



Completion Report

Project Number: 30022
Loan Number: 1708
July 2007

Bangladesh: Southwest Road Network Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – taka (Tk)

		At Appraisal (30 September 1999)	At Project Completion (as of 10 April 2007)
Tk1.00	=	\$0.021	\$0.014
\$1.00	=	Tk48.50	Tk70.76
SDR1.00	=	\$1.358	\$1.511

ABBREVIATIONS

ADB	–	Asian Development Bank
ADP	–	additional project director
AADT	–	annual average daily traffic
BRM	–	Bangladesh Resident Mission
BRTA	–	Bangladesh Road Transport Authority
BRTC	–	Bangladesh Road Transport Corporation
Danida	–	Danish International Development Assistance
EA	–	executing agency
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management and monitoring plan
5FYP	–	fifth five-year plan
GDP	–	gross domestic product
HDM	–	Highway Design and Maintenance Standards Model
ICB	–	international competitive bidding
IDC	–	interest and other charges during construction
IEE	–	initial environmental examination
LARP	–	land acquisition and resettlement plan
LCB	–	local competitive bidding
MOC	–	Ministry of Communications
MOF	–	Ministry of Finance
NDF	–	Nordic Development Fund
NGO	–	non-government organization
NRSC	–	National Road Safety Council
OFID	–	OPEC Fund for International Development
PCR	–	project completion review
PRIS	–	Poverty Reduction Impact Study
PRMP	–	Poverty Reduction Monitoring Program
RHD	–	Roads and Highways Department
ROW	–	right-of-way
SCF	–	standard conversion factor
SDR	–	special drawing rights
TA	–	technical assistance
VIC	–	vehicle inspection center
VOC	–	vehicle operating cost

NOTES

- (i) The fiscal year (FY) of the Government ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends. For example, FY2000 begins on 1 July 1999 and ends on 30 June 2000.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	Bangladesh
2.	Loan Number	1708-BAN(SF)
3.	Project Title	Southwest Road Network Development
4.	Borrower	People's Republic of Bangladesh
5.	Executing Agency	Roads and Highways Department, Ministry of Communications
6.	Amount of Loan	SDR83,897,000 (\$115 million equivalent)
7.	Project Completion Report Number	PCR: BAN-30022

B. Loan Data

1.	Appraisal	
	– Date Started	10 June 1999
	– Date Completed	24 June 1999
2.	Loan Negotiations	
	– Date Started	20 September 1999
	– Date Completed	22 September 1999
3.	Date of Board Approval	16 November 1999
4.	Date of Loan Agreement	07 December 1999
5.	Date of Loan Effectiveness	
	– In Loan Agreement	06 March 2000
	– Actual	02 March 2000
	– Number of Extensions	
6.	Closing Date	
	– In Loan Agreement	30 September 2004
	– Actual	27 September 2006
	– Number of Extensions	2
7.	Terms of Loan	
	– Interest Rate	1% per annum
	– Maturity (number of years)	32
	– Grace Period (number of years)	8

8. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
26 December 2000	20 September 2006	69.8 months
Effective Date	Original Closing Date	Time Interval
02 March 2000	30 September 2004	54.8 months

b. Amount (\$)

Category ^a	Original Allocation ^b	Last Revised Allocation	Net Amount Available	Amount Disbursed	Undisbursed Balance ^c
01A	3,249,997	3,337,994	3,327,027	2,349,890	977,137
01B	80,349,357	82,524,899	82,253,761	70,966,380	11,287,381
01C	1,280,260	1,314,925	1,310,604	1,088,720	221,884
02	9,999,464	10,270,210	10,938,075	12,062,482	(1,124,407)
03	3,569,377	3,666,021	3,653,977	2,531,499	1,122,478
04	16,551,545	16,999,696	8,630,300	0	8,630,300
Total	115,000,000	118,113,745	110,113,744	88,998,971	21,114,773

() = negative

^a 01A- Civil Works Component I, 01B- Civil Works Component II-IV, 01C- Civil Works Component V, 02- Consulting Services, 03- Interest Charge, 04- Unallocated.^b The difference between the original amount as against the revised total amount was due to the exchange rate variation between the special drawing rights (SDR) and the US\$.^c An undisbursed loan amount of SDR14,191,934.24 (equivalent to \$21,114,773.15) was cancelled at loan closing date of 27 September 2006. There was a previous cancellation of SDR3,378,219.00 (approximately equivalent to \$5,000,000) on 11 March 2004, and a further cancellation of SDR2,046,413.00 (approximately equivalent to \$3,000,000) on 30 September 2004. In total an amount of SDR19,616,566.24 (equivalent to \$29,114,774.28) was cancelled from the Loan.

9. Local Costs (Financed)

	Appraisal	Actual
- Amount (\$ million)	24.40	19.83
- Percent of Local Cost	22.1	23.0
- Percent of Total Cost	11.4	12.3

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimates	Actual
Foreign Exchange Cost	104.10	74.71
Local Currency Cost	110.30	86.15
Total	214.40	160.86

2. Financing Plan (\$ million)

Cost	Appraisal Estimates			Actual		
	Foreign	Local	Total	Foreign	Local	Total
Implementation Costs						
Borrower-Financed	-	80.00	80.00	0.00	59.31	59.31
ADB-Financed	87.03	24.40	111.43	66.63	19.83	86.46
Cofinancing						
OFID	10.90	4.10	15.00	3.04	5.62	8.66
Nordic Development Fund	2.40	1.60	4.00	2.51	1.39	3.90
Danida	0.20	0.20	0.40	0.00	0.00	0.00
Total	100.53	110.30	210.83	72.18	86.15	158.33
IDC Costs						
Borrower-Financed	0.00	0.00	0.00			
ADB-Financed	3.57	0.00	3.57	2.53	0.00	2.53
Cofinancing	0.00	0.00	0.00			
Grand Total	104.10	110.30	214.40^a	74.71	86.15	160.86

^a Financing estimated at \$214.40 million while project cost was estimated at \$214.45 million during appraisal and reflected accordingly in RRP. The PCR is using the approved figures from the RRP.

ADB = Asian Development Bank, Danida= Danish International Development Assistance, IDC = interest during construction, OFID = OPEC Fund for International Development.

3. Cost Breakdown by Project Component (\$ million)

Project Component	Appraisal Estimate			Actual ^a		
	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost						
1. Land Acquisition/Resettlement		10.00	10.00		10.05	10.05
2. LARP Implementation		1.00	1.00		0.85	0.85
3. Civil Works	77.97	74.79	152.76	63.13	66.98	130.11
a. National Highway No. 8 (Dhaka – Town Noapara)	77.09	73.47	150.56	62.45	65.95	128.40
b. Road Safety: i. ADB	0.80	1.20	2.00	0.68	1.03	1.71
ii, Danida: Dhaka–Aricha Highway	0.08	0.12	0.20			
4. Construction Supervision	7.17	4.03	11.20	6.54	5.52	12.06
5. Project Administration		1.00	1.00		1.37	1.37
6. Poverty Reduction Monitoring Program ^a		0.25	0.25			
7. Road Safety Component: i. NDF	2.40	1.60	4.00	2.51	1.38	3.89
ii Danida	0.08	0.12	0.20			
Subtotal (A)	87.62	92.79	180.41	72.18	86.16	158.33
B. Contingencies						
1. Physical	8.51	9.10	17.61			
2. Price	4.45	8.41	12.86			
Subtotal (B)	12.96	17.51	30.47			
C. Service Charge during Construction	3.57	0.00	3.57	2.53	0.00	2.53
Total	104.15	110.30	214.45^b	74.71	86.15	160.86

^a This item was transferred to the construction supervision consultants to undertake (para. 21 and para. 30 in the main text).

^b Financing estimated at \$214.40 million while project cost was estimated at \$214.45 million during appraisal and reflected accordingly in RRP. The PCR is using the approved figures from the RRP.

ADB = Asian Development Bank, Danida = Danish International Development Assistance, LARP = land acquisition resettlement plan, NDF = Nordic Development Fund.

4. Project Schedule

Item	Appraisal Estimate	Actual
Consultants Contracts		
Construction Supervision Consultants		
Contract Date	March 2000	14 June 2000
Consultant Supervision Completion	March 2003	July 2005
Road Safety Consultants		
Contract Date	October–December 2000	June 2003
Consultant Supervision Completion	March 2004	November 2006
Civil Works		
Road Network Development		
Prequalification and Tendering	April 1999–March 2000	June 1999–March 2000
Date of Award	March 2000	12 December 2000
Start of Construction	April 2000	February 2001
Completion of Construction	April 2003	May 2005
Road Safety		
Start of Construction	June 2002	July 2005
Completion of Construction	June 2003	March 2006
Other Milestones:		
1. 23 February 2004: Approval of first extension of loan closing date to 31 December 2005.		
2. 11 March 2004: Approval of partial cancellation of SDR3,378,219.		
3. 26 September 2004: Approval of partial cancellation of SDR19,966,566.24.		
4. 26 December 2005: Approval of second extension of loan closing date to 31 March 2006.		
5. 27 September 2006: Closing of loan accounts.		

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 1 Jan 2000 to 31 Dec 2000	Satisfactory	Satisfactory
From 1 Jan 2001 to 31 Dec 2001	Satisfactory	Satisfactory
From 1 Jan 2002 to 31 Dec 2002	Satisfactory	Satisfactory
From 1 Jan 2003 to 31 Dec 2003	Satisfactory	Satisfactory
From 1 Jan 2004 to 28 Feb 2004	Satisfactory	Satisfactory
From 1 Jan 2005 to 31 Dec 2005	Satisfactory	Satisfactory
From 1 Jan 2006 to 27 Sep 2006	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

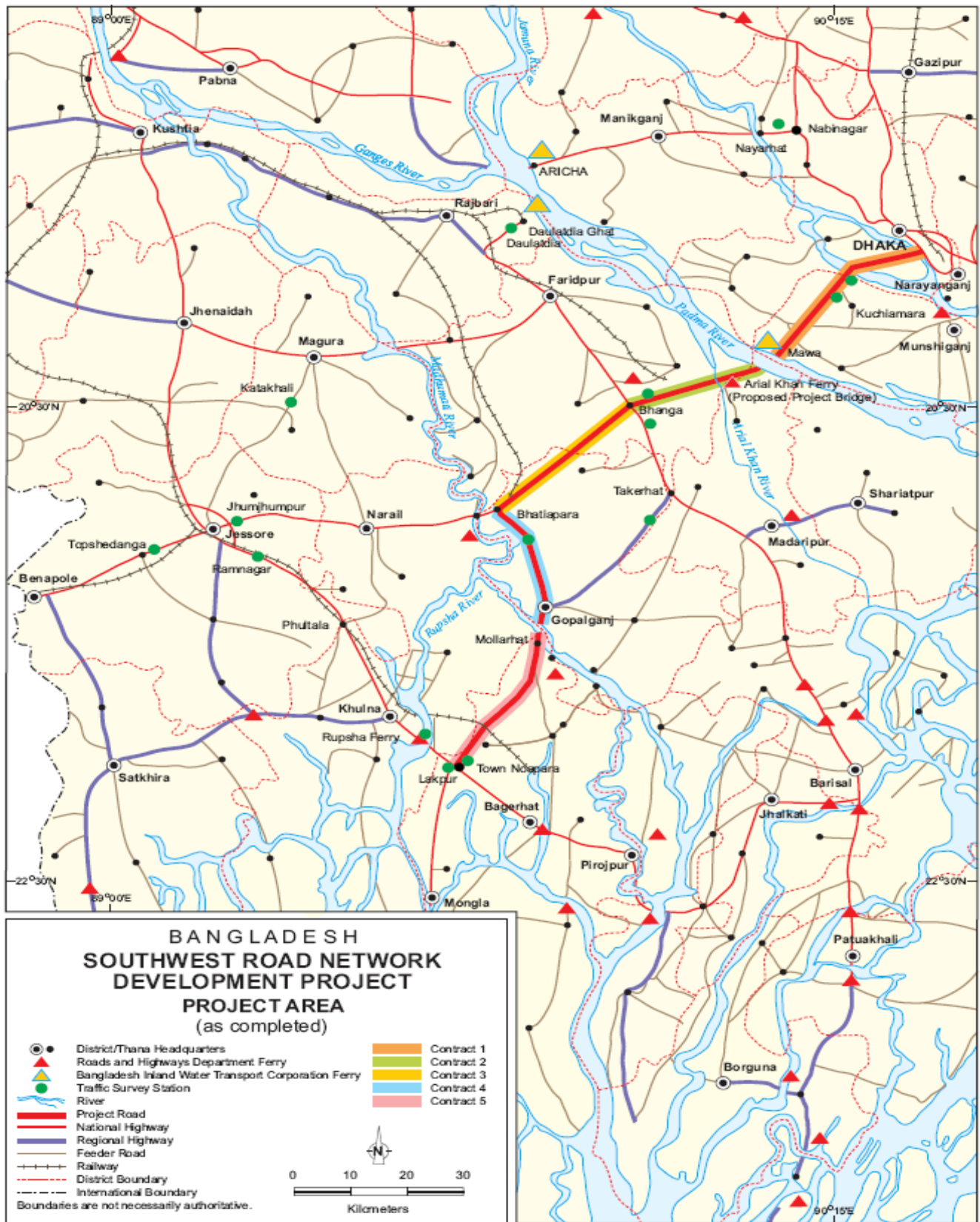
Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members^a
Fact-Finding	07–26 April 1999	5	95	a, c, e, f, l
Appraisal	10–24 June 1999	6	84	a, e, f, g, h, l
Inception Mission	02–11 December 2001	2	30	a, i, m
Special Loan Administration	13–28 March 2001	4	12	a, b, c, i
Follow-Up on Road Sector Issues	05–07 March 2002	3	9	a, b, c
Review 1	20–31 October 2002	4	20	a, e, i, i
Review 2	26 May–10 June 2003	2	30	a, b
Midterm Review	02–13 November 2003	2	22	a, b
Environmental Compliance Review	15–20 November 2003	2	10	f, k
Review 3	28 March–12 April 2004	2	30	a, b
Review 4	05–18 July 2004	1	13	a
Review 5	12–20 December 2004	1	8	a
Review 6	17 April–02 May 2005	1	15	a
Review 7	11–19 December 2005	1	8	a
Project Completion Review ^b	01–28 April 2007	3	81	a, i, j

^a a = mission leader/senior project specialist/engineer, transport engineer, b = project implementation officer, c = senior project implementation officer, d = social development specialist, e = project engineer/specialist, f = environment specialist, g = senior counsel, h = financial analyst, i = assistant project analyst, j = staff consultant., k = environment analyst, l = project economist, and m = resettlement specialist.

^b The project completion report was prepared by Stefan Ekelund, Senior Transport Specialist/Mission Leader; Md. Liaquat Ali Khan, Assistant Project Analyst; and a transport economist (staff consultant).



Map 2



I. PROJECT DESCRIPTION

1. The Southwest Road Network Development Project was developed in response to the Government's infrastructure development focus on the five major road corridors in Bangladesh, of which the Dhaka–Khulna corridor was the second most important. The need to develop and maintain an effective road network was a key theme in infrastructure development in Bangladesh, the general framework for which was set out in the Fifth Five-Year Plan (5FYP) from 1997–2002. Improvement of the road network under the Project was expected to lead to significant economic growth throughout the southwest region and to contribute to poverty reduction. The Project was also to introduce specific policy and institutional reforms in the road subsector and to address social and environmental concerns.

2. The objectives of the Project were to (i) open a shorter and more cost-effective road corridor linking Dhaka with the cities of Mongla, Khulna, Jessore, and Benapole, thereby creating conditions for greater regional cooperation with neighboring countries and inducing economic growth in the relatively neglected southwestern region of the country; (ii) address poverty reduction and human development needs by providing access to income and employment opportunities, and by creating safer roads through technical improvements and public awareness; (iii) improve public sector governance through institutional reform and private sector participation; and (iv) strengthen institutional responsiveness to social and environmental issues. At appraisal, the Project had three components: (i) developing an effective road network by improving, constructing, and rehabilitating about 166 kilometers (km) of roads from Dhaka to Town Noapara and constructing a 450-meter (m) bridge over the Arial Khan River; (ii) improving governance and institutional development through (a) the creation of procurement and monitoring divisions and improvements to financial processes at the Roads and Highways Department (RHD), and (b) making resource allocation for maintenance efficient; and (iii) addressing social and environmental issues by (a) establishing responsive institutions, (b) making roads safer, (c) creating opportunities for women, (d) reducing poverty, (e) implementing the Asian Development Bank's (ADB's) involuntary resettlement policy, and (f) improving air quality. The project framework at appraisal compared with the achievements of the Project is shown in Appendix 1.¹ Dhaka had also been identified as one of the most polluted cities in the world where transport-related emissions comprise the most significant proportion of anthropogenic emissions. Because of that, technical assistance (TA)² was added to the Project to focus on policy and institutional issues associated with activities to improve the quality of air.

3. The People's Republic of Bangladesh was the Borrower, with RHD of the Ministry of Communications (MOC) as the executing agency (EA). An ADB loan³ of \$115 million equivalent from ADB's Special Funds (SF) resources financed part of the foreign cost of the Project. Cofinancing amounting to \$19.40 million equivalent was to be provided through the OPEC Fund for International Development (OFID), Nordic Development Fund (NDF), and Danish International Development Assistance (Danida) who agreed to provide the equivalent of \$15.0 million, \$4.0 million, and \$0.4 million, respectively. OFID was used to finance part of the cost for

¹ The project framework at appraisal has been modified to be in line with the revised design and monitoring framework now adopted by ADB.

² ADB. 1999. *Technical Assistance to the People's Republic of Bangladesh for Urban Transport and Environment Improvement Study*. Manila (TA No. 3297-BAN for \$645,000, approved on 16 November).

³ 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 **project name***. Manila (Loan No. 1708-BAN [SF]) was approved for the amount of \$115 million equivalent on 16 November. Advance procurement action to permit prequalification of the civil works contracts was approved in May 1999.

the civil works.⁴ NDF provided parallel financing for the road safety component. Danida was also to provide parallel financing to cover both the road safety component, civil works, and consulting services along the Danida-financed Dhaka–Aricha Highway.⁵

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

4. The Project was formulated in response to the Government's infrastructure development focus on the five major road corridors⁶ in Bangladesh. Apart from the sectoral strategy for the road subsector set out in the 5FYP, the Project was also consistent with the Bangladesh Integrated Transport System Study undertaken in June 1998 and the Road Master Plan of 1994, which was financed by the United Nations Development Programme and implemented by ADB.⁷ The Project was developed in accordance with ADB's country operational strategy⁸, which emphasized the importance of the road network for regional cooperation. ADB's strategy also focused on developing the capacity of those institutions that plan, manage, and maintain the transport system. The Project was, and since its completion continues to be, highly relevant to the needs of the transport sector.

5. Processing of the Project started in 1999 with the Fact-Finding Mission in April and subsequently the Appraisal Mission in June 1999. The Project was based on detailed engineering reports, supplemented by reports on the environment, poverty reduction, economic evaluation, land acquisition and resettlement, and discussions with the Government and external financing agencies.

B. Project Outputs

6. Three project components were envisaged at appraisal, namely, (i) developing an effective road network, (ii) improving governance and institutional development, and (iii) addressing social and environmental issues.

1. Developing an Effective Road Network

7. **Civil Works.** It was envisaged at appraisal that 166 km of road would be improved, constructed, and rehabilitated. Actual works were divided into five sections under five civil works contracts, namely, (i) Dhaka–Mawa (31.25 km), contract 1; (ii) Mawa–Bhanga (22.76 km), contract 2;⁹ (iii) Bhanga–Bhatiapara (37.60 km), contract 3; (iv) Bhatiapara–Mollahat (41.82 km), contract 4; and (v) Mollahat–Town Noapara (28.96 km), contract 5. The total length of road rehabilitated under the Project was 162.39 km.

⁴ OFID Loan No. 817P was approved on 16 June 2000 and declared effective on 8 February 2001. NDF Credit 319 was signed in February 2000.

⁵ The Danida grant of \$0.4 million equivalent (\$0.2 million for consulting services and \$0.2 million for civil works) for improving road safety was considered cancelled, as Danida did not commit financing during appraisal and it was discovered that it was funding the section of the highway from Dhaka to Aricha under another project.

⁶ The five corridors are (i) Dhaka–Chittagong, (ii) Dhaka–Northwest, (iii) Dhaka–Khulna, (iv) Dhaka–Sylhet, and (v) Khulna–Northwest.

⁷ ADB. 1988. *Technical Assistance to the People's Republic of Bangladesh for Preparation of a Road Master Plan*. Manila (TA 1053-BAN, for \$2,060,000, approved on 24 October), and ADB. 1994. *Technical Assistance to the People's Republic of Bangladesh for Preparation of a Road Master Plan*. Manila (TA 1053-BAN [Supplementary], for \$470,000, approved on 26 May).

⁸ ADB, 1998. Country Operation Strategy Study, Bangladesh.

⁹ Including the 450 m Arial Khan Bridge.

8. An axle weigh bridge was installed under contract 1. The installation was supposed to be completed before 8 May 2005; however, the weigh bridge was not completed and tested until November 2005. Inspection by the project completion review Mission found that the weigh bridge was not in operation. There are four other weigh bridge stations¹⁰ in Bangladesh, none of which are presently operational as the Government is still formulating a policy for their operation.

9. At appraisal the Project also included the construction of a 450 m bridge over the Arial Khan River. The bridge was constructed but, due to erosion on the left embankment on the east side of the river in August 2000 at the bridge site, it was agreed in March 2001 that (i) the bridge site be moved by 150 m toward the left bank with a slight rotation of the centerline, (ii) the alignment of the approach road to the bridge would be changed accordingly, and (iii) embankment protection works around the bridge would be modified.

10. **Road Safety.** The Project implemented road safety civil works at selected black spots, including (i) Dhaka Mymensingh National Highway, 98 km; (ii) Dhaka Aricha National Highway including Nabinagar to Kaliakoir, 89.25 km; (iii) Dhaka (Chandra Junction) to Jamuna Bridge National Highway, 68.50 km; (iv) Dhaka Chittagong Coxbazar National Highway (Feni River to Coxbazar Portion), 178 km; and (v) Daulatdia–Faridpur–Jessore–Benapole National Highway, 198 km. The improvements included (i) traffic signs and markings; (ii) bus bays; (iii) improvement works for pedestrian facilities; (iv) improvement of railway level crossings; and (v) pavement widening, turning lanes, medians, barriers, raised separators, signs and markings with retroreflective studs.

2. Improving Governance and Institutional Development

11. This component focused on improving planning capabilities and the efficiency of business processes within RHD. A policy framework and action plan was developed at appraisal. A comparison of the appraisal policy framework and action plan targets with actual achievements is in Appendix 2.

12. A total of four circles were established, as envisaged at appraisal, namely, (i) procurement circle, (ii) monitoring circle, (iii) road design and safety circle, and (iv) social and environment circle (the last was an item under the component for addressing social and environmental issues, para. 15). After they had been established, the circles were found to have an inadequate number of staff who needed further training. There was limited involvement in the staff's area of authority for work implemented with external funding agencies, which resulted in the need for capacity building and duplication when the same activity is funded and included in several projects.¹¹ The PCR Mission visited each of the established four circles and obtained information on the composition of the staff, and determined that the full complement of staff as envisaged at appraisal, i.e., superintending engineers, executive engineers, subdivisional engineers, and assistant engineers, was now operational.

13. At appraisal it was envisaged that there were opportunities to promote private sector participation through the management of five vehicle inspection centers (VICs)¹² that had been

¹⁰ Weigh bridge stations are located on (i) the Dhaka–Aricha road, (ii) Chittagong, (iii) Jamuna Bridge, and (iv) the Dhaka Sylhet road.

¹¹ For example, road safety manuals are prepared under several projects.

¹² There are two VICs in Dhaka, and one each in Khulna, Chittagong, and Rajshahi.

established in a previous ADB-funded project.¹³ The VICs were handed over to Bangladesh Road Transport Authority (BRTA) in May 1999. The supplied testing equipment at the sites was, however, nonoperational due to a dispute between BRTA and the supplier. The expertise to operate the installed equipment was not available, and no operation and maintenance budget was available. Due to the absence of institutional capacity in BRTA, the planned privatization could not take place. To assist BRTA in this issue, support has been included under ADB's ongoing Road Network Improvement and Maintenance Project II.

3. Addressing Social and Environmental Issues

14. The component for addressing social and environmental issues involved (i) establishing responsive institutions, (ii) making roads safer, (iii) creating opportunities for women, (iv) reducing poverty, (v) implementing ADB's involuntary resettlement policy, and (vi) improving air quality (this last item was undertaken through a TA, para. 29).

15. A social and environment circle was established as envisaged at appraisal. The circle consists of two divisions: the resettlement division and the environment division. The total complement of staff as envisaged at appraisal is present except for one assistant engineer position, as the person was recently transferred. .

16. The road safety component,¹⁴ had seven subcomponents: (i) identification of accident-prone locations, (ii) safety measures in road designs, (iii) construction supervision for road safety civil works, (iv) training in enforcement, (v) safety awareness campaign, (vi) procurement of safety equipment, and (vii) monitoring and impact assessment of safety improvement works. The road safety civil works funded by ADB were only to begin after (i) and (ii) were completed. Five road safety civil works were funded by ADB, covering a total of about 428 km (paras. 10 and 34). This work was implemented as envisaged at appraisal except for the delay due to late recruitment of the consultants (para. 31). Examination of 150 identified highways with accident-prone areas showed that 18 priority links were made in October 2003. Road safety training was also carried out by the consultants in a series of workshops in 2005. In 13 workshops held with 529 engineers from RHD participating, the training covered, among other topics, (i) engineering countermeasures; (ii) road safety auditing; (iii) use of the traffic signs manual; and (iv) use and application of the geometric design standards manual.

17. At appraisal it was stipulated that to address gender concerns, the Project was to set employment targets for road construction and afforestation activities, as well as to require contractors not to differentiate wages between men and women. The target was that 50% of the people employed during construction would be women. Examination of the consultant supervision records for each of the civil works contracts showed that about 48% of the employment posts were filled by women earning the same wage as men.¹⁵

18. The impact of the Project in reducing poverty was substantial. This is described more fully in the section on impacts (para. 50). ADB's involuntary resettlement policy was implemented through the resettlement plan that was undertaken throughout project implementation (paras. 51–52).

¹³ 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 Road Overlay and Improvement Project*. Manila (Loan No. 1287-BAN [SF]), approved on 9 December for \$68 million).

¹⁴ Financed by NDF.

¹⁵ It has been estimated that, overall, women benefited from about 7,120 person-months of temporary employment during the construction period.

C. Project Costs

19. At appraisal, the project cost was estimated to be \$214.45 million equivalent, of which \$104.15 million (about 49%) was estimated to be the foreign exchange cost, including \$3.57 million for service charges and interest during construction (IDC); and the total local currency cost was \$110.30 million equivalent (about 51%) including taxes and duties. The ADB loan at appraisal was \$115 million equivalent from Special Funds (SF) to finance 53.6% of the total project cost. ADB financing represented about 87% of the total foreign exchange cost and 22% of local currency costs. Total cofinancing of \$19.40 million equivalent or about 9% of total project cost was envisaged at appraisal, of which \$15.0 million was to be provided by OFID to finance part of the foreign exchange cost for the road improvement civil works. NDF agreed to provide \$4.0 million for the road safety component, and Danida was to provide \$0.4 million for road safety and civil works. Total ADB and cofinancing funds amounted to \$134.45 million, or 63% of the total project cost. The remaining cost of \$80.00 million equivalent was to be funded by the Borrower. The appraisal estimate included physical contingencies and provisions for price escalation on the foreign exchange and on the local currency costs, and an estimate of the service charge during construction.

20. The actual project completion cost estimated by the PCR Mission was \$160.86 million equivalent, with a foreign exchange cost of \$74.71 million equivalent or about 46% and a local currency cost of \$86.15 million equivalent or 54%. ADB financed \$91.53 million equivalent or about 57% of the total project cost. OFID financing accounted for \$8.66 million equivalent or about 5% of the total project cost, and NDF accounted for \$3.90 million equivalent or about 2%. The remaining cost, local costs, of \$59.31 million equivalent was funded by the Government.

21. The cost estimated at appraisal for the civil works from Dhaka to Town Noapara was approximately \$150.56 million (excluding physical and price contingencies). The appraisal estimate for civil works including contingencies was approximately \$179 million. The actual cost of civil works amounted to \$128.40 million. All the civil works contract bids were significantly lower than the engineers estimate.¹⁶ Also, devaluation of the taka relative to the dollar occurred and the price contingencies provided were lower than the estimates. Thus, there were savings on the Project, which were cancelled from the loan (para. 23). The appraisal estimate for consulting services for construction supervision was \$11.2 million, compared with actual expenditures of \$12.06 million. The increase in construction supervision costs is attributable to the delays in implementing the civil works, which resulted in the extension of consulting services. Also the poverty reduction monitoring program that was to be undertaken by the Planning Commission was transferred to the consultants (para. 30).

22. The actual detailed costs for each component of the Project compared with the estimates at appraisal are shown in Appendix 3. For cost comparison, the local currency costs incurred by the EA were converted into dollars at the rate prevailing during each transaction. The average rates of exchange used are in Appendix 4. A summary of contracts financed by ADB, OFID, and NDF is given in Appendix 5.

¹⁶ Bid prices for each contract were 17%–31% lower than the engineers estimate. The total bid price for all contracts was 25% lower than the engineers estimate.

D. Disbursements

23. No disbursement schedule was included in the appraisal. However, based on the implementation schedule prepared at the time of appraisal, the projected disbursements were developed and are shown in Appendix 6 along with the actual disbursements that took place during implementation. The loan was disbursed more slowly than envisaged at appraisal because of project implementation delays mainly due to the slow progress of the civil works contracts. There were two partial loan cancellations of surplus funds requested by the Borrower. The first cancellation was on 11 March 2004 for SDR3,378,219 (equivalent to \$5 million) and the second on 26 September 2004 for SDR2,046,413 (equivalent to \$3 million). Disbursements from the loan account were completed on 27 September 2006, the actual date of loan closing. Following the last disbursement on 20 September 2006, ADB cancelled the remaining balance of SDR14,191,943.24 (equivalent to \$21,114,773.15). This reduced the loan to SDR64,280,433.76. ADB was administrator of the OFID loan. In some instances there were delays in payments from OFID, which required ADB to coordinate follow-up actions with them. The mobilization payment for contractors of the civil works contract from Dhaka to Mawa, which was partially financed by OFID, was delayed.¹⁷ This delay, estimated to be about 20 weeks, prevented the contractors from starting work on the contract.

E. Project Schedule

24. The ADB Board approved the loan on 16 November 1999. The Loan Agreement was signed on 7 December 1999 and became effective on 2 March 2000. The original closing date of the loan was 30 September 2004, but this was extended twice at the request of the Borrower to 31 March 2006. At appraisal it was envisaged that the Project would be implemented over a period of 4 years starting in March 2000, with completion of the civil works component within 36 months, i.e., by March 2003, excluding preconstruction activities that had already begun under advance procurement action in 1999. Actual completion of the civil works component was not until May 2005. At appraisal, implementation of all the project components was estimated to last for about 55 months. Actual implementation of all components took approximately 70 months, an overall delay of 15 months. The actual and the appraisal implementation schedules are compared in Appendix 7 and the chronology of major implementation events is set out in Appendix 8.

25. Delays in the civil works component were due to (i) initial delay in availability of Government funds and mobilization of contractors¹⁸ that lost the 2000/2001 dry season for earth works; (ii) a 2 months longer flood season and bad weather conditions in 2001 and 2002; and (iii) design-related delays.¹⁹ As of 31 October 2003, overall implementation progress of the civil works component was 51% compared to the elapsed loan period of 81%.

¹⁷ The delay was partly due to the EA's inadvertent use of ADB claim forms instead of OFID forms in submitting requests for payment, and to delayed submission of the specimen signature and copy of official authorization, and of progress reports of project implementation to OFID.

¹⁸ Although the civil works component contracts were awarded in 2000, the contractors did not begin preparatory works until mid-April 2001, an 8-month delay compared with the appraisal schedule. This was due to the delay in issuing the notice to proceed (NTP). Moreover, site clearance was not completed, i.e., land acquisition and resettlement had not finished and thus the contractors did not have unhindered access to the contract site. Also in contract 1 (from Dhaka to Mawa), the mobilization payment of the contractor from OFID was delayed.

¹⁹ Including, (i) nonavailability of earth in RHD borrow pits; (ii) working platforms at the roadsides consisting of water-filled borrow pits on all contracts; (iii) increased subbase required for all contracts; (iv) the redesign of the Arial Khan Bridge and realignment of the approaches due to erosion; (v) a change of methodology in contracts 4 and 5 because of soft soils; (vi) removal of unsuitable soil in the embankment of Gopalgonj bypass and removal and re-compaction of soil for other sections; and (vii) the relocation of utilities for electricity, telephone, water, and gas by the relevant agency.

26. The first extension of the loan closing date from 30 September 2004 to 31 December 2005 was requested by the Economic Relations Division (ERD) of the Ministry of Finance (MOF) on 10 January 2004 in order to complete the delayed work under the civil works contracts.²⁰ ADB approved the loan extension on 23 February 2004. A request to extend the OFID loan in line with the requested ADB loan extension to 31 December 2005 was also made and approved. A second request for extension of the loan closing date from 31 December 2005 to 31 March 2006 was made to ADB on 19 December 2005, including a request for reallocation of loan proceeds.²¹ The need for the second loan extension was due to the slower than anticipated progress of the road safety works due to the delay in the approval of the road safety consultants' contract,²² and the subsequent delays in the award of the five road safety civil works contracts. ADB approved the loan extension on 26 December 2005. The civil works under contracts 1, 3, 4, and 5 were substantially complete on 8 May 2005, while those under contract 2 were substantially complete on 28 February 2005.

F. Implementation Arrangements

27. The implementing arrangements were as envisaged at appraisal. The Borrower was the People's Republic of Bangladesh and the EA was RHD. The organizational structure of RHD is shown in Appendix 9. The Office of the Additional Chief Engineer assumed responsibility for the Project through a project director (PD), who was the designated additional chief engineer. Throughout implementation of the Project there were four PDs. The first PD who was only in office for 6 months retired for health reasons. The second PD was in office from January 2001 to February 2005, and the third from February 2005 to February 2006. The fourth PD was appointed in February 2006. The PD was to be assisted by two full-time additional project directors (APDs), one for contracts 1 and 2, and one for contracts 3, 4, and 5. In total there were eight APDs, four for contracts 1 and 2, and four for contracts 3, 4, and 5. The APDs changed frequently because of either promotion or a transfer to another department. Field activities were supervised by four project managers, one each for contracts 1, 2, and 5, and one for contracts 3 and 4. The several changes in staff at the PD and APD levels did not cause any significant delay in implementing the Project.²³

G. Conditions and Covenants

28. Details of compliance with the covenants under the loan are presented in Appendix 10. The Government and the EA generally complied with the standard loan covenants, but there were some exceptions. Under the component for improving governance and institutional development, there were delays in the covenants on (i) forming the road design and safety circle, social and environment circle, and the setting up of the procurement circle and monitoring circle; and (ii) appointing a full-time administrator to the National Road Safety Council (NRSC). Item (i) was to be completed with 3 months of loan effectiveness and (ii) was supposed to be completed within 6 months of loan effectiveness. All of the circles under (i) were formed in

²⁰ This included approved extensions of contract completion dates for contracts 1, 3–5 (extension of 3 months), and contract 2 (7 months) by a Review Mission of October 2002. This was subsequently revised in the Review Mission of November 2003 with additional extensions of contract completion dates for contracts 1, 3–5 by a further 12 months and contract 2 with a further 8 months. The result was an overall cumulative delay of 15 months.

²¹ Loan proceeds were reallocated as follows: \$200,000 from category 01B Civil Works to category 01C Civil Works to cover the costs of road safety that had originally been envisaged to be implemented by Danida, and \$1,850,000 from category 04 Unallocated to category 02 Consulting Services to cover the increase in costs of consulting services due to the extension of the contract.

²² Funded by NDF.

²³ However, the change in PD at the start of the Project delayed by 2 months the issuance of the notice to proceed for each civil works contract after it was signed.

November 2000. The full-time administrator to NRSC under (ii) was not appointed until June 2001, a 10-month delay on the loan covenant. The covenant related to the privatization of VICs under BRTA could not be fully implemented due to lack of capacity and resources. The EA was to ensure that the contractors followed the environmental mitigation measures when implementing the civil works. This was not always the case (para. 49). The covenant on resettlement and land acquisition was also delayed (para. 52).

H. Related Technical Assistance

29. The overall objective of the advisory TA (footnote 2) was to assist the Government to formulate a strategy to improve air quality in Dhaka and other major cities. The EA for the TA was Bangladesh Road Transport Corporation (BRTC). The TA had six components: (i) identify stakeholders and their roles in improving air quality in Dhaka and other major cities; (ii) develop an action plan to control and phase out dirty fuel, particularly in the transport sector; (iii) develop an action plan to introduce clean fuel based on natural gas; (iv) review environmental regulations relating to vehicular emissions and recommend strategies for enhanced implementation; (v) develop an action plan to improve operation and maintenance standards for registered vehicles, particularly in Dhaka; and (vi) identify the potential role of ADB in the implementation of the overall action plan for cleaner air, including formulating a policy-oriented project for reducing pollution caused by urban transport. The TA was signed on 16 November 1999. The consultants were fielded on 8 January 2001 and completed the TA in 31 May 2002. Overall the TA was rated successful. The technical assistance completion report (TCR) is given in Appendix 11.

I. Consultant Recruitment and Procurement

1. Consultant Recruitment

30. **Civil Works.** Consultant recruitment was as envisaged at appraisal in accordance with ADB's *Guidelines on the Use of Consultants*. The consultants' contract was signed on 14 June 2000. The consultants were mobilized in September 2000 and the contract period was to end June 2004. The total consultant supervision comprised about 300 person-months of international and 1,316 person-months of national consulting experts with an overall consulting service period estimated at 48 months. However, due to delays in project implementation (para. 25), a time and input extension was required. The actual total consultant supervision amounted to 354.43 person-months of international and 1,691.03 person-months of national consulting experts over a period of 64.5 months.²⁴ RHD requested MOC to extend the consultants' services for supervision of the civil works contracts through an addendum. All five civil works contracts were approved for extension on 21 April 2004 by the EA and the last date of contract completion was to be by 13 July 2005, the same as proposed in the addendum to the consultant supervision contract. The addendum was also to give the consultants the task of conducting the Poverty Reduction Monitoring Program (PRMP) that was originally to be implemented as at appraisal by a separate consultant contract to a national consultant engaged by the Planning Commission (PC). However, due to substantial delay and lack of action²⁵ by the PC, it was decided to give this work to the supervision consultants. Additionally there had been further

²⁴ An increase of 54.43 person-months international and 375.03 person-months national consulting services.

²⁵ The PRMP was supposed to be completed by March 2001. It still had not been undertaken by the PC in December 2001. ADB requested the PC to recruit consultants by August 2002. A further ADB Mission in May 2003 agreed that RHD could use the supervision consultants as the PC had still not progressed on the issue. This change in implementation arrangements did not represent a change in scope since the services were included under the Project.

extensive erosion upstream of the Arial Khan Bridge, which required physical modeling to design appropriate mitigation measures to protect the bridge and the approach road.

31. **Road Safety.** The consultants for the road safety component were recruited in accordance with NDF guidelines. The consultants submitted proposals in January 2001;²⁶ however, they were not recruited until June 2003,²⁷ a delay of about 2 years. The delay was primarily attributed to the Government's internal procedures, consisting of protracted internal discussion and internal disagreement with respect to evaluation criteria and evaluation procedures for selecting the road sections to receive attention under this component.

2. Procurement

32. Project goods and services under ADB financing were procured in accordance with ADB's *Guidelines for Procurement* as envisaged at appraisal. Procurement financed by NDF followed NDF's procurement guidelines.

a. Civil Works

33. Procurement for the component for developing an effective road network was carried out as envisaged at appraisal. The five contract packages were carried out under international competitive bidding (ICB) procedures. Prequalification²⁸ of the civil works contractors started in June 1999 and was completed at the end of December 1999. The bids closed on 11 April 2000.²⁹ All contracts were signed on 12 December 2000 and the notices to proceed (NTPs) were issued on 13 February 2001. The procurement process was delayed by 11 months on the appraisal estimate before each NTP was issued. The delay was attributed to time-consuming internal procedures of the Government, including (i) requesting the lowest evaluated bidders to resubmit information that had already been submitted, and (ii) forming additional tender evaluation committees at ministry level or higher, which was unnecessary.

b. Road Safety Civil Works

34. As at appraisal, procurement of civil works for road safety was carried out under local competitive bidding (LCB) procedures. The prequalification process was undertaken from January 2005 and was completed at the end of March 2005. Bidding documents were prepared and the bids were tendered in March 2005. Bid evaluation was completed by June 2005. There were five LCB packages.³⁰ Four packages were awarded in July 2005 and one package in November 2005. The road safety civil works were completed by April 2006.

c. Road Safety Equipment

35. A list of road safety equipment was prepared by the road safety consultants and submitted to NDF on 9 June 2004. NDF approved the equipment on 22 July 2004. The list included (i) training equipment; (ii) enforcement equipment; and (iii) training vehicles for police traffic training school, driver training school, and RHD engineers. NDF approved procurement

²⁶ Three consultants submitted proposals.

²⁷ The contract was signed on 30 June 2003. It was originally envisaged that the award of consultants contract would be in mid-May 2001.

²⁸ There were 31 prequalified contractors, 24 of whom purchased bid documents.

²⁹ A total of 12 bids were received for contract 1, 10 bids for contract 2, 14 bids for contract 3, 11 bids for contract 4, and 6 bids for contract 5.

³⁰ There were originally six packages, but one was cancelled because of alleged irregularities in the bidding process.

through ICB and LCB procedures on 31 August 2004. Seven packages of equipment were procured, four through ICB and three through LCB procedures. Equipment specifications for ICB were prepared in February 2004 and those for LCB in December 2003. The final bid documents were approved by NDF on 24 November 2004. They were forwarded to MOC, but final approval was not given until May 2005. On 29 May 2005 tenders were called. Although tenders were received on 26 July 2005, some tenders were nonresponsive and had to be rebid. The bids on the lots were approved and accepted in January 2006. By the end of November 2006, the appointed supply contractor for all lots had successfully supplied and delivered the equipment in accordance with the contract agreement, except for the appointed supplier for lot 1, who failed to supply the equipment. The allocated fund for lot 1 was reallocated to lot 3 for procurement of speed detector equipment.

J. Performance of Consultants, Contractors, and Suppliers

1. Consultants

36. RHD reported that the performance of the consultants was generally satisfactory and that the consultants performed their tasks professionally and in accordance with their terms of reference. The consultants also took on the task of implementing the poverty reduction monitoring program. The consultants produced comprehensive reports including a final completion report.

2. Contractors

37. The performance of the contractors on the civil works contracts under the component for developing an effective road network has varied from satisfactory to highly satisfactory. Overall, the PCR Mission findings confirmed the good quality of the construction works completed. For contract 1 there was inadequate managerial and planning capacity on site, and the available equipment lacked spare parts due to importation difficulties. To offset implementation delays more equipment was necessary. Traffic management by the contractor was poor, and construction warning signs were insufficient. There was also a lot of dust at the works site because the roads were not watered properly. The quality of the work was satisfactory. The contractor on contract 2 produced excellent work and managed the environmental issues according to plan. On contract 3 there were delays in earthworks due to lack of reliable equipment. The quality of the work, however, was satisfactory. Contracts 4 and 5 also suffered from lack of sufficient equipment. The quality of work, however, was satisfactory. In general, all contractors did not always fully comply with the requirements on environmental mitigation measures such as (i) traffic control measures to minimize accidents during construction, and (ii) air quality and dust minimization. However, after an Environmental Compliance Mission in November 2003, the situation improved.

3. Suppliers

38. The performance of the suppliers of road safety equipment is rated as satisfactory.

K. Performance of the Borrower and the Executing Agency

39. The performance of the Borrower and the EA was satisfactory. RHD effectively managed physical implementation of the Project. Due to delays in implementing the civil works, it was necessary to extend the services of the supervision consultants. Due to many bureaucratic

procedures to approve the extension, a time lapse of 17 months occurred.³¹ The civil works were partially delayed because land acquisition and resettlement were not completed before the civil works started (para. 52).

L. Performance of ADB

40. The Project was originally administered and supervised from ADB headquarters, but those functions were transferred on 27 January 2003 to the Bangladesh Resident Mission (BRM). ADB conducted seven review missions, one special loan administration mission, a midterm review mission,³² and an environmental review mission. The missions included visits to the project site and also to the EA's headquarters in Dhaka where coordination meetings were held. ADB had a total of five project officers involved during implementation of the Project.³³ The role performed by the ADB missions in providing advice on technical issues, preparing and evaluating bid documents, and matters of loan administration was recognized by the EA. It was also noted that while PCR missions fielded from headquarters had officers and analysts assigned full-time, the workload at BRM did not permit officers and analysts to be assigned full-time to a PCR Mission. Overall the performance of ADB was rated satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

41. The relevance of the Project is considered high, as the Project was and still is consistent with the Government's development objectives and ADB's strategy in the road subsector, which aims at (i) improving transport efficiency to stimulate growth in isolated areas, (ii) establishing an effective internal road network to serve major arterial traffic, (iii) promoting economic growth, (iv) creating better development opportunities for the poor, (v) improving human development, and (vi) protecting the environment.

B. Effectiveness in Achieving Outcome

42. The Project was rated effective. The outcome as envisaged at appraisal has been substantially achieved. The primary purpose of opening a shorter and more cost-effective road corridor linking Dhaka with the cities of Benapole, Jessore, Khulna, and Mongla, has been achieved. Road user benefits have been attained through significant reductions in vehicle operating costs (VOCs). Although the level of reduction in VOCs was not estimated at appraisal, the PCR Mission estimates that, due to a better and shorter route (by approximately 100 km) between Dhaka and Khulna, VOCs have been reduced by about 38%. Travel times have also been reduced. These time savings, however, are not significant because the ferry service on the road prior to the project road at Aricha was more efficient than the ferry service on the project road at Mawa. Crossing time on the ferry via Aricha takes only 30 minutes, whereas crossing time at Mawa is 2 hours (including waiting time). Travel time between Khulna and Dhaka via Aricha is approximately 15 hours, whereas it is approximately 12 hours via the project road and

³¹ After a recommendation of approval from MOC, the request then has to be approved by the Purchase Committee in the Office of the Prime Minister. The final approval was given on 30 May 2005, a 17-month elapsed time period. However, during this time period the supervision consultants remained on site and continued with their work.

³² It was during the Midterm Review Mission when, due to the delays that had been incurred, the first extension of the loan closing date was agreed upon. The Midterm Review Mission was useful in identifying the key issues of the delays and how they could be resolved.

³³ Four of the project officers were based in Manila. The fifth project officer, based in BRM, had handled project implementation since it was handed over to BRM.

the Mawa ferry. The 12 hours will be reduced further if there are improvements to the ferry service at Mawa.

43. The rates of passenger and freight traffic compared with the rates estimated at appraisal have also increased. At appraisal, passenger traffic and freight traffic were estimated to grow on average between 5% and 8% per annum depending on the vehicle type. Actual traffic growth from 1998 to 2005³⁴ has varied along each section of the project road and the annual average growth ranges from 6% to 17% per annum. The Project has also assisted in reducing poverty, as envisaged at appraisal, by increasing employment opportunities. Poverty has declined in the project region. The level of hard core poverty in the project area was 46% in 1999. In 2005 this level had gone down to 20%. Further details on the effects of the Project on poverty reduction and income and employment generation are described in para. 50. The Project has also improved public sector governance through institutional reform and the formation of several specialized divisions in RHD. It has been difficult to measure the impact of the road safety improvements under the Project as they have only been completed for 1 year and accident data should be collected over a longer period to determine the effectiveness of the safety measures.³⁵ A survey of vehicles overtaking at rumble strips found that, compared with the pre-Project situation, a minimum 86% of vehicles now do not overtake in these areas due to speed restrictions.

C. Efficiency in Achieving Outcome and Outputs

1. Financial Performance

44. The Project was not financially evaluated because it does not generate revenue.

2. Economic Performance

45. The Project was rated as highly efficient.³⁶ Efficiency has been rated through a recalculation of the economic internal rate of return (EIRR) for the project road, based on updated data collected by the PCR Mission. At appraisal, the EIRR calculated for the project road was 23.1%. The recalculated EIRR for the Project is 27.6%. This EIRR compares favorably with the 12% economic opportunity cost of capital. The primary differences between reevaluation and appraisal are due to (i) revised economic costs derived from actual costs, (ii) longer construction periods caused by delays in implementation, and (iii) differences in traffic growth at appraisal and reevaluation. Appendix 12 shows the recalculated EIRR as well as the supporting assumptions.

D. Preliminary Assessment of Sustainability

46. Maintenance of the project facilities is essential to sustain their economic life. At present the flow of funds is insufficient to cover routine and periodic maintenance costs of the road network. RHD is responsible for maintaining the project road with annual budget allocations from the Government. On average, the road routine maintenance budget has been estimated at

³⁴ Actual traffic data were collected by the consultants undertaking construction supervision as part of their monitoring exercise. Recent traffic data were also collected from RHD.

³⁵ Statistically, an accident is a rare occasion. In a limited period, random variations may be dominant. To eliminate the stochastic factor, information should cover several years.

³⁶ According to OED guidelines, if the estimated EIRR exceeds 18% a project is normally rated highly efficient. Highly efficient > 18%; efficient 18% ≥ E ≥ 12%; less efficient 12% > E ≥ 6%; inefficient < 6%.

about \$2.0 million.³⁷ Total periodic maintenance amounts to an annual budget of approximately \$42.0 million, which equates to an average allocation of around \$2,000 per km for periodic maintenance. The current allocation of funds for road maintenance is considered insufficient. The absence of regular maintenance due to budgetary shortages has resulted in a considerable backlog of maintenance work. A recent study³⁸ has estimated that the ongoing requirement for maintenance may be double the existing allocation. The PCR Mission's inspection found that the project road at present is in good condition. However, the large increase in heavy vehicles along the road and their overloading³⁹ will contribute to damage the project road. To ensure that the project road does not deteriorate from truck overloading, it will be necessary to enforce strict adherence to vehicle load limits (para 57). Although there was a vehicle axle-load station on the project road at the time of the PCR Mission, it was not operational.

47. The Government is at present seriously considering establishing a Road Maintenance Fund (RMF). A draft bill³⁹ for consideration by MOF and MOC has been prepared. The bill was reviewed by an 11-member committee set up by MOC on 20 March 2007. A second meeting to finalize the bill is expected during the next few months before it is presented to the Cabinet. The Government is committed to establishing the RMF and has been receiving assistance from a Road Fund Establishment Office⁴⁰ that was established to draft the legislation. It is expected that the RMF will be established later in 2007 or in early 2008. During the PCR Mission and in the absence of the RMF, the sustainability of the project road was rated as less likely. However, the PCR Mission is of the opinion that the Government commitment to the establishment of the RMF is considerable and that will ensure the sustainability of the project road.

E. Other Impacts

1. Environmental Impact

48. An initial environmental examination (IEE) prepared as part of the feasibility study for the project road indicated that an environmental impact assessment (EIA) would be required and that particular emphasis should be placed on the Arial Khan Bridge. The EIA was submitted to the ADB Board on 15 July 1999. The environmental mitigation measures recommended in the EIA were incorporated into the detailed design and civil works contracts. One of the key mitigating measures was to include a tree planting program. The felling of trees was to be minimized and the number of trees cut would be replaced by double that number by the Arboricultural Unit of RHD. A total of 27,607 trees were cut during project implementation, which meant that 55,214 new trees were to be planted. The actual number of trees planted was 198,200. Because some died and others were stolen, 49,000 additional trees were planted to cover the losses.

49. The construction supervision consultants prepared guidelines for an environmental management and monitoring plan (EMP) and also an environmental compliance report based on the summary EIA (SEIA). The EMP was agreed upon with ADB in April 2003 and, following

³⁷ This is to cover routine maintenance on approximately 21,000 km of road, which equates to a budget of about \$126 per km.

³⁸ Road User Charges Study for Sustainable Road Maintenance Financing (undertaken as part of the Road Sector Reform Project), World Bank, March 2006.

³⁹ The bill sets out the purpose of the fund, where the fund would derive its revenues, the composition and general duties of the road fund board, and the preparation and review of the road agencies annual road maintenance program.

⁴⁰ Set up under the Consolidated Institutional Component project financed by the Department for International Development of the United Kingdom.

the recommendations of an Environmental Compliance Review Mission,⁴¹ was updated in January 2004. It was found that the Project had complied with the mitigation measures and monitoring requirements cited in the SEIA. A total of 17 environmental issues were highlighted, including: (i) construction nuisances, e.g., sites for crushing plants and impacts of dust and noise; (ii) reduction of construction dangers, e.g., safe working practices; (iii) rehabilitation of borrow pits; (iv) proper chemical storage, handling, and transport and disposal of environmentally damaging solid and liquid wastes; (v) minimization of pollution of soil, water, and air quality; and (vi) information on communicable diseases due to issues on the influx of construction workers. The situation was monitored in further ADB missions and also by the social and environmental circle of RHD and the supervision consultants to ensure contractors' compliance with the EMP. Although the social and environmental circle, when it was established in June 2002, had an inadequate number of staff (para. 12) to monitor environmental issues properly, it had expanded sufficiently by January 2004 to actively participate in ensuring that all issues identified by the Environmental Compliance Review Mission were resolved and the necessary mitigation measures were implemented. During the PCR Mission no environmental problems were observed in terms of noise (para. 48 refers to trees being planted in sensitive areas, e.g., hospitals, schools, etc.), air pollution, soil erosion, etc.

2. Socioeconomic Impact

50. The Project's direct and indirect socioeconomic impacts were significant. The average net monthly income per household in the project area has increased significantly and there has been a significant increase in the number of families owning household goods (such as television sets and radios). A survey⁴² was undertaken during implementation as part of the monitoring exercise. In 1999 it was found that 15% of the surveyed group had incomes lower than Tk4,000 per month. By 2004 the number of the same surveyed group had gone down to 6%. In 1999 the people of the surveyed group earning more than Tk10,000 per month was only 7.7%, but it increased to 14.6% in 2004. These increases in income have had a significant impact on poverty levels⁴³ in the project area. The upper poverty line had been reduced from 52% in 1999 to 42.6% in 2005.⁴⁴ For hard core poverty, the lower poverty line, poverty was reduced from 46% poor in 1999 to 20% in 2005 in the project area.⁴⁵ The Project has provided increased employment opportunities for many skilled and unskilled jobs directly or indirectly through construction. Approximately 8.1 million person-days of temporary employment were created during implementation. After construction about 185,382 permanent jobs were created in transport, small enterprises, and the trade and service sectors. The culture of shrimps, the second largest export of Bangladesh, has increased. The area for cultivation and production increased by 25% during project implementation. The development of growth center markets in terms of lease value has increased from \$15,400 for a sample of eight typical growth center markets in 1999 to \$104,920 in 2004. The PCR Mission interviewed several small shopkeepers along the project road and found that, typically, incomes had increased. Prior to the introduction of the project road, these shopkeepers sold on average Tk300–Tk400 worth of goods per day. With the project road completed, sales are now Tk1,200–Tk2,000 per day.

⁴¹ Fielded from 15 to 20 November 2003.

⁴² Based on a sample of 538 respondents.

⁴³ The poverty standard is determined on the basis of levels of income enabling purchase of food and nutrition worth 1,850 kilocalories and 2,122 kilocalories of energy per capita per day. Poverty levels are defined as extreme poverty income (lower poverty line) where a household can afford up to 1,850 kilocalories nutritional intake per capita per day. Moderate poverty income (upper poverty line) is where a household can afford to buy 2,122 kilocalories per capita per day.

⁴⁴ This is 3% lower than the national average.

⁴⁵ This is a 26% decline compared with the national average fall of only 1.5%.

3. Resettlement Impact

51. At appraisal a land acquisition and resettlement plan (LARP) was formulated. It was determined that the Project would affect a population of 5,209 who would experience secondary or indirect impact. The LARP was implemented by a nongovernment organization (NGO) on behalf of RHD. The NGO began its work 1 year ahead of the award of civil works contracts. The total land acquired was about 263 hectares. The actual number of affected people finally compensated was 5,974 compared with the appraisal estimate of 5,209.⁴⁶

52. There have been problems related to land acquisition and resettlement activities, specifically noncompliance and delayed compliance with the related loan covenants. By December 2001 about 90% of the affected persons (APs) had already moved from the right-of-way (ROW) of the project road; however, they had not received any compensation at replacement cost although the majority of them had relocated 9–12 months earlier. Payments were the responsibility of the District Commissioners (DCs). There were considerable delays in payments by the DCs.⁴⁷ The delays were more than the legal constraints in ensuring title documents were valid, etc. The DC offices had inadequate staff to deal with such a large-scale acquisition and payment of compensation in a timely fashion. Due to the extensive delays, the NGO contract had to be extended five times. This, in turn, affected the implementation of civil works and delayed payment of compensation to the APs. The problem was compounded by the acquisition of small parcels of land during the project implementation period. Therefore, there were still some APs in the ROW when the civil works contracts were awarded for certain sections.⁴⁸ However, there was sufficient land free of encumbrances to enable the contractors to proceed with their work in an orderly manner, but due to minor changes in alignment of the road, problems with title deeds, and difficult negotiations concerning small parcels of land, the contractors were delayed in some sections of the project road.⁴⁹ By October 2003 land acquisition was 100% complete,⁵⁰ but it was not until 2005 that all APs were fully compensated. A resettlement impact evaluation was undertaken by the NGO to assess whether the APs were better-off or in worse condition as a result of the Project.⁵¹ The survey indicated that about 81% of the APs were better-off in terms of income levels and the remaining 19% had maintained their income and livelihood. No AP was in worse condition as a result of the Project. No indigenous peoples and/or ethnic minority issues arose during project implementation.

⁴⁶ Due to minor changes in alignment, which required additional small parcels of land.

⁴⁷ It was also noted by the NGO handling the resettlement process that the DCs also harassed certain APs and there were also allegations of corruption in the process of compensation payments made by the DC offices.

⁴⁸ The loan agreement stipulated that no civil works were to start until all properties had been acquired (para. 4, Schedule 6).

⁴⁹ Total delays due to the contractors' incomplete access to the sites, i.e., free of all encumbrances, were estimated as 2 months for contract 1, 4 months for contract 2, 2 months for contract 3, 2 months for contract 4, and 2 months for contract 5.

⁵⁰ Four minor acquisitions were still to be undertaken, namely, (i) one in contract 3, and (ii) three in contract 4, which had still not been paid for due to disputes on land prices.

⁵¹ An independent evaluation of resettlement management in the Project was also carried out under ADB TA No. 4006-BAN (ADB. 2003. *Technical Assistance to the People's Republic of Bangladesh for Enhancing Capacity of Infrastructure Agencies in Management of Involuntary Resettlement*. Manila).

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

53. The Project is considered successful, based on a review of its relevance, effectiveness, efficiency, and sustainability. Appendix 13 includes the quantitative assessment of project performance to determine the project rating.

B. Lessons

54. The Project has demonstrated that a contractor's ability to physically commit resources to a contract is crucial to performance. The prequalification documents require that the bidders prove their technical and financial capacities. However, there is no effective measure to ensure that bidders who passed the prequalification and won the contract indeed provided the required equipment, working capital, and management staff in the project sites as stipulated in the documents. In some contracts, managerial and planning capacity was inadequate, available equipment was old, and spare parts were unavailable. The extension of construction time also necessitated the extension of the services of the construction supervision consultants. The prequalification process needs to be more rigorous to avoid future delays in the implementation of civil works contracts. Also, for work under cofinancing arrangements the procurement procedures need to be fully discussed and agreed upon during project design to avoid unexpected delays during project implementation as was seen in respect of the NDF funding for the road safety component.

55. Although at the beginning of the Project the resettlement process progressed well, it slowed down after 2 years, mainly due to (i) slow progress of payments by the DCs due to disputes over ownership rights and lack of adequate staffing at the DCs, (ii) lack of funds and slow release of funds from RHD to pay the APs, (iii) long delays in extending the NGO's contract, and (iv) piecemeal land acquisition at different stages of implementation. To ensure that resettlement activities during project implementation run smoothly, they need to be monitored more thoroughly. ADB can assist in future projects by ensuring that the staff of agencies involved have sufficient capability, and insist that additional staff if required be recruited through the use of loan funds, to ensure that delays do not occur.

56. The absence of detailed field investigations during the design stage caused delays and necessary changes to the original design (para. 25, footnote 18). To avoid delays in the future, the quality of design can be improved by ensuring that a detailed review of the design is undertaken and that thorough field investigations have been undertaken.⁵²

C. Recommendations

1. Project-Related

a. Future Monitoring and Follow-Up Action

57. The maintenance of project facilities is critical to the long-term success of the project road. Due to the rapid increase in the number of heavy vehicles, some of which are overloaded, it is essential that axle-load limits be enforced. As was noted by the PCR Mission, the axle-load

⁵² The consultants undertaking construction supervision also undertook the detailed design. More thorough field investigations need to be ensured by incorporating that requirement into the terms of reference of the consultants.

weigh bridge that was installed under contract 1 is still nonoperational. ADB should monitor the opening of this axle-load station, ensure that axle-load monitoring and enforcement of axle-loads are conducted by RHD, and, if necessary, follow up the matter in further policy dialogue with the Government. ADB should continue to regularly monitor the maintenance of the project road and the availability of road maintenance funds and also follow up on the establishment of the proposed RMF.

b. Covenants

58. Since the contractors did not fully comply with the environmental covenants until after an Environmental Compliance Review Mission, it is recommended that ADB should regularly monitor environmental concerns through the consultant for supervision who must take a more active role in ensuring compliance with environmental covenants. The situation could have been avoided if the EMP, which was not prepared until April 2003, had been prepared earlier and incorporated into the bidding documents for the civil works contracts. The bidding documents could also then include the costs associated with environmental mitigation measures. It is also recommended that the contract documents stipulate effective measures for disciplining contractors who do not implement environmental mitigation measures. The covenants on resettlement were also not fully complied with. ADB should allocate more resources to regularly review the implementation of the resettlement plan of ongoing and future projects from the initial stage and allow a notice to proceed in a contract section to be given only after all land has been acquired.

c. Timing of Project Performance Evaluation Report Preparation

59. It is recommended that project performance be evaluated in another 2 years to determine if the Project is still meeting its objectives.

2. General

60. Maintenance for the national roads must be the top priority of RHD to retain the assets that local people use and ensure the social and economic growth of Bangladesh. Within the project area it would be useful if local people could also be involved in some road maintenance work so as to promote local employment and sustain the social impact of the Project.

61. To ensure that civil works contractors implement adequate measures to protect the environment, the EA's environmental unit should closely monitor their activities. It is recommended that the contract documents stipulate effective measures for disciplining contractors who do not implement environmental mitigation measures.

62. Delays in some civil works were due to the choice of contractors through the prequalification process. ADB needs to ensure that contractors' prequalification statements are duly followed during implementation to avoid delays. ADB should ensure that the EA has the capacity to oversee that the prequalification statements are followed.

PROJECT FRAMEWORK

Design Summary	Appraisal Performance Indicators/Targets	Project Achievements	Key Issues and Recommendations
Impact Improve national economic welfare by addressing constraints to infrastructure development.	Enhance economic growth through improvements to road network.	The regional gross domestic product has grown by 6% per annum over the 1999–2005 period (greater than the 5.5% per annum growth in the national economy).	No targets were given at appraisal for economic growth or any other topics.
Outcome 1. Optimize utilization of road network and continue development of essential transport linkages. 2. Reduce poverty in southwest Bangladesh. 3. Stimulate economic development of southwest Bangladesh. 4. Promote subregional cooperation and increase transit trade. 5. Improve operational efficiency of Roads and Highways Department (RHD). 6. Introduce commercial practices in roads subsector.	Reduce transport and O&M costs, allow for efficient and economic transport of good and passengers, increase trading opportunities, and improve access to major trading centers and seaports.	Vehicle operating costs are reduced by 38%. Traffic growth increased between 6% and 17% Upper level poverty was reduced from 52% in 1999 to 43% in 2005 Lower level poverty was reduced from 46% in 1999 to 20% in 2005. Economic development stimulated through incomes and employment increased. Operational efficiency improved due to division into circles: (i) monitoring circle (ii) social and environmental circle, (iii) procurement circle, and (iv) road design and safety circle. Commercial practices in vehicle inspection centers are not achieved.	See para. 42 and Appendix 12 See para. 50 See para. 50 See para. 43 and Appendix 2. Transferred to Road Network Improvement and Maintenance Project II
Component/Outputs 1. Rehabilitation and improvement of 166 km of roads along the Dhaka–Mawa-Bhanga-Bhatiapara-Gopalganj-Town Noapara route, and construction of the Arial Khan Bridge 2. Implementation of Environment	Improve roads along the Dhaka–Khulna/Mongla corridor and develop the east-west linkages to (i) reduce vehicle operating costs, (ii) facilitate and stimulate freight movement from Mongla Port and Benapole Land Port, (iii) offer passenger traffic shorter and faster access to Western Bangladesh, and (iv) increase incomes and employment opportunities along the project zone of	163.29 km of road from Dhaka to Town Noapara is improved Arial Khan Bridge is constructed. Environmental Management Action Program implemented in April 2003 and updated in January 2004 after	See paras. 7–9 See paras. 48–49

Design Summary	Appraisal Performance Indicators/Targets	Project Achievements	Key Issues and Recommendations
<p>Management Action Program</p> <p>3. Creation within RHD of (i) procurement circle, (ii) road design and safety circle, (iii) monitoring circle, and (iv) social and environmental circle.</p> <p>4. Implementation of the Land Acquisition and Resettlement Plan (LARP)</p> <p>5. Implementation of Poverty Reduction Monitoring Program.</p> <p>6. Implementation of Policy Framework and Action Plan.</p>	<p>influence. The Project will also (i) ensure fair compensation for Project-affected persons; (ii) ensure compliance with environmental standards and requirements; (iii) introduce and implement procedures to ensure proper planning, privatization, and allocation of resources for proper maintenance of roads; (iv) contribute to reducing poverty in the southwest region; (v) ensure transparent and procedurally correct bid evaluation and lending processes; and (vi) improve institutional governance.</p>	<p>Environmental Compliance Review Mission in November 2003</p> <p>Procurement circle, road design and safety circle, monitoring circle, and social and environmental circle established November 2000.</p> <p>LARP implemented, but payments to Project-affected people was delayed.</p> <p>Poverty Reduction Monitoring Program is implemented.</p> <p>Policy Framework and Action Plan is implemented.</p>	<p>See para. 12 and Appendix 2</p> <p>See paras. 51–52</p> <p>See paras. 21,30, and 50</p> <p>See Appendix 2</p>
<p>Activities</p> <p>1. Preparation of tender documents</p> <p>2. Procurement – civil works</p> <p>3. Construction supervision and project management</p> <p>Supervision of civil works Provision of training Expert guidance in resettlement and environment Monitoring of gender-based activities Capacity building at RHD</p>	<p>Ensure construction meets agreed-upon standards. Improve effectiveness of RHD. Increase organizational efficiency at RHD. Increase sensitization and capacity of RHD to respond to social and environmental issues.</p>	<p>Inputs</p> <p>1. Asian Development Bank financing, \$115 million. 2. Cofinancing from OFID, \$15 million 3. Cofinancing from Nordic Development Fund, \$4 million 4. Cofinancing from Danish International Development Agency, \$0.4 million, not committed 5. Counterpart financing from Government's resources, \$80 million. 6. Technical assistance, \$645,000</p>	

ADB = Asian Development Bank, RHD = Roads and Highways Department, LARP = land acquisition resettlement plan, km = kilometer, O&M = operation and maintenance.

POLICY FRAMEWORK AND ACTION PLAN

Policy Directions	Actions	Appraisal Agencies/Target Dates	Actual
1. Governance and Institutional Development	<ul style="list-style-type: none"> Bifurcate the existing monitoring and procurement circle into (i) a procurement circle, administratively accountable to the chief engineer of RHD, with adequate and appropriately qualified staff to standardize, monitor, and document procurement procedures for goods and services in RHD, with contract awards remaining the responsibility of the user division; and (ii) a monitoring circle with its current responsibilities and accountabilities, and the addition of an Evaluation Division within the monitoring circle. 	Chief Engineer, May 2000 MOC, June 2000	November 2000 November 2000
	<ul style="list-style-type: none"> Divide existing road and environment circle into two new circles: (i) road design and safety circle, with adequate and appropriately qualified staff to review, monitor, and initiate road safety activities in current and future RHD projects; and (ii) social and environment circle, with adequate and appropriately qualified staff to review, and monitor social and environmental issues in current and future RHD projects, particularly in the application of RHD guidelines that will be developed under the Project. 	Chief Engineer, January 2000 MOC, March 2000	November 2000 November 2000
	<ul style="list-style-type: none"> Staff social and environment circle with social scientists and environmental specialists. 	MOC/Government of Bangladesh, March 2001	June 2002
	<ul style="list-style-type: none"> Appoint a coordinator of foreign-assisted projects in the Office of Chief Engineer at staff officer/executive engineer level to act as focal point for reporting on all externally financed projects, including consultant activities throughout RHD. 	Chief Engineer, January 2000	December 2002
	<ul style="list-style-type: none"> Reorganize the project office for the Jamuna Bridge Access Roads Project by renaming the project office as Office of Additional Chief Engineer (ADB Projects), currently to be headed by the incumbent project director of Jamuna Bridge Access Roads Project. 	Chief Engineer, January 2000 MOC, February 2000	December 2002 December 2002
2. Technical Efficiency Improvements	<ul style="list-style-type: none"> Update RHD manual 	RHD, December 2000	November 2004
	<ul style="list-style-type: none"> Approve RHD manual 	Chief Engineer, March 2001	December 2004

Policy Directions	Actions	Appraisal Agencies/Target Dates	Actual
	<ul style="list-style-type: none"> Update maintenance manual Approve maintenance manual Prepare safety audit manual 	MOC, June 2001 RHD, December 2000 Chief Engineer, March 2001 MOC, June 2001 RHD, December 2000	December 2004 December 2004 November 2004
3. Financial Control Improvements	<ul style="list-style-type: none"> Update accounts manual Appoint accounts officer, Office of Chief Engineer, to work with the financial management expert to recommend improved accounting practices in the Project, which may be replicated in RHD projects. 	RHD, June 2001 Chief Engineer, March 2000 MOC, April 2000	November 2004 June 2002 July 2002
4. Maintenance Planning and Budgetary Reform	<ul style="list-style-type: none"> Issue administrative order mandating use of HDM in planning, prioritizing, and allocating resources for periodic maintenance. Prepare annual maintenance plans based on HDM outputs. Prepare detailed analysis of ways in which a sustainable approach to periodic maintenance can be established based on timely and adequate funding and clear organizational lines of responsibility. 	RHD, June 2000 RHD, by August each year RHD (IDC3), by August each year	November 2000 By August each year By August each year
5. Road Safety Activities	<ul style="list-style-type: none"> Appoint full-time administrator of the secretariat to the National Road Safety Council to assume responsibility for implementing NRSC recommendations and coordinating road safety programs 	MOC/BRTA, June 2000	November 2000
6. Commercial Activities in Road Operations	<ul style="list-style-type: none"> Conclude agreements for private operation of vehicle inspection centers (five) under the ADB-financed Road Overlay and Improvement Project. 	BRTA, June 2001	Transferred to Road Network Improvement Project

BRTA = Bangladesh Road Transport Authority, HDM = Highway Development and Management System, IDC3 = Institutional Development Component No. 3, MOC = Ministry of Communications, NRSC = National Road Safety Council, RHD = Roads and Highways Department.

Source: Asian Development Bank.

APPRAISAL AND ACTUAL COSTS (\$ million)

Project Component	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost						
1. Land Acquisition/Resettlement		10.00	10.00		10.05	10.05
2. LARP Implementation		1.00	1.00		0.85	0.85
3. Civil Works	77.97	74.79	152.76			
a. National Highway No. 8	77.09	73.47	150.56	62.45	65.95	128.40
b. Road Safety (a) ADB	0.80	1.20	2.00	0.68	1.03	1.71
(b) Danida ^a	0.08	0.12	0.20			
4. Construction Supervision	7.17	4.03	11.20	6.54	5.52	12.06
5. Project Administration		1.00	1.00		1.37	1.37
6. Poverty Reduction Monitoring Program ^b		0.25	0.25			
7. Road Safety Component: (a) NDF	2.40	1.60	4.00	2.51	1.38	3.89
(b) Danida	0.08	0.12	0.20			
Subtotal (A)	87.62	92.79	180.41	72.18	86.15	158.33
B. Contingencies						
1. Physical	8.51	9.10	17.61			
2. Price	4.45	8.41	12.86			
Subtotal (B)	12.96	17.51	30.47			
C. Service Charge during Construction	3.57	0.00	3.57	2.53		2.53
Grand Total	104.15	110.30	214.45	74.71	86.15	160.86

^a Danida withdrew its commitment to provide a \$0.40 million grant for part of the road safety component (Dhaka-Aricha highway) as that road section was to be financed under another project.

^b This item was transferred to the construction supervision consultants to undertake (paras. 21 and 30 in the main text).

Source: Asian Development Bank.

CURRENCY EQUIVALENTS

1 January–31 December	Tk to \$1.00
1999	49.19
2000	52.34
2001	56.77
2002	59.63
2003	60.06
2004	60.88
2005	64.65
2006	70.29
2007 ^a	71.53

Tk = People's Republic of Bangladesh taka.

^a 2007 exchange rate is based on 1 January–28 April 2007.

Source: Asian Development Bank.

Table A5.1: Summary of Contracts Funded by the Asian Development Bank

PCSS No.	Category	Contractor Supplier	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0005	01A- Civil Works	CAMC-TEL-CCL Jv., Bangladesh	Construction of Dhaka-Mawa Road-contract 1	BDT	1,037,947,018.99	2,349,890.00
Total - Category 01A				1,037,947,018.99	2,349,890.00	
0002	01B- Civil Works	Hanil Construction Co. Ltd.	Construction of Mawa (Charjanajat) - Bhanga Road-contract 2	BDT	1,586,779,107.23	18,266,612.00
0006		HH Consortium and Mir Akhtar Joint Venture	Construction of Bhanga-Bhatiapara Road-contract 3	BDT	1,700,253,363.46	19,869,491.00
0003		Abdul Monem Ltd.	Construction of Bhatiapara-Mollahat Road-contract 4	BDT	1,549,951,856.96	18,411,291.00
0007		China National Overseas Engineer, PRC	Construction of Mollahat-Town-Noapara contract 5	BDT	1,271,521,554.20	14,418,985.00
Total - Category 01B				6,108,505,881.85	70,966,379.00	
0008	01C- Civil Works (Road Safety)	Reza Construction	Road Safety Works in Daulidia-faridpur-Magura-Jhenaidah RSC-5	BDT	17,154,043.00	246,692.00
0009		MM Builders Engineers Ltd.	Road Safety Works in Dhaka-Mymengh National Highway RSC-1	BDT	23,182,529.00	340,874.00
0010		Tanita-OTBL JV.	Road Safety Works in Dhaka-Aricha-Nabinagar Highway RSC-2	BDT	10,649,537.00	152,997.00
0011		WEL-KAMAL-TNB JV.	Road Safety Works in Dhaka-kaliakoir-Jamuna Bridge RSC-3	BDT	10,931,151.00	158,260.00
0012		Rising Construction	Road Safety Works in Dhaka-kaliakoir-Jamuna Bridge RSC-3	BDT	13,163,774.00	189,897.00
Total - Category 01C				75,081,034.00	1,088,720.00	
0001	02- Consulting Services	Japan Overseas Consultants	Construction supervision	USD	12,062,482.00	12,062,482.00
Total - Category 02				12,062,482.00	12,062,482.00	
Total:		Grand Total				86,467,471.00

BDT = Bangladesh taka, USD = United States dollars.

Source: Asian Development Bank.

Table A5.2: Summary of Contracts Funded by OFID

PCSS No.	Category	Supplier's Name	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0001	01- Civil Work	CAMC-TEL-CCL JV.	Construction of Dhaka-Mawa Road- Contract 1	USD	8,925,757.00	8,657,231.00
Grand Total						8,657,231.00

OFID = OPEC Fund for International Development, USD = United States dollars.
Source: Asian Development Bank.

Table A5.3: Summary of Contracts Funded by the Nordic Development Fund

PCSS No.	Category	Supplier's Name	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
	Equipment	Various	Procurement of Road Safety Equipment	USD	661,900.71	661,900.71
	Consulting Services	FINROAD with DEVCON, Desh Upadesh & TPL	Consulting Services	BDT	214,823,216.00	3,227,891.93
Grand Total						3,889,792.64

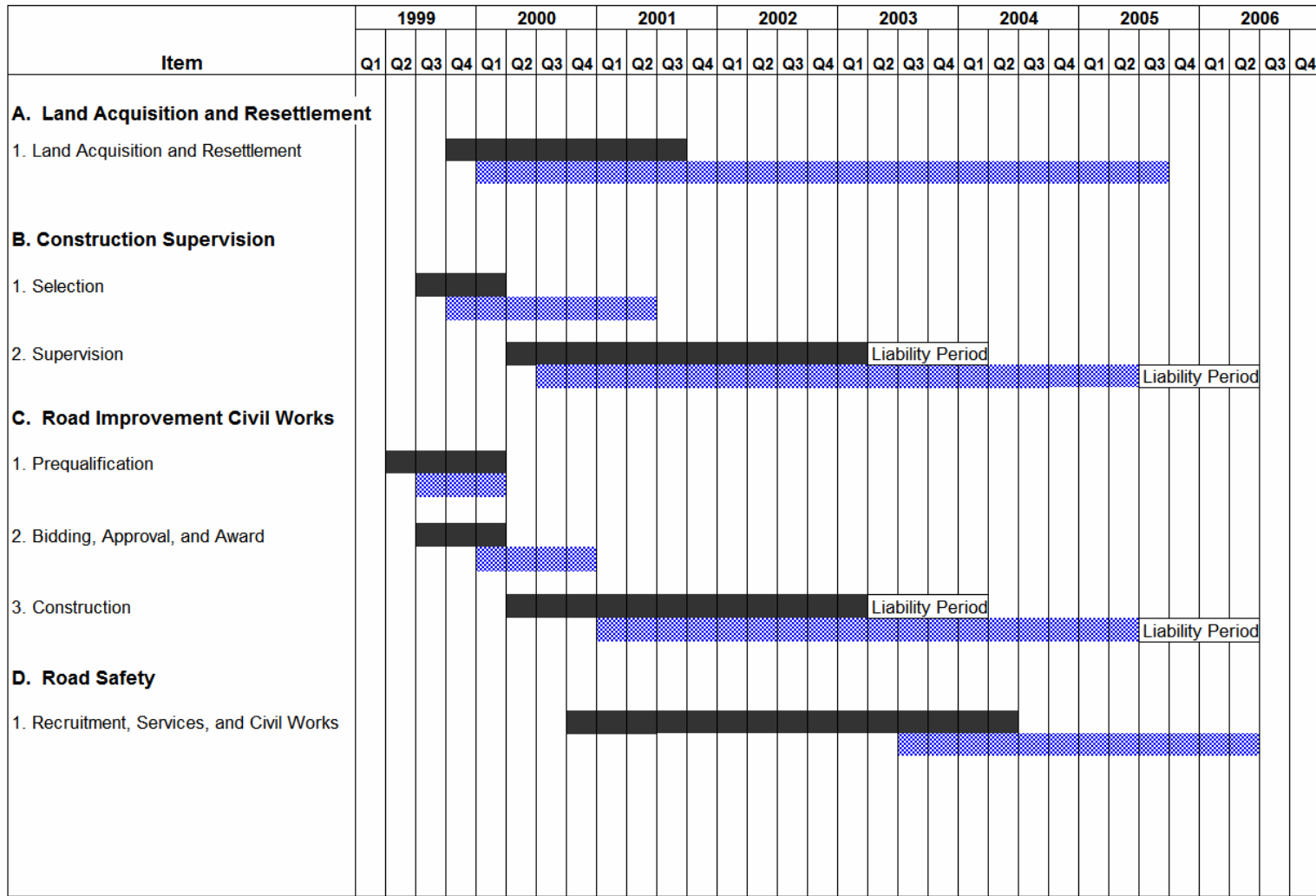
BDT = Bangladesh taka, USD = United States dollars.
Source: Asian Development Bank.

PROJECTED AND ACTUAL DISBURSEMENTS
(\$ million)

Year	Appraisal	Actual
2000	11.16	2.85
2001	19.55	16.62
2002	35.31	13.63
2003	48.98	13.23
2004		15.77
2005		21.04
2006		5.85
Total	115.00	88.99

Source: Asian Development Bank Loans Financial Information System.

PROJECT IMPLEMENTATION SCHEDULE



Legend

- Appraisal Estimate
- Actual

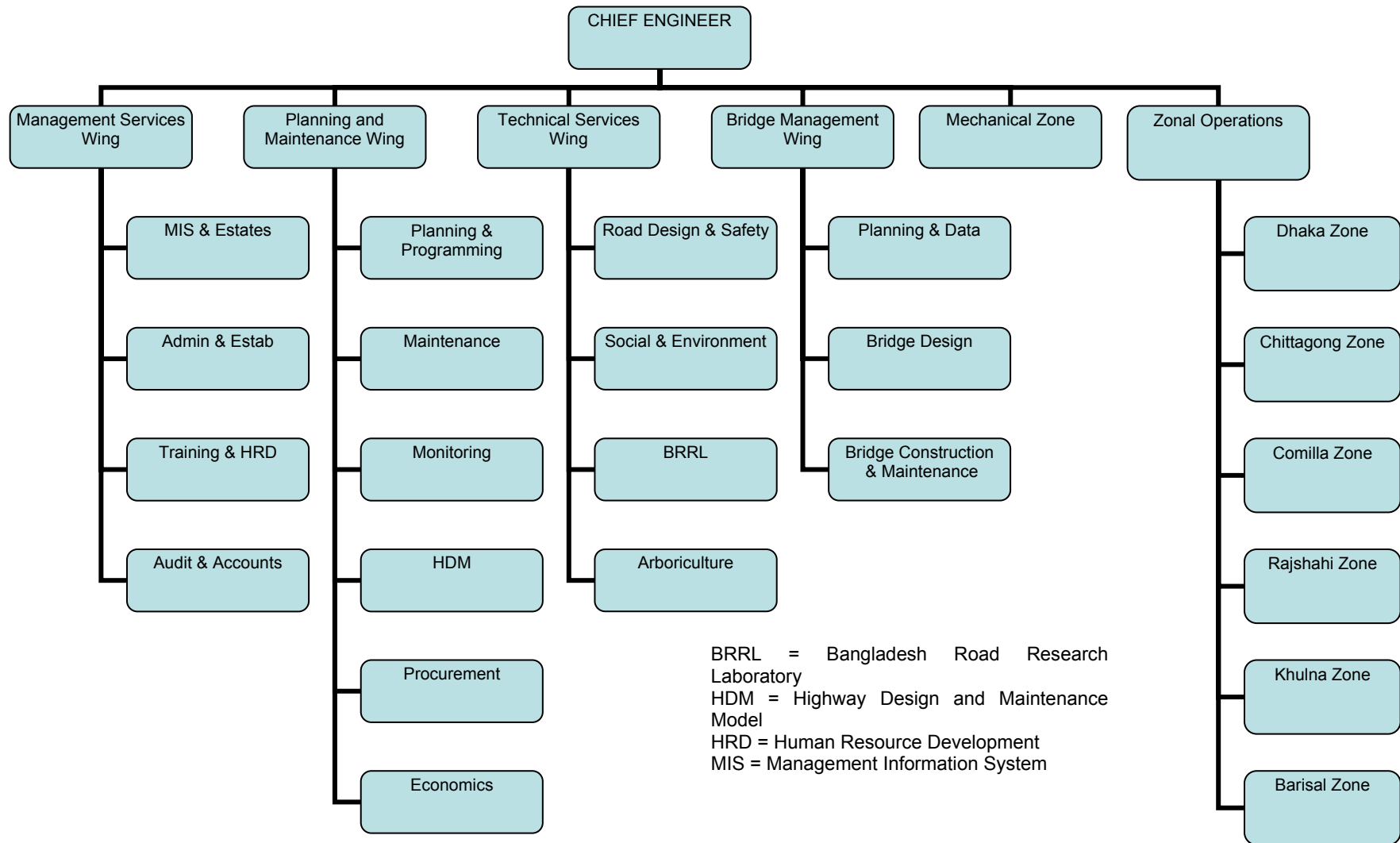
CHRONOLOGY OF MAJOR EVENTS

Date	Event
1999	
7–26 Apr 1999	- Fact-Finding Mission
1 June	- Advance procurement action approved
10 – 24 June	- Appraisal Mission
20-22 Sep	- Loan negotiations
16 Nov	- Loan approval
7 Dec	- Loan signing
31 Dec	- 31 bidders prequalified
2000	
4 Jan	- Invitation of bids for civil works
11 Apr	- Close of bids
2 Mar	- Effectiveness of loan
16 Jun	- OFID loan approved
28 Jul	- Contract awarded to supervision consultants
1 Sep	- Consultants mobilized
26 Nov	- EA issued letters of acceptance for contracts 1, 2, 3, 4, and 5
2001	
13 Feb	- EA issued notice to proceed for road improvement contracts 1–5.
13–28 Mar	- Special loan administration mission
2-11 Dec	- Inception Mission fielded
2002	
5–7 Mar	- Follow-Up Mission fielded
20–31 Oct	- Review Mission fielded

Date	Event
3 Dec	- ADB approved contract for consulting services for road safety component.
2003	
27 Jan	- Administration of Project delegated to BRM
26 May–10 Jun	- Review Mission fielded
15–20 Nov	- Environmental Compliance Review Mission fielded
2004	
10 Jan	- Government formally requested ADB to extend its loan closing date for 15 months from 30 September 2004 to 31 December 2005.
29 Jan	- Government requested ADB to cancel \$5.0 million as identified surplus loan.
23 Feb	- ADB approved extension of loan closing date for 15 months from 30 September 2004 to 31 December 2005.
1 Mar	- Government requested OFID for extension of loan closing for 18 months from 30 June 2004 to 31 December 2005 in line with the ADB loan extension.
11 Mar	- ADB partial cancellation of \$5 million as surplus loan savings
28 Mar–2 Apr	- Review Mission fielded
21 Apr	- EA allowed time extension for completion of contracts 1,2,3,4, and 5 up to 8 May 2005.
5–8 Jul	- Review Mission fielded
30 Sep	- ADB partial cancellation of \$3 million as surplus loan proceeds
12–20 Dec	- Review Mission fielded
2005	
7 Mar	- EA issued taking over certificate for contract 2.
17 Apr–2 May	- Review mission fielded
29 May	- EA issued taking over certificate for contract 1, 3, 4, and 5
16 Nov	- ADB received evaluation report of road safety contracts 1, 2, and 3 for approval.

Date	Event
11–19 Dec	- Review Mission fielded
19 Dec	- Government requested ADB for further 3 months extension of loan closing date to 31 March 2006.
26 Dec	- ADB approved second extension of loan closing date for 3 months from 31 December 2005 to 31 March 2006.
2006	
16 Jan	- ADB approval of road safety contracts
20 Mar	- Notice to proceed issued for procurement of road safety equipment lots 2, 4, 5, 6, and 7. Lot 1 was cancelled and combined with lot 3.
31 Mar	- Loan closed
12 Jul	- ADB requested EA to submit Borrower's PCR.
21 Jul	- Government requested OFID for extension of loan closing date of from 31 December 2005 to 31 May 2007 to accommodate expenditures incurred up to 31 March 2006 in line with the ADB loan.
27 Sep	- Loan account closed
5 Oct	- Borrower's PCR received.
17 Oct	- Notice to proceed issued for procurement of road safety equipment lot 3.
2007	
1–28 Apr	- PCR Mission fielded

ORGANIZATION CHART OF ROADS AND HIGHWAYS DEPARTMENT



Covenant	Reference in Loan Agreement	Status of Compliance
Social Covenants Land Acquisition and Resettlement The Borrower shall ensure that persons displaced by the Project will not bear any losses in income, employment opportunities or reduction in social and cultural well-being as a consequence of the physical construction of the Project. The Borrower shall ensure that those persons, who are to be displaced, are compensated for loss of land, housing, crops, and other forms of livelihood that occur as a consequence of the physical construction of the Project. The Borrower shall not commence any construction actively under the Project until all properties, including land and rights to land, free from any encumbrances, have been acquired. The Borrower shall ensure that compensation is made to the displaced persons under the Project in accordance with the Land Acquisitions and Resettlement Plan (LARP) agreed upon with the Bank. The Borrower shall ensure that the LARP is implemented by RHD through an agency under arrangements satisfactory to the Bank.	Schedule 6, para. 4	Complied with late Compensation to the Project Affected People although completed was seriously delayed; contractors did not have unhindered access to the civil works sites which caused delay.
The Borrower shall ensure that the cost of land acquisition and other resettlement compensation is financed from its own resources and that such cost is included in its annual development budget for RHD from fiscal year 1999/2000 to fiscal year 2002/2003. RHD shall include an evaluation on the progress of implementation of the LARP in its quarterly reports before submitting these reports to the Bank.	Schedule 6, para. 5 Schedule 6, para. 6	Complied with. RHD appropriated the fund for land acquisition and compensation to the Project Affected Persons to the Deputy Commissioners Office. Disbursement was coordinated by the Land Acquisition Resettlement Plan consultants. Complied with
Environmental Covenants RHD shall ensure that environmental problems associated with the Project are appropriately addressed during the Project implementation, and in the operation and maintenance of the Project facilities, all in accordance with the Bank's environmental guidelines and the Environmental Monitoring Action Plan agreed upon with the Bank.	Schedule 6, para. 8	Complied with Environmental Compliance Review Mission fielded from 15 to 20 November 2003 recommended revision of environmental management plans (EMP) to mitigate findings and to improve mitigation measures. EA and contractors took actions as recommended by the Mission.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>Project Performance Management System Activities During Project implementation, RHD shall carry out project performance management system (PPMS) activities under the Project by compiling and analyzing road traffic data on the Project roads and socio-economic data related to all Project activities. RHD shall include its PPMS activities in its quarterly reports on Project implementation and in the Project completion report before submitting these reports to the Bank. RHD shall use key indicators agreed upon between the Borrower and the Bank as the baseline data in the PPMS activities.</p>	Schedule 6, para. 18	Complied with
<p>Financial</p> <p>Financial Statements The Borrower shall maintain separate accounts for the Project and have such accounts audited annually in accordance with appropriate auditing standards not later than 12 months after the end of each fiscal year.</p> <p>Budget Allocation The Borrower shall include adequate provisions for the Project in its annual development budget allocations, starting from fiscal year 1999/2000.</p> <p>Cofinancing Within nine months after the Effective Date, or at a later date as the Bank may otherwise agree, the Borrower shall have obtained the OFID Loan, the Danida Grant and the NDF Credit or shall have made other arrangements, satisfactory to the Bank, to fund the amount intended to be provided by the OFID Loan, the Danida Grant and the NDF Credit.</p> <p>Accounts Officer Within three months after the Effective Date, RHD shall appoint a full-time Accounts Officer in the Office of Additional Chief Engineer (ADB Projects) to coordinate all accounting and financial reporting activities under the Project.</p>	<p>Schedule 4, para 4.06.</p> <p>Schedule 4, para 4.06.</p> <p>Schedule 6, para 17.</p> <p>Schedule 6, para 7.</p>	<p>Complied with</p> <p>Complied with</p> <p>Complied with late i) OFID loan effective in June 2000 ii) Danida did not commit to cofinance the Road Safety Component of the Project iii) NDF credit became effective in February 2001</p> <p>Complied with</p>
<p>Others</p> <p>Project Implementation RHD shall ensure that the Office of Additional Chief Engineer (ADB Projects) is responsible for carrying out day-to-day activities under the</p>	Schedule 6, para. 1	Complied with

Covenant	Reference in Loan Agreement	Status of Compliance
Project. RHD shall also ensure that this office is headed at all times by the Project Director/Additional Chief Engineer (ADB Projects) and that the aforesaid Project Director is assisted by two full-time Additional Project Directors (APDs). The APDs shall be at least Superintending Engineer level or its equivalent, one based in Dhaka and the other in Gopalganj.		
RHD shall ensure that the field activities to be carried out under the Project are supervised by four full-time Project Managers.	Schedule 6, para. 2	Complied with
Policy Framework and Action Plan The Borrower shall implement the measures specified in the Policy Framework and Action Plan agreed upon with the Bank.	Schedule 6, para. 3	Complied with late
Midterm Review The Borrower, any Cofinancier and the Bank shall carry out a midterm review of the Project in the second year of Project implementation or at any other time as may be agreed upon by the parties. The results of the midterm review, including an assessment of the Project's objectives against key result areas shall be discussed by the parties if required, appropriate corrective measures shall be formulated to ensure successful Project implementation and achievement of the Project's objectives.	Schedule 6, para. 19	Complied with Midterm Review Mission was carried out in November 2003.
Award of Contract Except for Contract 1, the Government will not award any Bank-financed civil works contract until after (i) the construction supervision consultants have been appointed; and (ii) acquiring or making available on a timely basis the land and rights in land, free from any encumbrances. For Contract 1 the Government will not award the contract until after the events in (i) and (ii) have been satisfied, and the Government has obtained the OFID loan.	Schedule 4, para. 10 (a) Schedule 4, para. 10 (b)	Complied with (i) and partly complied with (ii). The contracts were awarded before full compensation to Project Affected Persons had been completed and therefore access to the civil works sites was not free from encumbrances Civil works contracts 2-5 were awarded on 12 December 2000 after the appointment of the construction supervision consultants on 14 June 2000. OFID loan became effective in June 2000

Covenant	Reference in Loan Agreement	Status of Compliance
<p>Operation and Maintenance During Project implementation and after Project completion, RHD shall be responsible for the operation and maintenance of the Project facilities. The Borrower shall ensure that adequate funds are allocated to RHD in carrying out operation and maintenance activities.</p>	Schedule 6, para. 9	<p>Complied with Since Project completion there has been a considerable increase in the volume of trucks, some of which are severely overloaded, which will cause future damage to the road. It is essential that there be strict enforcement of axle-loads using the road. The Government, at the time of the PCR Mission, has put forward a bill to the Cabinet for the establishment of a Road Maintenance Fund. It is essential that this fund be established to provide funding for future maintenance of the Project facilities (paras 46, 47, and 57 refer).</p>
<p>Maintenance Plan (a) RHD shall continue to prepare annual maintenance plans for RHD-administered national and regional roads, and shall, as from fiscal year 2000/2001, allocate maintenance funds based on prioritized economic and technical parameters set out under its highway design and maintenance model.</p> <p>(b) By 30 June 2000, RHD shall issue an Administrative Order to mandate the use of its highway design and maintenance model for its future maintenance plans.</p>	Schedule 6, para. 10	<p>Complied with</p> <p>Complied with First implementation was related to Road Maintenance Improvement Project</p>
<p>Organizational Changes (a) Within three months after the Effective Date, the Borrower shall ensure that the existing Road Safety and Environment Circle with RHD is divided into two Circles (Road Design and Safety Circle and Social and Environment Circle) to separately address road safety, and social and environmental issues. The Borrower shall ensure that each Circle is headed by a full-time Superintending Engineer.</p> <p>(b) Within three months after the Effective Date, the Borrower shall ensure that the existing Procurement and Monitoring Circle within RHD is divided into two Circles (Procurement Circle and Monitoring Circle) within RHD to separately address procurement and monitoring of activities. The Borrower shall</p>	Schedule 6, para. 12	<p>Complied with</p> <p>Complied with late</p>

Covenant	Reference in Loan Agreement	Status of Compliance
ensure that each Circle is headed by a full-time Superintending Engineer.		
Coordinator Within one month after the Effective Date, the Borrower shall appoint a Coordinator at Staff Officer or Executive Engineer level or its equivalent within RHD. The Coordinator shall provide support to the Chief Engineer, RHD and external financiers, including reporting on RHD's externally assisted development works and consultant activities.	Schedule 6, para 13	Complied with late. Compliance with the governance and institutional development, the technical efficiency improvement, and the financial improvement were delayed.
Administrator Within six months after the Effective Date, The Borrower shall appoint a full-time Administrator for the Secretariat of the National Road Safety Council (NRSC). The Borrower shall ensure that the Administrator is responsible for implementation of the recommendations of the NRSC, and coordination of road safety programs in the country.	Schedule 6, para. 14	Complied with A full-time Manager of the Secretariat of the National Road Safety Cell (NRSC) commenced work on 15 March 2000. The Secretariat for NRSC has been renamed as the Road Safety Cell
Leasing By 30 June 2001, the Borrower shall cause BRTA to lease to the private sector the operation and management of BRTA's vehicle inspection centers under arrangements satisfactory to the Bank.	Schedule 6, para. 15	Could not be addressed under the Project. The issue is now to be addressed in the Road Network Improvement and Maintenance Project II.
Poverty Reduction Monitoring Program Within one year after the Effective Date, the Borrower, through the Planning Commission, shall design a Poverty Reduction Monitoring program satisfactory to the Bank and engage consultants to carry out this Program.	Schedule 6, para. 15	Complied with. late The Planning Commission had capacity constraints to carry out the study by themselves. ADB approved that the study would be administered by RHD engaging the consultants for construction supervision in consultation with the Planning Commission

TECHNICAL ASSISTANCE COMPLETION REPORT

Division: BRM

TA No. and Name TA 3297-BAN: Urban Transport and Environment Improvement Study			Amount Approved: \$645,000	
			Revised Amount: -	
Executing Agency: Bangladesh Road Transport Corporation		Source of Funding: JSF	TA Amount Undisbursed \$9,871	TA Amount Utilized \$635,129
Date			Closing Date	
Approval 16 November 1999	Signing 16 November 2000	Fielding of Consultants 8 January 2001	Original 31 January 2001	Actual 31 May 2002
<p>Description</p> <p>The overall objective of the advisory TA, Urban Transport and Environment Improvement Study, was to identify and prioritize problem areas and to develop policies and strategies to improve air quality in Dhaka and other major cities in Bangladesh. The TA was formulated in such a manner as to address two of the major issues that affect air quality in Dhaka, fuels and vehicle performance. Improvements in these two areas of focus will have a positive impact on the air quality of Dhaka, regardless of the mix of solutions that emerge over time for an ultimate control strategy. The analysis of policies and incentives in the TA focused on these two issues.</p> <p>Expected Impact, Outcome, and Outputs</p> <p>The scope of the TA included six components: (i) identify stakeholders and their roles in improving air quality in Dhaka and other major cities; (ii) develop an action plan to control and phase out dirty fuel, particularly in the transport sector; (iii) develop an action plan to introduce clean fuel based on natural gas; (iv) review environmental regulations relating to vehicular emissions and recommend strategies for enhanced implementation; (v) develop an action plan to improve operation and maintenance standards for registered vehicles, particularly in Dhaka; and (vi) identify the potential role of ADB in implementation of the overall action plan for cleaner air, including formulating a policy-oriented urban transport pollution-reduction project. The goal of the TA was to develop strategies to ensure that vehicular emissions are reduced over an 8-year project period to levels below those existing at the time of the TA. This included recognition of substantial growth in the number of vehicles, particularly in Dhaka, with corresponding potential increases in pollution. The development of the TA Action Plan components emerged from discussions over the 7-month TA period with the stakeholders, including the Government of Bangladesh, ADB, and other international groups. The objective was to develop a manageable yet fairly comprehensive menu of potential structural and nonstructural controls, and to complement other activities that were already under way in this area.</p> <p>Evaluation of Inputs and Conduct of Activities</p> <p>The consultants signed a contract in November 1999. The consultant's work was completed by May 2002. Bangladesh Road Transport Corporation (BRTC) and ADB rated the consultant's work as satisfactory.</p> <p>Evaluation of Outputs and Achievement of Outcome</p> <p>The TA produced several outputs, including the Inception Report, which was submitted on February 8, 2001, the Interim Report submitted on May 15, 2001, the Draft Final Report, and the Final Report submitted in September 2001. In addition, the consultants provided brief monthly progress statements and a Summary Report. The TA studied several components to improve the air quality management system, namely, (i) air quality assessment, (ii) environmental damage assessment, (iii) abatement options assessment, (iv) optimum control strategy, (v) cost-benefit analysis or cost-effectiveness analysis, and (vi) abatement measures. The TA Action Plan addressed ways that ADB can provide assistance to the Government of Bangladesh to address identified needs in the short and long term. The TA recommended that ADB assistance should be targeted initially to the fuels and vehicle performance issues, but could expand into other areas as the knowledge base develops and needs emerge.</p> <p>Overall Assessment and Rating</p> <p>The TA is rated successful and produced comprehensive documentation. It has assisted the Government of Bangladesh in more effectively undertaking a strategy to improve air quality in major cities throughout Bangladesh.</p> <p>Major Lessons Learned</p> <p>The TA provided the Government with valuable assistance. The TA structure should be used again for further work to ensure continuing improvements.</p> <p>Recommendations and Follow-Up Actions</p> <p>The TA produced strategies in the Action Plan by which the Government of Bangladesh could improve air quality. However, additional work is still necessary to ensure that the work undertaken in the TA is carefully monitored to determine air quality improvements throughout major cities in Bangladesh.</p>				

Prepared by Stefan Ekelund

Designation

Senior Transport Specialist, BRM

ECONOMIC REEVALUATION

A. General

1. The methodology used in the economic reevaluation was the same as that used in the appraisal. The with- and without-Project situations were compared to determine the effects of introducing the project road. The road runs from Dhaka to Town Noapara via Mawa, Bhanga, Bhatiapara, and Mollahat. The total length of road rehabilitated under the Project was 162.39 kilometers (km). The main economic benefits consisted of (i) savings in vehicle operating costs (VOCs) for normal, diverted, and generated traffic; and (ii) passenger time savings.

2. The assumptions in the appraisal report were modified, where necessary, based on updated information. The reevaluated economic internal rate of return (EIRR) considered the economic costs and benefits over the construction period plus 20 years of operation as at appraisal. All costs and benefits were expressed in 2006 constant prices. The methodology for calculating the EIRR used the highway and design maintenance model (HDM-4),⁵³ as at appraisal

B. Economic Costs

1. Construction Costs

3. The economic construction costs were derived from the financial costs of civil works, physical contingencies, land acquisition and resettlement, and construction supervision, excluding price escalation, price contingencies, and interest during construction. All financial costs were converted to economic costs by deducting taxes and duties and by differentiating local currency costs into indirect foreign exchange and local currency costs. A standard conversion factor (SCF) of 0.80⁵⁴ was applied to the local currency costs of those items that were nontradable. As at appraisal, no residual value was assumed at the end of the project life.

2. Maintenance Costs

4. Incremental maintenance costs were calculated as the difference between the costs of routine and periodic maintenance without- and with-Project, in 2006 prices. The Project Completion Review (PCR) Mission obtained maintenance unit costs from the Roads and Highways Department (RHD).

5. Maintenance costs for the without- and with-Project cases were calculated. For the without-Project case essential routine maintenance (i.e., pothole patching, shoulder maintenance, cleaning culverts, etc.) would be required to keep the road open to traffic. In the with-Project case both routine and periodic maintenance are necessary. Routine maintenance costs have been calculated on a per km per year basis. The same assumption at appraisal regarding periodic maintenance was adopted, i.e., a periodic overlay will be needed in the tenth year after road opening. The incremental economic costs for routine and periodic maintenance of the project road are shown in Table A12.1.

⁵³ The highway design and maintenance (HDM) model was developed by the World Bank and is used worldwide as best practice.

⁵⁴ The SCF of 0.80 was also used at appraisal and is consistent with other recent projects in the People's Republic of Bangladesh.

Table A12.1 Incremental Economic Maintenance Costs of Project Road

Cost Item		Costs (taka million)
Routine Maintenance	Pothole patching, crack sealing, etc. (every year)	4.7
Periodic Maintenance	Overlay (every 10th year)	762.0

Source: Roads and Highways Department.

C. Economic Benefits

1. General

6. The estimated economic benefits were based on a comparison of the with-Project and without-Project cases. Without the Project, the roads would generally have been in either poor or fair condition, and would accommodate only low vehicle speeds, and therefore would have caused high VOCs. With the Project, the road would be in good condition. With the improved surface condition, higher vehicle speeds would then be possible, which would, in turn, reduce VOCs. The VOC savings have been calculated for normal traffic, diverted traffic, and generated traffic.

2. Traffic Forecasts

7. The PCR Mission obtained updated traffic count data for the project road from RHD. The data had been collected as part of the Project Performance Monitoring and Evaluation Study (PPME) by the construction supervision consultants at three stages: before the project road was constructed, during construction, and immediately after the project road opened. Additional traffic data was also collected for 2006 by RHD from several traffic survey stations along the project road that were set up as part of the PPME. The survey traffic data was then processed to obtain the annual average daily traffic (AADT), taking into account daily and monthly variation factors. The total traffic volumes along the project road for 1998, 2002, 2005, and 2006 are shown in Table A12.2. Traffic composition by vehicle type is shown in Table A12.3 for traffic in 2005.⁵⁵

Table A12.2: Traffic Volume Comparison, 1998–2006 (Total Motorized Traffic AADT)

Survey Station	Road Section	1998	2002	2005	2006
Srinagar	Dhaka–Mawa	2,668	3,544	4,021	4,483
Maligram	Charjanajat–Bhanga	1,949	1,921	2,291	2,429
Mansurabad	Bhanga–Bhatiapara	—	—	1,121	1,222
Haridaspur	Bhatiapara–Gopalganj	958	1,942	2,546	2,763
Mollahat	Gopalganj–Mollahat	447	825	1,316	1,425
Fakirhat	Mollahat–Fakirhat–Town Noapara	356	643	2,154	2,320

— = not available, AADT = annual average daily traffic.

Source: Consultant supervision and Roads and Highways Department.

⁵⁵ Data for 2005 is given as it shows more vehicle categories than the 2006 counts and is thus more appropriate to determine traffic composition.

Table A12.3: Traffic by Vehicle Type, 2005 (AADT)

Survey Station	Car/Utility	Small Truck	Medium Truck	Heavy Truck	Micro Bus	Medium Bus	Large Bus	Auto Rickshaw	M/C	Total
Srinagar	646	160	309	38	250	844	808	635	331	4,021
Maligram	191	90	291	31	98	32	357	960	241	2,291
Mansurabad	212	61	167	12	103	3	98	307	158	1,121
Haridaspur	348	113	348	97	135	248	345	360	552	2,546
Mollahat	142	97	261	4	80	161	185	150	236	1,316
Fakirhat	204	43	285	2	93	177	124	660	566	2,154

AADT = annual average daily traffic, M/C = motorcycles.

Source: Consultant supervision and Roads and Highways Department.

8. At appraisal the traffic forecast was made from traffic counts that had been undertaken from 1998 to the opening of the project road in 2003 and then for a 20-year period of operation until 2022. Traffic growth at appraisal was calculated for the project roads for different vehicle categories, namely, (i) motorcycles; (ii) car; (iii) utility vehicles; (iv) light truck; (v) medium truck; (vi) heavy truck; (vii) micro bus; (viii) medium bus; (ix) large bus; and (x) auto rickshaws, and motorcycles. Traffic growth was based on an examination of historical growth rates, growth in gross domestic product (GDP), and income elasticity of demand (estimated as 1.5 for both passenger and freight traffic). The traffic forecast at appraisal used a set of growth rates: 8% per annum in 1998–2007, declining to 6% per annum in 2008–2012, and 5% per annum from 2013 thereafter. Actual annual traffic growth from 1998 to 2005 varied by road section and vehicle type and ranged on average from 6% to 17% per annum (traffic growth on the Mollahat–Town Noapara section was actually 29% per annum in 1998–2005).

9. Future traffic growth rates for the economic reevaluation were based on future expectations of growth in regional GDP, population growth, real income per capita growth, and the transport elasticity of demand for different vehicle categories. Regional GDP growth rates in the project area was 6% per annum in the 1999–2005 period (higher than the national GDP growth rate of 5.5% per annum over the same period). The regional GDP growth rate of 6% per annum is expected to continue until around 2010 and then decline to about 5% per annum from 2010 onward. The elasticity of demand for transport is considered to be between 1.0 and 1.5, depending on vehicle type. Traffic growth has been estimated for 5-year periods, as at appraisal: 2006–2010, 2011–2015, and from 2016 onward. A summary of the traffic growth rates for passenger and freight traffic for the project road is shown in Table A12.4 for the major vehicle categories. As at appraisal, “standard” growth rates have been adopted. These growth rates are a relatively conservative forecast, considering the high historical growth rates between 1998 and 2006.

Table A12.4: Traffic Growth Rates (%)

Vehicle Category	2006–2010	2011–2015	2016 onward
Motorcycles	9.0	7.5	7.5
Cars / Utilities	9.0	7.5	7.5
Trucks	9.0	7.5	7.5
Buses	9.0	7.5	7.5

Source: Asian Development Bank estimates.

10. Also as at appraisal, it is expected that with the fall in VOC because of the improved road surface traffic will be generated, i.e., people who did not travel before will now be encouraged to do so because of the improved road conditions. At appraisal, it was not indicated what percentage of generated traffic had been applied to the economic evaluation. In most economic evaluations, generated traffic is estimated to range from 10% to 20% of normal traffic. The economic reevaluation has used a conservative estimate of 10% generated traffic. Diverted traffic will also occur on the project road. Before the project road, travel from Dhaka to Khulna would be via the long route from Dhaka via Aricha, Daulatdia, Faridpur, Magura, and Jessore. After the project road was built, the route is 100 km shorter. To determine how much traffic was on the existing route before the project road was built, the consultants undertaking the PPME carried out several origin-destination (O-D) surveys throughout the project area. The O-D data was used to estimate how much of the traffic would divert to the project road once it was completed. The consultants undertook O-D surveys on the Aricha–Faridpur road, and the Jessore–Khulna–Mongla road. The O-D surveys on the Aricha–Faridpur route showed that approximately 32% of the existing passenger traffic and about 23% of the existing truck traffic on that route would divert to the project road. From an analysis of the main origin and destinations on the Jessore–Khulna–Mongla road, it was determined that 40% of the existing passenger traffic and approximately 20% of the existing freight traffic on that road would also divert to the project road. The distance saved accruing to those diverting from the Aricha–Faridpur road to the project road is approximately 100 km, while the distance saved by those on the Jessore–Khulna–Mongla road is about 70 km.

3. Vehicle Operating Cost Savings

11. The economic VOCs were updated by the PCR Mission based on data obtained from RHD. The data was used in the HDM-4 model to calculate the VOCs. The costs were updated to 2006 economic prices by excluding taxes and duties and were calculated for nine representative vehicle types: (i) motorcycles, (ii) car/utility, (iii) small truck, (iv) medium truck (v) heavy truck, (vi) micro bus, (vii) medium bus, (viii) large bus, and (ix) auto rickshaw. The rate of road deterioration used in the economic analysis is based on the levels of surface roughness that existed before the Project was implemented, i.e., the without-Project case, compared with the roughness values in the with-Project case, and the VOC savings due to the road improvement are calculated. The road roughness level, as measured by the International Roughness Index (IRI),⁵⁶ after improvement of the project road has been set to IRI 2.5 m/km at the year of opening. This IRI value has been verified by the PCR Mission visit to the project

⁵⁶ The IRI is measured in meters per kilometer.

road. On the project road prior to its operation and also on the route via Aricha, Daulatdia, Faridpur, Magura, and Jessore to travel to Khulna, IRI 4.0 m/km was used, as at appraisal.

12. Typical VOCs for various vehicle types, based on opening year surface roughness levels in accordance with the IRI, are shown in Table A12.5 along with the VOCs for the average surface roughness of the without-project case, which averages IRI 4.0 m/km. The rate of road deterioration used in the economic analysis is based on the levels of surface roughness that existed before the Project was implemented, i.e., the without-Project case, compared with the roughness values in the with-Project case and the calculation of VOC savings due to the road improvement are calculated. VOC savings for generated traffic are valued at 50% of unit VOC savings.

Table A12.5: Typical Vehicle Operating Costs with and without Road Improvement
(taka per km)

Vehicle Type	Without (IRI = 4)	With (IRI = 2.5)
Car	9.32	9.04
Utility Vehicles	9.26	8.89
Micro Bus	11.36	10.93
Medium Bus	11.40	11.06
Large Bus	13.72	13.10
Small Truck	9.56	9.13
Medium Truck	12.90	12.32
Auto Rickshaw	2.32	2.25
Motorcycle	1.30	1.28

IRI = international roughness index in meters / km.

Source: Asian Development Bank estimates

4. Time Savings

13. Passenger travel time savings have also been calculated as at appraisal. The economic costs of passenger time are based on the findings of several studies carried out in Bangladesh and RHD estimates based, among other things, on primary surveys carried out in different parts of the country. The value of time is calculated from average monthly wages derived from national statistical records of persons for various employment types, using different vehicle types. Time values per-hour are then calculated by vehicle type. The time values used are shown in Table A12.6. Time cost savings as a percentage of overall benefits, i.e., VOC and time savings benefits, are approximately 10%.

Table A12.6: Value of Passenger Time

Vehicle Type	Taka per Passenger per Vehicle-Hour
Car/Utility	30.9
Micro Bus	24.9
Medium/Large Bus	17.6
Auto Rickshaw	16.4
Motorcycle	22.90

Source: Roads and Highways Department Road User Cost Manual.

D. Results of Economic Analysis

14. The EIRR for the project road was calculated on the basis of the stream of estimated costs and benefits over the construction period plus 20 years of use as at appraisal. The results are shown in Table A12.7. The recalculated EIRR for the Project was 27.6%. This EIRR compares favorably with the opportunity cost of capital of 12% for the acceptance of economic feasibility. The EIRR calculated at appraisal was 23.1%. The difference in the EIRR calculated by the PCR Mission and that at appraisal is due to (i) revised economic costs derived from actual costs, (ii) longer construction periods caused by delays in implementation, and (iii) differences in traffic volumes and traffic growth at appraisal and reevaluation.

Table 12.7: Economic Evaluation of Project Road (taka million)

Year	Economic Costs			Economic Benefits			Total Benefits	Net Benefit
	Capital Cost	Incremental Maintenance Cost	Total Cost	VOC Savings	Generated Traffic	Passenger Time Savings		
2000	200.5		200.5					(200.5)
2001	1,172.3		1,172.3					(1,172.3)
2002	967.5		967.5					(967.5)
2003	929.8		929.8					(929.8)
2004	1,088.5		1,088.5					(1,088.5)
2005	1,412.3		1,412.3	1,041.5	42.4	197.0	1,280.9	(131.4)
2006	363.6		363.6	1,423.0	74.7	236.8	1,734.5	1,370.9
2007		4.7	4.7	1,609.8	87.5	269.5	1,966.7	1,962.0
2008		4.7	4.7	1,802.6	100.2	302.9	2,205.7	2,201.0
2009		4.7	4.7	1,985.2	110.0	335.0	2,430.2	2,425.5
2010		4.7	4.7	2,147.7	116.7	365.2	2,629.6	2,624.9
2011		4.7	4.7	2,319.5	122.4	397.7	2,839.7	2,835.0
2012		4.7	4.7	2,499.6	128.5	432.1	3,060.2	3,055.5
2013		4.7	4.7	2,680.1	132.8	458.6	3,271.6	3,266.9
2014		762.0	762.0	2,666.0	148.0	476.0	3,290.0	2,528.0
2015		4.7	4.7	2,511.9	185.0	543.0	3,239.9	3,235.2
2016		4.7	4.7	3,569.4	210.5	623.4	4,403.2	4,398.5
2017		4.7	4.7	3,877.1	230.3	681.3	4,788.7	4,784.0
2018		4.7	4.7	4,212.0	249.4	744.7	5,206.1	5,201.4
2019		4.7	4.7	4,569.0	263.2	813.9	5,646.1	5,641.4
2020		4.7	4.7	4,942.0	278.6	888.7	6,109.3	6,104.6
2021		4.7	4.7	5,332.6	290.5	968.0	6,591.1	6,586.4
2022		4.7	4.7	5,741.0	304.1	1,046.3	7,091.4	7,086.7
2023		4.7	4.7	6,139.5	320.0	1,091.3	7,550.8	7,546.1
2024		762.0	762.0	6,385.8	346.0	1,106.0	7,837.8	7,075.8
EIRR								27.6%

EIRR = economic internal rate of return, VOC = vehicle operating cost.

QUANTITATIVE ASSESSMENT OF OVERALL PROJECT PERFORMANCE

1. Overall Rating

Criteria	Assessment	Rating (0–3)	Weights (%)	Weighted Rating
Relevance	Highly Relevant	3	20	0.60
Effectiveness	Effective	2	30	0.60
Efficiency	Highly Efficient	3	30	0.90
Sustainability	Less Likely	1	20	0.20
Overall Rating		Successful		2.30

Note:

- Relevance: - Project objectives and outputs were relevant to strategic objectives of the Government and ADB.
- Effectiveness: - Project achieved its outcome.
- Efficiency: - Project achieved objectives in an efficient manner.
- Sustainability: - Project benefits and development impacts are sustainable.

2. Rating System

Rating Value	Relevance	Effectiveness	Efficiency	Sustainability
3	Highly Relevant	Highly Effective	Highly Efficient	Most Likely
2	Relevant	Effective	Efficient	Likely
1	Partly Relevant	Less Effective	Less Efficient	Less Likely
0	Irrelevant	Ineffective	Inefficient	Unlikely

Rating:	Greater than 2.7	=	Highly Successful
	Between 1.6 and less than 2.7	=	Successful
	Between 0.8 and less than 1.6	=	Partly Successful
	Less than 0.8	=	Unsuccessful