



Completion Report

Project Number: 31435
Loan Number: 1839
August 2014

India: Western Transport Corridor Project

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Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Indian rupee/s (Re/Rs)

		At Appraisal (15 August 2001)	At Project Completion (7 August 2012)
Re1.00	=	\$0.0212	\$0.02393
\$1.00	=	Rs47.13	Rs41.788

ABBREVIATIONS

ADB	–	Asian Development Bank
BOT	–	build–operate–transfer
CSC	–	construction supervision consultant
EIRR	–	economic internal rate of return
km	–	Kilometer
NGO	–	nongovernment organization
NHAI	–	National Highways Authority of India
NHDP	–	National Highways Development Project
O&M	–	operation and maintenance
PCR	–	project completion review
PIU	–	project implementation unit
RAP	–	resettlement action plan
TA	–	technical assistance
VOC	–	vehicle operating cost
WTC	–	western transport corridor

NOTES

- (i) The fiscal year (FY) of the Government of India ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2013 begins on 1 April 2012 and ends on 31 March 2013.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	India
2.	Loan Number	Loan 1839-IND
3.	Project Title	Western Transport Corridor Project
4.	Borrower	India
5.	Executing Agency	National Highways Authority of India
6.	Amount of Loan	\$240.0 million
	Net Loan Amount	\$145.6 million
	First Cancellation	\$32.00 million (8 February 2005)
	Second Cancellation	\$16.52 million (14 April 2005)
	Third Cancellation	\$32.00 million (30 April 2007)
	Fourth Cancellation	\$10.00 million (21 July 2008)
	Fifth and Final Cancellation	\$3.88 million (26 August 2008)
7.	Project Completion Report Number	PCR:IND 1461

B. Loan Data

1.	Appraisal	
	– Date Started	12 February 2001
	– Date Completed	1 March 2001
2.	Loan Negotiations	
	– Date Started	8 August 2001
	– Date Completed	10 August 2001
3.	Date of Board Approval	20 September 2001
4.	Date of Loan Agreement	14 December 2001
5.	Date of Loan Effectiveness	
	– In Loan Agreement	90 days after loan agreement signed
	– Actual	4 February 2002
6.	Closing Date	
	– In Loan Agreement	31 December 2005
	– Actual	26 August 2008
	– Number of Extensions	2
7.	Terms of Loan	London interbank offered rate-based
	– Interest Rate	lending facility
	– Commitment Charges	0.75%
	– Maturity (number of years)	25
	– Grace Period (number of years)	5
	– Front-end Fee	1.0%
8.	Terms of Relending (if any)	None
	– Interest Rate	
	– Maturity (number of years)	
	– Grace Period (number of years)	
	– Second-Step Borrower	

9. Disbursements
a. Dates

Initial Disbursement 4 February 2002	Final Disbursement 26 August 2008	Time Interval 78.73 months
Effective Date 4 February 2002	Original Closing Date 31 December 2005	Time Interval 46.87 months

b. Amount (\$)

Category	Original Allocation	Last Revised Allocation	Amount Increased/ (Cancelled)	Amount Disbursed	Undisbursed Balance
1. Civil Works	179,800,000	128,024,498	(51,775,502)	124,147,561	3,876,937
2. Consulting Services	14,000,000	15,475,502	1,475,502	15,475,501	1
3. Front-end Fee	2,400,000	2,400,000		2,400,000	0
4. Interest and Commitment Charge	20,100,000	3,578,791	(16,521,209)	3,578,791	0
5. Unallocated	23,700,000	0	(23,700,000)	0	0
Total	240,000,000	149,478,791	(90,521,209)	145,601,853	3,876,938

Note: The undisbursed amount was cancelled at loan account closing on 26 August 2008.

10. Local Costs (Financed)
- Amount (\$) 0
 - Percent of Local Costs 0
 - Percent of Total Cost 0

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	240.0	296.2
Local Currency Cost	138.0	164.2
Total	378.0	460.4

2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	138.0	286.3
ADB Financed	217.5	139.6
Total	355.5	425.9
IDC Costs and other Financial Charges		
Borrower Financed		28.5
ADB Financed	22.5	6.0
Total	22.5	34.5

ADB = Asian Development Bank, IDC = interest during construction.

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

Component	Appraisal Estimate	Actual
A. Base Cost		
1. Right-of-Way	10.6	21.1
2. Civil Works		
a. Package I (km 75.0–km 116.4)	45.6	40.9
b. Package II (km 122.2–km 189.6)	77.6	65.3
c. Package III (km 189.6–km 207.6)	26.6	35.8
d. Package IV (km 207.6–km 284.0)	83.8	119.2
e. Package V (km 284.0–km 340.0)	47.3	101.2
3. Resettlement	5.8	10.7
4. Consulting Services	14.04	29.1
5. Project Management	5.6	2.6
Subtotal (A)	317.1	425.9
B. Contingencies		
1. Physical	21.7	
2. Price	16.7	
Subtotal (B)	38.4	
C. Front-End Fee	2.4	2.4
D. Interest and Commitment Charges during Construction	20.1	32.1
Total (A+B+C+D)	378.0	460.4

km= kilometer.

4. Project Schedule

Item	Appraisal Estimate	Actual
A. Civil Works		
Procurement		
Original packages	Q1 2001–Q4 2001	Q2 2001–Q4 2001
Packages for the balance work		Q3 2006–Q3 2008
Construction		
Package I (km 75.0–km 116.4)	Q1 2002–Q2 2005	Q1 2002–Q4 2004
Package II (km 122.2–km 189.6)	Q1 2002–Q2 2005	Q1 2002–Q1 2008
Package III (km 189.6–km 207.6)	Q1 2002–Q2 2005	Q1 2002–Q2 2011
Package IV (km 207.6–km 284.0)	Q1 2002–Q2 2005	Q1 2002–Q3 2012
Package V (km 284.0–km 340.0)	Q1 2002–Q2 2005	Q1 2002–Q3 2012
B. Consulting Services		
Selection	Q2 2001–Q4 2001	Q2 2001–Q1 2002
Supervision	Q4 2001–Q2 2005	Q1 2002–Q4 2012
C. Corporate Finance Enhancement Study	Q4 2001–Q4 2002	Q1 2005–Q1 2006

km=kilometer.

5. Project Performance Report Ratings^a

Implementation Period	Ratings ^a	
	Development Objectives	Implementation Progress
From 20 September to 31 December 2001	Satisfactory	Satisfactory
From 1 January to 31 December 2002	Satisfactory	Satisfactory
From 1 January to 31 December 2003	Satisfactory	Satisfactory
From 1 January to 31 December 2004	Satisfactory	Satisfactory
From 1 January to 31 December 2005	Satisfactory	Satisfactory
From 1 January to 31 December 2006	Satisfactory	Satisfactory
From 1 January to 31 December 2007	Satisfactory	Satisfactory

^a Ratings in the project performance report are arrived at by a method different from that for project completion report ratings.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-finding	14–29 Nov 2000	4	64	b, b, l, m
Appraisal	12 Feb–1 Mar 2001	8	144	b, b, j, h, i, l, m, n
Inception	25 Nov–3 Dec 2002	3	27	a, e, f
Review	14–22 Sep 2003	4	36	a, a, b, h
Review	13–20 Apr 2004	3	24	b, f, h
Special loan administration review	1–9 Aug 2004	2	18	d, f
Review	17–21 Oct 2005	1	5	b
Special loan administration review	18–26 Jan 2006 (intermittent dates)	5	15	a, a, b, c, f
Midterm review	26 Sep–4 Oct 2006	3	27	a, b, g
Review and handover	22–26 Jan 2007	3	15	b, b, g
Review	13–15 Nov 2007	1	3	e
Project completion review	23–29 Jun 2013	1	7	h

a = portfolio management specialist, b = transport specialist, c = project specialist, d = social development specialist, e = project implementation officer, f = project analyst, g = operations assistant, h = consultant, i = counsel, j = environmental specialist, k = transport economist, l = senior programs officer, m = resettlement specialist, n = financial specialist.

I. PROJECT DESCRIPTION

1. India's highway sector had long suffered from lack of funding, weak policy coordination and capability to implement projects, and resultant delays in decision making. In 1998, the Government of India decided to address these long-standing problems and launched a National Highways Development Project (NHDP) of an unprecedented scale for widening to four lanes of (i) the 5,846-kilometer (km) heavily trafficked corridor connecting the major metropolitan cities of Delhi, Mumbai, Chennai, and Kolkata, known as the golden quadrilateral (NHDP Phase I); and (ii) the 4,000 km north–south corridor connecting Srinagar to Kanyakumari and the east–west 3,300 km corridor connecting Silchar to Porbandar (NHDP Phase 2). The implementation of the NHDP was entrusted to the National Highways Authority of India (NHAI). The western transport corridor (WTC) connecting the three major cities of Delhi, Mumbai, and Chennai is the busiest part of the golden quadrilateral, and constructing an efficient, continuous transport linkage throughout the WTC would have a significant impact on overall economic growth and allow the benefits to spread to poorer areas. During the 1998 country programming mission, the government requested the Asian Development Bank (ADB) to consider financing a series of projects along the WTC. The first of these, the Surat–Manor Tollway Project, was approved in July 2000.¹ In August 2000, the government requested funding for the second project along the WTC. ADB approved the second WTC loan, the Western Transport Corridor Project, on 20 September 2001 for \$240.0 million from ADB's ordinary capital resources.² The project was the first part of ADB's programmatic approach to establish a policy and institutional framework for efficient and sustainable development of the national highway network.

2. The objectives of the project were to: (i) remove capacity constraints on a critical section of the project highway along the WTC; (ii) enhance road safety by introducing design features that would reduce traffic accidents and minimize negative impacts of road construction on people in the project's zone of influence; (iii) enhance the corporate finance capability of the NHAI; and (iv) increase private sector participation in the development and operation and maintenance (O&M) of the national highway system. To realize these objectives, the project comprised investment, capacity building, and project implementation support. The investment component included (i) upgrading the existing two-lane single carriageway highway to a four-lane divided highway along the 259.2 km Tumkur–Haveri section of National Highway 4 and (ii) incorporation of specific design features to enhance road safety. The capacity building focused on (i) enhancing the corporate finance capability of the NHAI; (ii) commercializing O&M for the project highway through private sector participation; (iii) conducting road safety audits; (iv) and establishing a more rationally structured tolling system and increasing public acceptance of tolls. The project implementation support aimed to provide construction supervision services and environmental management training to the staff of the NHAI, contractors, and supervision consultants.

3. It was anticipated that the project's main quantifiable benefits would mainly consist of savings in vehicle operating costs (VOCs), which would reduce transport costs. The direct project beneficiaries would be road users and transport operators. The improved transport system would also bring significant economic and social benefits to local communities, including the poor.

¹ ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the National Highways Authority of India for the Surat–Manor Tollway Project in India*. Manila.

² ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to India for the Western Transport Corridor Project*. Manila.

4. In conjunction with the loan, a technical assistance (TA) project was also approved to implement the capacity building component of enhancing the corporate finance capability of the NHAI. The total cost of the TA was estimated at \$900,000, of which ADB would finance \$700,000 from the ADB-funded TA program.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. At appraisal, the project was relevant and consistent with the government's NHDP and ADB's country strategy and program, and it was the second ADB project providing assistance to the government for implementing the NHDP. At the time of appraisal, the government had taken a number of actions to boost the sources of funds for highway development and facilitate private sector participation in highway development and maintenance. While these actions had significantly contributed to resolving the problems, major challenges still remained. These included introducing more sophisticated financial instruments, diversifying methods of involving the private sector, and enhancing the financial and managerial autonomy of the NHAI with the eventual goal of corporatization. These challenges could not be addressed by a one-time intervention.

6. ADB envisaged taking a programmatic approach to address these challenges from a longer term perspective by undertaking a sequential and progressive approach for lending in the highway subsector, with the overall objective of establishing a policy and institutional framework for efficient and sustainable development of the national highway system. From 2002 to 2004, ADB approved one loan each year to assist the government in implementing the NHDP and continue strengthening the framework for private sector participation in highway development, O&M, road safety, and institutional development. With substantial progress on the implementation of works on the golden quadrilateral and east–west and north–south corridors (NHDP Phase I and II), the government expanded the NHDP program, adding NHDP Phase III–VII for improvements to other sections of the national highway network. The government made a policy decision in 2005 that NHDP Phase III–VII would be developed through public–private partnership mechanisms, primarily through build–operate–transfer (BOT) and through annuity for less viable sections.

7. During and after implementation, the project's design and formulation was found to be relevant to the government's objectives and policies, as well as to ADB's country strategy (paras. 28 and 29). At completion, a total of 259.2 km of national highways had been upgraded, which significantly improved the connectivity in the project area and improved the overall performance of the WTC (paras. 30 and 31). This project was also designed to incorporate a number of road safety features such as median strips, service roads, bypasses, underpasses, overpasses, and fencing. These design features were unprecedented and would act as a model for safety awareness in designing similar highways in India. The project generated remarkable socioeconomic impacts during and after implementation (para. 39). Though the project implementation experienced substantial delays (paras. 15–17), the impacts and outcomes of the project were as anticipated at appraisal. The TA in conjunction with the project was successfully implemented (para. 21) and other capacity building components on O&M, road safety, and tolling were relevant in strengthening the policy and institutional framework. The results demonstrate that the project's outcome has effectively contributed to meeting the government's objectives. The project framework showing the results is in Appendix 1.

B. Project Outputs

1. Highway Development

8. As anticipated at appraisal, the 259.2 km Tumkur–Haveri section of National Highway 4 was upgraded, including the widening of 232.1 km from two lanes to four and the construction of a new 27.1 km four-lane bypass.³ The design speed was 100 km per hour.⁴ The upgrading also included construction of 285 km of service roads, 21 interchanges, 69 vehicle over passes or under passes, 48 pedestrian over passes or under passes, 51 bridges, and 4 toll plazas. To enhance safety for users and minimize disruption to the settlements through which the project highway passes, the design of the highway had incorporated substantial road safety features, including vehicle and pedestrian passes, median separators, fences, and traffic signs. The movement of people and goods on upgraded roads during the first full year of operation was estimated as 2,940,365 average daily vehicle-km. The details of the outputs of the investment component are in Appendix 2.

9. ADB's project completion review (PCR) mission in June 2013 visited all sections of the project highway and observed that the highway was of good quality and included substantial safety and environmental protection facilities.

2. Capacity Building

10. The capacity building on enhancing the corporate finance capability of the NHAI was implemented through the piggyback TA. Section H provides details on the outputs and outcomes of the TA. As envisaged at appraisal, the capacity building components on commercializing O&M and conducting road safety audits and toll system studies were funded under the ADB-funded Surat–Manor Tollway Project (footnote 1). The comprehensive O&M concession study developed a framework and administrative manual for the corridor management unit and O&M concession documents under various formats. The road safety audit study for the 2,800 km national highway and expressway sections suggested location-specific short-term and long-term safety improvement measures, and suggested improvements to Indian road safety guidelines and codes. The toll system study proposed improvements to the toll collection system and proposed a pricing and communication strategy to increase toll collection. There was a significant delay in the selection of consultants and award of contracts for these studies. Timely initiation and completion of these studies would have made the study outputs more relevant.

C. Project Costs

11. At appraisal, the project cost, including the contingencies and financial charges, was estimated at \$378 million equivalent. The total contract value for all the civil works contracts at the time of award was \$206.7 million, which was 26.4% lower than the appraisal estimate of \$281.0 million. Similarly, the total contract value for all the consulting services at the time of award was \$9.9 million, which was 29% lower than the appraisal estimate of \$14.0 million. This resulted in a loan surplus of more than \$50.0 million, which was cancelled progressively. However, during project implementation, three of five civil works contracts had to be terminated

³ Four city bypasses were constructed at Bharmasagara (2.40 km), Ronebannur (9.67 km), Haveri (9.35 km), and Tungabhadra (5.64 km).

⁴ A reduced design speed of 80 km per hour was adopted for the Harihar and Chitradurga bypasses due to right-of-way constraints.

due to poor performance of the contractors. New contracts for completion of the remaining works under these contracts were awarded during 2007–2008 (para. 23) at a much higher cost than indicated in the original contracts awarded in January 2002 due to substantial increases in the costs of material, labor, and other inputs. The overall completion costs under these three terminated contracts were 93%, 121% and 137% higher than the respective contract values at award. At completion, the total cost for all the civil works contracts was \$362.5 million, which was 75% higher than the contract value at award. The cost for consulting services increased by \$19.1 million (192.6% higher than the contract value at award) due to a prolonged implementation period. The actual cost for the land acquisition and resettlement increased by \$15.3 million. The interest during construction and commitment charges increased by \$12.0 million due to extension of the loan closing date by 3.5 years. Upon completion, the overall cost for the project was \$460.4 million, which was about 21.8% higher than that estimated at appraisal.⁵ Appendix 3 compares the details of the project costs at appraisal and at completion.

12. Under the financing plan envisaged at appraisal, the project was to be financed by an ADB loan of \$240 million (64% of the total project cost) and government funding of \$138 million (36% of the total cost). During implementation, the government decided to use its own resources to pay the interest during construction and commitment charges, instead of capitalizing it from the loan, which led to a loan cancellation of \$16.5 million (para. 14). Due to prolonged delays in project implementation, the government decided to fund the completion of remaining civil works under the terminated contracts through its own funds, and the loan was prematurely closed and the balance loan amount cancelled (para. 17). At project completion, the ADB financing decreased to 31.6%, and the government financing increased to 68.4%. The detailed comparison of the financing plan at appraisal and at completion is in Appendix 3.

D. Disbursements

13. The loan was approved on 20 September 2001, signed on 14 December 2001, and became effective on 4 February 2002. The loan proceeds were disbursed in accordance with ADB's *Loan Disbursement Handbook* (2001, as amended from time to time). Although the project readiness at the time of approval was high and all the contracts were awarded in January 2002, the disbursements were slow due to poor performance of contractors for most of the contracts (paras. 15–16).

14. Based on requests from the government, the loan amount was reduced to \$149.5 million by progressive cancellation of a cumulative amount of \$90.5 million on the account of (i) assessment of loan savings (\$32.0 million cancelled effective 8 February 2005), (ii) the government's decision to pay the interest during construction through its own resources (\$16.5 million cancelled effective 14 April 2005), (iii) withdrawal of contract packages IV and V from ADB financing upon termination of the contract (\$32.0 million cancelled effective 30 April 2007), and (iv) assessment of loan saving (\$10.0 million cancelled effective 21 July 2008). The final disbursement was made on 26 August 2008 and the loan account was closed. At loan closing, \$145.6 million was disbursed and the undisbursed amount of \$3,876,938 was cancelled. The report and recommendation of the President did not include any disbursement schedule. The annual disbursement projection made by the NHAI each year and the actual disbursements are in Appendix 4.

⁵ The annual expenditures in Indian rupees were converted into dollar equivalents using the average exchange rates in the corresponding years.

E. Project Schedule

15. At appraisal, the project was envisaged to be implemented over 48 months, inclusive of procurement and pre-construction activities, and was expected to be completed by 30 June 2005. The feasibility study and detailed design had been undertaken by the NHAI through its own funds. To expedite the project implementation, ADB approved advance procurement action for prequalification of contractors on 11 November 2000 and the subsequent procurement actions (except for the signing of contracts) on 3 January 2001. ADB approved the advance action for the engagement of construction supervision consultants (CSCs) on 17 January 2001. Based on these actions, ADB approved the prequalification documents on 24 November 2000 and the bidding documents on 9 April 2001. For the civil works, all five contracts were awarded during 5–16 January 2002 after ADB approval on 26 November 2001, and the civil works commenced on 1 March 2002. The construction supervision contracts were signed on 17 January 2002 and 8 February 2002 with two consultants after ADB approval.

16. However, despite high project readiness, progress on the civil works contracts was very slow due to (i) serious problems in the mobilization and successful commissioning of crusher plants for all the contract packages, (ii) poor capacity of contractors in planning and project management, (iii) inadequate participation of the lead partner in the joint venture, (iv) lack of adequate financial resources with the contractor, and (v) delays in land acquisition, clearance of encumbrances, and design changes. By the original project completion date of 30 June 2005, only one civil works package had been completed and all the other packages were behind schedule. Such slow project progress led to the extension of the loan closing date by 1 year to 31 December 2006. The efforts made by the NHAI, including providing additional funds to assist the contractors in overcoming the financial crunch, did not result in any improvement. Due to prolonged poor performance of the contractors, the contract for package III was terminated in July 2006 and those for packages IV and V were terminated in January 2007.

17. To carry out the bidding and award for the completion of remaining works under packages III, IV, and V, in December 2006, the loan closing date was further extended to June 2008. The contract for the completion of remaining works for package III was awarded in March 2007. Upon termination of the contract and the initiation of the bidding process for packages IV and V, the terminated contractor filed a petition in court, which granted a stay on the award of a new contract for the completion of remaining works. In view of the uncertainty involved in the litigation process, the government decided to withdraw the completion of remaining works from ADB financing and complete the works using its own funds. The contracts were eventually awarded in September 2008 after the legal matter was settled. The remaining civil works under package III were completed on 24 May 2011 and those under packages IV and V on 7 August 2012, which was about 86 months later than anticipated at appraisal. The comparison of the appraised and actual project schedules is in Appendix 5. The chronology of major events is in Appendix 6.

F. Implementation Arrangements

18. As envisaged at appraisal, the NHAI was the executing agency for the project. A project implementation unit (PIU) was established in Chitradurga, a town between Tumkur and Haveri, to implement the project. The main activities of the PIU were overseen by the chairperson of the NHAI, who was assisted by a chief general manager in charge of the development of National Highway 4. The PIU, led by a project director at the general manager level, was supported by five deputy general managers or managers each responsible for one civil works contract. The PIU was established before the contract awards to expeditiously implement the pre-construction

activities such as shifting of utilities, cutting of trees, resettlement of affected persons, and land acquisition. The PIU was adequately staffed with experienced personnel, and sufficient administrative authority was delegated to the PIU for effective and timely decision making on many aspects of the project implementation. However, the project director of the PIU was not positioned at the project site until August 2002.

19. The PIU was assisted by the CSCs, who were assigned the powers of the engineer in accordance with the Fédération Internationale Des Ingénieurs-Conseils conditions of the contract, barring a few exceptions, for which the CSCs had to seek prior approval from the NHAI. The NHAI also appointed a nongovernment organization (NGO) to assist in the implementation of the resettlement plan. The institutional framework for the project implementation is in Appendix 7.

G. Conditions and Covenants

20. The project complied with the covenants specified in the loan and project agreement. The government and the executing agency established an adequate organizational framework with adequate staff for project implementation. Separate accounts for the project and for the NHAI's overall operations were maintained, as required, which were audited on an annual basis by statutory auditors. The audit reports with auditor's opinion were submitted to ADB as required in the loan agreement. The loan and project covenants related to project implementation, institutional development, road subsector development, O&M, and social and environmental safeguards were complied with. The required monthly and quarterly progress reports were submitted to ADB regularly. The capacity building program was implemented by the NHAI through the ADB-financed TA project and through the ADB-funded Surat–Manor Tollway Project (para. 10). During implementation, the government provided the required counterpart funds in a timely manner and ensured that the project was implemented successfully. Compliance with major loan covenants is set out in Appendix 8.

H. Related Technical Assistance

21. In conjunction with the loan, a TA project was provided with the total cost of \$900,000, of which ADB would finance \$700,000 from the ADB-funded TA program and the government the remainder. The objective of the TA was to build capacity at the NHAI in the areas of financial management and organizational restructuring. The TA consisted of two phases: phase I included capacity building for (i) facilitating fund mobilization, (ii) enhancing treasury function, and (iii) improving the financial reporting system. Phase II included organizational restructuring of the NHAI. However, during implementation, the organizational restructuring component, which was already being addressed by a World Bank-funded study, was replaced with a capacity building component for strengthening the NHAI's capacity to deal with social issues under the ADB-funded East West Corridor Project.⁶ The TA commenced on 28 February 2005 and was completed on 28 February 2006. Upon completion, four reports were produced, covering (i) fund mobilization, (ii) treasury function, (iii) financial reporting, and (iv) social issues. Each report was presented to the NHAI and ADB in 2005 during workshops designed for the discussion of these issues. The TA completion report was prepared and circulated in September 2007 (Appendix 9). Overall, the TA was rated successful in delivering useful information and recommendations related to the enhancement of the NHAI's capacity in emerging areas such as modernizing financial management and dealing with social issues.

⁶ ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the East-West Corridor Project*. Manila.

I. Consultant Recruitment and Procurement

22. As envisaged at appraisal, two CSCs were recruited in accordance with ADB's Guidelines on the Use of Consultants (1998, as amended from time to time). The CSC recruitment followed the quality-based selection procedures. To expedite project implementation, ADB approved advance action for engaging the CSCs on 17 January 2001. After approval by ADB, the contract with the consortium led by Louis Berger Group (for the civil works of packages of I, II, and III) was signed on 10 February 2002 and with the consortium led by Intercontinental Consultants and Technocrats Pvt. Ltd. (for the civil works of packages IV and V) on 8 February 2002. Due to prolonged delays in the completion of civil works contracts, the contracts with these two supervision consultants were extended several times. Eventually, the contracts of the CSCs were substantially completed by the civil works completion.⁷ At appraisal, it was envisaged that consulting services would be required for training for environmental management. However, during implementation, this training was incorporated in the contracts for the CSCs, and separate consultants were not engaged.

23. The civil works procurement conformed to ADB's Procurement Guidelines (1999, as amended from time to time). ADB approved advance procurement action in November 2000 for prequalification and in January 2001 for subsequent procurement actions (except for the signing of contracts). As envisaged at appraisal, five contract packages were procured following international competitive bidding procedures among the prequalified bidders. After approval by ADB, the contracts with the selected contractors were signed during 5–16 January 2002. All civil contract packages commenced on 1 March 2002 with a 30-month completion period. However, the progress of civil works was initially very slow, and packages II, II, IV, and V were behind schedule. Despite continuous efforts made by the NHAI and ADB to expedite the completion of works, the performance of contractors continued to be poor. Eventually, the NHAI terminated the contracts for packages III, IV, and V according to contractual provisions (para. 16). Procurement for the completion of remaining civil works was carried out by the NHAI using international competitive bidding procedures. The new contracts for the completion of remaining works for package III were awarded in March 2007 and those for packages IV and V in September 2008.

J. Performance of Consultants and Contractors

24. The overall performance of the consultants is rated *satisfactory*. At appraisal, two CSCs were envisaged with total consulting inputs of 2,630 person-months (around 480 person-months for international and 2,150 person-months for national consultants). For environmental management training, one international and three national consultants were to be engaged. During implementation, two consulting consortiums were recruited as the CSCs (para. 22). The two CSC teams were nominated as the engineer in accordance with the Fédération Internationale Des Ingénieurs-Conseils conditions of contract. During implementation, the CSCs undertook the tasks specified in the terms of reference, including project management, quality control, construction supervision, measurement and payment assistance, project performance monitoring and evaluation, environmental monitoring, progress report preparation, and the environmental trainings. Due to overall delays in the progress of the civil works, the contract periods of the supervision consultants were extended with suitable variations. Upon completion, 9,242 person-months of consulting services were provided by the CSCs, including 588 person-

⁷ The civil works for packages IV and V were completed in August 2012, followed by a 1-year defect liability period. During the ADB PCR mission, the consultants were still working to assist the PIU during the defect liability period.

months for international consultants and 8,654 person-months for national consultants. However, there were some initial mobilization delays by the supervision consultants.

25. The performance of the civil works contractors is rated *unsatisfactory*. The project experienced an initial delay in 2002, which was mainly due to serious problems in the mobilization and successful commissioning of crusher plants for all the contract packages. Despite the commitment by the contractors to improve their performance with additional resources, the civil works continued to be slow. By the original project completion date of 30 June 2005, only package I was completed and all the other packages were far behind schedule. Contract packages II, IV, and V were awarded to a single joint venture contractor. The prolonged delay in the execution of civil works was mainly caused by poor capacity of contractors in planning and project management, inadequate participation of the lead partner in the joint venture, and lack of adequate financial resources of the contractor. In order to expedite the implementation of these contract packages, NHAI senior management held several meetings with the contractors' top management and also provided additional financial support to overcome the financial crunch of the contractors. Due to prolonged poor performance, the contracts for packages III, IV, and V were terminated in accordance with the contractual provisions and the remaining civil works were completed by new contractors. The weak capacity and poor performance of the contractors caused prolonged delays and cost overrun.

K. Performance of the Borrower and the Executing Agency

26. The overall performance of the borrower (Government of India) and the executing agency (the NHAI) is rated *satisfactory*. The related government agencies, including the Department of Economic Affairs, Ministry of Finance, actively participated in the coordination and monitoring of project implementation during the tripartite project review meetings. The NHAI established a well-staffed PIU for the project's implementation, and it undertook the project's preparatory and pre-construction activities, including feasibility studies, detailed project preparation, shifting of utilities, substantial land acquisition, tree cutting, environmental clearance, procurement of civil works contracts, and engagement of supervision consultants in a timely manner, achieving a high degree of project readiness by the time of Board approval. The NHAI complied with the conditions of the loan covenants (para. 20). However, there were substantial delays during implementation due to poor performance of the contractors (para. 25), which caused an "at risk" project rating during June 2005–August 2006 and also postponed the project benefits anticipated at appraisal.⁸ The TA was successful in strengthening the NHAI's capacity in financial management and social issues. As a part of ADB's programmatic approach to establish a policy and institutional framework for efficient and sustainable development of the national highway system, ADB continued strengthening the framework for private sector participation in O&M and road safety. The NHAI also initiated its own organizational restructuring program in 2007, taking into account the emerging needs of national highway development.

L. Performance of the Asian Development Bank

27. The performance of ADB is rated *satisfactory*. The project was administered by ADB's headquarters in the Philippines until January 2007, and was subsequently delegated to the India Resident Mission. ADB was closely involved in identifying and resolving issues during implementation through tripartite project review meetings and regular project review missions.

⁸ ADB Project Performance Reports, *Loan No 1839-IND: Western Transport Corridor Project*. June 2005 – August 2006.

ADB analyzed contractual and implementation issues affecting the project and provided substantial inputs in preparing an action plan to expedite project implementation. During implementation, ADB conducted nine loan review missions, including the inception mission in 2002, the midterm review mission in 2006, and two special project administration missions for resettlement and disbursement issues. Documents were approved in a timely manner at both the processing and implementation stages (for engagement of consultants and procurement of civil works). All claims for payment were processed promptly. Based on requests by the government, ADB extended the loan closing date twice to facilitate project implementation and made four partial cancellations of the loan proceeds. In general, the government recognized the role of the ADB missions in providing timely advice on technical and contract administration matters.

III. EVALUATION OF PERFORMANCE

A. Relevance

28. The project was considered *relevant* at appraisal as it was an integral part of the government's strategy to develop a national highway network under its NHDP program (paras. 5–6). As a part of its programmatic approach to support the implementation of the NHDP, ADB continued its multiyear lending program by providing three loans during 2002–2004 for the development of the east–west and north–south corridors under the NHDP. The government's Eleventh Five Year Plan, 2007–2012 articulated the need for adequate, cost-effective and high-quality infrastructure as a prerequisite to sustaining growth. The plan set the ambitious target of increasing the total investment in infrastructure from about 5% of gross domestic product in the Tenth Five Year Plan, 2002–2007 to 9% in the Eleventh Five Year Plan, 2007–2012.⁹ As of 31 March 2014, 22,365 km of national highways had been upgraded to four or six lanes and 12,055 km were being upgraded.¹⁰ The implementation of the project has significantly improved national highway connectivity along the WTC, which has facilitated the rapid socioeconomic development in the project area and throughout the country. However, the delay in the completion of the project due to poor performance of the contractors delayed the delivery of benefits. The delays and the uncertainty due to the litigation by the terminated contractors resulted in partial cancellation of ADB funding and completion of the remaining works through government funding.

29. ADB's India country partnership strategy, 2009–2012¹¹ was designed to support the government's efforts to address some of the binding constraints identified in the Eleventh Five Year Plan, 2007–2012. These include strengthening infrastructure development in poor states, promoting private sector participation in infrastructure development, supporting climate change adaptation and mitigation, and encouraging innovative financing modalities to increase the leverage of ADB's operations. As of the end of 2013, ADB had provided 49 loans to the transport sector in India. These loans totaled \$9,867.75 million, which accounted for about 33.62% of the total ADB lending to the country. To support the NHDP, ADB provided multiyear lending assistance, which includes assistance to the project. This has helped the NHAI in enhancing private sector participation in road development and O&M. Overall, the project is relevant to the government's development objectives and plan as well as to ADB's country partnership strategy and lending policy.

⁹ Government of India, Secretariat for Infrastructure, Planning Commission. 2011. *Compendium of National Highway Projects*. Delhi.

¹⁰ The NHAI administers 50,618 km of national highways, including 48,476 km under the NHDP.

¹¹ ADB. 2009. *India Country Partnership Strategy 2009-2012*. Manila.

B. Effectiveness in Achieving Outcome

30. The project is rated *effective* in achieving its outcomes. Despite large implementation delays in the completion of the civil works, all project components were completed as envisaged at appraisal. The objectives and outcomes of the project were achieved. Upon completion, 259.2 km of national highways along the WTC had been upgraded and widened to four lanes. Substantial road safety features have been incorporated in the works. On the project highway, the average vehicular speeds have increased to 60 km–80 km per hour, and the VOC has been reduced by an average of 40%, which has led to substantial reduction in passenger and freight transport costs. At completion, the volume to capacity ratio was reduced from 0.63 to 0.33. Along the project stretch, the savings in travel time is 1.94 hours for cars and 2.16 hours for trucks. The road accidents per vehicle-km are declining, partially due to the separation of the carriageway and the road safety features incorporated under the project. The project highway, service roads, and roadside amenities have effectively improved connectivity to rural areas and have brought socioeconomic benefits to the project area. Local public transporters use the project highway to provide transport services to local residents, including the poor. The government is developing financially viable national highway sections through private sector participation. As of 1 April 2011, total national highway projects completed through the private sector participation constituted 26.5% and projects under implementation through the private sector participation constituted 78%. O&M of all completed projects are being undertaken through the private sector entities.

31. As envisaged at appraisal, the operation of the project highway has been awarded to private sector entities. Currently, the section comprising km 72–km 189 is being operated by a BOT concessionaire that is responsible for widening the section to six lanes and for its O&M. The concessionaire is equipped with vehicles for emergency rescue, regular patrolling, and routine maintenance. The remaining sections are operated by two private operators (one for the section comprising km 189–km 260 and the other for the section comprising km 260–km 340). Maintenance of the sections operated by the private operators is still under the responsibility of the NHAI and is being undertaken through a separate private sector contract. On the project highway, there are four toll plazas, two of which are operated by the BOT concessionaire and two by the respective private operators. The toll rate and scheme is decided by the NHAI according to national rules.¹² The toll scheme includes the following: (i) an average rate of Rs0.95 per km for cars, jeeps, and vans (2013 toll rate); (ii) different toll rates for different vehicle types; (iii) a different toll tariff at each toll plaza according to the respective highway length; (iv) annual adjustment of the toll rate according to price escalation; (v) discount rates for round-trips and for monthly users; (vi) exemption for two- and three-wheelers; and (vii) exemption for government vehicles. For control of overloaded trucks, some plazas have installed weighing equipment. Highway accidents are monitored and managed by the traffic police. A summary of the initial operation of the project highway is in Appendix 11.

C. Efficiency in Achieving Outcome and Outputs

32. The project is rated *less than efficient*. Although the traffic growth on the project highway has been high and the results of economic and financial reevaluations are good, the project experienced substantial delays due to poor performance of the contractors, which led to slow disbursements, loan extensions, and cost overrun. The termination of two major contracts due to poor contractor performance led to litigation and uncertainty in the re-award of contracts for

¹² Government of India. 1997. *National Highways (Rate of Fee) Rules*. GSR 570(E). Delhi.

the remaining civil works. The government decided to withdraw the completion of these contracts from ADB financing and complete them using its own funds. This resulted in loan cancellation and a change in financing arrangements between ADB and the government. These factors adversely affected the efficiency of the project.

33. The project highway is an important section of the WTC in India. The highway upgrading and improvements are facilitating socioeconomic development in the project area, and the traffic on the project highway is increasing rapidly. During ADB's PCR mission, actual traffic data was collected for the project highway, which indicated that annual average daily traffic was 9,965 vehicles in 2012 and 11,244 vehicles in 2013.¹³ Taking into consideration the current traffic and the traffic growth rates at appraisal, the traffic forecast was revised. The revised traffic forecast was used for the economic and financial reevaluations. The details of the traffic analysis are in Appendix 12.

34. The ADB PCR mission carried out an economic and financial reevaluation of the project using a methodology similar to that adopted at appraisal. In the economic reevaluation, the economic benefits were calculated by comparing the "with" and "without" project scenarios. The economic benefits included (i) VOC savings, (ii) passenger travel time cost savings, and (iii) other non-quantified benefits. The economic internal rate of return (EIRR) was recalculated at 20.9%, with the economic net present value of Rs66,150.2 million for the project. The recalculated EIRR is lower than the 38% estimated at appraisal. The lower EIRR was mainly due to higher project cost at completion and the longer implementation period. However, the EIRR is much higher than the ADB recommended discount rate of 12%. The project is therefore still considered economically viable. The financial internal rate of return (FIRR) of the project was recalculated based on actual capital cost, prevailing O&M costs, revised traffic forecast, and existing toll rates. The FIRR was recalculated at 13.3% compared to the appraisal estimate of 11.1%. The higher FIRR was mainly caused by higher toll rates.¹⁴ Therefore, this project is still considered financially viable. Details of the economic reevaluation are in Appendix 12 and those of the financial reevaluation are in Appendix 13.

D. Preliminary Assessment of Sustainability

35. The project is considered to be *likely sustainable*.

36. As a part of the expanded NHDP, 6,500 km of the national highway, including the golden quadrilateral, are being widened to six lanes under NHDP Phase V, and the project highway also forms a part of the widening program. Widening of the highway section to six lanes under packages I and II (total length of 117.0 km) has been undertaken through public-private partnership by a BOT concessionaire. The BOT concessionaire has the responsibility of O&M of the highway section during the concession period. For the remaining section of the project highway, the detailed project design for widening to six lanes is being undertaken, and the works will be implemented through a BOT concessionaire selected through a competitive bidding process. In the meantime, the project highway section is being operated and maintained by private sector entities through short-term contracts. Award of an integrated concession for widening of the highway section to six lanes as well as its O&M will ensure requisite level of service and maintenance in accordance with stipulated performance standards. The BOT concessionaire and the private operators are selected through a qualification process that

¹³ From a 7-day traffic census of the NHAI in February 2013.

¹⁴ The toll rates per vehicle-km at appraisal, which were Rs0.45 for cars, Rs0.80 for light commercial vehicles, and Rs1.65 for buses and heavy commercial vehicles, are about half of the current toll rates.

assesses their capability to undertake the works. The performance indicators and the obligations of the concessionaire and the operators are stipulated within their contracts. As confirmed under the financial reevaluation, the toll revenue is adequate to cover not only the O&M costs, but also the capital cost (para. 34). Adequate budgetary resources are provided by the NHA for maintenance of the highway through the private sector, wherever required.

37. Although the project has incorporated substantial road safety features, the road safety of the project highway still remains an important issue to be addressed. Most of the project highway sections are not fully access-controlled and serve mixed traffic, local traffic, and pedestrians. Many slow-moving vehicles use the inner lane of the highways, and some vehicles drive in the wrong direction. The fence along the highway has been broken at several locations, allowing pedestrians to cross the highway. The accident rate is still significant, with a high fatality rate (Appendix 11). Therefore, road safety needs to be enhanced through strict enforcement of traffic rules, road safety awareness campaigns, and provision of additional safety features such as median barriers, pedestrian overpasses or underpasses, additional service roads, and traffic lights and signs in populated areas.

38. Although public transport services operate and serve the local population along the project highway, these services are not adequate and are poorly regulated. The major modes of transport for the local population are large jeeps and three-wheelers, which are generally overloaded. The government needs to develop and implement policies to promote public transport and provide low-cost and reliable transport services to the local population, particularly the poor. A well-developed, low-cost, safe public transport system is important to increase accessibility and also enable the poor to participate in economic activities and access social services.

E. Impact

1. Socioeconomic Impacts

39. During implementation, the CSCs carried out a project performance monitoring survey and evaluation in 2005.¹⁵ During the ADB PCR mission, the latest information and data on the project's social impacts were collected and analyzed. The results indicated that (i) the overall VOC was reduced by about 40%; (ii) the savings in travel time for passengers were about 1.94 hours for car and jeep passengers and 2.16 hours for bus passengers for a whole journey; (iii) 426,252 person-months of local workers were utilized for construction, comprising unskilled and semi-skilled workers (38%), skilled workers (43%), technical workers (15%), and other workers (4%). About 400 full-time staff currently work at the four toll plazas on the project highway. A large number of roadside businesses have been established or expanded, providing significant working opportunities to the local population, especially the poor. The project has improved connectivity for rural areas and poor residents, although public transport services could be improved further. The upgraded highway corridor provides opportunities for further economic, industrial, and commercial development, potentially leading to increased employment. The overall impact of the project is *significant*. A summary of the socioeconomic impacts is in Appendix 14.

¹⁵ The CSCs only did the interim project performance monitoring and evaluations. Due to prolonged project implementation, no follow-up monitoring and evaluation activities were carried out.

2. Environmental Safeguards

40. At appraisal, the project was classified under environmental category B. An initial environmental examination report was prepared by the NHAI, which complied with ADB's Environmental Guidelines for Selected Infrastructure Development Projects (1993) and Environmental Assessment Requirements of the Asian Development Bank (1998, as amended from time to time). The initial environmental examination concluded that the project would have positive impacts by improving regional transport links and increasing economic opportunities for local residents. An environmental management action plan prepared for the NHAI and contractors, which summarized the mitigation proposals and allocated the responsibility for implementing and monitoring, was implemented. The environmental experts of the supervision consultants visited the project sites regularly to monitor the air quality, noise level, soil pollution, afforestation, and other environmental parameters. Any noncompliance was recorded and reported, and contractors were advised to take immediate corrective actions. The monitoring report, as a part of the project progress reports, indicated that the project did not cause any significant adverse environmental impacts. Environmental experts of the supervision consultants provided training in June 2004 on environmental management to 60 participants, including staff from the NHAI, consultants, and contractors.

41. The ADB PCR mission observed that adequate drainage measures (bridges, culverts, and drains) had been constructed to avoid waterlogging and reduce soil erosion problems. The completed project has improved the environmental quality along the project highway by reducing air and dust pollution and noise levels. The planting of trees and shrubs was well implemented, with sufficient and timely maintenance.

3. Land Acquisition and Resettlement

42. It was planned during project preparation that the project would be carried out generally within the existing right-of-way, except for certain highway sections where some land acquisition and resettlement would be required due to widening and realignment. A full census of the project affected persons was carried out, and it was estimated that the project would require acquisition of 611.7 hectares of privately owned land affecting 3,151 households, and 541 privately owned structures affecting 541 families. A total of 35.1 hectares of government land and 27 government-owned structures were to be acquired, including social infrastructure such as schools, clinics, and government offices. In addition, acquisition of structures without formal titles was to affect 310 families. A resettlement action plan (RAP) was prepared by the NHAI at appraisal in accordance with ADB's Involuntary Resettlement Policy (1995) and its *Handbook on Resettlement* (1998, as amended time to time). The rehabilitation and resettlement of affected persons was to be undertaken by the NHAI in accordance with the RAP. Two NGOs were to be recruited to assist in the implementation of the RAP.

43. During implementation, the NHAI established an adequate institutional framework for the implementation of the RAP, including deployment of resettlement officers in the PIU and the recruitment of an NGO to assist in RAP implementation. District-level committees were formed in each district through which the project highway traverses.¹⁶ Public consultation meetings were conducted with all affected persons. A grievance redressal committee was also established in each district in accordance with the RAP. Micro-plans were prepared for title holders and the non-titleholders, and the NHAI implemented the RAP and the micro-plans with the assistance of the NGO. At completion, 686.7 hectares of land were acquired, comprising

¹⁶ The project affected areas cover the districts of Tumkur, Chitradurga, Davanagere, and Haveri.

43.8 hectares of government land and 643.0 hectares of private land, which affected 5,150 affected persons, 1,561 structures, and 67 common assets. Upon completion, the NGO prepared a final report on the RAP implementation.¹⁷ The report indicated that (i) the affected persons were given a total compensation of Rs202.3 million, (ii) the resettlement was carried out adequately with assistance from the PIU, (iii) the common assets affected were well relocated, and (iv) income restoration and training were provided to the affected persons.

44. However, some delays in land acquisition and resettlement activities occurred during implementation, which were caused by slow processing by the local district administration and weak capacity of the NGO in the preparation of micro-plans. The delay in land acquisition of some sections affected the work on those stretches and was one of the contributors to the delay in project implementation. The NHAI made continuous efforts to resolve related issues, including coordinating regularly with the district authorities and the affected persons, and seeking court intervention, wherever required. The NHAI also made accommodations by making use of the available land through either redesign or removal of a part of the road section from the project scope, if an acceptable solution could not be reached in a timely manner. ADB monitored the implementation of the resettlement plan on a regular basis to ensure that land acquisition and resettlement was carried out in accordance to ADB's Involuntary Resettlement Policy (1995) and its *Handbook on Resettlement* (1998, as amended from time to time).

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

45. Overall, the project is rated *successful*. The project is relevant with the government's overall development objectives and ADB's country partnership strategy. Even though there were large implementation delays, the project has effectively and efficiently achieved the outcomes and outputs envisaged at appraisal. The upgraded highway has significantly improved connectivity in the project area, facilitated traffic flow along the WTC, and made a significant socioeconomic impact in the region. The economic and financial reevaluations indicate strong viability of the project. The O&M of the highway through the private sector will help in improving the quality of service and reducing related costs. The project, through the related TA, has also assisted the NHAI in enhancing its capacity in modernizing financial management and dealing with social impacts. However, there were large delays during implementation, which postponed the benefits anticipated at appraisal and also caused cost overrun. Some sustainability issues related to road safety and public transport services need to be addressed to enhance the benefits of the project.

B. Lessons

46. The NHAI undertook several measures towards achieving project readiness such as (i) project preparation using its own funds; (ii) deployment of a project team at its headquarters and field office during the initial stage to supervise project preparation and undertake procurement activities and pre-construction activities; and (iii) advance action on civil works procurement, recruitment of CSCs, and pre-construction activities such as shifting of utilities, cutting of trees, and land acquisition. All the contracts were awarded within 5 months from the Board approval for the project.

¹⁷ Development Management Trust. 2007. *Detailed Completion Report - Implementation of Resettlement and Rehabilitation*.

47. However, due to inappropriate selection of the contractors, a significant delay in the completion of the contracts was caused by (i) weak planning; (ii) weak project management capacity; (iii) poor performance of the contractors; and (iv) inadequate participation of the lead partner, particularly the joint venture contractor, who was awarded three contract packages. Three out of five civil works contracts were ultimately terminated after a considerable delay. The criteria for the qualification of the contractor under a joint venture and for the award of multiple contracts should be strengthened. The contractual provisions to ensure the participation of the lead partner need to be strengthened. The performance of contractors on projects in India has always been a matter of concern. The contractual provisions related to contractors' performance, such as mobilization, staffing, deployment of equipment and funds, release of payments, bonus for early completion, and penalties, need to be strengthened so that poor performance by the contractor is discouraged. The performance of the contractor should be assessed in the initial stages of the contract and the decision on termination, if warranted, should not be delayed.

C. Recommendations

1. Project Related

48. **Timing of the project performance evaluation report.** The project performance evaluation report should be prepared in 2017. By then, the widening of the project highway to six lanes is expected to be completed. At that time, the traffic growth, O&M through private sector participation, public transport services, and impacts on poverty can be better assessed.

49. **Project benefit monitoring and evaluation.** The performance monitoring and evaluation program of the project was conducted for the baseline and intermediate phases. Due to prolonged delays in project implementation and loan closing, the final monitoring and evaluation was not conducted. The project highway has had remarkable and broad socioeconomic impacts in the project area. A benefit monitoring and evaluation study should be undertaken after the full development benefits have been realized to assess and document the socioeconomic benefits as well as the lessons learned for incorporation in future projects.

2. General

50. **Avoiding project implementation delays.** Most of the highway projects in India have experienced implementation delays, which have mainly been caused by inadequate project management, weak capacity and/or poor performance of contractors, and land acquisition and environmental clearance. In future projects, project preparation and readiness should be enhanced, including (i) carrying out sufficient assessments on the capacities of the PIU and contractors, (ii) developing appropriate qualification criteria for contractors and contractual provisions to ensure implementation progress, and (iii) enhancing project monitoring and management. The performance of the contractor should be assessed in the initial stages of the contract and the decision on termination, if warranted, should not be delayed.

51. **Ensuring project sustainability.** Road safety and transport services are important aspects to ensure project sustainability. In future projects, these aspects should be enhanced by (i) adding more safety features to the project design and implementation; (ii) strengthening highway safety management (such as by enforcing traffic laws); (iii) controlling overloaded vehicles; and (iv) promoting public transport development, which may provide low-cost and safe transport services to the local population, particularly the poor.

PROJECT FRAMEWORK

Design Summary	Performance Targets/Indicators	Project Achievements
Impact <ul style="list-style-type: none"> Contribute to sustainable economic growth 	<ul style="list-style-type: none"> Reduce the transport cost for goods and passenger, thus increasing the efficiency of economic activities in India Provide increased job opportunities 	<ul style="list-style-type: none"> For the project highway, the vehicle operation cost was reduced by about 40% About 426,000 person-months of local laborers and 8,650 person-months of national consultants were used during implementation, and about 400 full-time staff are used for highway operations. The number of roadside businesses has grown, providing significant work opportunities to the local population, particularly the poor
Outcome <ul style="list-style-type: none"> Increase the efficiency of the transport system by expanding capacity of the existing road network, with increased participation of the private sector in highway development and maintenance Enhance road safety 	<ul style="list-style-type: none"> Reduce volume to capacity ratio from 0.63 to 0.30 by 2005 Reduced travel time by 3 hours for cars and by 3.5 hours for trucks along the project section by 2005. Reduce the number of fatalities along the project section from 262 to 90 by 2005 Increase the highways developed by the private sector from 9% to 24% and highways to be operated and maintained by the private sector from 10% to 41% 	<ul style="list-style-type: none"> At completion in 2012, the volume to capacity ratio was reduced to 0.33 The savings in travel time on the project highway is about 1.94 hours for cars and 2.16 hours for trucks On the project highway section, fatalities were reduced to 163 in 2011 and 152 in 2012 The government is developing financially viable national highway sections through the private sector. As of 1 April 2011, national highway projects completed through the private sector constituted 26.5%. The national highway projects under implementation through the private sector constituted 78%. Operation and maintenance of all completed projects are being undertaken through the private sector.
Outputs <ul style="list-style-type: none"> Upgrade the existing two-lane carriageway highways to four-lane divided carriageway with service road along the right-of-way Develop build–operate–transfer tender documents for toll road operation and maintenance of the project 	<ul style="list-style-type: none"> Construction to be completed by December 2004 Operation and maintenance concession to be concluded by December 2003 	<ul style="list-style-type: none"> A total of 259.2 kilometers of national highway was upgraded to four lanes under the project between 2004 and 2012 The kilometer 72–kilometer 189 highway section has further been widened to six lanes and operated by a build–operate–transfer concessionaire. The operation and maintenance of remaining highway sections was entrusted to private operators upon completion
Inputs <ul style="list-style-type: none"> Procurement of civil works for 259.2 kilometers of national highway under the project. Recruitment of a consultant to complete the concession-based 	<ul style="list-style-type: none"> Asian Development Bank provides loan of \$240 million, while \$138 million equivalent will be financed by the government 	Actual Project Cost (\$ million) <ul style="list-style-type: none"> Total 460.4 Asian Development Bank 145.6 Government 314.8

Design Summary	Performance Targets/Indicators	Project Achievements
operation and maintenance for the project		By components <ul style="list-style-type: none"> • Right-of-way 21.1 • Civil works 362.4 • Resettlement 10.7 • Consulting services 29.1 • Project management 2.6 • Financial charge 34.5

Source: Asian Development Bank project completion review mission.

SUMMARY OF PROJECT OUTPUTS

	Unit	Package I	Package II	Package III	Package IV	Package V	Total
Project Section		Tumkur–Sira	Sira– Chitradurga	Chitradurga Section	Chitradurga– Harihar	Harihar– Haveri	Tumkur– Haveri
Location		km 75.0– km 116.4	km 122.2– km 189.6	km 189.6– km 207.6	km 207.6– km 284.0	km 284.0– km 340.0	km 75.0– km 340.0
Length	km	41.4	67.4	18.0	76.4	56.0	259.2
Service roads	km	Total 122.0 km for packages I, II, and III			92.0	71.0	285.0
Interchanges	no.	2	3	3	10	3	21
Vehicle overpass or underpass	no.	6	16	5	4	4	35
Light commercial vehicle underpass	no.				20	14	34
Pedestrian subway (underpass)	no.	7	5	1	18	3	34
Foot bridge (overpass)	no.	6	5	2	1		14
Major bridge	no.		4		3		7
Minor bridge	no.	9	13	1	14	7	44
Pipe culvert	no.	40	81	22	95	83	321
Box and slab culvert	no.	24	34	8	22	8	96
Toll plaza	no.	1	1		1	1	4
Fence	km	Total 200 km for packages I, II, and III			54.0	52.0	306.0

km = kilometer

Source: Project implementation unit.

PROJECT COST AND FINANCING

Table A3.1: Project Costs (\$ million)

Items	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base Cost						
1. Right-of-way	0.0	10.6	10.6	0.0	21.1	21.1
2. Civil works						
a. Package I (km 75.0–km 116.4)	28.8	16.8	45.6	25.8	15.1	40.9
b. Package II (km 122.2–km 189.6)	49.4	28.2	77.6	41.6	23.8	65.3
c. Package III (km 189.6–km 207.6)	17.2	9.4	26.6	23.2	12.7	35.8
d. Package IV (km 207.6–km 284.0)	53.4	30.4	83.8	76.0	43.2	119.2
e. Package V (km 284.0–km 340.0)	30.9	16.4	47.3	66.1	35.1	101.2
3. Resettlement	0.0	5.8	5.8	0.0	10.7	10.7
4. Consulting services	14.0	0.0	14.0	29.1	0.0	29.1
5. Project management	0.04	5.6	5.6	0.0	2.6	2.6
Subtotal	193.8	123.3	317.1	261.7	164.2	425.9
B. Contingencies (Physical and Price)	23.7	14.7	38.4			
C. Front-End Fee	2.4	0.0	2.4	2.4	0.0	2.4
D. Interest and Commitment Charges During Construction	20.1	0.0	20.1	32.1	0.0	32.1
Total	240.0	138.0	378.0	296.2	164.2	460.4

Sources: Asian Development Bank. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to India for the Western Transport Corridor Project*. Manila; Asian Development Bank loan financial information system; project implementation unit.

Table A3.2: Project Financing (\$ million)

Source	At Appraisal				Actual			
	Foreign Exchange	Local Currency	Total Cost	% of Total	Foreign Exchange	Local Currency	Total Cost	% of Total
Asian Development Bank	240.0		240.0	63.5	145.6	0	145.6	31.6
Government		138.0	138.0	36.5	150.6	164.2	314.7	68.4
Total	240.0	138.0	378.0	100.0	296.2	164.2	460.4	100.0

Sources: Asian Development Bank. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to India for the Western Transport Corridor Project*. Manila; Asian Development Bank loan financial information system; project implementation unit.

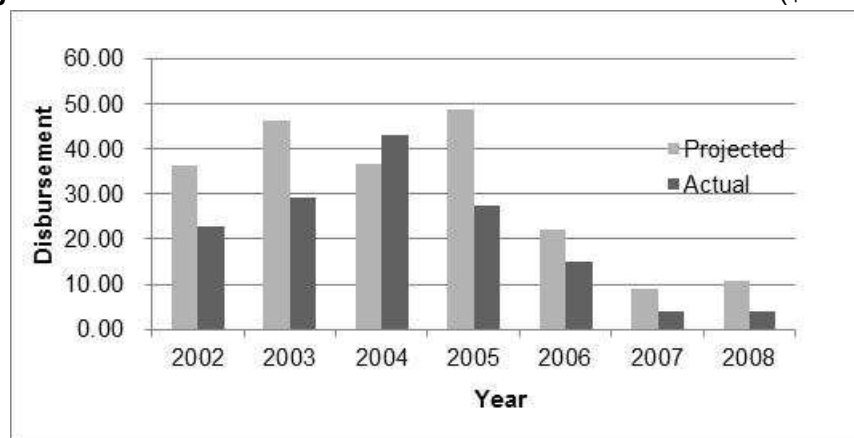
DISBURSEMENT OF ADB LOAN PROCEEDS

Table A4: Annual and Cumulative Disbursement of ADB Loan Proceeds (\$ million)

Year	Annual Disbursement			Cumulative Disbursement	
	Amount		% of Actual Total	Amount	% of Total
	Projected	Actual			
2002	36.45	22.97	15.77	22.97	15.77
2003	46.40	29.32	20.14	52.28	35.91
2004	36.70	43.02	29.55	95.30	65.45
2005	48.66	27.32	18.76	122.62	84.21
2006	22.00	14.83	10.18	137.45	94.40
2007	9.00	4.08	2.80	141.52	97.20
2008	10.90	4.08	2.80	145.60	100.00
Total		145.60	100.00		

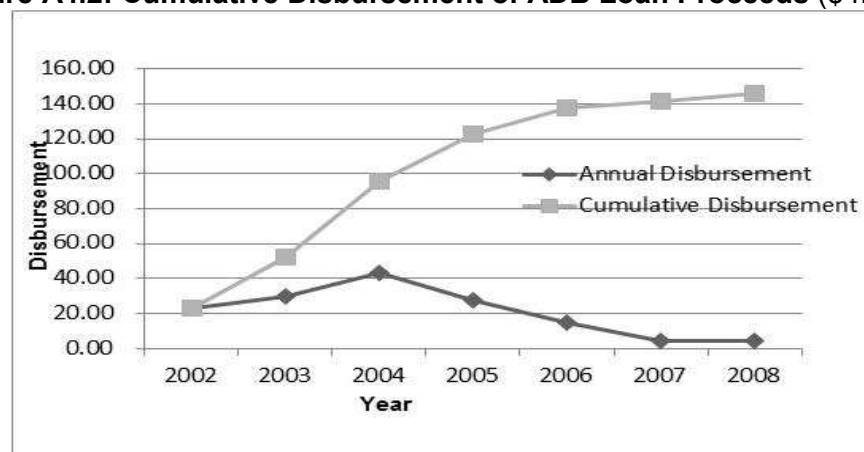
ADB = Asian Development Bank.

Source: Asian Development Bank.

Figure A4.1: Annual Disbursement of ADB Loan Proceeds (\$ million)

ADB = Asian Development Bank.

Source: Asian Development Bank.

Figure A4.2: Cumulative Disbursement of ADB Loan Proceeds (\$ million)

ADB = Asian Development Bank.

Source: Asian Development Bank.

APPRAISAL AND ACTUAL PROJECT IMPLEMENTATION SCHEDULES COMPARED

Item	2001				2002				2003				2004				2005				2006				2007				2008				2009				2010				2011				2012			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4								
1. Civil Works Procurement																																																
Original packages																																																
Package for remaining civil works																																																
2. Civil Works Implementation																																																
Package I																																																
Package II																																																
Package III																																																
Package IV																																																
Package V																																																
3. Consulting Services																																																
Selection																																																
Implementation																																																
4. Technical Assistance on Enhancing the Corporate Finance Capability of NHAI																																																

 At appraisal

 Actual

^a The contract packages III, IV, and V were terminated due to poor performance of the contractors, and completion of the remaining civil works was undertaken after new contracts were awarded through a bidding process.
Sources: Project implementation unit and Asian Development Bank project completion review mission.

CHRONOLOGY OF MAJOR EVENTS

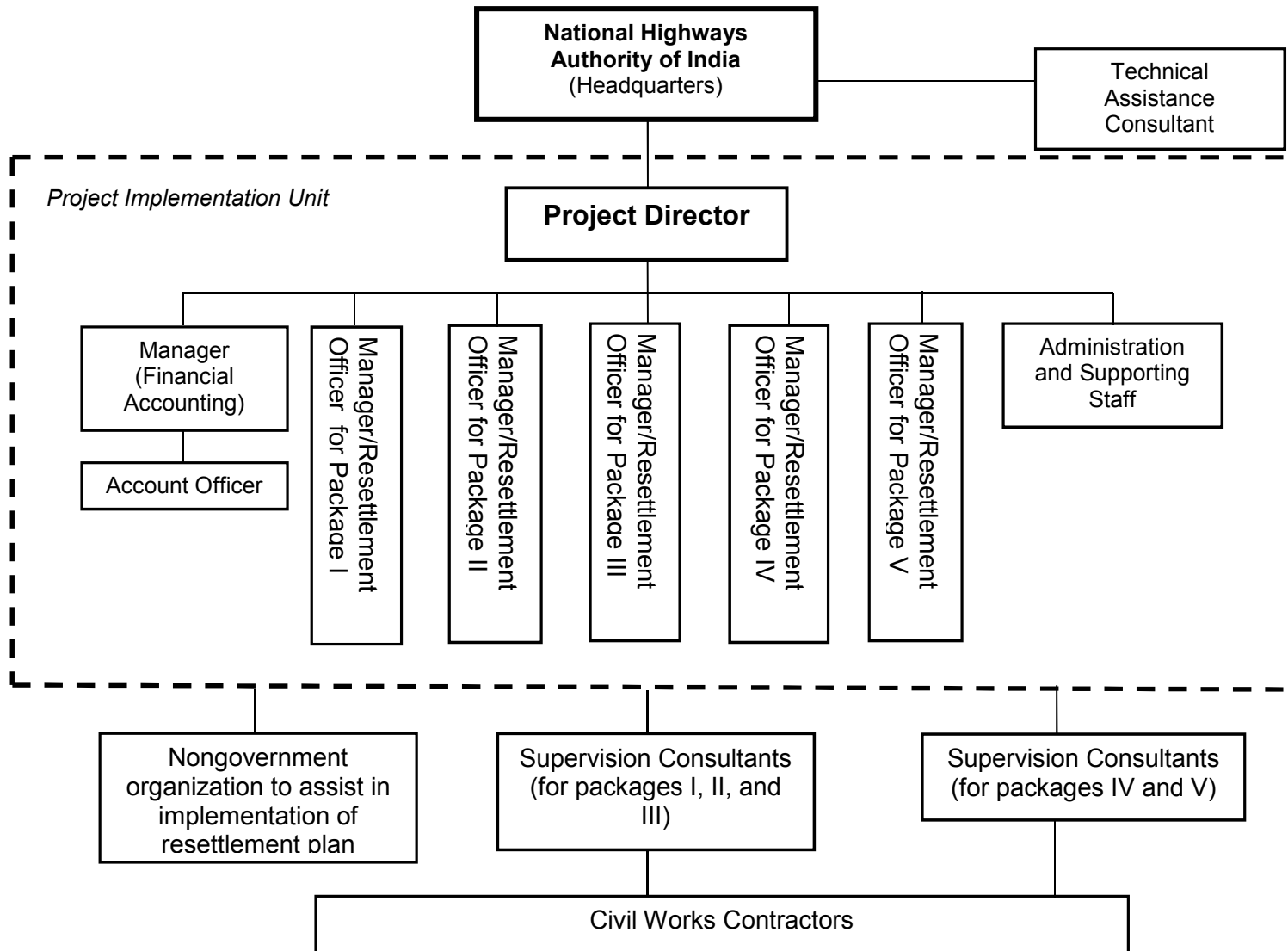
Date	Main Event
2000	
11 November	ADB approved advance procurement action for prequalification of contractors
14–29 November	ADB project fact-finding mission
24 November	ADB approved the prequalification documents
2001	
3 January	ADB approved subsequent procurement actions (except for the signing of contracts)
17 January	ADB approved advance action for the engagement of construction supervision consultant
12 February–1 March	ADB project appraisal mission
9 April	ADB approved the bidding documents
20 September	Loan approval
20 September	Technical assistance approval
14 December	Loan signing
2002	
5 January	Contract signed for civil works package III
7 January	Contract signed for civil works package I
16 January	Contract signed for civil works package II
16 January	Contract signed for civil works package V
16 January	Contract signed for civil works package IV
17 January	Contract signed for the supervision consultant for packages I, II, and III
4 February	Loan effectiveness
8 February	Contract signed for the supervision consultant for packages IV and V
16 February	Commencement of services by construction supervision consultants
1 March	Commencement of civil works for all packages
25 November–3 December	ADB inception mission
2003	
14–22 September	ADB project review mission
2004	
13–20 April	ADB project review mission
1–9 August	ADB special loan administration review mission
31 December	Completion of civil works contract package I
2005	
8 February	First partial cancellation of \$32 million from loan account

Date	Main Event
28 February	Commencement of related technical assistance (Enhancing the Corporate Finance Capability of National Highways Authority of India)
14 April	Second partial cancellation of \$16.52 million from loan account
17–21 October	ADB project review mission
27 December 2005	ADB approval of extension of the loan closing date by 12 months to 31 December 2006
2006	
18–26 January	ADB special loan administration review mission
28 February	Physical completion of the technical assistance
1 August	Termination of civil works contract package III due to poor performance of contractor
26 September–4 October	ADB midterm review mission
22 December	Extension of loan closing date to 30 June 2008 (second extension)
2007	
16 January	Termination of civil works packages IV and V due to poor performance of contractors
22–26 January	ADB project review mission
31 January	Delegation of project administration to the India Resident Mission
16 March	Contract signed for civil works package III (remaining civil works)
30 April	Third partial cancellation of \$32 million from loan account
13–15 November	ADB project review mission
2008	
26 March	Completion of civil works contract package II
21 July	Fourth partial cancellation of \$10 million from loan account
26 August	Loan account closing
23 September	Contract signed for packages IV and V (remaining civil works)
2011	
24 May	Completion of civil works contract package III (remaining civil works)
2012	
7 August	Completion of civil works contract package IV and V (remaining civil works)
2013	
23–29 June	ADB project completion review mission

ADB = Asian Development Bank.

Source: ADB project completion mission.

ORGANIZATIONAL STRUCTURE FOR PROJECT IMPLEMENTATION



Source: Project implementation unit.

STATUS OF COMPLIANCE WITH LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
<i>Project Execution</i>		
1. NHAI shall be responsible for the execution of the project. The borrower shall ensure that NHAI is delegated sufficient administrative and financial authority for the expeditious implementation of procurement and disbursement of the project.	Schedule 6, para 1	Complied with The NHAI was given sufficient administrative and financial authority for procurement and disbursement under the project.
<i>Project Implementation</i>		
2. The PIU set up by NHAI shall be responsible to implement the project components. The PIU shall be delegated sufficient administrative autonomy for effective and timely decision making on project implementation matters. NHAI shall ensure that the PIU is adequately staffed by experienced personnel at both managerial and professional levels for effective project implementation. The PIU shall be headed by a project director who shall be a general manager level staff of NHAI. The project director shall be assisted by five deputy general managers and/or managers of NHAI, each responsible for one contract package for the project. The activities of the PIU shall be overseen by the chairperson of NHAI who shall be assisted by a chief general manager in-charge of the NH4 development.	Schedule 6, para 2 and 3	Complied with A PIU headed by a project director and staffed with adequate and experienced personnel was set up. The PIU was delegated sufficient administrative autonomy for effective and timely decision making. Regular meetings were conducted by the NHAI chairperson and the chief general manager for monitoring project implementation.
3. The PIU shall also include a resettlement unit headed by the project director who shall also be in charge of resettlement. The project director shall be assisted by four resettlement officers as appointed, for supervision at the local district levels. To the extent possible fifty percent of the personnel engaged from non-governmental organizations to assist such unit shall be women.	Schedule 6, para 4	Complied with
4. A high powered committee shall be set up by NHAI within 3 months of the effective date in accordance with the resettlement action plan (RAP) which shall be responsible to monitor the implementation of the RAP and the activities of the PIU resettlement unit as per para. 3 above.	Schedule 6, para 5	Complied with
<i>Highway Upgrading</i>		
5. The borrower shall ensure that NHAI does not award any civil works contract until after it (i) acquires or makes available on a timely basis the land and rights in land, free from any encumbrances, required for the execution of the contract; and (ii) clears on a timely basis the utilities, trees and any other obstruction from the land to be used for construction activities relating to the contract.	Schedule 4, para 7 Schedule 6, para 6	Complied with All the civil works contracts were awarded after complying with conditions.
6. NHAI shall ensure timely administrative clearance for removal of utilities and trees from the project highway as required for the speedy	Schedule 6, para 7	Complied with

Covenant	Reference in Loan Agreement	Status of Compliance
implementation of the project.		
<i>Road Safety</i>		
7. NHAI shall monitor the incidence of traffic accidents and report to ADB, in a format agreeable to ADB, during the project implementation period, and two years after its completion.	Schedule. 6, para 8	Complied with The incidence of road accidents was monitored on a regular basis and reported to ADB in the agreed format until the project completion review.
8. NHAI shall carry out a safety audit for the western transport corridor during the project implementation period and develop recommendations to be used on other parts of the national highway system by 31 December 2004.	Schedule 6, para 9	Complied with The NHAI conducted a road safety audit for 2,800 km of selected national highways and expressways, including the western transport corridor. As a part of the road safety audit, recommendations were also developed for the national highway system.
<i>Commercialization of Operation and Maintenance</i>		
9. NHAI shall ensure that upon completion of the project highway, its operation and maintenance are awarded to the private sector under concession agreements satisfactory to ADB. NHAI shall submit the terms and conditions of the proposed concession to ADB for review and comment prior to inviting bids from the private sector.	Schedule 6, para 10	Complied with Operation and maintenance of the highway sections under the project was awarded to the private sector.
<i>Enhancement of Corporate Finance Capacity of NHAI</i>		
10. The borrower and NHAI shall implement in a timely manner the recommendations of the technical assistance as to be mutually agreed by the borrower, ADB and NHAI. For this purpose, NHAI shall establish a task force, or assign an appropriate team by 31 October 2001.	Schedule 6, para 11	Complied with A task force was established by NHAI. The reports prepared under the technical assistance provided useful information and developed reasonable recommendations, some of which have been implemented. The government has also been undertaking its own policy reforms and organizational restructuring based on inputs from various stakeholders, taking into account the emerging needs in India's national highway development. The government formed a Committee on Infrastructure in August 2004 to formulate and review policies and monitor implementation of programs and projects across infrastructure sectors. The committee prepared several reports on financing of the

Covenant	Reference in Loan Agreement	Status of Compliance
		National Highways Development Project, tolling policy, and other recommendations, some of which are related to the covenant and have been implemented. The policy and regulatory framework and the institutional mechanism are reviewed by the government on a regular basis, and suitable modifications are made from time to time.
11.NHAI shall also implement the first securitization project including through its special purpose vehicles, based on the results of the technical assistance, by March 2004 or other date acceptable to the borrower, ADB and NHAI under arrangements satisfactory to ADB and the borrower.	Schedule 6, para 12	Partly complied with Based on the recommendations in the report prepared under the technical assistance and the experiences on the implementation of BOT projects, guidelines for securitization of toll revenues by BOT operators through the special purpose vehicle have been developed by the NHAI. The securitization of toll revenue is undertaken by the special purpose vehicles under these guidelines.
<i>Environment</i>		
12.NHAI shall ensure that the project is undertaken in compliance with the Environmental Assessment Requirements of ADB, 1998 and the Environmental Guidelines for Selected Infrastructure Projects, 1993, as amended from time to time.	Schedule 6, para 13	Complied with
13.NHAI shall ensure that all environmental mitigation measures identified in the summary initial environmental examination are incorporated into the detailed project design and are followed during construction, operation and maintenance of the Project Highway. NHAI shall also ensure that the project is designed and constructed according to the Environmental Management Action Plan agreed upon with ADB in accordance with ADB's Environmental Guidelines for Selected Infrastructure Projects .	Schedule 6, para 14	Complied with The environmental mitigation measures identified in the initial environmental examination and summary initial environmental examination were incorporated in the detailed design and were followed during construction, maintenance, and operation. The initial environmental examination was based on ADB's Environmental Guidelines for Selected Infrastructure Projects (1993).
14.NHAI shall conduct a training program for environmental management for its staff as also the staff of the contractors under the project.	Schedule 6, para 15	Complied with The training the environmental management was conducted by the supervision consultant.
<i>Resettlement Plan</i>		
15.NHAI shall implement the RAP agreed upon with	Schedule 6,	Complied with

Covenant	Reference in Loan Agreement	Status of Compliance
ADB, under arrangements satisfactory to ADB in accordance with ADB's Policy on Involuntary Resettlement and ADB's Handbook on Resettlement, 1998, as amended from time to time.	para 16	The RAP was implemented during the project implementation.
16. NHAI shall ensure that any person who may be relocated as a consequence of the project is consulted and fairly compensated on the basis of replacement values such that his or her living standards are not adversely affected by the project.	Schedule 6, para 17	Complied with
17. NHAI shall carry out timely settlement of compensation payments under land acquisition for the project.	Schedule 6, para 18	Complied with Payments were made in accordance with the resettlement plan prior to commencement of civil works on the relevant section.
<i>Social Measures</i>		
18. NHAI shall ensure public awareness and acceptance of the project through participation as necessary, of non-governmental organizations and community.	Schedule 6, para 19	Complied with Public consultations were conducted during resettlement planning as well as the implementation stage. Resettlement monitoring officers were deputed by the NHAI to the PIUs. The NHAI undertook the consultation process and implementation and monitoring of the resettlement plan with the assistance of NGOs.
19. NHAI shall ensure under civil works contracts that contractors: (a) shall carry out, including through engaging suitable non-governmental organizations, the HIV/AIDS awareness and prevention programs for labour, and (b) shall not use children as labor, by incorporating a provision to these effects in their contracts.	Schedule 6, para 20	Complied with These provisions were incorporated into the contract agreement for civil works and were implemented.
<i>Project Implementation, Benefit Monitoring and Progress Review</i>		
20. The Borrower and NHAI shall undertake periodic reviews during the project implementation, to evaluate the scope, implementation arrangements (with due participation of non-governmental and community based organizations), benefit monitoring, progress and achievement of the objectives of the project in accordance with ADB's project performance management systems handbook.	Schedule 6, para 21	Partly complied with Baseline data and intermediate baseline data were collected. No further updates were available as the NHAI completed the project through its own funds.
21. Under mid-term review of the project, the borrower, NHAI and ADB shall review the results of the private sector financed projects along the WTC to assess appropriate models of private sector participation for national highway	Schedule 6, para 22	Complied with The framework for private sector participation has been adequately developed by the government, and the NHAI has

Covenant	Reference in Loan Agreement	Status of Compliance
development.		undertaken a number of highway projects, including projects along the WTC, through private sector participation.
22. Except as otherwise agreed with and required by ADB, NHAI shall implement in a timely manner the Study on toll system by December 2003.	Schedule 6, para 23	Complied with The toll system study and the experience of the NHAI in implementing toll policy and collecting tolls on national highways have been useful in reviewing the toll policy and addressing deficiencies.
<i>Others</i>		
23. The Borrower shall actively consider allowing NHAI to use the toll revenue collected by NHAI on its behalf, for maintenance of the national highways and other related purposes by December 2004.	Schedule 6, para 24	Complied with Tolls on the project highway are collected and retained by private concessionaires to cover operation and maintenance costs in accordance with the provision of concession agreement.
24. Without limiting the generality of the foregoing, NHAI shall furnish to ADB quarterly reports on the execution of the project and on the operation and management of the project facilities. Such reports shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the quarter under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following quarter.	PA Section 2.08 (b)	Complied with Quarterly reports were submitted in a timely manner.
25. NHAI shall (i) maintain separate accounts for the project and for its overall operations; (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualification, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than six (6) months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements.	PA Section 2.09, (a)	Complied with The project accounts and related financial statements were audited by government auditors. The audited reports were submitted to ADB on a regular basis. However, some of the submissions were delayed by 2–6 months from the stipulated period of 6 months after closure of the financial year.

ADB = Asian Development Bank, BOT = build–operate–transfer, km = kilometer, NGO = nongovernment organization, NHAI = National Highways Authority of India, PIU = project implementation unit, RAP = resettlement action plan.

Source: ADB project completion review mission

TECHNICAL ASSISTANCE COMPLETION REPORT

Division: Transport and Communications

TA No., Country and Name			Amount Approved: \$ 700,000	
TA 3724-IND : Enhancing the Corporate Finance Capability of National Highway Authority of India			Revised Amount: \$ 700,000	
Executing Agency		Source of Funding	Amount Undisbursed:	Amount Utilized:
National Highway Authority of India (NHAI)		TA Funding Program	\$ 382,098.53	\$ 317,901.47
TA Approval	TA Signing	Fielding of First Consultant(s):	TA Completion Date	
20 Sep 01	24 Dec 01	28 Feb 05	Original: 28 Feb 03 Actual: 28 Feb 06	
			Account Closing Date	
			Original: 28 Feb 03 Actual: 13 Oct 06	
Description				
<p>1. The primary responsibility of NHAI is the development and management of national highways (NHs) that the Central Government has delegated to NHAI for their construction, operation and maintenance (O&M). Given the size of the programs to be delivered by NHAI and its broad responsibility including fund mobilization and corridor management, the NHAI needs to transform itself from a traditional engineering oriented organization to a comprehensive highway development/management agency with broader responsibilities covering engineering, financial and social areas. This requires the reorientation of staff of NHAI and the development of different expertise within the organization.</p> <p>2. The TA was essentially designed for building capacity at NHAI in the area of financial management. It was also designed for making necessary adjustment to the current organizational structure of NHAI. The TA consists of two phases: Phase I includes capacity building for (i) facilitating fund mobilization, (ii) enhancing treasury function, and (iii) improving the financial reporting system, while Phase II includes a development of alternative forms of the organization of NHAI.</p> <p>3. However, in the early stage of the TA implementation, NHAI has asked to replace the phase II activities from the organizational restructuring issue to the social development issues since the organizational restructuring issue was decided to be addressed by the World Bank study on institutional strengthening study. ADB agreed to this request and made necessary modifications to the original scope of the phase II TA. Social issues to be addressed in the revised phase II are road safety, grievance handling and O&M capacity enhancement.</p>				
Expected Impact, Outcome and Outputs				
1. Expected impact:				
<ul style="list-style-type: none">Transformation of NHAI from an engineering oriented implementation agency to a program development/management agency which can deliver high standard NH networks to India				
2. Outcome and outputs:				
<ul style="list-style-type: none">Fund mobilization capability, strengthened so as to leverage earmarked future tax (fuel tax) revenue to raise several times large funds necessary for the accelerated development of NH networksTreasury function, strengthened so that available funds, particularly excess cash, be utilized in a most efficient manner with high yieldFinancial reporting system, modernized to meet Generally Accepted Accounting Practices (GAAP) in consideration of the special nature of the NHAI as an agency for the development/management of NHs for the Central GovernmentCapacity to address social concerns/issues, strengthened particularly with regard to road safety, grievance handling and corridor management.				

Delivery of Inputs and Conduct of Activities

1. Four reports were produced, covering: (i) fund mobilization; (ii) treasury function; (iii) financial reporting; and (iv) social issues.
2. Each of the reports was presented to NHAI and ADB in workshops designed for the discussion of these issues in 2005.
3. The first two reports (one for fund mobilization and the other for treasury function) compiled related information in an effective and informative manner and developed recommendations with significant value addition for improvement. The draft financial reporting report was not well structured and missed core issues facing NHAI at the draft final stage, but, after the workshop, the final report was improved to the acceptable level. Social development report was acceptable with some value addition.

Evaluation of Outputs and Achievement of Outcome.

Overall, the above four reports have provided useful information and developed reasonable recommendation, some of which have been implemented (e.g. zero based cash flow at project implementation units, while the entire cash are managed at HQ level in an integrated manner with maximum yield).

Overall Assessment and Rating

The TA is successful in delivering useful information and recommendations for NHAI's implementation to enhance its capacity in the field of emerging areas such as modernizing financial management and dealing with social impacts. Coordination with the World Bank avoided the overlapping of study areas, saving the TA costs by effectively focusing on social aspects.

Major Lessons

The success of the TA depended not only on the satisfactory design and final outputs, but also on the practical and implementable recommendations to be implemented on the ground. This requires due process of implementation, the ownership and political will of the Government, and the participation and acceptance by all stakeholders.

Recommendations and Follow-Up Actions

The long term strategy recommended by the TA will still be valid for the next medium-term involvement of ADB in NHAI projects. As NHAI initiates its own organizational reform, to which the World Bank is providing advisory support, reform agenda requires to be well coordinated among relevant government agencies, key financiers, and donors, to keep momentum of government's and NHAI's willingness to enhance NHAI's administrative and operational efficiency, taking into account the emerging needs in India's national highway development.

Prepared by: S.Tsukada/H.Yamaguchi

Designation: Principal Transport Specialist/Transport Specialist

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

SUMMARY OF CONTRACT PACKAGES

	Contractor/Consultant	Procurement Method	Contract Date	Contract Amount		Actual Total	
				Amount	Total (\$ Equivalent)	Amount (Rs)	Amount (\$ Equivalent)
Civil Works Package							
1. Package I	Larsen & Toubro, Ltd.	ICB	7 Jan 02	Rs830,913,120 \$3,159,915	31,497,105	1,853,014,192	40,925,438
2. Package II	UEM-Essar JV	ICB	16 Jan 02	Rs558,336,694	17,929,504	2,923,241,451	65,338,348
3. Package III	Dolomite Berhad ALS	ICB	5 Jan 02	Rs851,588,921 \$16,247,856	55,084,112	395,021,712	8,709,778
Remaining Works	SUPREME-MBL (JV)	ICB	16 Mar 07	Rs1,032,862,266	22,400,000	1,246,757,143	27,127,214
4. Package IV	UEM-Essar JV	ICB	16 Jan 02	Rs831,219,539 \$18,250,183	54,444,517	2,987,074,996	66,243,700
Remaining Works	Gammon India Ltd.	ICB	23 Sep 08	Rs2,075,000,000	45,190,235	2,496,627,260	52,975,637
5. Package V	UEM-Essar JV	ICB	16 Jan 02	Rs585,863,964 \$14,787,083	41,298,993	2,287,502,205	50,778,166
Remaining Works	Gammon India Ltd.	ICB	23 Sep 08	Rs1,960,000,000	42,685,716	2,369,901,014	50,387,349
Supervision Consulting Services							
1. Packages I, II, & III	Louis Berger Group in association with Roughton International Consulting Engineering Group and Sheladia Association	QBS	17 Jan 02	Rs117,584,439 \$2,528,933	4,998,818	450,972,013	10,021,003
2. Packages IV & V	ICT in association with Pacific Consultants Inc & Renardet	QBS	8 Feb 02	Rs115,671,094 \$2,464,263	4,806,972	866,243,600	19,046,646
Total						391,553,278	

ICB = international competitive bidding, QBS = quality-based selection.

Notes: New contracts for completion of remaining civil works were awarded after termination of the original contracts for packages III, IV, and V due to poor performance of contractors. The actual costs in \$ equivalent were converted based on annual expenditure and the average exchange rates in corresponding years.

Source: Asian Development Bank loan financial information system; project completion review mission.

INITIAL OPERATION OF THE PROJECT HIGHWAY

A. Highway Operation and Maintenance

1. As envisaged at appraisal, the contract for operation and maintenance (O&M) of the project highway has been awarded to the private sector. Currently, the section of kilometer (km) 72–km 189 is operated by a build–operate–transfer (BOT) concessionaire.¹ The remaining sections are operated by two private operators (one for the km 189–km 260 section and the other for the km 260–km 340 section).² The corridor management unit of the National Highways Authority of India (NHAI) is responsible for contracting and supervising the highway operation and maintenance.

2. The BOT concessionaire is responsible for widening the project highway to six lanes and also for O&M of the 117.0 km Anthrasanahally–Dodasidavanahally highway section. The highway site was handed over to the concessionaire on 4 June 2011 with a 26-years concession period, including 912 days for construction. According to the agreement, the concessionaire would pay a concession fee of Rs1,404 million per annum to the NHAI with a 5% increase every year. The concessionaire operates two toll plazas along the highway section. At the time of the Asian Development Bank (ADB) project completion review (PCR) mission in June 2013, the civil works for the widening of the project highway to six lanes was almost complete.³ The remaining project highway section from Dadasidavanahally to Devigeri is now operated by two private operators with short-term contracts (3 months, extendable). These two operators operate one toll plaza each, with the commencement date of 12 October 2012.⁴ The NHAI is responsible for maintaining the remaining highway section through its regular highway maintenance arrangement through the private sector. At the time of the ADB PCR mission, the remaining project highway section was still in the defect liability period.

3. Each toll plaza has 12–14 toll collection booths, with a special lane for oversized vehicles and toll-exempted vehicles. The toll plazas operate 24 hours a day with about 20–30 administrative staff and 70–80 toll collectors working at each toll plaza. The toll booths use computerized automatic toll collection systems that collect vehicle and toll information, which is summarized and recorded by the main computer station at the toll plaza office.

Table A11.1: Toll Plazas and Operators

Plaza	1	2	3	4
Location	Karjeevanhally	Guilau	Chalageri	Hebbalu
Details of highway section	Anthrasanahally-Tavarakere (km 72–km 132)	Tavarakere–Dodasidavanahally (km 132–km 189)	Dodasidavanahally–Hadadi (km 189–km 260)	Hadadi–Devigeri (km 260–km 340)
Length of highway section	60 km	57 km	71 km	80 km
Operator	RB Tumkur-Chitradurga Tollway Pvt. Ltd.		Eagle Infra India Ltd., Mumbai	M/S B.V.S.R Construction Pvt. Ltd. Hyderabad

km = kilometer.

Source: Project implementation unit.

¹ IRB Tumkur-Chitradurga Tollway Pvt. Ltd.

² Eagle Infra India Ltd, Mumbai, and M/S B.V.S.R Construction Pvt. Ltd. Hyderabad.

³ The target date for completion was 1 December 2013.

⁴ This highway section (packages IV and V of the project) was completed in August 2012.

B. Traffic Growth

4. After completion of the project, several traffic surveys and censuses were conducted in 2011, 2012, and 2013. The traffic counts collected from the surveys and censuses were converted into annual average daily traffic and consolidated by the PCR mission, with slight adjustments made to ensure consistency in the data. During the PCR mission, the actual number of vehicles passing through the toll plazas was also collected (for certain periods of time only), which has been used to verify the traffic survey data (Table A11.2).

Table A11.2: Average Traffic of the Project Highway
(Annual average daily traffic)

	Two/Three Wheeler	Car/Jeep	Minibus	Bus	Light Truck	Heavy Truck	Total
2012	290	2,128	610	629	2,709	3,599	9,965
2013	298	2,320	685	663	2,872	4,507	11,344
Vehicle Composition (%)							
2012	2.9%	21.4%	6.1%	6.3%	27.2%	36.1%	100.0%
2013	2.6%	20.4%	6.0%	5.8%	25.3%	39.7%	100.0%
Annual Growth Rate (%)							
2001–2012	0.9%	2.5%	5.8%	2.3%	2.5%	17.0%	6.3%
2012–2013	2.8%	9.0%	12.4%	5.4%	6.0%	25.2%	13.8%

Note: the traffic counts in 2012 and 2013 were mainly from the 7-day censuses conducted in November 2012 and January–February 2013 by the National Highways Authority of India.

Source: Project implementation unit; project completion review mission

5. The traffic counts includes tolled vehicles, vehicles with monthly passes, and toll-exempted vehicles. The annual average daily traffic in 2012 was compared with that at appraisal,⁵ which showed 6.3% average annual daily traffic growth during 2001–2012. After completion of the project, the annual average daily traffic jumped by 13.8% in 2013. The high traffic growth rate indicates rapid socioeconomic development in the project area and along the highway corridor. A higher increase in heavy truck traffic reflects diversion of interstate traffic due to the improved highway.

C. Toll Scheme

6. The toll rate and scheme is decided by the NHAI according to national rules.⁶ The toll scheme includes the following: (i) an average rate of Rs0.95 per km for cars, jeeps, and vans (2013 toll rate); (ii) different toll rates for different vehicle types; (iii) a different toll tariff at each toll plaza according to the respective highway length; (iv) annual adjustment of the toll rate according to price escalation; (v) discount rates for round-trips and monthly users; (vi) exemption for two- and three-wheelers; and (vii) exemption for government vehicles. The base toll rates for different vehicle types are shown in Table A11.3.

⁵ The traffic counts in the detailed project design for the baseline year (2001).

⁶ Government of India. 1997. *National Highways (Rate of Fee) Rules*. GSR 570(E).Delhi

Table A11.3: Toll Rates
(Rs per vehicle – single journey)

Toll Plaza	Karjeevanhally (60 km)	Guilau (57 km)	Chalageri (71 km)	Hebbal (80 km)
Car/Jeep/Van	55	55	65	80
LCV/LGV/Minibus	85	85	100	125
Bus/Truck	180	180	215	265
Large Truck	280	280	230	290
HCM/EME	340	340	335	415
Oversized Vehicle	340	340	405	505

EME = earth-moving equipment, HCM = heavy construction machinery, km = kilometer, LCV = light commercial vehicle, LGV = light goods vehicle.

Source: Project implementation unit.

7. For the return journey, the toll rate is about 50% of that for a single journey, but is required to be paid up front. The monthly ticket is only for local vehicles within the district.⁷ The rate of the monthly ticket is based on one trip per day.⁸

D. Road Safety and Accidents

8. The concessionaire is equipped with vehicles for emergency rescue, regular patrolling, and routine maintenance. For control of overloaded trucks, some plazas have weighing equipment installed. Highway accidents are monitored and managed by the traffic police. Although the project highway has incorporated substantial road safety features, accident rates remain high, particularly the fatality rate. However, considering higher traffic volume, the accident rates per vehicle-km indicate a declining trend. Tables A11.4 and A11.5 provide accident statistics on the project highway.

Table A11.4: Traffic Accidents on the Project Highway

Year	No. of Accidents	No. of Affected Persons			
		Fatal	Serious	Minor	Total
2010	727	149	186	1,091	1,426
2011	957	163	341	811	1,315
2012	775	152	342	984	1,478

Source: Project implementation unit.

Table A11.5: Traffic Accident Rate per Vehicle-kilometer

Year	No. of Accidents	Affected Persons	Million Vehicle-km-Year	Accidents/Million Vehicle-km-Year	Affected Persons/Million Vehicle-km-Year
2010	727	1,426	865.34	0.84	1.65
2011	957	1,315	928.34	1.03	1.42
2012	775	1,478	1,076.51	0.72	1.37

km = kilometer.

Source: Project implementation unit.

⁷ About 200–500 monthly passes are issued at each toll plaza.

⁸ At toll plaza 4, the monthly ticket is Rs2,095 for cars, jeeps, and vans, and Rs3,385 for light commercial vehicles.

ECONOMIC REEVALUATION

A. General

1. The Asian Development Bank (ADB) project completion review (PCR) mission conducted an economic reevaluation of the project using similar methodology as that at appraisal. The “without” project scenario assumed that the original state of the highways would be retained, whereas the “with” project scenario assumed the highways were upgraded so that vehicles could drive at higher speeds with lower operating costs and reduced travel time. Economic benefits were calculated by comparing the “with” and “without” project scenarios. Consequently, the economic internal rate of return (EIRR) was calculated for the project and a sensitivity test was carried out.

B. Traffic Analysis

2. The project highway is an important section of the western transport corridor in India. The upgrading of the project highway has facilitated rapid socioeconomic development in the surrounding area, and the traffic volume has increased significantly. During ADB’s PCR mission, actual traffic data of the project highway was collected, which indicated a sharp increase in traffic volume. The annual average daily traffic on the project highway was 11,344 vehicles in 2013, a year-on-year increase of 13.8%. The actual traffic and vehicle composition data on the project highway are listed in Table A12.1.

Table A12.1: Actual Traffic on the Project Highway
(Annual average daily traffic)

	Two/Three Wheeler	Car/Jeep	Minibus	Bus	Light Truck	Heavy Truck	Total
2012	290	2,128	610	629	2,709	3,599	9,965
2013	298	2,320	685	663	2,872	4,507	11,344
Vehicle composition (%)							
2012	2.9%	21.4%	6.1%	6.3%	27.2%	36.1%	100.0%
2013	2.6%	20.4%	6.0%	5.8%	25.3%	39.7%	100.0%

Source: Project implementation unit.

3. Taking into consideration the current traffic and the traffic growth rates at appraisal, the traffic forecast was revised. The revised traffic growth rates for various vehicle categories are listed in Table A12.2. The traffic forecast results, shown in Table A12.3, were used in the financial and economic reevaluations.

Table A12.2: Revised Traffic Growth Rates

Years	Two/Three Wheeler	Car/Jeep	Mini bus	Bus	Light Truck	Heavy Truck
2013–2015	6.4%	7.6%	6.2%	5.3%	6.9%	9.8%
2016–2020	5.1%	7.4%	6.2%	5.3%	6.8%	9.6%
2021–2025	3.8%	7.3%	6.2%	5.3%	6.8%	9.4%
2026–2030	1.9%	3.7%	3.1%	2.7%	3.4%	4.7%

Source: Asian Development Bank project completion review mission.

Table A12.3: Revised Traffic Forecast for the Project Highway
(Annual average daily traffic)

Year	Two/Three Wheeler	Car/Jeep	Minibus	Bus	Light Truck	Heavy Truck	Total
2012	290	2,128	610	629	2,709	3,599	9,965
2013	298	2,320	685	663	2,872	4,507	11,344
2014	317	2,495	727	698	3,069	4,946	12,252
2015	338	2,683	772	735	3,279	5,428	13,235
2016	355	2,882	820	774	3,502	5,947	14,279
2017	373	3,096	871	815	3,740	6,514	15,409
2018	392	3,326	925	858	3,994	7,137	16,632
2019	412	3,573	982	903	4,266	7,818	17,955
2020	433	3,838	1,043	951	4,556	8,565	19,387
2021	449	4,119	1,108	1,002	4,863	9,366	20,907
2022	466	4,419	1,177	1,055	5,192	10,241	22,550
2023	484	4,742	1,250	1,111	5,542	11,199	24,327
2024	503	5,088	1,327	1,170	5,916	12,246	26,249
2025	522	5,459	1,410	1,232	6,315	13,391	28,329
2026	532	5,659	1,453	1,264	6,529	14,017	29,453
2027	542	5,865	1,498	1,298	6,749	14,672	30,624
2028	552	6,079	1,545	1,332	6,977	15,358	31,843
2029	563	6,301	1,593	1,367	7,212	16,076	33,112
2030	573	6,531	1,642	1,404	7,456	16,828	34,433

Source: Asian Development Bank project completion review mission.

C. Economic Costs

4. The project cost comprises capital and operation and maintenance (O&M) costs. The actual annual expenditures for the project implementation were used as the capital cost, including those for civil works, land acquisition and resettlement, consulting services, and the financial charges of the loan. The total project cost in Indian rupees was about 18.1% higher than that estimated at appraisal, which was mainly caused by prolonged project implementation and rebidding for the completion of remaining civil works. The project highway is now operated by several private operators. Average O&M costs of the operators were used in the economic analysis. It was assumed that those O&M costs would increase by 3% each year in considering the traffic increase and the deterioration of the highway. The periodic maintenance cost for pavement resurfacing every 7 years was estimated at 10% of the capital cost considered at appraisal. The financial capital and O&M costs were converted into economic costs using the average conversion factor of 0.85 used at appraisal. All economic costs were estimated in 2013 prices.

D. Economic Benefits

5. As envisaged at appraisal, the main sources of economic benefits were (i) savings in vehicle operation costs (VOCs), (ii) savings in passenger travel time costs, and (iii) other non-quantified benefits. The unit VOC savings at appraisal were adopted as Rs1.57 for cars and jeeps, Rs6.29 for buses, Rs5.85 for heavy cargo vehicle, and Rs7.06 for multi-axle vehicle. Average passenger vehicle speeds were assumed to be 60 kilometers (km)–80 km per hour for

the “with” project scenario and 40km–50 km per hour for the “without” project scenario. The passenger travel time cost savings were calculated by different types of passenger vehicle. The passenger travel time cost was derived from the gross national income per capita of India in 2011. Other factors taken into account in the calculation for passenger travel time cost savings included average vehicle loads, percentage of work-related trips, time costs by different road users, travel speeds for different types of passenger vehicles, and potential increases in income. Due to a lack of availability of data, 10% was added to the VOC and time cost savings to reflect other benefits such as the benefits from local traffic, accident cost reduction, maintenance cost savings, and lower freight damages.

E. Economic Reevaluation and Sensitivity Test

6. Based on the above estimates of economic costs and benefits, the project’s economic internal rate of return (EIRR) was recalculated at 20.9%, with an economic net present value of Rs66,150.2 million. The recalculated EIRR is lower than the 38.0% estimated at appraisal. The lower EIRR was mainly due to the higher overall project cost and the longer implementation period. However, the EIRR is much higher than the ADB recommended discount rate of 12%. The project is therefore still considered economically viable. The detailed EIRR calculations for the project are in Table A12.5.

7. The EIRR was subjected to sensitivity analysis to test different scenarios of costs and benefits. The sensitivity analysis results show that the project continues to be economically viable for all scenarios. If a 20% O&M cost increase were to be combined with a 20% reduction in benefits, the EIRR would be 18.5% for the project. The sensitivity analysis also shows that the EIRR is more sensitive to changes in benefits. Therefore, the National Highways Authority of India and the private operators should pay adequate attention to the road condition to facilitate traffic development. The results of the sensitivity tests are in Table A12.4.

Table A12.4: Results of Sensitivity Tests

Scenarios		EIRR (%)	ENPV (Rs million)
Base Case		20.9	66,150.2
Sensitivity Tests			
1	Operation cost 10% higher	20.4	65,869.6
2	Operation cost 20% higher	20.8	65,589.0
3	Maintenance cost 10% higher	20.9	66,076.0
4	Maintenance cost 20% higher	20.9	66,001.7
5	Benefits 10% lower	19.8	55,240.1
6	Benefits 20% lower	18.6	44,329.9
7	Benefits 10% higher	21.9	77,060.4
8	Benefits 20% higher	22.9	87,970.6
9	O&M cost 10% higher & benefits 10% lower	19.7	54,885.2
10	O&M cost 20% higher & benefits 20% lower	18.5	43,620.1

EIRR = economic internal rate of return, ENPV = economic net present value,
O&M = operation and maintenance.

Source: Asian Development Bank project completion review mission.

A12.5: Economic Reevaluation									(Rs million)	
Year	Costs				Benefits				Net Benefit	ENPV
	Capital	Operation	Maintenance	Total	VOC	Time Cost	Others	Total		
2002	353.3			353.3					(353.3)	(1,229.0)
2003	3,101.4			3,101.4					(3,101.4)	(9,632.5)
2004	3,780.7			3,780.7					(3,780.7)	(10,484.3)
2005	2,155.2			2,155.2					(2,155.2)	(5,336.1)
2006	1,239.7			1,239.7					(1,239.7)	(2,740.5)
2007	768.9			768.9	310.9	47.6	35.9	394.4	(374.5)	(739.3)
2008	837.6	20.5	12.9	871.0	669.4	102.8	77.2	849.4	(21.5)	(37.9)
2009	1,703.7	21.1	13.2	1,738.0	721.6	110.9	83.3	915.8	(822.2)	(1,293.8)
2010	2,060.4	32.6	20.5	2,113.5	1,175.5	179.5	135.5	1,490.5	(623.0)	(875.3)
2011	1,444.4	61.4	38.6	1,544.4	2,136.6	322.9	245.9	2,705.4	1,161.0	1,456.3
2012	415.9	102.4	64.3	582.6	4,680.4	696.9	537.7	5,915.1	5,332.5	5,972.4
2013		102.4	64.3	166.7	5,435.9	785.8	622.2	6,844.0	6,677.3	6,677.3
2014	893.1	103.2	66.2	1,062.6	5,891.2	875.6	676.7	7,443.5	6,380.9	5,697.2
2015		104.1	68.2	172.4	6,385.9	975.8	736.2	8,097.8	7,925.4	6,318.1
2016		105.0	70.3	175.3	6,915.0	1,066.1	798.1	8,779.2	8,604.0	6,124.1
2017		105.9	72.4	178.3	7,489.4	1,165.0	865.4	9,519.8	9,341.6	5,936.7
2018		106.7	64.3	171.1	8,113.1	1,273.1	938.6	10,324.8	10,153.7	5,761.5
2019		107.6	66.2	173.9	8,790.4	1,391.4	1,018.2	11,199.9	11,026.0	5,586.1
2020		108.5	68.2	176.7	9,526.0	1,520.7	1,104.7	12,151.4	11,974.6	5,416.7
2021	1,786.1	109.4	70.3	1,965.8	10,311.7	1,661.3	1,197.3	13,170.3	11,204.5	4,525.3
2022		110.2	72.4	182.6	11,164.1	1,815.1	1,297.9	14,277.1	14,094.4	5,082.6
2023		111.1	64.3	175.4	12,088.9	1,983.2	1,407.2	15,479.3	15,303.9	4,927.4
2024		112.0	66.2	178.2	13,092.5	2,167.1	1,526.0	16,785.6	16,607.3	4,774.2
2025		112.9	68.2	181.1	14,181.7	2,368.2	1,655.0	18,204.9	18,023.8	4,626.3
2026		113.8	70.3	184.0	14,772.9	2,513.7	1,728.7	19,015.3	18,831.3	4,315.6
2027		114.6	72.4	187.0	15,389.4	2,668.2	1,805.8	19,863.4	19,676.4	4,026.2
2028	1,786.1	115.5	64.3	1,965.9	16,032.2	2,832.3	1,886.5	20,751.0	18,785.1	3,432.0
2029		116.4	66.2	182.6	16,702.7	3,006.5	1,970.9	21,680.1	21,497.5	3,506.7
2030	(7,442.2)	117.3	68.2	(7,256.7)	17,401.9	3,191.5	2,059.3	22,652.8	29,909.5	4,356.1
									ENPV:	66,150.2
									EIRR:	20.9%
									Discount Rate:	12%

EIRR = economic internal rate of return, ENPV = economic net present value, VOC = vehicle operating cost. () = negative.

Source: Asian Development Bank project completion review mission.

FINANCIAL REEVALUATION

1. The financial internal rate of return (FIRR) of the project was recalculated based on actual capital costs, actual operation and maintenance (O&M) costs, the revised traffic forecast, and existing toll rates. The major assumptions used in the FIRR recalculation are as follows:

- (i) The capital costs included all capital expenditures related to the civil works, land acquisition and resettlement activities, and consulting services, but excluded the financial charges. In addition, the large-scale highway maintenance (periodical maintenance) expenditures were treated as capital costs.
- (ii) Average O&M costs of the operators were used as the basic costs. The O&M costs were kept at constant prices, and a 3% increase per year was added to cater for traffic increases and deterioration of road conditions.
- (iii) Average existing highway toll rates were used to calculate future toll revenue (see Appendix 11 for toll rates). A revised traffic forecast was used (see Appendix 12 for traffic analysis). The toll-exempted traffic was excluded from the revenue calculation. The revenue calculation also considered round-trip and monthly-ticket vehicles, for which lower toll rates were applied.

2. Based on the above assumptions and estimations, the FIRR was recalculated at 13.3%, which is a little higher than the estimate at appraisal of 11.1%. The higher FIRR was mainly caused by much higher toll rates.¹ Therefore, this project is considered financially viable. Table A13.2 presents the cash flows of the FIRR recalculation. The FIRR was subject to sensitivity tests. At a combination of 20% increase in O&M costs and 20% decrease in revenue, the FIRR was still at 11.3%. The test results also indicate that the FIRR was more sensitive to revenue changes (Table A13.1). Therefore, the National Highways Authority of India and the highway operators should improve their management of toll collection to ensure sufficient revenue.

Table A13.1: Sensitivity Tests

Scenarios	FIRR (%)
Base Case	13.3
Sensitivity Tests	
1 O&M cost 10% higher	13.3
2 O&M cost 20% higher	13.2
3 Revenue 10% lower	12.4
4 Revenue 20% lower	11.4
5 Revenue 10% higher	14.2
6 Revenue 20% higher	14.9
7 O&M cost 10% higher & revenue 10% lower	12.4
8 O&M cost 20% higher & revenue 20% lower	11.3

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

Source: Asian Development Bank project completion review mission.

¹ The toll rates per vehicle-kilometer at appraisal were Rs0.45 for cars, Rs0.80 for light commercial vehicles, and Rs1.65 for bused and heavy commercial vehicles, which are about half of the current toll rates.

Table A13.2: Financial Reevaluation of the Project
(Rs million)

Year	Costs				Toll Revenue	Cost-Revenue Stream
	Capital	Operation	Maintenance	Total		
2002	291.2			291.2		(291.2)
2003	3,614.2			3,614.2		(3,614.2)
2004	4,383.5			4,383.5		(4,383.5)
2005	2,391.7			2,391.7		(2,391.7)
2006	1,193.7			1,193.7		(1,193.7)
2007	583.1			583.1		(583.1)
2008	686.4	24.1	15.1	725.6	108.5	(617.1)
2009	1,847.8	24.8	15.6	1,888.2	470.9	(1,417.3)
2010	2,374.8	38.3	24.1	2,437.2	513.0	(1,924.3)
2011	1,651.3	72.3	45.4	1,768.9	1,402.9	(366.0)
2012	447.0	120.4	75.7	643.1	3,082.7	2,439.6
2013		120.4	75.7	196.1	3,593.4	3,397.3
2014	1,050.7	121.5	77.9	1,250.1	3,897.1	2,647.1
2015		122.5	80.3	202.8	4,227.4	4,024.6
2016		123.5	82.7	206.2	4,580.7	4,374.5
2017		124.6	85.2	209.7	4,964.5	4,754.8
2018		125.6	75.7	201.3	5,381.4	5,180.2
2019		126.6	77.9	204.6	5,834.4	5,629.8
2020		127.6	80.3	207.9	6,326.6	6,118.7
2021	2,101.3	128.7	82.7	2,312.7	6,852.6	4,539.9
2022		129.7	85.2	214.9	7,423.4	7,208.5
2023		130.7	75.7	206.4	8,043.0	7,836.6
2024		131.8	77.9	209.7	8,715.7	8,506.0
2025		132.8	80.3	213.1	9,446.1	9,233.0
2026		133.8	82.7	216.5	9,842.7	9,626.2
2027		134.9	85.2	220.0	10,256.4	10,036.4
2028	2,101.3	135.9	75.7	2,312.9	10,687.9	8,375.0
2029		136.9	77.9	214.9	11,137.9	10,923.1
2030	(8,239.3)	137.9	80.3	(8,021.1)	11,607.4	19,628.5
					FIRR:	13.3%

FIRR = financial internal rate of return.

() = negative.

Source: Asian Development Bank project completion review mission.

SUMMARY OF THE SOCIOECONOMIC IMPACTS

A. Project Impact Area

1. The project highway comprises the Tumkur–Haveri section of National Highway 4 in the southern part of India. This national highway connects two major ports, Mumbai and Chennai. Tumkur is situated 70 kilometers (km) north of Bangalore. The Tumkur–Haveri section starts at the north end of Tumkur (km 75); traverses the towns of Sira, Hiriya, Chitradurga, Davangere, and Harihar; and ends on the northern point of Haveri town (km 340). The landscape is characterized by vast stretches of undulating plains with sporadic ranges of low rocky hills. Areas are basically dry with a few rivers running between the hills. Most of the areas are open land often used as plantations and for other agricultural purposes. Around 5% of the land is forested. The main agricultural production in the project area is maize, paddy, oil seeds, cotton, wheat, and gram. The project covers four districts in the state of Karnataka with a total population of 7,887,238 people in 2011. Table A14.1 shows the population and the geographical area of the project districts.

Table A14.1: Population and Geographical Area of Project Districts

District	Area (square km)	Population (2011)			Covered by the Project (km)
		Total	Male	Female	
Tumkur	10,597	2,681,449	1,354,770	1,326,679	56.0
Chitradurga	8,440	1,660,378	843,411	816,967	98.1
Davanagere	5,924	1,946,905	989,602	957,303	47.0
Haveri	4,823	1,598,506	819,295	779,211	58.1
Total	29,784	7,887,238	4,007,078	3,880,160	259.2

km = kilometer.

Source: Louis Berger Group, Inc. January 2006. *Interim Project Performance Mentoring and Evaluation Report*.

2. According to a consultant's report on poverty impact conducted during project appraisal on the basis of the governmental 1993-94 survey, the proportion of population living below the poverty line in Karnataka was 33.2%, which was better than the national average of 36.0%¹. There was intrastate disparity in poverty levels in Karnataka. Population living below the poverty line in the project districts ranged from 39.0% in Chitradurga to 49.7% in Haveri.

B. Connectivity Improvement

3. Upon completion, a 259.2 km section of the national highway along the western transport corridor had been upgraded and widened, including upgrading of an existing 232.1 km two-lane highway section to four lanes and construction of a new 27.1 km four-lane bypass. The design speed was 100 km per hour.² The upgrading also included 285 km of service roads, 21 interchanges, 69 vehicle over passes or under passes, 48 pedestrian over passes or under passes, 51 bridges, and 4 toll plazas. Substantial safety features have been incorporated in the highway design. On the project highway, vehicles can now drive at average speed of 60km–80 km per hour and the vehicle operation cost (VOC) has been reduced by an average of 40%, which has led to a substantial reduction in passenger and freight transport costs. The project

¹ The National Sample Survey in India conducted in 2000 and published in 2001 indicated that the national average of the proportion of the population living below the poverty line declined from 36% in 1993/94 to 26% in 1999/2000.

² A reduced speed of 80 km per hour was adopted for the Harihar and Chitradurga bypasses due to right-of-way constraints.

highway, service roads, and roadside amenities have improved connectivity to rural areas and have brought rapid and significant socioeconomic benefits to the project area. Local public transporters use the project highway to provide transport services to the local residents, particularly the poor.

4. In 2005, the construction supervision consultants carried out a survey in the project area.³ The Asian Development Bank (ADB) project completion review (PCR) mission assessed the passenger travel time savings in comparing the “with” and “without” project scenarios. The results indicate that the passenger travel time savings for the journey along the project highway were about 1.94 hours for passengers in cars and/or jeeps and 2.16 hours for bus passengers along the project highway. Table A14.2 summarizes the survey results for the districts of Tumkur and Chitradurga (project packages I, II, and III).

Table A14.2: Connectivity Improvement

		Travel Destination			
		Workplace	Hospital/ Health Care Facility	Market	Bank/Post Office
Mode	Bus	55%	81%	17%	72%
	Two/three wheeler	20%	10%	76%	18%
	Car/van	3%	4%		3%
	Walk	18%	5%	6%	7%
	Bicycle	4%		1%	
		100%	100%	100%	100%
Frequency	Daily	100%		16%	4%
	Weekly		17%	78%	37%
	Monthly		77%	6%	59%
	Occasionally		6%		
		100%	100%	100%	100%
Distance	<5 km	65%	21%	12%	33%
	5 - 10 km	20%	39%	43%	43%
	10 - 20 km	10%	21%	30%	14%
	>20 km	5%	19%	15%	10%
		100%	100%	100%	100%
Used Project Highway	Yes	99%	99%	99%	99%
	No	1%	1%	1%	1%
		100%	100%	100%	100%

km = kilometer.

Source: , The Louis Berger Group, Inc. January 2006. *Interim Project Performance Monitoring and Evaluation Report for Package I, II and III*

C. Working Opportunities Generated by the Project

5. The project used 426,252 person-months of local worker inputs. These local workers comprised 38% unskilled and semi-skilled workers, 43% skilled workers, 15% technical workers, and 4% other workers. In addition to the local workers, the consulting firms for construction supervision also utilized 8,654 person-months of national consultants, among which 70% were

³ The construction supervision consultants only did the interim project performance monitoring and evaluations. Due to prolonged project implementation, no follow-up monitoring and evaluation activities were carried out.

local.

6. On the project highway, there are four toll plazas. The toll plazas operate 24 hours a day, with about 20–30 administrative staff and 70–80 toll collectors working at each toll plaza. The ADB PCR mission noted that about 150 newly established and/or expanded roadside service facilities existed along the project highway, including restaurants, hotels, fuel stations, and garages. There were also large numbers of small shops along the highway and near each toll plaza. These roadside service facilities and shops have provided significant working opportunities to the local people, especially to the poor.

D. Road Accidents

7. Substantial road safety features have been incorporated in the project design and construction, which have resulted in a reduced accident rate. However, the number of accidents on the project highway are still significant, particularly the fatality rate. Tables A14.4 and A14.5 summarize the accident statistics.

Table A14.4: Summary of Accidents on the Project Highway

Year	No. of Accidents	No. of Affected Persons			Total
		Fatal	Serious	Minor	
2010	727	149	186	1,091	1,426
2011	957	163	341	811	1,315
2012	775	152	342	984	1,478

Source: Project implementation unit.

Table A14.5: Accident Statistics by Highway Section

		No. of Accidents	No. of Affected Persons			Total
			Fatal	Serious	Minor	
2010	Section 1	136	50	40	324	414
	Section 2	126	25	20	202	247
	Section 3	145	18	70	198	286
	Section 4	229	28	36	165	229
	Section 5	91	28	20	202	250
2011	Section 1	219	45	113	185	343
	Section 2	196	32	113	185	330
	Section 3	104	15	34	116	165
	Section 4	380	52	43	285	380
	Section 5	58	19	38	40	97
2012	Section 1	204	28	127	225	380
	Section 2	210	36	121	179	336
	Section 3	110	18	54	125	197
	Section 4	172	35	5	302	342
	Section 5	79	35	35	153	223

Note: The highway sections correspond to the civil works packages.

Source: Project implementation unit.

E. Land Acquisition and Resettlement

8. At project completion, 686.7 hectares of land were acquired, comprising 43.8 hectares of government land and 643.0 hectares of private land, which affected 5,150 people, 1,561 structures, and 67 common assets. Upon completion, the nongovernment organization that was recruited to assist in the implementation of the resettlement action plan prepared a final report.⁴ The report indicated that (i) the affected persons were given a total compensation of Rs202.3 million, (ii) the resettlement was carried out adequately with assistance from the project implementation unit, (iii) the common assets affected were well relocated, and (iv) income restoration and training were provided to the affected persons.

Table A14.6: Land Acquired under the Project
(hectares)

Package	Government Land	Private Land		Total
		Notification	Consent	
Package I	17.48	62.46	28.26	108.20
Package II	11.73	51.94	100.83	164.50
Package III	2.86	10.13	14.97	27.96
Package IV	7.68	100.96	58.44	167.08
Package V	4.00	211.01	3.98	218.99
Total	43.75	436.50	206.48	686.73

Source: Project implementation unit.

Table A14.7: Persons Affected by the Project
(no. of people)

District	Agriculture	Non-Agriculture	Non-title Holders	Total
Tumkur	667	454	295	1,416
Chitradurga	779	320	629	1,728
Davanagere	323	348	139	810
Haveri	940	217	39	1,196
Total	2,709	1,339	1,102	5,150

Source: Development Management Trust. 2007. *Detailed Completion Report – Implementation of Resettlement and Rehabilitation*.

F. HIV/AIDS Awareness

9. An HIV/AIDS awareness seminar was first conducted in December 2003 with the cooperation of the Karnataka State AIDS Prevention Society. In addition, an environmental and social management training workshop was carried out during 1–2 July 2004, which included HIV/AIDS as one of the topics. More than 50 people from the contracting firm under the project attended the workshop. HIV/AIDS awareness posters and information were on display at the project implementation unit office and project site offices to disseminate relevant information to people claiming compensation payments.

⁴ Development Management Trust. 2007. *Detailed Completion Report - Implementation of Resettlement and Rehabilitation*.