at an average annual rate of 8.4% for passengers and 8.2% for freight during the 1990s, increases that were almost double the average gross domestic product (GDP) growth of 4.7% for the same period. The modal share of transport has gradually shifted in favor of roads. Between 1975 and 1997, the modal share of road transport rose from 54% to 73% for passenger traffic, and from 35% to 63% for freight. The road has become the principal mode of transport in Bangladesh.

4. The condition of roads, as well as the capacity and reach of the road network, has also substantially improved. Over the past 5 years, the primary roads classified as good or fair have increased from 73% to 96%.

5. The sustainability of these achievements could, however, be jeopardized by insufficient resources allocated to road maintenance. Over the last 5 years, the allocation for routine and periodic road maintenance per kilometer of RHD roads decreased by 3% per annum. The Highway Design and Maintenance Standards Model (HDM) estimates that the long-term spending on preserving the road network should be Tk5 billion (\$85.5 million) per annum. The actual spending is, however, no more than Tk3.1 billion (\$53 million), about 62% of the requirement. Furthermore, the accumulated backlog of deferred maintenance, estimated at Tk24 billion (\$410 million), will require an additional Tk2.5 billion (\$42.7 million) per annum for the next 10 years.

6. Recognizing this problem, RHD is shifting its focus from road development to road maintenance. Under the institutional development components funded by the Department for International Development of the United Kingdom and included in the World Bank's Second and Third Road Rehabilitation and Maintenance Projects, RHD developed an annual road maintenance plan (ARMP). The first ARMP covered 1999-2000. The ARMP uses the HDM to

¹ The primary road network comprises 3,086 km of national roads, 1,751 km of regional roads, and 15,962 km of type A feeder roads.

determine which roads should be maintained for the year in question and what the level of maintenance should be.

7. Apart from strengthening institutional focus on road maintenance, there is also a need to establish additional sources of road maintenance financing so that the ARMP can eventually be financed from domestic sources on a sustainable basis. A loan covenant of the Asian Development Bank's (ADB's) previous project² required that by 2003, the Government would have carried out a national review of mechanisms for funding the requirements of the ARMP from domestic sources, including the option of establishing a road maintenance fund; and that by 2005, it would implement a time-bound action plan for meeting the annual costs of maintaining all roads under RHD's jurisdiction. The national review is supported jointly by ADB, the World Bank, Department for International Development (DFID) of the United Kingdom, and Japan Bank for International Cooperation (JBIC), building on previous work by the World Bank to examine the requirements for introducing a road maintenance fund. DFID provided consulting services for these activities.

8. Road transport operations are largely in the hands of the private sector, with the sole public sector Bangladesh Road Transport Corporation (BRTC) controlling about 2% of passenger operations and 1% of the freight market. BRTC has introduced the first compressed natural gas (CNG)-powered bus in its fleet on a pilot basis. It expects to increase CNG use as the option provides for about 50% savings in fuel costs and significant environmental benefits in reducing air pollution. Under the Road Overlay and Improvement Project,³ ADB provided technical advice and financing for five vehicle inspection centers (located in Dhaka, Chittagong, Rajshahi, and Khulna) that will be responsible for issuing fitness and nonpollution certificates.⁴ Under the Southwest Road Network Development Project,⁵ ADB provided technical assistance (TA) to formulate a strategy to improve air quality in Dhaka and other major cities, particularly in relation to vehicular emission. The study identified opportunities to introduce technological changes to the use of CNG in trucks and buses.⁶ These efforts have begun to produce the visible output of BRTC's introducing CNG-powered buses.

9. In the case of freight operation, almost 90% of the private trucking fleet is owned by individuals, and the industry is highly competitive. Greater efficiency in operations would be achieved by having larger fleets, and depots and maintenance workshops so that the operators could function as regular transport companies.

² ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Road Maintenance and Improvement Project*. Manila.

³ ADB. 1993. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Road Overlay and Improvement Project*. Manila.

⁴ Five vehicle inspection centers were built and sophisticated equipment installed. The equipment, however, has not been fully utilized because of lack of expertise in the Bangladesh Road Transport Authority (BRTA). Recognizing this problem, the Southwest Road Network Development Project required, as one of its loan covenants, BRTA to lease to the private sector the operation and management of vehicle inspection centers by June 2001. This requirement has not been complied with because of poor institutional capacity and lack of the right expertise in BRTA. The project completion report, prepared in August 2002, recommended ADB's further assistance for strengthening BRTA's capacity as a way of normalizing and ultimately privatizing the operation of vehicle inspection centers. BRTA will submit a time-bound action plan to privatize the operation of vehicle inspection centers, together with an assessment of their capacity, and identified the areas for ADB assistance to implement the action plan. ADB will consider further assistance as part of Road Network Improvement and Maintenance Project II programmed for 2003.

⁵ ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Southwest Road Network Development Project*. Manila.

⁶ The Dhaka Clean Fuel Project programmed for 2002 with \$72 million will complement the effort to introduce CNG-powered vehicles by improving the availability of and access to CNG.

10. Road safety is a continuing major issue as the fatality rate on the country's roads network remains the highest in South Asia. The number of persons reported killed increased from 955 in 1983 to 3,162 in 1997, corresponding to an annual fatality rate of 73 per 10,000 motor vehicles. The current rate is more than double that in other South Asian countries, and several times higher than that in Europe. The causes of the significantly increased accident rate are mainly overspeeding, overloading, and overtaking by motor vehicles. Unregulated movement of nonmotorized vehicles along with motorized vehicles on the same route is also one major cause of road accidents and traffic congestion.

11. Recent research carried out by ADB⁷ and the World Bank has established that drivers' ignorance of traffic regulations and inefficient enforcement are the major causes of road accidents, followed by poor road and vehicle conditions and overloading. Under the Jamuna Bridge Access Roads Project,⁸ ADB financed a weighbridge to monitor axle load and provided consulting services to (i) identify accident-prone locations, or black spots; (ii) recommend safety measures in road design; (iii) supervise construction of civil works for low-cost accident prevention measures; (iv) conduct training in road safety enforcement and education; and (v) monitor and evaluate the effectiveness of the various accident-prevention measures.

12. Under the Southwest Road Network Development Project (footnote 5), RHD established an independent Road Design and Safety Circle (RDSC), which monitors road safety aspects throughout RHD and prepares manuals for road safety and road design. RDSC also introduced a road safety audit program for RHD roads, and prepared a road safety manual that provides for an institutionalized systematic method of checking the safety aspects of new and existing roads to identify hazards. The project also provided consulting services, partly financed by Nordic Development Fund (NDF), to assist the National Road Safety Council (NRSC) in setting up district and municipal committees and funding the initial public campaigns, bus driver training programs, truck driver training, and overloading awareness campaigns, and in involving nongovernment organizations (NGOs) in road safety programs.

B. Analysis of Key Problems and Opportunities

1. Road Improvement

13. The Partnership Agreement on Poverty Reduction concluded in April 2000 identified roads as one of the leading agents for poverty reduction. In line with the agreement, the road subsector strategy in Bangladesh focuses on (i) accelerating pro-poor economic growth, e.g., by providing farmers with access to markets and inputs; (ii) reducing the obstacles to social service delivery and providing access to vulnerable groups; (iii) facilitating popular participation by facilitating travel; and (iv) conducting road sector operations with greater public scrutiny and introducing more objective and transparent approaches to resource allocation, especially for road maintenance.

14. Since 1977, ADB has provided 12 loans totaling \$931 million to the road sector in Bangladesh, focusing largely on the completion of five strategic road transport corridors. Other major financiers, including the World Bank and bilaterals, have invested \$1.8 billion in the road sector, also focusing on strengthening the strategic corridors. External assistance to the roads sector from aid agencies are in Appendix 2. These coordinated efforts contributed considerably

⁷ ADB. 1995 and 1997. *Regional Initiatives in Road Safety*. Manila.

⁸ ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Jamuna Bridge Access Roads*. Manila.

to meeting the growing demand for roads by linking strategic areas in Bangladesh through strategic corridors. About 96% of national and regional roads are paved.

15. With the completion of key strategic road connections, more emphasis should now be given to developing an integrated road network to link the rural poor to economic opportunities. Compared with national and regional roads, type A feeder road, which is mostly used by rural farmers to access markets or social facilities, has only 60-65% pavement ratio. Because of this poor condition of feeder roads, the connection of rural farmers to national roads is constrained; consequently, their access to markets or education or health facilities, which are located in commercial centers connected by national roads, is limited. The Project is designed to focus on improvement of regional and feeder roads to strengthen integrated road networks, especially in the northwest and the central north regions in Bangladesh where the level of poverty incidence is known to be highest.⁹ The project areas also have significant potential development impact for not only nationwide but also subregional economic development in the medium term.¹⁰

16. The districts of the project areas measure about 35,000 km² accommodating more than 31 million people and about 4,500 km of national, regional, and type A feeder roads. Type A feeder roads comprise more than 76% of the total length of roads. Industrial activities in the project areas are low compared with those in other regions of the country, particularly Dhaka, Chittagong, Jessore, and Khulna. Each project district has an industrial estate of Bangladesh Small and Cottage Industries Corporation, where small and medium-size industrial enterprises are set up. Total employment in the industrial activities in the project district was estimated at 100,000 in 1996/1997. Outside the estates, small and cottage industries such as rice milling, timber processing, furniture making, food processing, and hand loom weaving are popular.

2. Road Maintenance

17. While a mechanism for sustainable domestic financing for road maintenance is expected by 2005 (para. 7), there is a need to separately address the present shortfall of Government resources for periodic road maintenance and the increasing backlog of deferred maintenance. The World Bank provided \$70 million for periodic maintenance over the period 2000-2004 through its Road Rehabilitation and Maintenance Project 3. ADB's Road Maintenance and Improvement Project (footnote 2) attempted to reduce the increasing backlog by encouraging the Government to commit more of its annual budget to periodic road maintenance. ADB allocated \$10.8 million for periodic road maintenance and required the Government to shoulder 70% of the cost of periodic maintenance while the Project pays 30%. This arrangement will enable the Government to source \$36 million in total that can finance 300 km of periodic maintenance for 3 years. The Project will extend this program by 2 years and finance 200 km of periodic maintenance for 2 years with the same scheme of leveraging Government financing.

3. Private Sector Development

18. Under the same ADB project (footnote 2), a policy and guidelines for private investment in highway projects are being prepared with the aim of enacting them by September 2004. The policy and guidelines are concerned with establishing a legal and regulatory framework for

⁹ Sen, Binayak. 2000. *Bangladesh Poverty Analysis: Trends, Policies and Institutions*. The poverty survey identified Gaibandha, Kurigram, Lalmonirhat, Nilphamari, Panchagarh, Rangpur in the northwest, and Jamalpur and Sherpur in the center-north as the poorest districts in Bangladesh with higher than 50% poverty incidence.

¹⁰ The northwest will be a major route of cross-border traffic from Nepal and Bhutan to Mongla and Chittagong port when regional economic cooperation becomes active through the South Asian Growth Quadrangle initiative. The center-north will be an important route connecting Sylhet in the northeast to the Jamuna Bridge in the future, which will replace the current long route through Dhaka.

private sector investment in highway projects including build-operate-transfer (BOT)-type of road development contracts. This legal and regulatory framework will foster an enabling environment for private sector participation in developing the road sector. Until such a framework is put in place, efforts can be made to attempt a less sophisticated mode of private sector participation in the road sector.

19. Traditionally, road maintenance is contracted out based on a schedule of unit prices and estimates of quantities. The works to be performed are specified in the contract and payments are based on executed measured works. In contrast, a performance-based road maintenance contract defines the minimum road conditions that the contractor has to provide. Payments are based on how well the contractor complies with the performance standards defined in the contract, not on the amount of works executed.¹¹ The performance-based maintenance contract transfers the risks of work selection, technology, process, design or management to the contractors, and thereby encourages them to improve the efficiency and effectiveness of their maintenance works for their own benefit. This efficiency gain will be translated into low-cost road maintenance through competitive bidding. Without the legal and regulatory framework for private sector participation in place, performance-based road maintenance can be introduced as a way of improving the efficiency of road maintenance and relieving RHD of excessive workloads for monitoring input quantities under the traditional maintenance contract. As private sector participation in road maintenance grows, and the participants' capacity improves, RHD's role in road maintenance will be reduced. Then, RHD's maintenance equipment and workshops, presently used by RHD for its own maintenance work and rented as necessary to private contractors who can't afford to keep such equipment and workshops, can be privatized.

4. Road Safety

20. While RHD addresses road safety through engineering solutions such as a road safety audit, NRSC leads the national-level activities to improve road safety. The secretariat of NRSC was established in the Bangladesh Road Transport Authority (BRTA) in 1998 and was involved in monitoring the implementation of the national road safety strategic action plan. In January 2001, the BRTA Road Safety Cell was formed as a successor to the NRSC secretariat under the World Bank's Road Rehabilitation and Maintenance Project 3. The Road Safety Cell provides secretariat services to NRSC and coordinates all road safety activities as defined in the national road safety action plan.

21. In November 2001, NRSC issued the National Road Safety Strategic Action Plan 2002-2004 which prescribes the direction for nationwide road safety activities for the next three years. It identified problems, goals, and required actions for nine key road safety issues: (i) planning, management, and coordination of road safety activities; (ii) establishing an accident data system; (iii) preventing road accidents through more safety-conscious planning, design, construction, and maintenance of roads; (iv) revising traffic legislation promoting road user compliance; (v) developing a more effective and efficient traffic police; (vi) ensuring minimum standards for driver competence through improved driver training and testing procedures; (vii) improving the roadworthiness of vehicles; (viii) introducing road safety education and publicity programs; and (ix) improving the emergency assistance, hospital care, and rehabilitation available for victims of road traffic accidents. The Road Safety Cell has developed various activities for implementing the action plan, and coordinates with aid agencies such as the World Bank, DFID, and ADB in implementing them.

¹¹ Zietlow, J. Gunter, and Alberto Bull. 1999. *Performance Specified Road Maintenance Contracts-The Road to the Future*.

III. THE PROPOSED PROJECT

A. Objectives

22. The objective is to help the Government achieve poverty reduction through economic growth by improving transport efficiency and strengthening integrated road networks effectively linking national, regional, and feeder roads. The Project will (i) improve subnational roads to provide rural farmers with better access to markets, social services, and employment opportunities; (ii) secure Government resources for periodic road maintenance; (iii) promote private sector participation in road maintenance; and (iv) improve road safety.

B. Components and Outputs

23. The Project will (i) reconstruct 47 km of regional roads and 127 km of type A feeder roads; (ii) support periodic road maintenance of 400 km of roads; (iii) support routine road maintenance through performance-based contracts; (iv) improve accident-prone areas or black spots and undertake education and public campaigns for road safety; and (v) provide consulting services for project management, construction supervision, preparing and supervising a performance-based road maintenance contract, conducting a feasibility study for privatizing RHD's maintenance equipment and workshops, road safety improvement, and detailed designing for Road Network Improvement Maintenance Project II.

1. Roads Improvement Component

24. The Project will reconstruct a 47 km regional road in Mymensingh-Nandail and five type A feeder roads in (i) Muktagacha-Chechua, 10.0 km; (ii) Jamalpur-Dewanganj, 41.0 km; (iii) Mithapukur-Madhyapara, 24.0 km; (iv) Thakurgaon-Ranisankail, 37.0 km; and (v) Saidpur-Parbatipur, 15.0 km. A summary for the design approach and technical standards for reconstruction is attached as Appendix 3.

25. The feasibility study for the Project assessed 27 roads selected from the northwest region covering Dinajpur, Gaibandha, Kurigram, Lalmonirhat, Nilphamari, Panchagarh, Rangpur, and Thakurgaon; and the central north region covering Jamalpur, Kishoreganj, Mymensingh, Netrokona, and Sherpur. The 27 candidate roads were identified by a set of selection criteria¹² established through extensive consultative meetings with various stakeholders including Government officials, road engineers, NGOs, transport operators, public representatives, and common road users in the project areas. Of the 27 candidate roads, 17 were identified as technically and economically viable.

26. Of the 17 roads, 6 were selected as the project roads based on their economic rate of return as main criterion, and some other aspects such as likely poverty impact, adverse environmental impact, or social and resettlement implications. The six project roads entail the repair, rehabilitation, or reconstruction of nine bridges.

¹² The criteria included (i) social aspects such as population density, roof material of houses, and literacy level; (ii) economic aspects such as unemployment level, nonagricultural employment, and nonfarm income sources; (iii) road condition and traffic such as road roughness level, general road conditions, traffic level, and nonmotorized vehicles; (iv) level of completion of road network loop; and (v) stakeholders' recommendation.

2. Periodic Road Maintenance Component

27. The periodic road maintenance component will finance a two-year time slice of priority road maintenance activities under the ARMP. For each of the two years, this component will cover periodic maintenance of an estimated 200 km, to be carried out through civil works contracts worth \$8 million equivalent. The roads to be maintained will be selected annually using the HDM ranking as part of the ARMP. Support will be restricted to periodic maintenance works and will comprise mainly sealing and overlay. Road widening and improvement are excluded except in specific locations approved by ADB such as market places and bus bays. The support will target the districts selected as project areas (para. 25). The criteria for selecting road maintenance subprojects are in Appendix 4. Consulting services will be provided to supervise the civil works under the ADB-assisted time slice.

28. Since this component is included to encourage the Government to commit more of its annual budget to periodic road maintenance, the costs to be met under the ADB loan will be lower than those to be met through Government counterpart funding. This element will contribute significantly to securing Government resources for periodic road maintenance and addressing the critical backlog of periodic maintenance.

3. Routine Road Maintenance Component

29. Routine and recurrent maintenance for about 50 km of regional or type A feeder roads will be contracted out to domestic contractors based on a performance-based contract for the period of 3-5 years. The roads for routine maintenance will be selected from regional or type A feeder roads in the project areas, the periodic maintenance of which has been completed within a year at the time of selection.

30. The performance-based contract consists of three major maintenance components: preventive work, catch-up routine work, and performance (routine and recurrent) work. Preventive maintenance is designed to improve the road's structural condition. Catch-up routine maintenance is designed to reduce the present maintenance backlog, particularly for shoulders and drainage. It may include some minor improvements such as drainage structures, slope protection, guardrails, road signs, and markings. After preventive and catch-up routine maintenance are completed, performance-based maintenance will begin. The preventive and catch-up routine maintenance works will be executed and paid for based on the quantity of work completed. Performance-based maintenance, however, will be executed according to minimum standards set in the contract. If contractors fail to maintain the standards, the monthly lump sum payment will be reduced according to the penalties for noncompliance delineated in the contract. The concept of performance-based maintenance and its implementation are outlined in Appendix 5.

31. Consulting services will be provided to develop the contract scheme, train RHD officials and local contractors, assist with contract award, and supervise the works in the first year of implementation. During the remaining years of implementation, RHD will supervise and monitor the works. During the first year, the consultant will monitor and evaluate implementation, and prepare a final report giving the findings, lessons learned, and recommendations for replication.

4. Road Safety Component

32. The Project will undertake civil works at selected accident-prone areas or black spots along the project roads and other selected roads. For the purpose, a safety audit will be

conducted for project roads along with detailed designing to comply with safety requirements. Safety will also be assessed for about 200 km of existing roads with the highest accident rate, and the findings will be implemented by the Project. Road safety will be improved in accordance with ADB's *Road Safety Guidelines for the Asian and Pacific Region*.

33. Road designs will be improved by (i) improving delineation and edge marking on roads and installing reflecting market posts; (ii) installing deviation boards in critical locations; (iii) widening the pavement sections of main roads that carry high volumes of pedestrians, rickshaws, and animal-driven vehicles; (iv) providing off-road facilities for pedestrians in settlements, including facilities for buses and bus passengers; and (v) providing adequate reflective warning signs, setting realistic speed limits, and building speed bumps on roads through settlements.

34. The Project will assist the BRTA Road Safety Cell to implement its strategic action plan, particularly for developing a more comprehensive highway code that will set out rules for road users and provide guidelines for safe driving, and to prepare illustrated guides for road safety education.

C. Special Features

35. Nonmotorized traffic comprises a significant share of present-day traffic on most roads in Bangladesh. For the project roads, the proportion of nonmotorized to motorized traffic ranges from 2.2 to 9.1. Nonmotorized traffic comprises slow-moving traffic such as bicycles, cycle rickshaws, handcarts, and animal-drawn carts. Cycle rickshaws operating in villages, towns, and cities have even become an icon of Bangladesh. They are widely used for passengers as well as for small size freight traffic in rural areas. Rickshaws are the most common mode of transport among small farmers transporting their products in small quantities to nearby markets. Especially for perishable commodities such as fruits, vegetables, milk, and dairy products, rickshaws are taken as a more relevant mode of transport mainly due to lack of storage and other facilities required for those commodities. In 1998, it was estimated that 554,000 rickshaws were operating in Bangladesh, almost the same size as the total motorized vehicles.

36. Nonmotorized traffic uses the outer part of the carriageway as most roads rarely have a sufficient width of hard shoulder. Thus, nonmotorized traffic poses a significant hindrance to motorized traffic. It also poses a significant accident risk, in particular as drivers of larger vehicles take little note of these slow-moving vehicles. An analysis of speed regression shows that nonmotorized traffic reduces the achievable speed on a road more rapidly than motorized traffic does, i.e., nonmotorized traffic takes 7 years to reduce the achievable speed to 20 km per hour, while the same number of motorized traffic takes 19 years. It proves that slow-moving nonmotorized traffic has a significant adverse impact on the speed of motorized traffic.

37. Under the present economic situation and continued pressure on the labor market, it is not foreseeable that the demand for and use of nonmotorized means of transport will be reduced in favor of motorized traffic in the near future. The adverse impact of nonmotorized traffic might then be addressed by improving road design in such a way as to accommodate such traffic while maintaining the desired speed. The feasibility study for the Project recommended two options: (i) provide separate surfaced lanes for nonmotorized traffic; and (ii) provide hard shoulders wider than the current standard. One of the project roads, Muktagacha-Chechua, 26.0 km, will be designed adopting the latter option. It will have a 2.0-meter-wide hard shoulder that is 33% wider than the current standard of 1.5 meters. If this option proves successful in accommodating nonmotorized traffic, it will be replicated in other road designs.

D. Cost Estimates

38. The total cost of the Project is estimated at \$122.9 million equivalent, inclusive of physical and price contingencies, taxes and duties, and interest charges during construction (Table 1). The foreign exchange cost is estimated at \$49.4 million, representing about 40% of total cost. The local currency cost is estimated at \$73.5 million equivalent, or about 60% of total cost. The local currency costs include \$18.6 million equivalent for taxes and duties, and about \$3.6 million equivalent for land acquisition and resettlement.

Table 1: Cost Estimates
(\$ million)

Item	Foreign Exchange	Local Currency	Total Cost
A. Base Cost ^a			
1. Land acquisition/Resettlement	0.0	3.6	3.6
	33.8	45.8	79.5
2. Road Improvement			
3. Road Maintenance			
a. Periodic Road Maintenance	5.0	11.0	16.0
b. Routine Road Maintenance	0.3	0.6	0.9
4. Road Safety			
a. Black Spot Improvement	0.2	0.3	0.5
b. Education and Public Campaign	0.1	0.2	0.3
5. Consulting Services			
a. Supervision	3.2	2.0	5.2
b. Project Preparation ^b	0.4	0.6	1.0
6. Project Administration	0.0	1.0	1.0
7. Implementation of Land Acquisition and Resettlement	0.0	0.5	0.5
Subtotal (A)	42.9	65.6	108.5
B. Contingencies			
1. Physical ^c	4.0	5.4	9.3
2. Price ^d	1.7	2.5	4.2
Subtotal (B)	5.7	7.9	13.6
C. Interest Charges During Construction	0.8	0.0	0.8
Total ^e	49.4	73.5	122.9

^a In 2002 prices.

^b Detailed design for the proposed Road Network Improvement and Maintenance Project II.

^c At 10% of base cost, excluding the road maintenance component.

^d At 2.4% annually for foreign exchange and local currency costs, excluding the periodic road maintenance component.

^e Including customs duties and taxes, estimated at about \$18.6 million equivalent.

E. Financing Plan

39. The proposed ADB loan is \$65 million equivalent from the Special Funds (ADF) resources. The ADF loan will be denominated in special drawing rights, and will have a term of 32 years including a grace period of 8 years with an interest rate of 1% per year during the

grace period and 1.5% thereafter. The ADB loan will finance 88% of the foreign exchange cost of the Project and 29% of the local currency cost. Total ADB financing accounts for 53% of all project costs, and Government financing will be 39%. The Borrower will be the People's Republic of Bangladesh. The Borrower will make the loan available to the Project's Executing Agency through appropriate budgetary allocation. The project financing plan is presented in Table 2. The detailed financing plan is in Appendix 6.

40. The Organization of Petroleum-Exporting Countries (OPEC) Fund will provide joint cofinancing of \$10 million equivalent for the Project. The amount will be used to finance a portion of civil works construction (contract 3, Jamalpur-Dewanganj road; and contract 4, Saidpur-Parbatipur road). ADB will administer the OPEC Fund loan and for this purpose will enter into an agreement with the OPEC Fund. The loan will have a maturity of 20 years with an interest rate of 1%, service charge of 1% per annum, and a grace period of 5 years. In the event that the OPEC Fund loan does not become effective, or becomes effective in an amount that creates a shortfall in financing, the Government will meet the shortfall from its own resources.

Table 2: Financing Plan
(\$ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent
ADB	43.7	21.3	65.0	52.9
Government	0.0	47.9	47.9	39.0
OPEC Fund	5.7	4.3	10.0	8.1
Total	49.4	73.5	122.9	100.0

ADB = Asian Development Bank, OPEC = Organization of Petroleum-Exporting Countries.

41. Providing financing for local currency costs is considered justified under ADB's local currency financing policy.¹³ Because a low level of per capita income imposes constraints on national savings, assistance is required to support the local currency costs of some development projects. The domestic savings and investment rate of Bangladesh is one of the lowest among developing member countries (DMCs). Public finances remain severely constrained. The banking system also faces serious financial problems, including a high proportion of nonperforming loans. The Government is taking steps to strengthen the financial sector and generate increased national savings by introducing financial sector reforms and improving budgetary revenue collection. Given all those factors, the current social and economic development circumstances warrant continued ADB financing of local costs.

F. Implementation Arrangements

1. Project Management

42. The Executing Agency will be RHD within MOC, except for the road safety component for education and public campaign. RHD has substantial experience in implementing ADB-financed road projects. In accordance with the loan covenants for the ADB-financed Southwest Road Network Development Project (footnote 5), the office of additional chief engineer (ADB projects) RHD implements all ADB projects. The additional chief engineer (ADB projects) is currently responsible for all ADB-assisted projects.

¹³ ADB. 1995. *Review of Lending Foreign Exchange for Local Currency Expenditure on Projects*. Manila.

43. Recognizing that the additional chief engineer is fully loaded with current ADB projects, RHD will appoint a separate full-time additional chief engineer as project director for the Project before loan negotiation. The project director will report to the chief engineer of RHD and be supported by two executive engineers as project managers responsible for day-to-day implementation of the Project. The project director will also be responsible for implementing the land acquisition and resettlement plan. Details of the proposed project management for the road improvement component are in Appendix 7.

44. The project director will have overall responsibility for the periodic road maintenance component, including overseeing subproject selection under the ARMP using HDM, procurement, monitoring and reporting, and acting as project coordinator for the performance-based maintenance contract. Administering contracts and other aspects of day-to-day implementation for periodic road maintenance and routine maintenance by the performance-based contract will be delegated to RHD's zonal offices, through the project director.

45. BRTA will be the Executing Agency for the road safety component for education and public campaign. The director technical in BRTA will be the project director, and will report to the chairman of BRTA, and be supported by the manager of BRTA Road Safety Cell, as project manager responsible for day-to-day implementation of the Project.

2. Implementation Period

46. The Project will be implemented over 4 years, inclusive of preconstruction activities. Detailed designing for the project roads will start in March 2003 and civil works should start by July 2004. The Government will not award any ADB-financed civil works construction contracts until after the construction supervision consultants have been appointed, and until the land and rights to land, free of encumbrances, required for the execution of such contracts have been acquired or made available. The Project is expected to be completed by 30 June 2007. Details of the implementation schedule are in Appendix 8.

3. Procurement

47. Civil works for the road improvement component will be procured through international competitive bidding (ICB) procedures among prequalified bidders in accordance with ADB's *Guidelines for Procurement*. Contract packages for the road improvement components are listed in Appendix 9. Civil works for the periodic road maintenance component will be packaged in contracts with an estimated value of \$1.0 million-\$3.0 million, and procured in accordance with local competitive bidding (LCB) procedures acceptable to ADB. Local contractors have proved technically and financially qualified to carry out this size of periodic maintenance works, and few international contractors will be interested because of the logistical difficulties of managing maintenance works. For these contracts a separate prequalification exercise will not be necessary. Instead, bidders will be required to submit the information pertaining to their qualification together with their bids following single-stage, two-envelope bidding procedures. Civil works for the periodic maintenance packages with an estimated value of more than \$3.0 million will be procured through ICB procedures in accordance with ADB's *Guidelines for Procurement*.

48. Civil works for the routine road maintenance with performance-based contract will be procured in accordance with LCB procedures acceptable to ADB, and its program design and implementation plan that will be developed by consultants. Black spot improvement for the project roads will be implemented as part of the related road contract packages. For

improvement of black spots on existing roads, local contractors will be selected in accordance with LCB procedures acceptable to ADB.

4. Consulting Services

49. Consulting services will be required for supervising civil works for the road improvement and the periodic road maintenance components. An international consulting firm will undertake supervision in association with domestic consultants. The ADB has approved the Government request that the internationally recruited consultants be required to collaborate with domestic consultants. In addition to contract supervision, the consultants will (i) undertake program design and implementation supervision for performance-based road maintenance; (ii) assess the safety of existing roads, develop a black spot improvement plan, and procure and supervise civil works; and (iii) conduct a feasibility study for privatizing of RHD's maintenance equipment and workshops. The consultant will also be responsible for ensuring community participation, identifying community needs, and monitoring gender and child labor issues. About 163 person-months of international and 745 person-months of domestic consulting services will be required. The consultants will be selected and appointed by the quality-and-cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants* and arrangements satisfactory to ADB for engaging domestic consultants. Outline terms of reference for these services are in Appendix 10.

50. Consulting services (about 20 person-months international and 140 domestic) will be required for preparing a detailed design for the proposed Road Network Improvement and Maintenance Project II. The consultants will be selected and appointed by the quality-and-cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants* and arrangements satisfactory to ADB for engaging domestic consultants. Outline terms of reference for these services are in Appendix 11.

51. RHD will appoint full-time domestic consultants or NGOs to support implementation and independent monitoring of the land acquisition and resettlement plan. The consultants will be recruited according to arrangements satisfactory to ADB for engaging domestic consultants.

5. Disbursement Arrangements

52. For consulting services, procurement of equipment, and civil works contracts, loan funds will be disbursed using direct payment and reimbursement procedures in accordance with ADB's *Loan Disbursement Handbook*.

6. Accounting, Auditing, and Reporting

a. Accounts and Audit

53. RHD will maintain separate records and accounts adequate to identify the goods and services financed from the loan proceeds, the financing resources received, the expenditures incurred for the Project, and use of local funds. The accounts will be set up in accordance with sound accounting principles. External accounting experts will be engaged to design the project accounts to be used by RHD. Consolidated project accounts and related financial statements will be audited annually by private sector auditors acceptable to ADB. The audited reports and related financial statements will be submitted to ADB not later than 6 months after the end of the fiscal year to which they relate. The Office of the Director of Accounts in RHD will coordinate all

accounts activities and ensure compliance with ADB's audit and accounting requirements, which will be followed up in regular reviews by ADB.

54. All procurement activities will be subject to an independent performance audit to ensure transparency and objective and independent assessment of such activities. The performance audit will be conducted twice during implementation in conjunction with the annual audit of project accounts and related financial statements, and will be carried out by the same private sector auditors. In addition, ADB will conduct project procurement audits during implementation as part of its regular review process.

b. Reports

55. The supervision consultant will submit monthly progress reports to RHD, MOC, and ADB. RHD will ensure that the consultant includes in the reports the status of land acquisition and resettlement and other activities that are critical to project implementation, but are not directly included in the scope of the engineering services. This will continue until the Project has been completed. Within three months of physical completion, the consultant will prepare a completion report in a format acceptable to RHD and ADB.

56. RHD will monitor project preparation and implementation in accordance with the implementation schedule, and will keep ADB informed of any significant deviations that could result in the schedule not being met.

6. Project Performance Monitoring and Evaluation

57. RHD, assisted by the supervision consultant, will establish a capability for systematic project performance monitoring and analysis throughout the life of the Project, integrated with its management information system. Before construction, project performance monitoring will develop and conduct a "quick and easy" sample survey to establish a baseline for subsequent performance monitoring. After construction is completed, surveys will be conducted annually. The scope of the survey, quantity and quality of data, and frequency of collection will be guided primarily by the project management's need for progressive and rapid feedback on implementation status, as well as early warning on situations that might jeopardize the attainment of the development objectives. The key indicators and assumptions outlined at the development objective (i.e., goal and purpose) levels in the project framework (Appendix 1) will form the core of the data required for assessment. Project performance monitoring will be strengthened by supplementary systematic analysis of sample data from similar nonproject areas.

7. Project Review

58. ADB staff will review the implementation of the Project through regular or special review missions. The Loan Agreement will also require a detailed midterm review. Based on the project schedule, the review will be carried out around July/August 2005. The midterm review will discuss with the Government the approach to contracting out routine maintenance through a performance-based maintenance contract. Terms of reference for the midterm review will be included in the project administration memorandum to be prepared by ADB's Inception Mission for the Project.

IV. PROJECT BENEFITS, IMPACTS, AND RISKS

A. Economic Impacts

59. The benefits of the Project are wide-ranging and include direct and quantifiable benefits as well as indirect and nonquantifiable benefits. The direct and quantifiable benefits consist of savings in vehicle operating costs (VOCs) to normal traffic (and diverted traffic where applicable) and savings in time costs. Nonquantifiable benefits include greater comfort and safety for road users, and reduced damage to cargo. Indirect benefits are those arising from secondary effects brought about by the reduction in VOCs and time costs, which in turn lead to increased economic activities. Indirect benefits have been estimated in the form of generated passenger and cargo traffic.

60. The beneficiaries include (i) those benefiting directly from the investments, i.e., the various categories of road users such as owners/operators of buses and trucks, passengers of the various vehicle categories, cyclists and pedestrians, and cargo owners and those involved in the production of cargo; and (ii) those benefiting indirectly because they live and work in the area of influence of the roads. The latter is estimated at some 2.75 million people when the zone of influence is taken as a band of 15 km (7.5 km on either side of the road). It is also estimated that about 50% of this population live below the (upper) poverty line.¹⁴ This population is expected to benefit because the road investments will mitigate the underlying causes of poverty in the area by facilitating economic integration and economic development on which the realization of the area's broader needs — medical facilities, schools and livelihood opportunities — ultimately depends.

61. The economic internal rate of return (EIRR) for the project roads ranges from 17.7% to 30.8%, or a combined EIRR of 24.5%. A review of the various factors affecting the EIRR indicates that the main threat to the viability of the investment is premature road failure due to inadequate maintenance and overloading. The Project includes measures to address these risks by helping the Government to establish and implement appropriate policies. Various sensitivity tests indicate that the EIRR is robust in relation to a construction cost increase of 15%, reduction of benefits by 20%, and reduction by 30% of benefits derived from nonmotorized traffic. The switching values of those sensitivity tests range from 34% to 314%. Detailed economic analysis for the road improvement components is in Appendix 12.

B. Poverty Reduction Impacts

62. The Project proceeded through different stages with a strong poverty focus at every stage. First, the target area in which the project roads were selected comprises some of the poorest districts in the country. Second, following the establishment of a comprehensive database of all roads in this target area, roads were screened based on a number of criteria, including the socioeconomic profile of the districts and of its population, expected poverty reduction impacts, road conditions, traffic, road network requirements, and input from stakeholders through an extensive process of consultations. In the final stage, a selection was made from among the roads screened in the second stage, taking into account the funding constraint.

¹⁴ Upper poverty line: the level of per capita income or consumption at which the members of a household can be expected to meet their basic food consumption needs – i.e., to meet their calorie intake requirements – as well as some essential nonfood need. These estimates are based on Bangladesh Bureau of Statistics (BSS). 2000. *Household Expenditure and Income Survey (HEIS)*.

63. The technical features and implementation arrangements were designed so as to address the key needs and concerns of the poor. The road designs provide for wider shoulders than has been the standard so far; in addition, the shoulders will be surfaced. These features will ensure much improved road space and riding conditions for nonmotorized traffic, which is the mode used overwhelmingly by the poorer sections of the population. In addition, targeted interventions during the construction phase are designed to benefit the poor. They include (i) recruiting labor from the project area. It is estimated that funds directly injected in the local economy from employment of locally recruited labor will amount to some Tk355 million; (ii) procuring goods and services from within the project area; and (iii) providing for gender equity in the construction contracts to ensure that women employed in road construction activities will receive comparable pay for comparable work.

64. A distribution analysis assessed the extent to which the direct and quantifiable benefits flowing from the Project during the operational phase accrue to poor people and hence to calculate the poverty impact ratio of the project investments. The benefits considered include the savings in VOCs and time costs of motorized and nonmotorized traffic. The approach to determining the poverty impact of the Project proceeded in two steps. First, an estimate was made of the distribution of the directly quantifiable benefits to the various categories of road users, i.e., bus and truck operators/owners; bus and motor rickshaw passengers; car, utility, and motorcycle owners, drivers and passengers; rickshaw passengers and cyclists. The estimates were based on the analysis of the competitive conditions in the transport and product markets. Second, the poverty status of these road users was determined based on (i) a poverty line for the area of the project roads, and (ii) a survey of road users to establish whether their income is below or above this poverty line.

65. The analysis of the distribution of project effects among road users, construction workers, the Government, and lenders took as starting point the outcome of the distribution of benefits among road users and incorporated the negative or positive effects on (i) the Government and the economy in general (a negative effect) by way of the subsidy the Government provides to road users in funding part of the construction cost and the loss of tax revenue it incurs as a result of savings in VOCs; (ii) lenders who also provide a subsidy to road users as a result of the concessional loan terms; and (iii) construction workers who gain because the salaries earned are higher than the opportunity cost of their labor. When gains and losses of all parties were netted, the analysis reveals that Tk3.71 billion of the total gains of Tk7.01 billion accrues to the poor, with the poverty impact ratio of 0.53. The distribution analysis is summarized in Appendix 13. A detailed distribution analysis is available as Supplementary Appendix B.

C. Social Impacts

66. Currently more than 50% of the population in the project areas live below ADB's poverty line in Bangladesh. The net benefit of the project will be distributed among the following groups: (i) users of freight transport, (ii) users of passengers transport, (iii) vehicle owners, (iv) labor, (v) the Government, and (vi) the economy in general. The Project will benefit the entire population residing in the project areas through improved access to resources and markets and the generated income-earning opportunities. By facilitating economic growth, the Project will contribute to poverty reduction. The Project will create construction job opportunities of about 133,000 person-months for both skilled and unskilled workers during project implementation. Men and women will be provided equal opportunity for employment. The summary poverty reduction and social strategy is in Appendix 14.

67. The Project is also expected to produce the following nonquantifiable benefits: (i) improved physical access to basic social services such as health clinics and schools, (ii) improved infrastructure safety and efficient enforcement of traffic safety rules, and (iii) increased public awareness on safety.

68. The Project will affect approximately 2,108 structures and required acquisition of 60 hectares for right-of-way. The affected people are approximately 8,204. The total cost for both land acquisition and resettlement is estimated to be \$3.6 million equivalent. An initial resettlement plan has been prepared, addressing the scope of resettlement, socioeconomic information on the affected people, policy framework and entitlement matrix, resettlement objective and strategy, participation and grievance redress, institutional arrangements, monitoring, cost estimates, and implementation schedule. The summary resettlement plan is in Appendix 15. A small number of tribal people living in one of the project areas are not directly affected by the Project. Therefore, the Project will not involve the ADB policy on indigenous peoples. The Government will prepare a full resettlement plan, based on 100% census and asset inventory, and submit it to ADB for approval. Civil works contracts will be awarded only when ADB approves the resettlement plan.

D. Environmental Impacts

69. The Project will improve roads that are currently in place. The overall finding of the initial environmental examination (IEE) is that the Project will not cause significant environmental problems and the potential adverse impacts are manageable. In addition, the Project will not disturb any environmentally sensitive areas. Therefore, a full environment impact assessment (EIA) to determine further impacts of the roads involved is not required. However, one of the project roads, the Mymensingh-Nandail road, falls under the red category in Bangladesh's Environmental Preservation Rules 1997, which requires a full EIA.¹⁵ Civil works for this project road can be started only after the Department of Environment (DOE) issues an environmental clearance based on the full EIA. The EIA for the subject road will be prepared as part of the detailed engineering design of the road, and will be submitted to ADB with DOE's environmental clearance before civil works contracts are awarded.

70. Implementation of mitigation measures during the construction stage will be the responsibility of the contractor. An environmental engineer, who will be hired as part of consulting services for supervision, will assist the Social and Environmental Circle (SEC) of RHD in preparing contractual documentation so that the bidding documents, bills of quantity, and other contractual obligations of the contractor clearly identify environmental responsibilities and describe penalties for noncompliance. RHD together with SEC will be responsible for implementing overall environmental monitoring and management plan. The summary environmental analysis is in Appendix 16.

E. Risks

71. The proposed road improvement component does not present exceptional or unusual risks that would require specially designed mitigation measures. RHD, the contractors, and the supervision consultants are all familiar with the kind of works to be financed and have performed satisfactorily in implementing similar works. If the implementation arrangements are properly structured, the risks of failure of the construction works will be minimal. The main risk for the

¹⁵ According to Bangladesh's Environmental Preservation Rules 1997, any improvement works for national and regional roads require a full environmental impact assessment regardless of the types of, and the expected environmental impact from, improvement works.

road improvement component is that inadequate maintenance and truck overloading may prevent the expected benefit streams from being achieved or, if they are achieved, from being sustained. This risk factor will be addressed by incorporating a project component to secure a Government budget for road maintenance and undertaking policy dialogue to improve axle-load control. The economic returns for periodic maintenance are typically high, and the Project will focus on priority maintenance based on the economic ranking of the ARMP.

72. The notable project risk concerns contracting out of routine maintenance based on a performance-based maintenance contract. Local private contractors may be unfamiliar with this new contract. The performance-based maintenance contract may be poorly designed and thus fail to provide the right incentives or penalties to the contractors. This risk will be addressed by providing consulting services for designing the performance-based maintenance contract and monitoring the performance of the contractors.

73. The risk in project implementation will be addressed by (i) approving advance action for procurement, (ii) preparing the land acquisition and resettlement plan and EIA by consulting with stakeholders, (iii) obtaining the Government's commitment for counterpart funding, and (iv) providing sufficient resources for supervision consulting services.

V. ASSURANCES

74. In addition to the standard assurances, the Government has given the following assurances, which will be incorporated in the legal documents:

A. Specific Assurances

- (i) The Government will ensure that all counterpart funding required for the Project in accordance with the financing plan — including the cost of land acquisition, other resettlement compensation, and implementation and monitoring under the land acquisition and resettlement plan, utility relocation, and general project management expenses — will be fully provided in a timely manner through approved annual development plan allocations.
- (ii) The Government will ensure that land acquisition and resettlement activities are implemented in accordance with all applicable laws and regulation, and ADB's policy on involuntary resettlement, as set out in the agreed upon resettlement plan, including
 - (a) land and rights-of-way acquired in a proper and timely manner;
 - (b) compensation and entitlements as stipulated in the resettlement plan;
 - (c) timely provision of counterpart funds and disbursements to affected peoples;
 - (d) guarantee to meet unforeseen obligations in excess of budget estimate;
 - (e) adequate supervision, monitoring, and reporting by the Executing Agency;
 - (f) external monitoring and evaluation by a competent independent agency (consultant or NGO);
 - (g) annual audit of resettlement fund disbursements and expenditures;

- (h) adequate information dissemination and consultation with affected peoples;
 - (i) documentation of consultation and grievances;
 - (j) updated resettlement plan if the scope of the Project is changed; and
 - (k) regular reporting of progress to ADB.
- (iii) The Government will ensure that all environmental mitigation measures identified in the IEE and to be identified in the EIA are incorporated into the project design and followed during project construction, operation and maintenance in consultation with, DOE, and in accordance with ADB's EIA requirements.
- (iv) The Government will ensure that civil work contractors comply with all applicable labor laws, do not employ child labor for construction and maintenance activities, and provide appropriate facilities for children in construction campsites. The Government will set employment targets for women for road construction activities, and will require contractors not to differentiate wages between men and women for work of equal value. A specific clause will be included in bidding documents, and compliance will be strictly monitored during project implementation.
- (v) The Government will ensure that an adequate number of information and education campaigns on sexually transmitted diseases and HIV/AIDS¹⁶ for construction workers will be conducted at worksites as part of the health and safety program.
- (vi) The Government will ensure that loan proceeds for routine road maintenance will be used for contracting out routine maintenance of about 50 km of regional or type A feeder roads through a performance-based maintenance contract for 3-5 years.
- (vii) The Government will ensure that within 18 months of loan effectiveness, supervision consultants will carry out a feasibility study for privatizing RHD's road maintenance equipment and workshops, and develop a time-bound action plan for implementing its recommendations.
- (viii) Within 1 year of loan effectiveness, the Government will submit to the Parliament a draft Road Transport and Traffic Act that will replace the Motor Vehicles Ordinance.
- (ix) The Government will absorb the current staff resources in BRTA Road Safety Cell financed under the World Bank's Road Rehabilitation and Maintenance Project 3, and provide sufficient budget for the Road Safety Cell to carry out its tasks as secretariat to NRSC.

¹⁶ HIV/AIDS = Human immunodeficiency virus/acquired immunodeficiency syndrome.

B. Conditions for Loan Effectiveness

- (i) The Government will approve a project proforma for the Project.
- (ii) The terms for the administration of the OPEC loan as set forth in a draft of the OPEC Administration Agreement will have been agreed upon between ADB and OPEC Fund.

C. Conditions for Contract Award for Civil Works

- (i) The Government will ensure that, after detailed design and before award of civil works contracts, a full land acquisition survey, 100 per cent census of people affected, and 100% asset inventory, are required to finalize the resettlement plan. This would provide a final head count of affected people, and final measurement of losses in terms of numbers of assets lost, broken down by category of loss and category of entitled person, and applicable rates per category. Affected people include both those affected through loss of assets and those affected through loss of livelihood. The resettlement budget should be revised based on the new data collected, and any additional land acquisition and resettlement cost will be borne by the Government. This full resettlement plan will be submitted to ADB for review and approval before award of civil works contracts.
- (ii) The Government will prepare a full EIA for Mymensingh-Nandail road as part of detailed designing and submit it with DOE's environmental clearance to ADB before award of civil works contract.
- (iii) RHD will (i) appoint the supervision consultants in accordance with ADB's *Guidelines on the Use of Consultants*; and (b) acquire or make available the land and the rights to land, free from any encumbrances, required for the execution of the Project before award of civil works contract.

D. Condition of Disbursement for Civil Works for the Jamalpur-Dewanganj Road (contract No. 3) and Saidpur-Parbatipur Road (contract No. 4)

- (i) The OPEC Fund Loan Agreement will have been duly executed and delivered, and all conditions precedent to its effectiveness will have been fulfilled.
- (ii) The Government will have submitted to ADB a legal opinion stating that the OPEC Fund Loan Agreement has been duly authorized or ratified by, and executed and delivered on behalf of, the Government and OPEC Fund, and is legally binding upon OPEC Fund and the Government in accordance with its terms, subject to the fulfillment of the conditions precedent to its effectiveness.

VI. RECOMMENDATION

75. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve (i) the loan in various currencies equivalent to Special Drawing Rights 48,964,000 to the People's Republic of Bangladesh for the Road Network Improvement and Maintenance Project from ADB's Special Funds resources with an interest charge at the rate of 1% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board; and (ii) the administration by ADB of a loan not exceeding the equivalent of \$10,000,000 to the People's Republic of Bangladesh for the Road Network Improvement and Maintenance Project, to be provided by the OPEC Fund for International Development.

TADAO CHINO
President

12 September 2002

PROJECT FRAMEWORK

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks
Sector Goals Economic development and poverty reduction through improved transport efficiency and strengthened integrated road networks linking national, regional, and feeder roads	Increase in gross domestic product and expansion of employment and earnings Traffic increase in feeder roads higher than that in national and regional roads for the next 5 years Road condition of feeder roads improved to the level of national and regional roads	Compilation of statistics	Political stability and improved governance Complementary development in project areas
Purpose Provide rural farmers with better access to markets, social services, and employment opportunities Secure Government resources for road maintenance and promote private sector participation in road maintenance Enhance road safety and axle-load control	Reduced travel time to nearest markets, health services and schools ¹ Growth of rural enterprises ¹ Generated employment in the off-farm sector ¹ Increased labor mobility ¹ Allocation of road maintenance budget per kilometer for Roads and Highways Department (RHD) roads increased on a year-on-year basis for 5 years since loan effectiveness Pilot performance-based road maintenance contract capable of being replicated Accident rate in the project roads decreased by 30% over 5 years after completion of improvement Development of enforceable measures to discourage overloading	Compilation of statistics Socioeconomic surveys Asian Development Bank (ADB) missions to assess implementation of the Project	Amendments of Motor Vehicles Ordinance to incorporate an appropriate penalty structure sufficient to act as a deterrent to potential violators Routine maintenance for a project road contracted out based on a performance-based contract Feasibility study carried out for privatization of RHD's road maintenance equipment and workshops

¹ Baseline data will be surveyed during the detailed design phase.

Outputs Improvement of 47 km of regional road and 127 km of type A feeder roads Periodic road maintenance of 400 km of roads Routine road maintenance of 50 km of regional or type A feeder roads based on a performance-based long-term contract Black spots improvement and education and public campaign for road safety	Procurement completed by Jun 2004 All construction works completed in accordance with technical specifications and requirements of the engineering design by Jun 2007 Year-round passage after completion Sealing and overlay of priority roads within Annual Road Maintenance Plan for the years of 2005/2006 and 2006/2007 Contracting out of routine maintenance of 50 km of regional or type A feeder roads to a private sector on a performance-based contract for 3-5 years Road safety audit and black spot improvement	ADB missions to monitor the implementation of the Project Monitoring of road maintenance contract Quarterly progress report Project completion report	Government's counterpart funding fully provided for Land acquisition and resettlement plan properly prepared and implemented Environment mitigation measures identified by the IEE and the EIA fully incorporated in detailed designing of project roads Contractors complying with all applicable labor laws Government approval of project proforma before loan effectiveness
Activities Detailed designing Recruitment of supervision consultants Preparation of tender document Procurement Construction Construction supervision Contracting out of routine maintenance	Start Apr 2003, completed Dec 2003 Start Jul 2003, completed Mar 2004 Start Jul 2003, completed Dec 2003 Start Dec 2003, completed Jun 2004 Start Jul 2004, completed Jun 2007 Start Jul 2004, completed Jun 2007 Start Dec 2003, completed Jun 2007	Quarterly progress report	High-quality work by contractors
Inputs Land, civil works, and administration Consulting services Contingencies and interest during construction Project financing	\$102.4 million \$6.2 million \$14.3 million ADF loan of \$65 million, Government financing of \$47.9 million, and cofinancing of \$10.0 million	Quarterly progress report	Asian Development Bank loan of \$65.0 million and necessary cofinancing by Dec 2002 Timely and adequate provision of counterpart funds

ADF = Asian Development Fund, EIA = environmental impact assessment, IEE = initial environmental examination.

EXTERNAL ASSISTANCE TO THE ROADS SUBSECTOR, 1977–2001

Source	Project	Amount (\$ million)	Year of Approval
ADB	• Khulna-Mongla Road	15.00	1977
	• Feeder Roads Improvement	58.00	1985
	• Road Improvement	137.50	1987
	• Flood Damage Restoration	40.00	1988
	• Second Flood Damage Restoration	80.00	1989
	• Cyclone Damaged Roads Reconstruction	28.80	1991
	• Road Overlay and Improvement Project	68.00	1993
	• Jamuna Multipurpose Bridge	200.00	1994
	• Jamuna Bridge Access Roads Project	74.25	1997
	• Flood Damage Rehabilitation Project (1998)	45.60	1998
	• Southwest Road Network Development Project	115.00	1999
	• Road Maintenance and Improvement	68.70	2000
	Subtotal	930.85	
World Bank	• Second Highway	10.00	1979
	• First Highway Supplemental	6.00	1982
	• Road Rehabilitation and Maintenance	102.00	1987
	• Flood Damage Rehabilitation	25.00	1989
	• Second Road Rehabilitation and Maintenance	146.80	1994
	• Jamuna Multipurpose Bridge	200.00	1994
	• Third Road Rehabilitation and Maintenance	270.96	1998
	Subtotal	785.76	
Japan	• Upazila Connecting Roads (JICA)	4.40	1985
	• Construction of Meghna Bridge(JICA)	56.00	1986
	• Construction of Meghna-Gumuti Bridge(JICA)	74.00	1991
	• Jamuna Multipurpose Bridge (JBIC)	200.00	1994
	• Jamuna Bridge Access Road Project (JBIC)	50.40	1997
	• Construction of Small and Medium Bridges on Dhaka-Chittagong Highway (JICA)	21.23	1998
	• Meghna Bridge Resettlement Project (JICA)	1.66	1999
	• Paksey Bridge (JBIC)	116.93	1997
	• Rupsa Bridge (JBIC)	77.85	2001
	Subtotal	602.47	
People's Republic of China	• Buriganga Bridge	19.00	1986
	• Shambhuganj Bridge	14.00	1989
	• Mohananda Bridge	6.50	1991
	• Karatua Bridge	8.50	1996
	• Gabkhan Bridge	10.30	1988
	Subtotal	58.30	
Netherlands	• Karnaphuli Bridge	25.80	1987
United Kingdom	• Bailey Bridges	25.00	1981
	• Gorai River Bridge	69.00	1986
	• Institutional Development Component-2	10.00	1994
	• Institutional Development Component-3	7.00	1999
	• Bridge Improvement and Maintenance Project-2	20.90	1995
	• Bhairab Bridge	37.94	1998
	• Reconstruction of Narrow Bridge and Culvert	11.00	1999
	Subtotal	180.84	
Denmark	• Road Maintenance Equipment	3.50	1981
	• Supply of Road Rollers	2.50	1983
	• Dhaka-Aricha Highway	30.00	1993
	• Important Road Rehab. in Patuakhali and Barguna	33.70	1999
	• Khagrachari-Rangamati Road	17.38	2001
	Subtotal	87.08	
Italy	• Dinajpur-Panchagarh Road	25.00	1991
Kuwait	• Doarika-Shikerpur Bridge Project	21.63	1998
	• Sylhet-Tamabil Road Project	22.00	1996
	Subtotal	43.63	
Total		2,714.73	

JBIC = Japan Bank for International Cooperation, JICA = Japan International Cooperation Agency.

DETAILS OF PRELIMINARY DESIGN OF ROADS

A. Summary of Design Approach and Technical Standards

1. Introduction

1. The Project involves improving 47 kilometers (km) of regional roads and 127 km of type A feeder roads in Mymensingh region and in Rangpur region.

2. The roads or road sections to be improved under the Project were traditionally constructed with sand seal surfacing or thin bituminous carpeting over brick macadam base, which have deteriorated and do not satisfy international standards in alignment, cross section, and pavement structure. The suggested improvements are full reconstruction following the current alignment, but including widening and correcting substandard curves.

3. As required by the terms of reference for the project preparatory technical assistance (TA 3508-BAN: Road Network Improvement and Maintenance I), the consultant conducted the feasibility study for the project roads and prepared preliminary designs. The TA consultant designed the project roads in accordance with current international standards and procedures but largely followed Geometric Design Standards of RHD (unpublished), and Guidelines for Bridge Design by RHD, respectively, for cross section parameters of roads and structural configurations. The principal international standards that were adopted follow:

- (i) For the highway alignment design: TRRL. UK. 1998. Recommendations of Transport and Road Research Laboratory, Overseas Road Note 6; and American Association of State Highway and Transportation Officials (AASHTO). 1994. *A Policy on Geometric Design of Highway and Streets*.
- (ii) TRRL. UK, and AASHTO. Method for Design of Pavements. Overseas Road Note 31.
- (iii) For bridges and other drainage structures: AASHTO. 1996. *Standard Specifications for Highway Bridges*.
- (iv) For materials, AASHTO and American Society for Testing and Materials methods were used.

2. Horizontal and Vertical Geometry and Cross Sections

4. Traffic counts were taken during the feasibility study, and projections were developed for the 20-year project evaluation period. The projections were used to determine physical capacity requirements in terms of number and width of lanes for motorized and nonmotorized traffic, and intersection layouts. A design speed of 85 km per hour for national and regional roads and 65 km for feeder roads was adopted and the horizontal and vertical alignments were designed accordingly.

5. Cross sections were developed from traffic projections for motorized and nonmotorized traffic, and the terrain. The cross section consists of motorized traffic lanes of 7.3 m, 5.5 m, and 3.65 m, respectively, for national, regional, and type A feeder roads, with two surfaced shoulders of 1.5 m for all types of road except for the pilot feeder road, which will have 2.0 m hard shoulders. A feature that adds to the overall cost but is considered necessary for reasons of safety and traffic flow efficiency is surfaced shoulders along the length of each project road. The shoulders will provide space for nonmotorized and slow motorized traffic as well as space

for vehicle repairs, tire replacement, or mechanical breakdown, without disturbing traffic flow or posing high traffic safety risks.

3. Pavements

6. The pavements were designed in accordance with accepted international standards and procedures for a 20-year life, with provision for overlays during or at the end of 10 years to cover the serviceability loss and extend the life to 20 years while maintaining international roughness index at recommended level. The designs will be based on traffic counts and traffic projections (for capacity), and axle-load surveys and projections (for structural capacity). The pavement structure will consist typically of an improved subgrade, a granular subbase of brick aggregate, a base of stone aggregate, asphaltic concrete surfacing (base course and wearing course), or double bituminous surface dressing. Roughness values for the completed pavements, expressed in international roughness index terms, should be 2.0-2.5.

4. Bridges and Drainage Structures

7. The structures were designed in accordance with AASHTO standards. AASHTO HS20 live loading was adopted and the return period of 20 years was considered for drainage structures. Improvement of structures includes (i) rehabilitating bridges/culvert decks, and widening structures according to road section and RHD guidelines; (ii) reconstructing structures that must be replaced because of structural and hydrological inadequacy; and (iii) constructing new structures on realigned sections.

B. Roads for Improvement

8. Details of the roads for improvement are in Table A3.

Table A3: Details of Preliminary Design of Roads

Item	Mymensingh Region			Rangpur Region		
	Mymensingh-Nandail	Muktagacha-Chechua	Jamalpur-Dewanganj	Mithapukur-Madhyapara	Thakurgaon-Ranisankail	Saidpur-Parbatipur
Length (km)	47.0	10.0	41.0	24.0	37.0	15.0
Number of Lanes	2 lanes	2 lanes	2 lanes	2 lanes	2 lanes	2 lanes
Pavement Width						
Current	5.5 m traffic lane	5.5 m traffic lane	3.65 m traffic lane	5.5 m traffic lane	3.6 5 m traffic lane	3.65-5.5 m traffic lane
Design	5.5 m traffic lane	5.5 m traffic lane	3.65 m traffic lane	5.5 m traffic lane	3.65 m traffic lane	5.5 m traffic lane
Shoulder Width						
Current	1.81 m each, no pavement	1.22 m each, no pavement	1.28 m each, no pavement	1.48 m each, no pavement	1.72 m each, no pavement	1.9 m each, no pavement
Design	3.35 m each, 1.5 m paved	2.95 m each, 2.0 m paved	2.45 m each, 1.5 m paved	2.45 m each, 1.5 m paved	2.45 m each, 1.5 m paved	2.45 m each, 1.5 m paved
Improvement Type	Reconstruction	Reconstruction	Reconstruction	Reconstruction	Reconstruction	Reconstruction
Pavement (Typical)						
Bituminous Surface Dressing (mm)			15-20		15-20	
Asphalt Concrete(mm)	125	100		125		125
Aggregate Base (mm)	275	250	225	250	225	250
Aggregate Subbase (mm)	275	250	250	250	250	200
Improved Subgrade (mm)	300	300	300	200	250	200
Construction Cost (\$ million)	31.9	4.0	13.5	11.0	11.1	8.1

CRITERIA FOR SELECTING PERIODIC ROAD MAINTENANCE SUBPROJECTS

1. The periodic road maintenance component will finance a time slice of maintenance of roads under the Roads and Highways Department's (RHD's) responsibility from RHD's annual road maintenance plan (ARMP). The work will be divided into two annual tranches and will be implemented over two years. Each tranche will cover civil works valued at about \$8 million equivalent, providing for periodic maintenance of about 200 kilometers (km) of roads.

2. Roads to be included will need Asian Development Bank's (ADB's) approval. They will be selected annually in order of estimated economic returns, based on the rankings produced each year by the ARMP, and subject to the criteria listed below. Among roads satisfying the listed criteria, preference will be given to roads that were previously improved with ADB assistance. The criteria for selecting subprojects for the periodic maintenance program are as follows:

- (i) The roads are included in RHD's ARMP and have been given priority in periodic maintenance tasks, using the Highway Design and Maintenance Standards Model.
- (ii) The roads are located within the districts of Dinajpur, Gaibandha, Kurigram, Lalmonirhat, Nilphamari, Panchagarh, Rangpur, and Thakurgaon in the northwest region, and Jamalpur, Kishoreganj, Mymensingh, Netrokona, and Sherpur in the central north region.
- (iii) The proposed civil works will be limited to periodic maintenance consisting of overlay and sealing works, but excluding road development, upgrading, and widening.
- (iv) Based on a minimum 10-year evaluation period using full life cycle costs and benefits, the estimated economic internal rate of return for the road maintenance works will be at least 20%.
- (v) The proposed works will not adversely affect the environment and will include mitigation measures when environment impacts are anticipated.
- (vi) Sufficient Government counterpart funding from the RHD budget will be allocated to implement the works as scheduled.
- (vii) To facilitate efficient subproject implementation and to encourage participation by qualified contractors, the civil works will be arranged in packages each with an estimated value of at least \$1.0 million.

PERFORMANCE-BASED MAINTENANCE CONTRACT

A. Concept

1. A performance-based maintenance contract is an agreement between a government department or state enterprise and a private contractor whereby the private contractor maintains the road to achieve specified condition standards for a certain period of time (usually long-term, ranging from 3 to 10 years) in return for a fixed payment stream.

2. The concept of a performance-based contract originated from a consideration of (i) the increasing lack of personnel within the government department to measure the vast quantity of activities involved in the more traditional maintenance contracts, and to monitor performance standards using input indicators; (ii) the frequency of claims resulting from the need to increase the quantity of activities in the original contracts; (iii) the need to focus more on customer satisfaction; and (iv) the need to shift greater responsibility to contractors throughout the entire contract period, as well as to stimulate and profit from their innovative capabilities.¹

3. The performance-based contract is different from a traditional quantity- and unit-price-based, short-term maintenance contract. In the traditional maintenance contract, the private sector maintains an existing road based on input indicators, such as materials, equipment, and labor, and more frequently, tons of pothole patch material used, number of linear meters of pipe culverts replaced, and number of square meters of crack sealed. In the performance-based contract, the private sector maintains an existing road on the basis of customer-based performance indicators, such as riding and strength quality (smoothness), safety features, and aesthetic and attractiveness of the roadside.

4. The performance-based contract is also different from a road operation and maintenance concession. Under the performance-based contract, performance risks are allocated between the government/client and the contractor. However, the traffic risk remains with the government. Under the road operation and maintenance concession, the concessionaire assumes the traffic and, ultimately, the revenue risks. The concessionaire collects toll, maintains the road, and pays an agreed-upon amount to the government. Since the risk from uncertain traffic is to be borne by the private sector, the road operation and maintenance concession is suitable only for roads with sufficient traffic volume. For low-volume roads, the performance-based contract may prove a promising alternative modality for private sector participation in road maintenance.

5. Performance-based maintenance is especially suitable for low-volume roads with gravel surface or thin bituminous surface treatments, as the continued serviceability of such roads depends on the quality and reliability of future maintenance. It offers an effective means to improve the efficiency and public accountability of road maintenance operations. Other benefits include improved service to road users and reduced size of the government establishment (staff, equipment, and workshops) needed for road maintenance operations. In the long run, this approach will significantly reduce the unit cost of maintenance operations while improving the quality and cost-effectiveness of maintenance works.

B. Monitoring of Maintenance Performance

6. The contractor is responsible for maintaining the road at performance standards agreed upon in the contract. These standards should be defined with the aim of minimizing the long-

¹ Cabana, G, G Liautaud, and A Faiz. 1999. *Areawide Performance-Based Rehabilitation and Maintenance Contracts for Low-Volume Roads*. Proceedings of the 7th International Conference on Low Volume Roads. Baton Rouge, Louisiana. Transport Research Record 1652.

term cost of preserving the road, as well as the cost to the road user. Examples of performance standards are in Table A5.

Table A5: Examples of Performance Standards Applied in Different Contract ^a

Asset Class	Component	Performance Standard
Pavement	Potholes Roughness (asphalt) Roughness (bituminous treatment) Rutting Cracks	No potholes IRI<2.0 (Argentina), IRI<2.8 (Uruguay) IRI<2.9 (Argentina), IRI<3.4 (Uruguay) <12 mm (Argentina), <10 mm (Uruguay) Sealed
Shoulders	Potholes Cracks Joints with Pavement	No potholes Sealed Vertical alignment<1 cm (Chile, Uruguay), Sealed (Peru)
Drainage System	Obstruction Structures	No obstructions. Should allow for unhindered flow of water (Chile, Uruguay) Without damages and deformations (Chile, Peru)
Road signs and Markings	Road Signs Road Markings Retroreflexivity of Road Markings	Complete and clean (Argentina, Chile) Complete and clean (Argentina, Chile) 160 mcd (Argentina) 70 mcd (Uruguay)
Right-of-Way	Vegetation Foreign Elements	<15 cm high (Argentina, Uruguay) No foreign elements allowed

cm =centimeter, IRI – international roughness index, mcd = meter critical distance.

^a Zietlow, Gunter J. 1999. *Performance Specified Road Maintenance Contracts-The Road to the Future: The Latin American Perspective*. The 21st World Road Congress, Kuala Lumpur, 3-9 October.

7. Vital to the success of the performance-based contract are appropriate and well-defined monitoring procedures, combined with penalties for noncompliance. Inspectors may be hired to inspect the road and make random checks regularly to verify compliance. Road users may also be encouraged to take an important role in monitoring performance by reporting road deficiencies to the road agency. A percentage of noncompliance may be calculated based on a formula incorporated in the contract, by which penalties are applied.

C. Bidding Processes

8. The guiding principle for the bidding processes should be to maximize competition and clarity of the process. The major aspects that should be considered to ensure competitive and transparent bidding processes are as follows:

- (i) Detailed development of the contract should be set out clearly in the bidding documents, specifying the responsibilities of the contractor and the government.
- (ii) A draft contract agreement should be prepared by the government and included in the bidding documents to ensure that all bidders make similar assumptions.
- (iii) The evaluation criteria should be clearly set out in the bidding documents. The most transparent approach is to select a single criterion, perhaps the lowest level of bid price for a given performance specification. The decision should be made only after prequalification procedures where potential bidders are evaluated in terms of their technical, operational, and financial capacity.

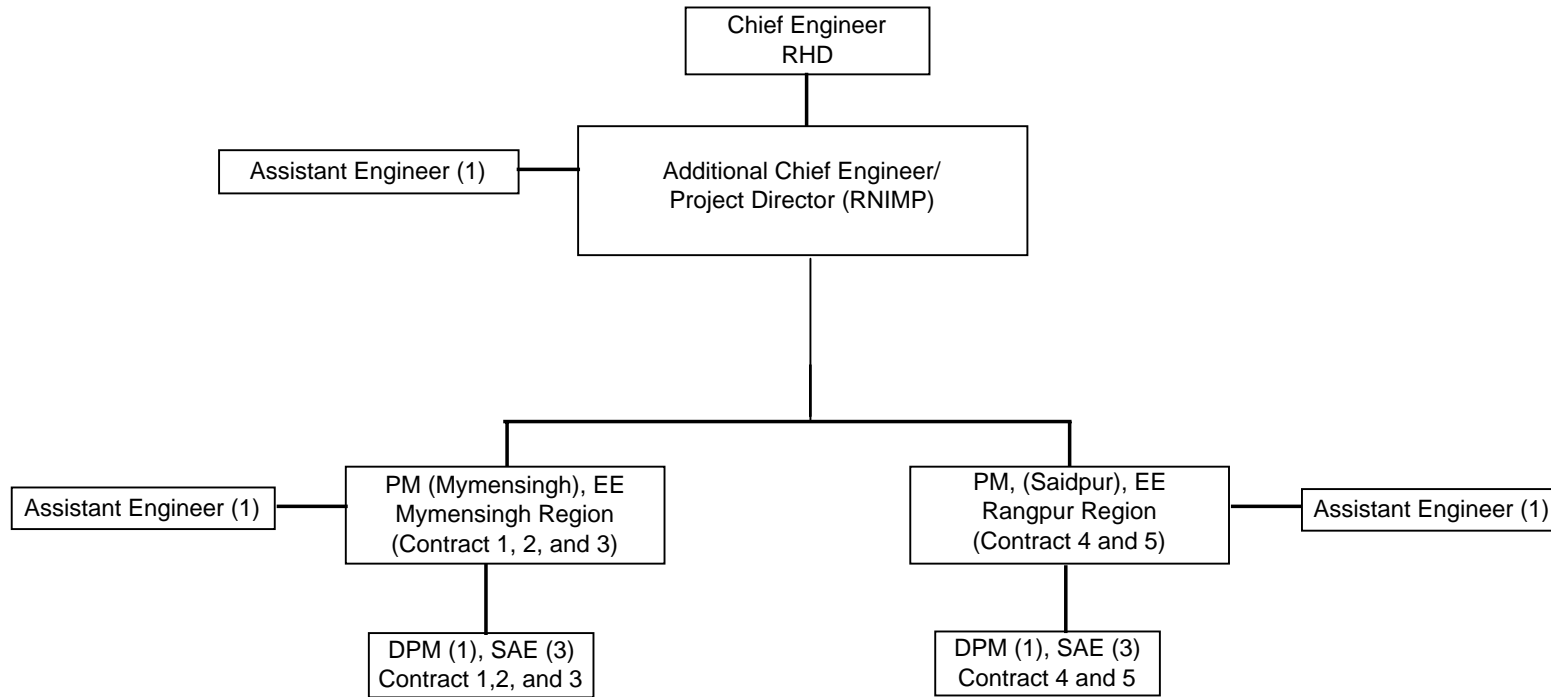
DETAILED COST ESTIMATES AND FINANCING PLAN

(\$ million)

Item	Project Cost			Financing Source		
	Foreign Exchange	Local Currency	Total Cost	ADB	Government	OPEC Fund
A. Base Cost						
1. Land /Resettlement	0.0	3.6	3.6	0.0	3.6	0.0
2. Road Improvement	33.8	45.8	79.5	45.9	23.6	10.0
3. Road Maintenance						
a. Periodic Road Maintenance	5.0	11.0	16.0	5.0	11.0	0.0
b. Routine Road Maintenance	0.3	0.6	0.9	0.7	0.2	0.0
4. Road Safety						
a. Black Spot Improvement	0.2	0.3	0.5	0.4	0.1	0.0
b. Education and Public Campaign	0.1	0.2	0.3	0.2	0.1	0.0
5. Consulting Services						
a. Supervision	3.2	2.0	5.2	5.2	0.0	0.0
b. Project Preparation	0.4	0.6	1.0	1.0	0.0	0.0
6. Project Administration	0.0	1.0	1.0	0.0	1.0	0.0
7. Land Acquisition and Resettlement Plan Implementation	0.0	0.5	0.5	0.0	0.5	0.0
Subtotal (A)	42.9	65.6	108.5	58.5	40.0	10.0
B. Contingencies						
1. Physical	4.0	5.4	9.3	4.0	5.4	0.0
2. Price	1.7	2.5	4.2	1.7	2.5	0.0
Subtotal (B)	5.7	7.9	13.6	5.7	7.9	0.0
C. Interest During Construction	0.8	0.0	0.8	0.8	0.0	0.0
Total	49.4	73.5	122.9	65.0	47.9	10.0

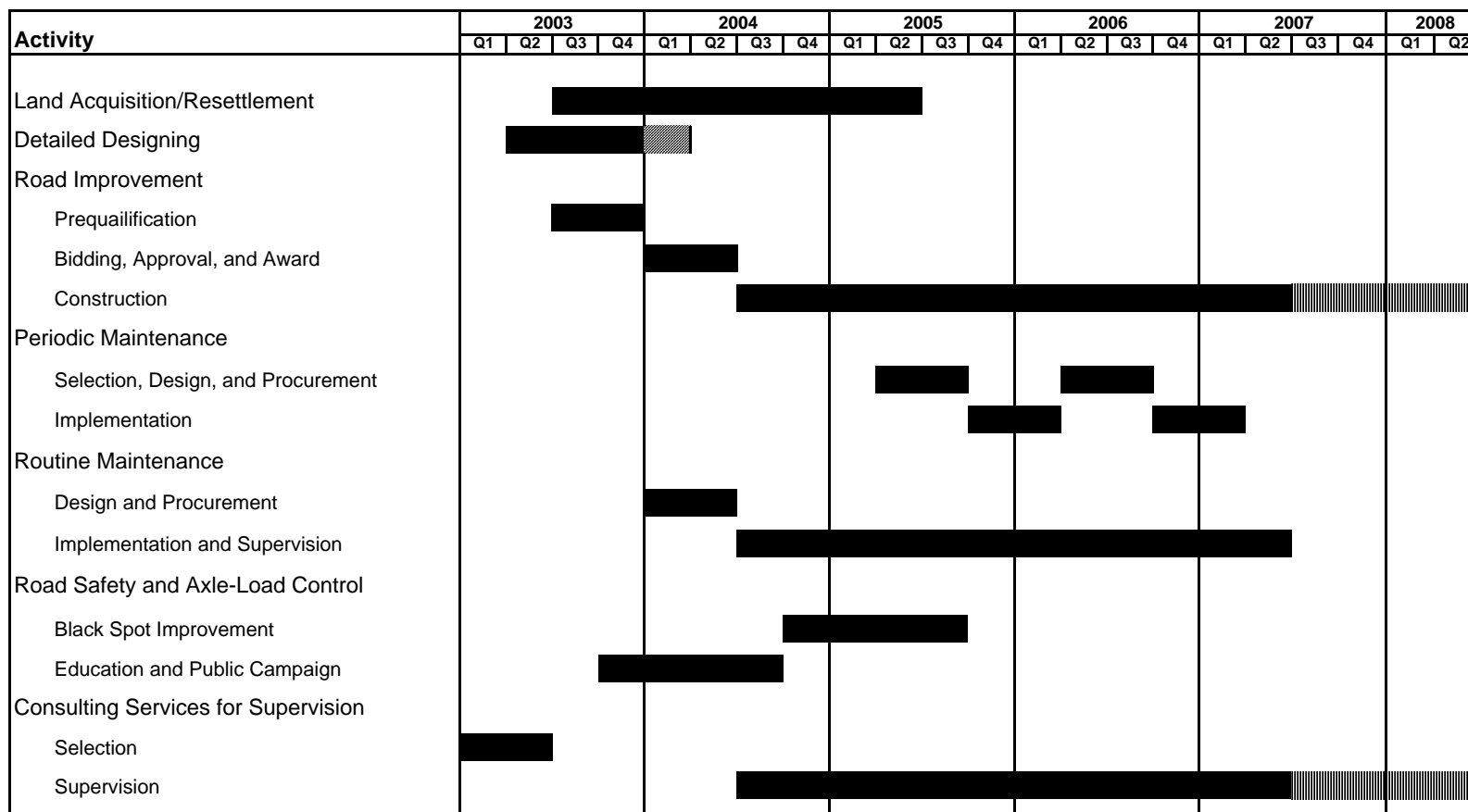
ADB = Asian Development Bank, OPEC = Organization of Petroleum-Exporting Countries.



IMPLEMENTATION ARRANGEMENTS



DPM = deputy project manager, EE = executive engineer, PM = project manager, RHD = Roads and Highways Department, RNIMP = Road Network Improvement and Maintenance Project, SAE = sub-assistant engineer.

IMPLEMENTATION SCHEDULE



 Preconstruction works
 Defects liability period

CONTRACT PACKAGES

Contract No.	Section	Length (km)	Estimated Cost (\$ million)	Type of Procurement
Road Improvement				
Mymensingh Region				
1	Mymensingh-Nandail, Section 1 (20 km) Muktagacha-Chechua (10 km)	30.0	17.6	ICB
2	Mymensingh-Nandail, Section 2 (27 km)	27.0	18.3	ICB
3	Jamalpur-Dewanganj (41 km)	41.0	13.5	ICB
Rangpur Region				
4	Mithapukur-Madhyapara (24 km) Saidpur-Parbatipur (15 km)	39.0	19.1	ICB
5	Thakurgaon-Ranisankail (37 km)	37.0	11.1	ICB
Total		174.0	79.6	
Periodic Road Maintenance		30-80	1.0-3.0	LCB ^a
Total		400 ^b	16.0	

ICB = international competitive bidding, LCB = local competitive bidding.

a Contracts with an estimated value of over \$3 million will be procured through ICB.

b The total length of periodic maintenance will depend on types of work to be required for priority sections.
Around 400 kilometers (km) is an estimated figure based on the average periodic maintenance cost per km.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES TO SUPERVISE CIVIL WORKS CONSTRUCTION

A. The Project

1. These terms of reference set out the works to be undertaken by the consultant for the Road Network Improvement and Maintenance Project, for which the Government of Bangladesh requested a loan from the Asian Development Bank (ADB). The Project, which will be the responsibility of the Roads and Highways Department (RHD) in coordination with the Ministry of Communication, will involve improvement of 174 kilometers (km) of regional and type-A feeder roads in Mymensingh region and Rangpur region. The civil works for the road improvement component will be executed through five contracts, ranging in value from \$11.1 million to \$19.1 million:

- Contract No. 1: Mymensingh – Nandail, Section 1 (regional road, 20 km)
Muktagacha- Chechua (type A feeder road, 10 km)
Reconstruction
- Contract No. 2: Mymensingh-Nandail, Section 2 (regional road, 27 km)
Reconstruction
- Contract No. 3: Jamalpur-Dewanganj (type A feeder road, 41 km)
Reconstruction
- Contract No. 4: Mithapukur-Madhyapara (type A feeder road, 24 km)
Saidpur-Parbatipur (type A feeder road, 15 km)
Reconstruction
- Contract No. 5: Thakurgaon-Ranisankail (type A feeder road, 37 km)
Reconstruction

2. The contracts for the road improvement component will be procured under international competitive bidding (ICB) procedures. Before the consultant to which these terms of reference apply is appointed, the design consultants will have brought procurement to the stage of award of contract. The terms of reference were prepared on that basis. Assuming the procurement and consultant appointment schedules proceed as planned, the consultant will take over the process immediately before notices to proceed with the civil works are issued, and will manage the process from that time onward.

3. The works will be executed under ADB's standard bidding documents (Procurement of Civil Works, August 1997), based on the Federation Internationale des Ingenieurs-Conseils (FIDIC) Conditions of Contract, Fourth Edition. As defined in these conditions, the employer will be RHD, the engineer will be the employer's representative, and the engineer's representative will be the consultant, selected and engaged by RHD in accordance with ADB's *Guidelines on the Use of Consultants*. The consultant will nominate a team leader to act as the representative on site. The construction periods for the individual contracts will be around 36 months.

4. The consultant will prepare the civil works contract packages for the periodic road maintenance component. The works will be packaged in contracts with an estimated value of at least \$1 million each. Civil works packages with an estimated value of \$1 million-\$3 million will be procured in accordance with local competitive bidding procedures acceptable to ADB, using the single-stage, two-envelope procedure. Civil works packages with an estimated value of more than \$3 million will be procured through ICB procedures in accordance with ADB's *Guidelines for Procurement*. The total contract value in each cycle will be about \$8 million.

B. The Consultant

5. The consultant will be an association of international and domestic firms, with the international firm, from a member country of ADB, to lead the association. The firms will have extensive experience in supervising road and bridge works carried out by contract, and will nominate personnel who have similar experience. It is anticipated that the consultant's organization will be essentially as set out in para. 11, although in preparing their proposal, the consultants are at liberty to propose alternative arrangements that, in their opinion, will provide supervision services of an equivalent quality. The final staffing will be adjusted to suit the methods adopted by the contractors for road construction, and the actual procurement and implementation schedules.

C. Scope of Consulting Services

1. Road Improvement Component

6. As the engineer's representative, the consultant's nominated team leader will administer the civil works contract and ensure that the works are constructed in accordance with its provisions. The consultant will have all powers defined as those of the engineer's representative, with the exception of the following, which will be retained and exercised by the employer's appointed engineer, generally on the advice of the consultant's team leader:

- (i) issuing the order to commence the works,
- (ii) approving variation orders that have financial implications,
- (iii) approving significant variations in quantities,
- (iv) approving subletting of any part of the works, and
- (v) approving extensions of time.

7. The consultant's responsibilities in detail will include, but will not necessarily be limited to, the following:

- (i) review the detailed design prepared and updated by the other consultants to identify inconsistencies, etc. and advise the employer on their potential impacts;
- (ii) approve the contractor's work program, method statements, material sources, etc.;
- (iii) prepare and subsequently issue reports as defined;
- (iv) approve and issue working drawings, approve the setting out of the works, and give instructions to the contractor;
- (v) make measurements and keep measurement records;
- (vi) maintain records, correspondence, and diaries;
- (vii) certify work volume and interim certificates of progress payments;
- (viii) assist the engineer with maintaining consolidated project accounts and preparing financial statements and withdrawal applications for submission to ADB;
- (ix) certify completion of part or all of the works;
- (x) inspect the works at appropriate intervals during the defects liability period and certify the Defects Liability Certificate for issuance by the engineer;
- (xi) advise the engineer on all matters relating to the execution of the works, and assist the engineer with processing the contractor's possible claims;
- (xii) ensure compliance with the environmental and social impact mitigation requirements of civil works contracts, monitor the implementation of the

- resettlement plan being carried out by nongovernment organizations, and inform ADB on this process in the monthly progress reports;
- (xiii) monitor women's participation in civil works (specific items will be provided in the civil works contracts) and in afforestation works to be implemented by the Government, and report to ADB through the monthly progress reports;
- (xiv) at the completion of the contracts, undertake benefit monitoring and evaluation of the Project in a format used for the Jamuna Bridge Access Roads Project (Loan 1478-BAN[SF]), and assist in preparing a consolidated project completion report in a format to be provided by ADB;
- (xv) check and certify as-built drawings for the works prepared by the contractors;
- (xvi) provide the employer with complete records, and inception, monthly, and completion reports; and
- (xvii) develop and implement for RHD staff at site training programs on project management including quality assurance and contract administration.

2. Periodic Road Maintenance Component

8. As the engineer's representative, the consultant's nominated team leader will administer the civil works contract and ensure that the works are constructed in accordance with its provisions. The consultant's responsibilities will include, but will not necessarily be limited to, the following:

- (i) assist RHD with selecting the project roads based on the HDM rankings in the annual road maintenance plan;
- (ii) prepare design and bidding documents for the civil works contracts;
- (iii) assist RHD with procurement of civil works;
- (iv) approve the contractor's work program, method statements, material sources, etc.;
- (v) prepare and subsequently issue reports as defined;
- (vi) approve and/or issue working drawings, approve the setting out of the works, and give instructions to the contractor;
- (vii) make measurements and keep measurement records;
- (viii) maintain records, correspondence, and diaries;
- (ix) certify work volume and interim certificates for progress payments;
- (x) assist the engineer with maintaining consolidated project accounts and preparing financial statements and withdrawal applications for submission to ADB;
- (xi) certify completion of part or all of the works;
- (xii) inspect the works at appropriate intervals during the defects liability period and certify the Defects Liability Certificate for issuance by the engineer;
- (xiii) advise the engineer on all matters relating to the execution of the works, and assist the engineer with processing the contractor's possible claims;
- (xiv) at the completion of each cycle, review the implementation of the maintenance program and make recommendations for the next cycle; and upon completion of the second and final cycle prepare a project completion report including evaluation of the program;
- (xv) check and certify as-built drawings for the works prepared by the contractors;
- (xvi) provide the employer with complete records, and inception, monthly, and completion reports; and
- (xvii) develop and implement for RHD staff at site training programs on project management including quality assurance and contract administration.

3. Road Safety Improvement

9. The consultant's responsibilities include the following:

- (i) audit 200 km of roads that will be selected in coordination with RHD, to comply with safety requirements;
- (ii) collaborate closely with RHD (Road Safety Wing) during each phase of the works;
- (iii) conduct traffic accident surveys, determine accident-prone areas, examine accident causes; and recommend solutions, including black spot improvement and public awareness;
- (iv) conduct a heavy vehicle survey, and propose heavy vehicle management including selection of suitable locations for providing axle-load control and necessary public campaigns; and
- (v) develop a road safety improvement program for audited roads, and assist RHD in implementing it.

4. Performance-Based Maintenance

10. The consultant's responsibilities include the following:

- (i) establish a performance indicators standard for 50 km of regional or type A feeder roads to be contracted out to domestic contractors based on a performance-based contract for of 3-5 years;
- (ii) prepare a basic design indicating the minimum standards to apply;
- (iii) propose contract packages and produce tender and contract documentation suitable for performance-based maintenance to be procured under LCB methods;
- (iv) produce cost estimates for the cost of works (including the performance-based maintenance);
- (v) assist RHD in procuring civil works, and supervise and monitor the works for the first year of the contract period;
- (vi) train RHD staff to properly supervise and monitor the contractor's works for the remaining period of contract; and
- (vii) conduct a feasibility study for privatizing RHD's road maintenance equipment and workshops, and develop a time-bound action plan to implement the recommendation of the study.

D. Staffing Inputs

11. With reference to the scope of consulting services, the following staffing inputs for each consultant contract were used in formulating the Project (person-months are in parentheses):

1. International Team Members (about 163)

- (i) Senior highway engineer/engineer's representative and team leader (40)
- (ii) Senior resident engineer for the road improvement component/senior construction engineer (36)
- (iii) Senior resident engineer for the periodic road maintenance component/senior road maintenance engineer (12)
- (iv) Senior pavement and materials engineer (36)
- (v) Senior structure engineer (6)

- (vi) Senior contract specialist (6)
- (vii) Senior environment specialist (3)
- (viii) Senior social development/resettlement specialist (3)
- (ix) Senior traffic engineer and road safety specialist (3)
- (x) Senior performance-based maintenance contract specialist (18)

2. Domestic Team Members (about 745)

- (i) Senior highway engineer/deputy team leader (40)
- (ii) Resident engineers (road improvement) -3 positions (36/person)
- (iii) Resident engineers (periodic maintenance) -2 positions (24/person)
- (iv) Quantity surveyors (road improvement) -3 positions (36/person)
- (v) Quantity surveyors (periodic maintenance) -2 positions (12/person)
- (vi) Pavement/material engineer (road improvement) - 3 positions (36/person)
- (viii) Pavement/material engineers (periodic maintenance) -2 positions (12/person)
- (ix) Structure engineer-2 positions (24/person)
- (x) Survey engineer -2 positions (36/person)
- (xi) Contract specialist (36)
- (xii) Hydrologist (12)
- (xiii) Environment specialist (12)
- (xiv) Social development specialist (12)
- (xv) Traffic and road safety engineer (6)
- (xvi) Junior engineer (road improvement) - 4 positions (30/person)
- (xvii) Junior Engineer (periodic maintenance) -2 positions (12/person)
- (xviii) Legal Expert on Performance-based Maintenance contract (3)

E. Implementation Schedule

12. For the purpose of preparing proposals, consultants are to adopt the following implementation schedule. This is subject to change as project preparation and procurement proceed.

Consultant's contract signed	2nd quarter March 2004
Civil works construction begins	3rd quarter July 2004
Civil works completed	2nd quarter June 2007

Based on the above completion date of civil works, the consultant's services will continue up to the fourth quarter of December 2007, with minimum inputs for completing measurements, payments, and final report. In addition, the consultant's senior resident engineer will assist RHD with inspecting works during and at the conclusion of the defect liability period. For the purpose of the supervision contract, the team leader's input will be 2 person-months, over 2-3 visits. Suitable domestic inputs, professional and support, will also be required over this period.

F. Reports

13. The consultant will prepare the following reports and distribute them in the number of copies indicated to RHD and ADB:

	RHD	ADB
Inception (including design review)	6	2
Monthly	15	1
Project completion	6	5

14. Monthly reports, and other reports as applicable, are to include schedules of contract payments and variation orders, graphic representations of progress against the program based on the approved contract schedules, charts of physical progress on major items, relevant photographs, and details of impediments to the works and proposals for overcoming them.

G. Facilities and Equipment

15. The consultant will obtain the following items through the civil works contracts:

- (i) field office accommodation including team leader's office, furnishings, maintenance, security, and facilities;
- (ii) vehicles, drivers, fuel, and vehicle maintenance for the consultant;
- (iii) office and survey equipment, consumables, and skilled and unskilled labor needed for surveys and quality control; and
- (iv) engineers' laboratories with equipment, tools, consumables, and operation and maintenance.

16. The following items will be provided by the consultant:

- (i) technical support staff for the supervision works, and
- (ii) administration support staff.

OUTLINE TERMS OF REFERENCE FOR DETAILED DESIGN OF THE PROPOSED ROAD NETWORK IMPROVEMENT AND MAINTENANCE PROJECT II

A. Background

1. These terms of reference (TOR) set out the scope of work to be undertaken by the consultants to be appointed by the Roads and Highways Department (RHD), and the Ministry of Communications (MOC) to prepare detailed engineering design for the proposed Road Network Improvement and Maintenance Project. The feasibility of this project was studied separately under Asian Development Bank (ADB) technical assistance (TA), and the project roads for detailed design selected as a result of the TA as agreed upon by RHD and ADB. The project roads to be covered by the TOR will be around 200 kilometers (km).

B. Scope of Services

2. The TOR for the consulting services will include, but will not be limited to, the following tasks:

- (i) undertake inventories of the road sections selected for detailed engineering, including geometric features, type and condition of drainage structures, an estimate of their load carrying capacity, pavements, and other major features;
- (ii) carry out topographic detailed engineering surveys, including horizontal and vertical alignments and cross sections; establish horizontal control points, benchmarks, and reference beacons as required in preparing detailed engineering designs to enable construction quantities to be calculated to a reasonable accuracy (5%);
- (iii) prepare designs based on the typical pavement sections, applying sound engineering practice and giving due regard to environmental aspects in accordance with ADB's environmental guidelines;
- (iv) investigate the suitability of locally available construction materials and, where necessary, locate new quarries and borrow pits and assess the quality and quantity of materials and hauling distance;
- (v) study the existing hydrological regime in detail – based on an analysis of rainfall and flood records, supplemented by detailed field investigations – to establish the adequacy of road embankment levels, culverts, and side ditches; and design appropriate bed and slope protection for the drainage structures and bridges;
- (vi) assess cross-drainage requirements and propose new structures (bridges, culverts, and causeways as appropriate) or improvements to existing structures where these are otherwise structurally unsound;
- (vii) on the basis of projected traffic levels, pavement structure studies, axle load consideration as determined from activities (i) to (vi) and from previous studies, traffic safety, the initial environmental examination (IEE), and the environmental impact assessment (EIA) (if required) and other relevant inputs, prepare practical and cost-effective geometric (horizontal, vertical, intersection, etc.), pavement, structural designs;
- (viii) determine the most cost-effective improvement option for each project road section. Where new pavements are to be provided, they will be designed for a 10-year life, using an internationally recognized procedure, with provision for overlays during or at the end of that period to extend the life to 15-20 years;
- (ix) prepare detailed technical specifications for each work item, taking into account relevant specifications in use in this country and elsewhere for similar works;

- (x) prepare detailed engineering designs of roads, pavement, and structures, and bills of quantities, and calculate the detailed costs estimates using the COSTAB software for civil works appropriately broken down into foreign (direct and indirect) and local components as well as taxes and custom duties;
- (xi) prepare rights-of-way acquisition plans, where appropriate, and utility relocation plans;
- (xii) prepare appropriate contract packages, taking into account the location of the project roads and size of contracts, suitable for international competitive bidding;
- (xiii) prepare detailed project implementation schedules showing anticipated progress of works and expenditures for each contract package; the schedules will reflect seasonal climatic effects at the work sites and will take into account typical outputs on earlier ADB-financed road projects;
- (xiv) prepare engineering drawings, including road plans (1:2,000 scale), longitudinal profiles (scales: 1:2,000 horizontal and 1:200 vertical), cross sections, structure plans, and other relevant requirements;
- (xv) prepare the prequalification and contract documentation (use ADB's Sample Bidding Documents - Procurement of Civil Works, [August 1997]);
- (xvi) assist RHD with prequalifying potential contractors and evaluating tenders in accordance with ADB's *Guidelines for Procurement*;
- (xvii) depending on the findings of the IEE, carried out in the feasibility study, prepare detailed EIA and summary environmental impact assessment (SEIA);
- (xviii) prepare a resettlement action plan for the project-affected persons; and
- (xix) conduct poverty impact study for the project roads.

C. Staffing

3. Staffing inputs will be about 20 person-months international and 140 of domestic consulting services. Required expertise will include highway design, materials and pavement engineering, structure engineering, contract management, social development, and environment assessment.

D. Duration

4. The consulting services will begin around January 2004 and will last for 9 months plus 3 more months with minimum inputs for preconstruction activities.

E. Reporting and Documentation Requirements

5. The consultant will prepare the following reports: (i) inception report, (ii) progress report, (iii) interim report, (iv) draft EIA and SEIA reports (if required), (v) draft resettlement action plan, (vi) final design report, (vii) prequalification documents, (viii) bidding documents, (ix) draft prequalification evaluation report, and (x) draft bid evaluation report.

ECONOMIC ANALYSIS

A. General

1. The principal project component comprises improvement of six roads in poor condition. Three roads — a regional road and two type A feeder roads — are located in the north-central region and three type A feeder roads are in the north-west region. The main quantifiable benefits from these investments are savings in road user costs (vehicle operating costs [VOCs] and time costs) for traffic using the roads.

B. Traffic Analysis and Projections

1. Base Year Traffic

2. For purposes of traffic analyses, representative vehicles (Table A12.1, column 1) were selected based on traffic surveys. The 2001 base year traffic was estimated on the basis of historical trends, classified traffic counts, an origin-destination (O-D) survey carried out in the project areas, and a seasonal adjustment factor.

Table A12.1: Base Year Traffic, by Project Road, 2001
(No.)

Representative Vehicle	Muktagacha-Chechua	Mymensingh-Nandail	Jamalpur-Dewanganj	Mithapukur-Madhyapara ^a	Thakurgaon-Ranisankail	Saidpur-Parbatipur
<i>Motorized</i>						
Heavy Truck	0	0	0	20	0	0
Medium Truck	224	228	29	193	69	162
Small Truck	37	88	63	73	21	37
Large Bus	60	251	11	30	11	4
Medium Bus	69	51	8	82	67	91
Micro Bus	52	104	10	38	28	63
Car	55	65	8	64	4	19
Utility	92	65	21	107	40	112
Auto-Rickshaw	197	91	111	110	196	10
Motorcycle	258	306	326	639	803	454
Total Motorized	1,044	1,249	587	1,356	1,239	952
<i>Nonmotorized</i>						
Bicycle	927	1,134	2,071	3,660	1,706	3,907
Rickshaw	1,831	1,478	3,098	1,229	1,268	2,754
Cart	0	8	229	6	0	0
Total Nonmotorized	2,758	2,620	5,398	4,895	2,974	6,661

^a Year 2006 traffic. There is no year 2001 traffic as one section of this road is currently not open to traffic, Year 2006 traffic was estimated taking into account traffic diversion from two other roads.

2. Traffic Projections

3. Traffic projections were developed from an analysis of historical traffic growth patterns in relation to growth in gross domestic product (GDP), population, vehicle fleet, and industrial production; and where applicable, such as for the road, taking into account estimates of traffic diversion based on O-D analyses. The key factors in the traffic projection are growth in GDP and the elasticity of traffic to GDP growth. Over the analysis period — 2002-2026 — GDP is projected to grow in a range of 5.0% - 5.5% and the elasticity of transport demand is projected in a range of 1.20-1.35. The resultant traffic growth factors are shown in Table A12.2.

Table A12.2: Traffic Growth, by Vehicle Category
(%)

Period	Motorized		Nonmotorized
	Passenger	Freight	
2002 – 2007	7.4	7.2	6
2007 – 2012	6.9	6.6	5
2012 – 2026	6.3	6.0	5

4. The road improvements will also give rise to generated traffic, i.e., traffic that did not exist before the investment. Additional traffic will be generated as a result of the increased attractiveness of the project area for agricultural production and business activities following reduced VOCs. Generated traffic was estimated conservatively at 10% of normal traffic.

C. Economic Evaluation

1. Benefits and Beneficiaries

5. The direct and quantifiable benefits of the project consist of savings in VOCs to normal traffic (and diverted traffic where applicable), and savings in time costs. Nonquantifiable benefits include greater comfort for passengers and reduced damage to cargo. Indirect benefits are those arising from secondary effects brought about by the reduction in VOCs and time costs, which brings about increased economic activities. These benefits have been estimated in the form of generated passenger and cargo traffic.

6. The beneficiaries include (i) those benefiting directly from the investments, i.e., the various categories of road users such as owners of buses and trucks, passengers of the various vehicle categories, cyclists and pedestrians, cargo owners, and those involved in the production of the cargo; and (ii) those benefiting indirectly because they live and work in the area of influence of the roads. The latter population is estimated at some 2.75 million people when the zone of influence is taken as a band of 15 km (7.5 km on either side of the road). It is also estimated that about 50% of this population is living below the (upper) poverty line.¹ This population is expected to benefit because the road investments will alleviate the underlying causes of poverty in the area by facilitating economic integration and economic development on which the realization of the area's broader needs—medical facilities, schools, and livelihood opportunities—ultimately depends.

2. Evaluation Approach

7. The evaluation examines investment and maintenance costs, traffic, road condition and VOCs and time costs with and without the project over a period of 20 years following completion of the road, and identifies and estimates the differences in cost between the two cases. All costs elements are valued at border prices, using a world price numeraire, with all taxes and duties excluded. A standard conversion factor of 0.8 was applied to nontraded items and labor. This evaluation was carried out using the Highway Design and Maintenance Model 4 (HDM 4), which has been calibrated for conditions in Bangladesh under the Institutional Development Project sponsored by the main funding agencies to the road sector. Under the without-project case, only maintenance and minimum spot improvements would be carried out, while the with-the-project

¹ Upper poverty line: the level of per capita income or consumption at which the members of a household can be expected to meet their basic food consumption needs – i.e., to meet their calorie intake requirements – as well as some essential nonfood consumption.

case provides for major improvement. For generated traffic, half of the VOC savings of normal traffic was adopted.

3. Technical Options

8. The engineering evaluations examined the feasibility of rehabilitating only the pavement through an overlay. This was not found viable due to the poor quality of the pavement layers and of the subgrade and embankment. Full reconstruction was found to be the only viable alternative as the existing structure would not be able to withstand expected pavement loadings. Under the reconstruction alternative, two options were evaluated:

Option 1: full reconstruction of the existing pavement, with repair and maintenance of existing structures but without widening or hard shoulders.

Option 2: full reconstruction of the existing pavement with widening of embankments, construction of new structures and rehabilitation of existing structures, and including hard shoulders and widening where justified.

9. Option 2 was selected because all the roads carry a substantial amount of non-motorized traffic and the wider pavement and hard shoulders provide additional benefits mainly through higher speeds, which are not fully reflected in the quantification of road user savings. In addition, the hard shoulders provide significant qualitative benefits — comfort and safety — to nonmotorized traffic, a large portion of whom are the poor. One of the roads was therefore selected as a pilot case for provision of wider, hard shoulders for nonmotorized traffic.

4. Construction Costs

10. The economic costs of road construction and maintenance are expressed in early 2002 prices (Table A12.3) and were derived from the financial costs by deducting taxes and duties from the costs of imported equipment and materials and applying a standard conversion factor of 0.8 for nontraded items and labor. The costs cover physical contingencies, land acquisition, environmental mitigation, and resettlement as well as construction supervision.

Table A12.3: Construction Costs
(Tk million)

Road	Per km	Total
Muktagacha-Chechua	27.1	271.2
Mymensingh-Nandail	30.3	1,424.6
Jamalpur-Dewanganj	20.8	850.9
Mithapukur-Madhyapara	24.8	595.2
Thakurgaon-Ranisankail	18.5	684.4
Saidpur-Parbatipur	31.1	466.8

5. Vehicle Operating Cost and Time Costs

11. VOCs for the representative motorized vehicles are those prepared by RHD under the institutional development component (IDC). They were derived from financial costs by excluding from various cost components all applicable duties and taxes such as customs duty, development surcharge, supplementary duty, value added tax, advance income tax, and landing permit fee. For fuels, the economic costs of petrol, diesel, and lubricants were calculated by

excluding the tariff and other implicit taxes and including the economic cost of distribution expenses. For conversion of financial costs to economic ones, a standard conversion factor of 0.8 was used. For nonmotorized vehicles, the cost and operating parameters developed by RHD under the IDC were also used. VOCs for the representative vehicles at free flow speeds are shown in Table A12.4.

Table A12.4: VOC for Representative Vehicles
(Tk/km at IRI^a of 2 and 6)

Vehicle Category	IRI of 2	IRI of 6
Medium Truck	8.58	9.62
Small Truck	5.02	5.87
Large Bus	9.13	11.14
Medium Bus	5.42	6.24
Microbus	4.52	5.20
Car	7.50	8.41
Utility	6.08	7.71
Auto Rickshaw	0.83	0.95
Motorcycle	0.80	0.85
Bicycle	0.37	0.53
Rickshaw	0.78	1.27
Animal Cart	3.44	4.89

^a IRI = international roughness index.

12. The economic costs of passenger time are based on the findings of several studies carried out in Bangladesh and estimates developed by RHD based, among others, on primary surveys carried out in different parts of the country. For freight, the time cost estimate was based on the cost of working capital tied up in representative trucks in the area of influence using cargo flows obtained in the O-D surveys. The time costs are shown in Table A12.5.

Table A12.5: Value of Passenger and Cargo Time
(Tk/vehicle-hour)

Vehicle Category	Passenger	Cargo
Medium/heavy Truck		15.58
Small Truck		6.68
Bus	14.0	
Microbus	24.3	
Car	32.4	
Utility	11.9	
Auto Rickshaw	19.0	
Motorcycle	22.6	

6. Economic Internal Rate of Return (EIRR) and Net Present Value (NPV)

13. The EIRR for each road was estimated for both improvement options 1 and 2 using the HDM-4 evaluation model, which compares the streams of costs and benefits under the with- and without-the-project scenarios. It was assumed that construction would be spread over 3 years with about 20% of the works being completed in the first year, 40% in the second year, and 40% in the third. It was assumed that periodic maintenance or overlays or both are applied every 6-8 years depending on traffic loading. The salvage value of the road at the end of the 20-year evaluation period is estimated at 20% under improvement option 2.

14. At 12% discount, NPV calculated for each project road ranges from Tk390 million to Tk2.2 billion. The consolidated NPV for six roads amounts to Tk5.4 billion. Details of the EIRR and NPV for each project road are provided in Table A12.6.

Table A12.6: EIRR and NPV

Road	EIRR(%)	NPV (Tk million)
Muktagacha-Chechua	28.8	390
Mymensingh-Nandail	29.6	2,192
Jamalpur-Dewanganj	17.7	601
Mithapukur-Madhapara	23.1	586
Thakurgaon-Ranisankail	19.5	566
Saidpur-Parbatipur	30.8	1,064
All Roads Combined	24.5	5,399

7. Risk and Sensitivity Analysis

15. A review of the various factors affecting on the EIRR indicates that the main risk in the viability of the investment is premature road failure due to inadequate maintenance and overloading. The Project includes measures to address these risks by helping the government to establish and implement appropriate policies.

16. Various sensitivity tests indicate that the EIRR is robust in relation to construction cost increases on the order of 15-20 %. The EIRR, however, is sensitive to benefits derived from nonmotorized traffic. Accordingly, the EIRR was tested for a 30% reduction in benefits from nonmotorized traffic. The results of the sensitivity tests as well as a combination of adverse outcomes are shown together with their switching values in Table A12.7.

Table A12.7: EIRR Sensitivity Analysis

Road	(%)			
	Construction Cost + 15%	Benefits – 20%	Cost + 15% Benefits – 20%	NMT Benefits – 30%
Muktagacha-Chechua	25.9 (1.42) ^a	24.2 (0.55)	21.7	23.8 (0.89)
Mymensingh-Kishoreganj	26.6 (1.52)	24.9 (0.57)	22.3	25.2 (1.06)
Jamalpur-Dewanganj	16.3 (0.65)	15.6 (0.34)	14.3	14.7 (0.52)
Mithapukur-Madhyapara	20.7 (0.90)	19.6 (0.45)	17.4	22.2 (3.14)
Thakurgaon-Ranisankail	17.9 (0.77)	16.9 (0.39)	15.4	16.3 (0.61)
Saidpur-Parbatipur	28.3 (2.40)	27.0 (0.68)	24.7	25.6 (0.86)

NMT = nonmotorized traffic.

^a Switching values in parentheses.

PROJECT BENEFITS DISTRIBUTION ANALYSIS

A. Introduction

1. The poverty impacts of the Project are reviewed and analyzed from three perspectives: (i) how the approach to developing the Project and its design features contributed to enhancing its poverty reduction impacts; (ii) how the Project benefits are distributed among the various categories of road users and who among those road users are poor people; and (iii) how the effects of the Project are allocated among a broader group of project participants including – in addition to road users – lenders, construction labor, and the government (also representing the rest of the economy).

B. Project Development and Design Features

2. **Selection of Project Area and of Project Roads.** To ensure that the project beneficiaries include a high proportion of the poor, the project regions and project roads were carefully selected at different stages, with a strong poverty focus present at every stage. First, the target area where the project roads were selected comprises some of the poorest districts in the country. Second, roads in the area were screened based on criteria including the socio-economic profile of the districts and of their population, expected poverty reduction impacts, road conditions, traffic, road network requirements, and input from stakeholders through an extensive process of consultations. In the third and final stage, a selection was made from among the roads screened, taking into account the funding constraint.

3. **Technical Design.** The technical features were designed so as to address the key needs and concerns of poor people among the beneficiaries. The road designs not only provide for wider shoulders than the standard so far, in addition, the shoulders will be surfaced. These features will ensure much improved road space and riding conditions for nonmotorized vehicles, the mode used overwhelmingly by the poorer sections of the population.

4. **Targeted Implementation Arrangements.** In addition, targeted arrangements during the construction phase are designed to benefit the poor. A first implementation feature is labor recruitment from the project area. The Project will disburse sizable expenditures for skilled, semi-skilled, and unskilled labor. Unskilled labor and half of the semiskilled labor can be recruited from the project area by incorporating labor recruitment requirements in the contracts. The funds that will be directly injected in the local economy from employment of locally recruited labor would amount to some Tk355 million based on estimates of the number of labor-days of skilled, semiskilled, and unskilled labor for road construction and using local labor rates.

5. A second feature is procurement of goods and services from the project area. During the construction phase, the Project will generate a considerable demand for goods and services that can be purchased in the project area, thereby benefiting the local population. The contract documents will include provisions to ensure that goods and services are procured in a manner that will benefit local suppliers.

6. A third feature relates to gender equity. Women are expected to participate in the employment generated by the works. The construction contracts will include provisions ensuring that women employed in road construction activities will receive comparable pay for comparable work.

C. Distribution of Project Benefits Among Road Users

7. The aim of distribution analysis is to estimate (i) the proportion of the project benefits that accrues to each category of road users, i.e., vehicle owners or operators, passengers, cargo owners, farmers and laborers involved in producing the cargo; and (ii) the proportion that accrues to poor people. More specifically, estimation of the distribution of the net benefits involves five steps.

8. **Identifying Beneficiaries and the Non-Poor by Vehicle Type.** Vehicles are classified into six categories for the analysis: (i) buses; (ii) trucks; (iii) cars, utility vehicles, motorcycles; (iv) tempos (auto rickshaw); (v) rickshaws; (vi) bicycles. For each category, potential beneficiaries can be identified, such as bus owners and bus passengers; truck owners, businessmen, farmers, and laborers; owners of cars, utility vehicles, motorcycles, passengers, and drivers; tempo owners, drivers, and passengers; rickshaw owners and passengers; and cyclists. Several of these beneficiaries — bus owners; truck owners; owners, passengers and drivers of cars, utility vehicles, and motorcycles; and tempo owners — can safely be classified as non-poor without risk of error. However, the benefits that accrue to them need to be estimated and separated out from the total benefits generated by the Project.

9. **Distributing Benefits Between Vehicle Owners and Clients.** How the benefits will accrue to the vehicle owners on the one hand and to the clients — i.e., passengers, cargo owners, and those involved in producing the cargo — on the other depends on the organization, structure, and competitiveness of the local transport and product markets. For buses (large, micro and mini), tempo vehicles, and rickshaws, it is necessary to examine these markets to determine how the benefits are distributed between owners and passengers. For cargo, it is also necessary to examine the trucking markets to determine the distribution of benefits between the parties concerned. For the category of cars, utility vehicles, and motorcycles, 100% of the savings accrue to the non-poor and further investigation is not required. In the case of bicycles, the owner and the user are the same and, hence, it is necessary to examine only the poverty status of the rider.

10. For buses, there are essentially two segments in the market: (i) the low-cost, regulated segment; and (ii) the luxury bus segment, which is unregulated. The former represents a major traffic category on the project roads, while the latter does not. Bangladesh Road Transport Authority (BRTA) sets fares at the national level, and there are strong pressures from government to keep fares low. The standard bus fare had remained constant at Tk0.32/kilometer (km) from the 1980s to the 1990s and increased to Tk0.47/km in 2001. The standard fare at the national level implies cross subsidization between roads featuring low VOC and roads with high VOC. The effect of the regime is that it will not be possible to witness fare reductions on particular roads as a result of VOC savings arising from improvements on these roads.

11. However, this regime does not preclude passing on the bus passengers part of the benefits of nationwide programs of road improvement. This is possible through a lagging of fare increases in response to continuing increases in input costs (depreciation, parts, fuel, labor, etc). The impact of delayed fare increases on the real cost of bus transport was examined by modeling the situation that prevailed in Bangladesh during the 1980s and 1990s. The finding is that the lagging effectively provides bus passengers with part of the benefits of nationwide road improvements, i.e., 60-70% of the savings are passed on. Thus, all bus passengers in the nation benefit from improvements on the project roads while the bus passengers on the project

roads benefit from all other road improvements in the nation. Based on these findings it was assumed that bus passengers will be the beneficiary of 55% of the savings resulting from road improvements.

12. For tempo vehicles, the market is essentially unregulated. At the local level, entry is organized through the owners associations. Businessmen typically own 3-5 vehicles that are rented out on a daily basis to drivers. Rates charged by the drivers vary according to market and road conditions. Thus, owners will gain from road improvements through reduced wear and tear and reduced maintenance costs. Drivers will gain on account of a potentially higher volume of activity as a result of faster speeds and lower fuel consumption. Passengers will gain in particular because the local markets on the project roads are competitive. Therefore, it is estimated that 80 percent of the savings to tempo vehicles from improvements on the project roads will accrue to tempo passengers.

13. For rickshaws, the market situation is comparable to that for tempo vehicles. A rickshaw is either owned by a small businessman and rented out on a daily basis to pullers or, to a lesser extent, owned by the puller or his family. For most typical runs, there are standard fares that take road conditions into account. Owners will gain from road improvements through reduced wear and tear on vehicles and reduced maintenance costs. Pullers will gain on account of lower effort and faster speeds. Passengers will gain on account of lower fares and faster speeds. It is estimated that 80% of the savings will accrue to passengers.

14. As regards cargo, trucking markets are very competitive with rates being negotiated between truckers and cargo owners or merchants and the outcome being related to various factors, the principal ones being supply and demand and road conditions. However, the distribution of the benefits of road improvements between truck owners and businessmen/merchants on the one hand and farmers and laborers on the other depends largely on the competitive conditions in the product markets. Thus, knowledge of the nature of the cargo movements and of the product markets is essential. Detailed information on the commodities being transported in the project regions was obtained through the origin-destination survey of a sample of 2,770 trucks. Cargo movements were consolidated in broad categories: food grains, building materials, fruits and vegetables, cement, fertilizer, coal, iron and steel, sand, jute, edible oil, and general cargo.

15. In general, product markets for the commodities concerned are relatively competitive. Prices for agricultural produce are determined mainly by the forces of supply and demand, and a reduction in VOC will be passed on largely to farmers. This is because at the margin, following transport cost reductions, additional production will become viable and bring about an increase in farmgate prices. Prices for agricultural inputs (e.g., fertilizer) are competitive at the retail level with the result that a large proportion of VOC will also be passed on to farmers. For building materials a distinction needs to be made between materials sourced within the region (sand, bricks, rock) and materials imported into the region. For the former, supply is from a large number of small producers and demand also comes from a relatively large number of buyers; this allows cost savings to be shared between the two groups. For building materials imported within the region, there are alternative sources of supply and the retail markets are competitive so that a good proportion of the savings will be passed on to the final buyers. For general cargo (mainly consumer products of various kinds) retail markets are competitive and a fair proportion of the savings will be passed on to consumers.

16. Insight into these market conditions allows apportioning the benefits by commodity group to the various parties concerned: truck owners, merchants, and businessmen (who are non-

poor) on the one hand, and farmers, laborers, and consumers (among whom there are both poor and non-poor) on the other. When the estimates of the percentages of benefits accruing to the different parties are weighted by the cargo volumes for each commodity group, it is found that on average 46% of the benefits will accrue to truck owners, merchants, and businessmen, and 54% to farmers, laborers, and consumers.

17. Classification of Passengers, Farmers, Laborers and Consumers According to Poverty Status. Determining the poverty status of passengers involves two steps: (i) establishing a poverty line¹ for the area of the project roads; (ii) assessing the proportion whose income is below the poverty line. Poverty lines in taka per person per month were established for two regions based on the findings of the Household Expenditure and Income Survey (HEIS) – 2000 by the Bangladesh Bureau of Statistics (BBS).

18. To determine the proportion for each of the five categories of passengers whose income is below or above the poverty line, an extensive program of surveys of randomly selected passengers was undertaken on three of the six roads. The average percentage of passengers below the lower poverty line, below the upper poverty line, and of the nonpoor is shown in Table A13.1.

Table A13.1: Poverty Status of Road Users, Average for 3 Roads

Road User Category	% Below the Lower Poverty Line	% Below the Upper Poverty Line	% Non-Poor
Bus rider	40.0	46.9	53.1
Tempo rider	30.3	42.6	57.4
Rickshaw rider	49.5	57.9	42.1
Cyclist	55.9	59.6	40.4
Pedestrian	60.4	67.3	32.7

19. For cargo, the estimate of the poverty status of farmers/laborers involved in the production of the various commodities being transported and of consumers of the general cargo was based on a review of the socioeconomic profile of the two regions and their population, including such factors as the incidence of landless laborers and literacy rates. For farmers/laborers in both regions, the proportion below the upper poverty line was estimated at 65%, which is somewhat above the proportion for the population in the region in general. It was estimated that the same proportion is valid for consumers in the project area.

20. Distribution of Benefits to Poor and Non-Poor. This step of the analysis involves distributing the project benefits to non-poor and poor beneficiaries. For each of the passenger vehicle categories, this is done by combining the percentages of the first-level distribution of benefits (between owners and passengers) with the percentages of the second-level distribution (between poor and non-poor). For cargo this is done by combining the proportion of savings accruing to farmers/laborers and consumers on the one hand, and the proportion of the poor among them on the other. When these proportions are weighted by the volumes of the commodities being transported, an estimate is obtained of the proportion of the total savings that accrues to people under the poverty line.

¹ Poverty line: the level of per capita income or consumption at which the members of a household can be expected to meet their basic food consumption needs i.e., to meet their calorie intake requirements as well as some essential nonfood needs. The difference between the lower and upper poverty lines resides in the difference in the allowance for nonfood consumption as the estimates of the cost of basic food needs are the same for both. The lower poverty line incorporates a very minimal allowance for nonfood goods while the upper poverty line includes the typical nonfood spending of those who just attained the food requirement.

21. When six roads are combined, the proportion of poor is 0% for vehicle owner. For passengers, the average percentage of the poor (among those traveling by bus, tempo, rickshaw, and bicycle) is 64%; and for those involved in the production (and consumption) of cargo (farmers, laborers), the proportion of the poor is 64%.

22. **Calculating the Poverty Impact Ratio (PIR).** Using the percentage of the poor (para. 22), the net present value of the Project is allocated to road users, and then to the poor and non-poor within each road user group. The results are in Table A13.2 and the key entries are elaborated. All amounts are in net present value using a discount rate of 12%.

23. The amount of Tk7.2 billion in the column Economic Minus Financial are the savings that accrue to the different categories of road users. In the table, however, the savings are distributed between vehicle owners on one hand and passengers and cargo on the other.

- (i) **Government of Bangladesh.** The amount of Tk1.73 billion is the present value of Government funding to the Project.
- (ii) **Loans, interest, and principal.** The amount of Tk2.71 billion is the present value of the Asian Development Bank and the Organization of Petroleum-Exporting Countries Fund financing for the Project, while Tk1.18 billion (interest Tk0.42 billion and principal Tk0.76 billion) represents the debt service. The difference between the funding and the debt service (Tk1.53 billion) is the subsidy implicit in the concessional loan terms.
- (iii) **Investment and operations & maintenance.** The amount of Tk4.44 billion is the construction cost, which is matched by funding from the Government and the lenders during the construction period.
- (iv) **Labor.** The amount of Tk437 million is the total amount of (domestic) labor expenditures. The opportunity cost of this labor is estimated at Tk349 million and the difference is a gain for laborers among whom 59% are estimated to be poor (all the unskilled and part of the semiskilled).
- (v) **Gains and losses and poverty impact ratio (PIR).** The balance of gains and losses of the various parties is Tk7.01 billion. Out of this total, Tk3.71 billion accrues to the poor; hence, the PIR is calculated as 0.53.
- (vi) **Sensitivity test.** A sensitivity test that was conducted by lowering the proportion of the poor among vehicle passengers from 64% to 50%. The PIR is lowered from 53% to 43% with a switching value of 86%.

Table A13.2: Distribution of Net Benefits and Poverty Impact Ratio of Road Improvement Investment
(Present Value at 12% Discount Rate)
(Tk Million)

Inflows and Outflows	Financial Present Value	Economic Present Value	Economic Minus- Financial	Car, Utility Veh., MC Owners and Passengers	Other Vehicle Owners	Vehicle Passen gers	Cargo	Labor	Government	Lenders	Total
Inflow											
Road User Benefits		9,332	9,332	903	2,575	5,083	771				
Government (39% cost sharing)	1,733	-	(1,733)						(1,733)		
Loans (ADB and OPEC)	2,711	-	(2,711)							(2,711)	
Outflow											
Investment and O&M	(4,443)	(3,584)	859						859		
Labor	(437)	(349)	88					88			
Interest (ADB and OPEC)	(424)	-	424								424
Principal (ADB & OPEC)	(755)	-	755								755
Net Present Value	(1,615)	5,399	7,014	903	2,575	5,083	771	88	(874)	(1,532)	
Gains and Losses				903	2,575	5,083	771	88	(874)	(1,532)	7,014
Proportion of Poor (%)				0%	0%	64%	64%	59%	10%		
Net Benefits for the Poor				-	-	3,253	493	52	(87)		3,711
											0.53
Poverty Impact Ratio	Sensitivity Test			Ratio of Poor in GOB Net Loss: 50%		Total Net Benefit				3,361	0.48
				Ratio of Poor among Vehicle Passengers: 50%		Total Net Benefit				2,999	0.43

ADB = Asian Development Bank, O&M = operations and maintenance, OPEC = Organization of Petroleum-Exporting Countries.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

A. Linkages to the Country Poverty Analysis

Sector identified as a National Priority in Country Poverty Analysis? Yes	Sector identified as a National Priority in Country Poverty Partnership Agreement? Yes
<p>Contribution of the sector/subsector to reduce poverty in Bangladesh:</p> <p>Bangladesh made notable progress in income poverty reduction since the last few years – from 43% in 1991/92 to 36% in 1995/96. However, this trend masks the fact that poverty at 40% remains much higher in the rural areas than in the urban areas at 15%. There is considerable income disparity across the country. Per capita income is highest in the urban centers of economic activity. In contrast, people living in the project area have per capita income lower than the national average. More than 50% of the people in project area – Rangpur, Jamalpur, Nilphamari, Kishoregonj, Mymensingh, Dinajpur, and Thakurgaon – live below the poverty line. This Project will be a poverty intervention project, since the proportion of the poor among the project beneficiaries is larger than their proportion in the overall population of the country. Poverty criteria, i.e., districts with a high incidence of poverty, were considered in selecting the road corridors.</p> <p>The Project will contribute to poverty reduction in two major ways: by generating income-earning opportunities for the poor and improving their physical access to resources and markets. The Project is expected to have a positive impact on the socioeconomic development of the region, and to provide immediate economic benefits to farmers, merchants, and passengers through better access to goods and services. The improvement of 174 kilometers of roads will improve access to markets and social facilities.</p> <p>Through civil works contracts, the Project will directly generate income-earning opportunities of 133,000 person-months for the poor in the rural areas, the majority of whom fall below the poverty line.</p>	

B. Poverty Analysis

Proposed Classification: Poverty Intervention

What type of poverty analysis is needed?

Poverty impact analysis was prepared to estimate both the percentage of the net benefits that will reach the poor and extremely poor, as well as the number of poor who will receive those benefits. Poverty impact analysis (i) assessed the extent to which transport cost reductions will be passed on to passengers and owners of freight, (ii) assessed the distribution of the benefits between them and other group, and (iii) identified the proportion of poor and very poor beneficiaries and the net benefits they will receive.

Poverty impact indicators to measure the consequences of the Project for the beneficiary will be developed. These indicators will be part of the system developed to measure and monitor project performance. In general, the indicators will provide information relating to travel time and cost for different purposes by different modes of transport, cash crop produced, rural and urban income, labor participation, school attendance, and use of health clinics.

C. Participation Process

A participatory approach was adopted in conducting the Technical Assistance. The participatory process will be implemented by consulting local communities in the project area. Details of the process will be based on the final road design and consultations will be conducted throughout the project cycle to ensure that local concerns and suggestions are taken fully into account. Local community-based organizations will assist the contractors in identifying potential recruitment areas.

The Project will ensure that the affected people and other stakeholders are informed, consulted, and encouraged to participate actively during the implementation of the resettlement plan (RP). A nongovernment organization will be responsible for carrying out public consultation on a continuing basis during the implementation of the RP. The coordinator of resettlement and rehabilitation activities in the Environment and Resettlement Circle of the Roads and Highways Department will be responsible for monitoring this activity. A grievance redress committee (GRC) will be established at each project road link when RP implementation starts. The GRC will comprise key stakeholders, including representatives of the affected people and will be chaired by the union parishad/ward committee member.

D. Social Issues^a

	Significant/ Non significant/ Uncertain/ None	Strategy to Address Issues	Output Prepared ^b
Resettlement ^c	Significant	The socioeconomic survey showed that the Project will affect 4,708 structures and there is a need for additional 60 hectares for widening 174 km of roads. Based on the 40% sample survey, approximately 10,646 people will be affected. The Roads and Highways Department (RHD) submitted an RP to the Asian Development Bank for approval (Appendix 15). The RP will be updated before award of civil work contracts to inventory 100% affected people.	Full
Gender	Not Significant	Gender concerns will be addressed by setting up employment targets for women's construction activities. The contractors will be required not to differentiate wages between men and women for work of equal value, not to hire children as construction workers, and to provide appropriate facilities for children in construction campsites. A specific clause will be included in the bid documents and compliance strictly monitored during project implementation. Involving women of the community in different project activities will ensure women's participation in the project area. Women labor contracting societies will be organized and involved in project activities	No

		like earthwork and maintenance. This activity will help the poor and destitute women to become socially and economically more self-sufficient.	
Affordability	None	The ability of the client groups to acquire and utilize services to be offered to them on completion of the Project is high. It is expected that, with the development of the roads, the number of passenger buses will increase because of good road condition, which will facilitate greater mobility of the rural poor in the project areas.	No
Labor	Not significant	The Project will have a positive impact through more employment opportunities in road construction for skilled and unskilled laborers. Recruitment of unskilled laborers will be targeted to provide maximum benefit to the poor, particularly the most disadvantaged group; and labor recruitment requirements will be included in the bidding specifications.	No
Indigenous People	Not significant	The social assessment report indicates that tribal people live in one project area; however, the number is negligible and they are not directly affected by the Project. Therefore, an indigenous people development plan is not warranted. A follow-up fact-finding mission conducted by a social development specialist before the Management Review Meeting confirmed that the Project had no negative impact on indigenous people,	No
Other Risks/ Vulnerability		The capacity of RHD to implement and monitor the RP and incorporate cross-cutting social issues is critical. Strengthening the RRC and GRC has to be incorporated in the terms of reference for consultants. Independent monitors should be appointed before implementing the RP.	Not Known

^a If not known, a contingency should be included in the TA budget to predict the need for a plan.

^b A plan will be required at design stage if any of the social issues are found significant.

^c Significant involuntary resettlement requires a full resettlement plan; nonsignificant requires a short resettlement plan.

SUMMARY RESETTLEMENT PLAN

A. Introduction

1. The summary of the resettlement plan (RP) is based on the resettlement action plan prepared for affected persons (AP) living within the right-of-way of the Road Network Improvement and Maintenance Project (RNIMP). The RP was prepared by Bangladesh Roads and Highways Department (RHD) through a consultative process with key stakeholders, particularly the AP and host communities.

B. Scope of Resettlement

2. In 2001, RHD conducted a socioeconomic survey in Rangpur and Dinajpur areas. The survey identified the potentially affected properties and categorized them as residential, commercial, residential-cum-commercial mixed, and agricultural. Each property category was further divided into owner, tenant, encroacher, and squatters. The survey found that the Project would affect 2,018 structures and would need for an additional 60 hectares in improving 174 kilometers of roads. In this sample, 76% of the structures are in commercial use and 24% in residential use. Commercial structures are mostly small shops used by approximately 60% tenants. In the growth center areas, more than 50% of the structures in commercial use are *pucca*,¹ overall, only 5% of the structures are *pucca* and the rest combine tin wall and roof or bamboo-thatched wall and roof.

C. Socioeconomic Information

3. In 2001, a socioeconomic survey was carried out through interviews of 1,943 (40%) sample households. The total population of the surveyed households was about 10,129, an average of 5.5 persons per household. The survey found that 89.5% of the households are shopkeepers. The literacy rate of the people in the project area was around 39%. The household expenditure and income data indicates that 12% of the sample households earning up to Tk3,000/per month spend up to 102% of their income, indicating their indebtedness. Households in the income group Tk3,001 and above have considerable savings, indicating their relative prosperity. Considering all income groups, an average household saves up to 29.8% of its income. Landholding is an indicator of relative poverty or prosperity. In Bangladesh a minimum landholding of 0.2 hectare indicates a state of absolute poverty. The limitations of the RP could record only marginal and upward landholding and no landless household was identified. In the sample areas overall, approximately 40% of the landholdings are small – 0.4-1.2 hectares of agricultural land – followed by marginal landholdings, 31.4%.

D. Policy Framework and Entitlement Matrix

4. The current legislation governing land acquisition for public purposes in Bangladesh is the Acquisition and Requisition of Immovable Property Ordinance (Ordinance 11 of 1982) and its subsequent amendments in 1993 and 1994. The legal process is initiated by an application by the requiring agency or department to the deputy commissioner (DC) of the District. In determining the amount of compensation for affected owners, the DC considers a number of factors, e.g., present market rate to determine the value of the land. As there is no national policy for resettlement of project-affected people in Bangladesh, the Asian Development Bank (ADB) policy on involuntary resettlement will be the guideline in this resettlement plan.

¹ *Pucca* means permanent structure: floor, wall, and roof made of concrete.

5. The project compensation policy and entitlement matrix was designed to cover compensation for lost assets, and restore or enhance the livelihoods of all categories (direct, indirect, titleholders and non-titleholders) of AP. The AP will not only receive replacement land or cash for land and other assets at market price; many additional measures will be adopted, such as moving allowance, assistance to households headed by females and other vulnerable groups, to help the AP to regain or improve their lives in the postresettlement period. Table A15 below explains the various compensation and entitlement policies applicable under the Project.

Table A15: Entitlement Matrix

Type of Loss/Impacts	Definition of Entitled Person/Unit	Definition of Entitlement	Application Guidelines
I. Agricultural Land			
Privately owned land	Landowner: a person with an original certificate of title, or a transfer certificate of title in case of registered property; and tax declaration for unregistered land	1. Replacement value in cash or land-for-land when acquisition exceeds 25% of the total holding of the entitled person (EP) and if lands for replacement are available; in all cases of land-for-land compensation, replacement value will be equal to or greater than the productivity of the land acquired	Owners losing up to 25% of their total holdings to be compensated in cash. EPs to be exempt from capital gains tax against this payment. All fees and property transfer costs will be paid by the Roads and Highways Department (RHD).
1. Loss of income from agricultural activities	Agricultural lessee/tenant: a person who personally cultivates land furnished either by the owner, or the legal possessor of the property and covered by the agrarian laws of the country	2. Provision of agricultural inputs and/or livestock to all agriculturist.	Owners losing more than 25% land will be offered replacement value in cash, or replacement land if available.
2. Loss of water bodies for natural and cultured fisheries		3. Disturbance compensation to agricultural lessee equivalent to the value of 5 years' gross harvest from the area being acquired	Compensation for loss of standing crops will be provided, taking into consideration 10 times the annual value of the gross production of the concerned land, averaged over the preceding 5 years.
3. Loss of standing crops;	Informal tenant: a person cultivating land under an informal or short-duration lease, not covered by the agrarian laws of the land	4. Financial assistance to informal tenant, equal to gross harvest for 1 year, not less than Tk10,000.	Owners losing more than 75% of their land or whose farm is reduced to a nonviable size as a result of the acquisition may ask that the entire farm be acquired in cash or in return for replacement land if available.
4. Loss of perennial crops			Compensation for perennial crops and trees at replacement cost/value and fish will be calculated as annual produce value for the last 3 years.
			Agricultural lessee is entitled to value of the gross harvest calculated on the basis of the average of gross harvest during the last 5 years.
			Share-tenants are at par with agricultural lessees.
			Informal tenants are entitled to gross harvest based on average of the last 3 years.

II. Residential Land and Structures			
<p>1. Loss of housing by owners, tenant, and informally sheltered (the <i>uthuli</i>)</p> <p>2. Loss of plot or frontage of structures</p>	<p>Owner: a person with a certificate of title (titleholder) or tax declaration for the residential land</p> <p>Renting occupant: a person or family occupying a structure on payment basis</p> <p>Uthuli: extremely poor people, informally sheltered free of cost within the structure of an owner</p>	<p>1. Replacement value in cash without depreciation</p> <p>2. For isolated cases, RHD will make an attempt to provide land within the same settlement if lands for replacement are available</p> <p>3. Owner/occupant will receive assistance to transport all material from previous residence to new location, and owners will receive a dislocation allowance equivalent to 3 months' average income</p>	<p>1. Proportionate cash compensation when only partial acquisition is made and the PAH is not displaced</p> <p>2. Full replacement cost for residential structure, without depreciation</p> <p>3. Transitional allowance for 3 months to owners</p> <p>4. Shifting allowance for owners, tenants, and uthuli</p> <p>5. Rental allowance for three months for owners, tenants, and uthuli</p>
III. Commercial Structures/Establishments			
<p>1. Loss of permanent or temporary units</p> <p>2. Loss of structure or frontage of small industries (e.g., rice mills)</p>	<p>Project affected people running a business establishment on property to be acquired. This includes owners and tenants of structure as well as encroachers and squatters on the right-of-way</p>	<p>1. Replacement value in cash without depreciation</p> <p>2. Alternative location with equivalent land to rehabilitate the business if lands for replacement are available</p> <p>3. Compensation for loss of income during the transition period, but not less than 3 months' income</p>	<p>1. The Project will provide replacement value for structure and transportation cost as for other project-displaced households</p> <p>2. Transitional allowance for actual time lost, the minimum being 3 months' income</p>
IV. Livelihood			
<p>Loss of work-day/income by wage employees</p>	<p>Wage employee: a person employed by a shop or other establishment</p> <p>Assistance to vulnerable groups</p>	<p>Income restoration assistance</p> <p>Financial assistance to household below poverty line Tk3,000; training grant of Tk6,000 per person for non-titled people; and grant of Tk1,000 for households with female heads.</p>	<p>1. Transitional allowance to wage employees, equivalent to three months' minimum wage</p> <p>2. Income restoration assistance, including skills upgrading</p>

V. Social Infrastructure/Civic Amenities			
Loss of social infrastructure like religious places, libraries, etc.	The local community in general	Replacement of the properties	1. Reconstruction of the social infrastructure within easy reach of all users 2. Shifting allowance as appropriate.

E. Resettlement Objective and Strategy

5. The principal objective of the RP is to ensure that AP should be at least as well-off as, if not better-off than, they would have been without the Project. AP should be able to maintain and, preferably improve their standard of living and quality of life. AP are defined as those who stand to lose, as a consequence of the Project, all or part of physical and nonphysical assets, including homes, homesteads, productive land, commercial properties, tenancy, income-earning opportunities, social and cultural activities and relationships, and other losses that may be identified during the process of resettlement planning.

6. To achieve the objective, a full range of mitigation measures is available to help AP to overcome the potentially adverse effects of moving from the current location. Of the 2,108 households potentially affected, approximately 10% may have houses and shops displaced for all rights-of-way in six corridors. All households prefer to make their own arrangements for resettlement and will be assisted during the transition period. Landless households, nontitleholders, and the ultrapoor will be entitled to resettlement and income restoration assistance if they have been occupying the affected land for at least 3 years before the census cutoff date and do not have title to any other land. It is mandatory that all relocation efforts be completed 1 month before construction of the main investment project starts. The Project will provide resettlement and rehabilitation (R&R) allowance. After all compensation and other entitlements have been delivered, land titles will be transferred from AP to RHD.

F. Consultation, Participation, and Grievance Mechanism

7. The Project proposes to continue stakeholder consultation throughout project implementation. It will ensure that the affected population and other stakeholders are informed, consulted, and allowed to participate actively during implementation. The nongovernment organization (NGO) project manager at the road link level will be responsible for carrying out public consultations on a continuing basis during implementation, and the R&R coordinator in the Environment and Resettlement Circle (ERC) of RHD will be responsible for monitoring this activity. The summary of the RP was posted on ADB's web site. Before implementation of the RP, a brochure containing the summary of the RP will be disseminated to the APs.

8. A grievance redress committee (GRC) at each project road link will be set up in sufficient time for AP to lodge complaints during the initial determination of compensation. The GRC will comprise the road link level project manager (NGO contractor), a project affected people representative, a union parishad member (in rural areas) or ward committee member (in urban areas), and the subdivisional engineer of RHD for that project road link. The union parishad/ward committee member will chair this committee. The procedures of grievance redress were developed to determine the qualified beneficiaries living in the project area.

G. Institutional Arrangements

9. ERC in RHD, headed by an executive engineer, was established under previous ADB loan to monitor the R&R activities of the road improvement projects. The main tasks of RHD for the R&R activities involve resettling and rehabilitating the affected persons, or otherwise mitigating any negative social impacts related to land acquisition for the road improvements. While the Government acquires land for RHD through the deputy commissioner of an affected district, RHD is directly responsible for implementing the R&R activities.

H. Monitoring

10. Internally, ERC will conduct monthly internal monitoring of the progress of the planned land acquisition and resettlement activities. The land acquisition officer in the office of the deputy commissioner will assist RRC in monitoring the progress of land acquisition. The external monitoring and evaluation agency will be commissioned for annual, midterm, and end-term monitoring and evaluation of these activities.

I. Cost Estimates

11. Adequate budgetary support is fully committed and will be made available to cover the costs of land acquisition within the agreed upon implementation period. The estimated costs for RP implementation and management amount to Tk210 million (approximately \$3.6 million equivalent). This is an indicative budget, which includes compensation for compensation, income rehabilitation and assistance to vulnerable groups, and support for project implementation. The revised RP, based on a detailed census, will prepare a detailed annual budget specifying timing for the release of funds and will meet resettlement costs in full.

J. Implementation Schedule

12. Construction activities will not start until the required lands have been acquired and the populations appropriately relocated in accordance with the objective. All resettlement activities will be coordinated with the civil works and will be completed satisfactorily before awarding the civil works contracts for the pipeline. At this point in time, it is anticipated that the construction works will start early in 2004. Therefore, the land acquisition activity is expected to be completed by the end of 2003.

SUMMARY ENVIRONMENTAL ANALYSIS

A. Introduction

1. The proposed Road Network Improvement and Maintenance Project is categorized as a B project in the Asian Development Bank's (ADB's) *Environmental Assessment Requirements*. An initial environmental examination (IEE) was prepared. This appendix is based on the information in the IEE and the summary IEE reports that were undertaken under the project preparatory technical assistance.¹

B. Description of the Project

2. The proposed Project will involve reconstructing existing roads to higher standards by widening, adjusting the alignment, and other improvements (e.g., lane marking, cross walk, signs and safety features). The six project roads are located in the northern central and north western part of Bangladesh. The summary of the project description for the six project roads is in Table A16.

Table A16: Summary of the Project Description

Division	From	To	Total Length (km)	Proposed Action Under the Project ^a
Rangpur	Saidpur	Parbatipur	15	Widening from 7.5 to 10.4 meters (m)
Rangpur	Mithapukur	Madhyapara	24	Widening from 8.5 to 10.4 m
Thakurgaon	Thakurgaon	Ranisankail	37	Widening from 7.1 to 8.6 m
Mymensingh/ Kishoreganj	Mymensingh	Nandail	47	Widening from 9.1 to 12.2 m
Mymensingh	Muktagacha	Chechua	10	Widening from 7.9 to 11.4 m
Jamalpur	Jamalpur	Dewanganj	41	Widening from 6.2 to 8.6 m

^a All project roads involve increasing embankment height, improving drainage structures, and planting trees on the roadsides

C. Description of the Environment

3. The six projects are administratively located within Rangpur and Thakurgaon districts of Rangpur Division; and Jamalpur, Kishoreganj, and Mymensingh districts of Mymensingh Division. The environmental condition of the project area is summarized as follows:

- (i) **Saidpur-Parbatipur road.** This project road is in Rangpur District. The area is topographically flat. The soil is predominantly floodplain soil. The Tista River skirts the northeast boundary of Rangpur District in northwest-southeast direction. The district is subject to periodic rainwater flood and above average floods. The road passes mainly agricultural land. This area is not rich in flora or fauna. Homestead trees are scattered on both sides of the road along 15 kilometers (km). About 2,850 trees are located 15 meters (m) from the centerline of the road. No wildlife is found in the project area.
- (ii) **Mithapukur-Madhyapara road.** This project road, also located in Rangpur District, has a flat area. The soil is dominantly sandy and clay loams. This

¹ ADB. 2000. *Technical Assistance to Bangladesh for the Road Network Improvement and Maintenance Project*. Manila.

area is also subject of rainwater floods. The road crosses the Jamuneshawari, Akhiri, Katgori and Girnai rivers and low-lying agricultural fields. Homestead trees are found along the 24 km road. However, only about 950 trees are within 15 m from the centerline. The last 0.5 km of the road crosses a forest area.

- (iii) **Thakurgaon-Ranisankail road.** This project road in Thakurgaon District has a flat area. The soil is predominantly non-calcareous. The road crosses two rivers (Tangon and Vakti) and there are some small streams in the area. The 37 km road crosses mainly agricultural fields. A considerable number of homestead trees are along the road. About 5,060 trees are within 15 m from the centerline of the road.
- (iv) **Mymensingh-Nandail road.** This road is located in Kishoreganj and Mymensingh districts. The project area is flat. Both Kishoreganj and Mymensingh lands are classified as lowland part of the Meghna River floodplain. The project area is not flood-prone, but sometimes experiences moderate flooding due to high intensity of rainfall. The road crosses agricultural lands, ponds, and homestead trees. About 8,500 trees are within 15 m from the centerline of the road. During the flood season, a wide variety of birds and aquatic fauna are found in the project area. Fish production is also high.
- (v) **Muktagacha-Chechua road.** This project road is Mymensingh District. The area is flat. The soil characteristic is predominantly old alluvium. The old Brahmapuna River dominates the hydrology of Mymensingh District. However, the road area is flood free. Considerable numbers of homestead and roadside trees are on both sides of the road. About 1,690 different species of trees are found within 15 m from the centerline of the road. The fauna species are limited.
- (vi) **Jamalpur-Dewanganj road.** This project road is in Jamalpur District. The area is flat and is also classified as lowland. River erosion and flooding are significant concerns in this area. The road passes agricultural fields, and homesteads are on the sides of the road. About 11,580 trees are within 15 m from the road centerline. Wildlife such as dolphins, snakes, and aquatic birds are often found during floods.

D. Screening of Potential Environmental Impacts and Mitigation Measures

4. The six roads will have no significant environmental impact because the Project will be executed only on the existing roads, none of which are in environmentally sensitive areas. The environmental impacts associated with the construction stage will include (i) disruption of traffic in the construction area; (ii) increased air pollution due to increasing dust and other volatile chemical substance from asphalt plants; (iii) noise and vibration; (iv) disruption of the water system due to cut-and-fill and other earthworks; and (v) potential landslides associated with elevating some part of the road. All these impacts will occur only during the construction period. Mitigation measures will be adopted to minimize the impacts: (i) reroute the traffic with clear signs; (ii) maintain optimum moisture content during handling of soil, spray water to minimize dust, and maintain a safe distance between the asphalt plant and public facilities including education facilities; (iii) strictly control the construction works that create noise and vibration by

prohibiting night work in the residential areas; (iv) provide for pumping of stagnant water and an adequate drainage system; and (v) stabilize road embankment side slopes, restrict construction in flood areas to only the dry season, and avoid road widening at pond sites. All these mitigation requirements will be included in the contract documents for the contractor. Clearly, all the impacts are temporary and manageable. The environmental impact associated with the operation of the Project is mainly on traffic safety; therefore, adequate traffic signs and physical barriers to reduce motorist speed will be installed. The other important environmental impact that will not concentrate in the road areas is borrow pits excavation. In this context, strictly borrow pits operation will be adopted (e.g. restrict borrow pits in the fertile agriculture lands and areas prone to erosion and landslide, restore and rehabilitate former borrow pit areas).

E. Institutional Requirement and Environmental Monitoring Program

5. **Institutional Framework and Responsibility.** The contractor will be responsible for implementing mitigation measures during the construction stage. An environmental engineer, who will be hired as part of the consulting team for implementing the Project, will assist the Social and Environmental Circle (SEC) of RHD in preparing contractual documentation so that the bidding documents, bills of quantity, and other contractual obligations of the contractor clearly identify environmental responsibilities and describe penalties for noncompliance. RHD and its SEC will be responsible for implementing overall environmental monitoring and management.

6. **Environmental Monitoring and Management Plan.** The IEE has identified the generic monitoring and management program, that will be part of the mitigation of adverse impacts. Detailed monitoring and management for each road will be prepared during the detailed engineering work being carried out under an ongoing project.

F. Findings and Recommendations

7. The IEE shows that environmental impacts associated with the proposed Project are manageable and can be mitigated. In addition, the Project will not disturb any environmentally sensitive areas. Therefore, a full environmental impact assessment (EIA) is not required. However, one of the project roads, Mymensingh-Nandail road, falls under the red category according to Bangladesh's Environmental Preservation Rules 1997. Civil works for this project road can be started only after the Department of Environment issues an environmental clearance based on a full EIA. Conducting the full EIA requires detailed information about engineering design. In view of this, the EIA for the Mymensingh-Nandail road will be prepared as part of detailed engineering design.

G. Conclusion

8. The Project will improve roads that are currently in place. The overall IEE finding is that the Project will not cause any significant environmental problem and any potential adverse impacts are manageable. However, continued monitoring will be carried out.