



Completion Report

Project Number: 42399-013
Grant Number: 0153-KGZ (SF)
Loan Number: 2533-KGZ (SF)
September 2015

Kyrgyz Republic: CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 2

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Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit	–	som (Som)
		At Appraisal (11 May 2009)
		At Project Completion (21 November 2014)
Som1.00	=	\$0.023
\$1.00	=	Som43.0999
		\$0.0174
		Som57.6000

ABBREVIATIONS

ADB	–	Asian Development Bank
CAREC	–	Central Asia Regional Economic Cooperation
CRBC	–	China Road and Bridges Company
IPIG	–	Investment Projects Implementation Group
km	–	kilometer
MOTC	–	Ministry of Transport and Communications
PCR	–	project completion report
PIU	–	project implementation unit
PRC	–	People's Republic of China

NOTE

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

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BASIC DATA

A. Loan and Grant Identification

1.	Country	Kyrgyz Republic
2.	Loan and Grant Numbers	Loan 2533-KGZ(SF), Grant 0153-KGZ(SF)
3.	Project Title	CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 2
4.	Borrower	Kyrgyz Republic
5.	Executing Agency	Ministry of Transport and Communications
6.	Amount in Financing Agreement	
	Loan 2533	SDR18,492,000 (\$28 million)
	Grant 0153	\$22 million
7.	Project Completion Report Number	1538

B. Loan and Grant Data

1.	Appraisal	(waived) ^a
2.	Loan Negotiations	
	– Date Started	21 May 2009
	– Date Completed	22 May 2009
3.	Date of Board Approval	14 July 2009
4.	Date of Financing Agreement	5 August 2009
5.	Date of Loan and Grant Effectiveness	
	– In Financing Agreement	60 days after the date of the Financing Agreement (6 October 2009)
	– Actual	30 October 2009
	– Number of Extensions	0
6.	Loan and Grant Closing Date	
	– In Loan Agreement	30 June 2014
	– Actual	1 March 2015
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	1% per annum during the grace period and 1.5% per annum thereafter
	– Maturity (number of years)	32 years
	– Grace Period (number of years)	8 years

^a Based on the ADB procedure for processing sovereign projects, the appraisal mission was waived. References to 'appraisal' in this project completion report refer to the due diligence undertaken by ADB prior to approval of project.

8. Disbursements

a. Dates

Initial Disbursement		Final Disbursement	Time Interval
G0153-KGZ	25 May 2010	25 February 2015	57 months
L2533-KGZ	21 July 2010	25 February 2015	55 months
Effective Date		Original Closing Date	Time Interval
30 October 2009		30 June 2014	56 months

b. Loan Amount (SDR million)^a**Loan 2533-KGZ(SF)**

Category	Original Allocation	Last Revised Allocation	Amount Increased/ (Canceled)	Net		Undisbursed Balance ^a
				Amount Available	Amount Disbursed	
Civil Works	14.53	17.05	0.02	17.07	17.07	0.00
Consulting Services						
Project Management	0.93	0.78	(0.01)	0.77	0.77	0.00
Capacity Development	0.20	0.00	0.00	0.00	0.00	0.00
Financing Charges	0.66	0.66	(0.01)	0.65	0.26	0.39
Unallocated	2.18	0.00	0.00	0.00	0.00	0.00
Total	18.49	18.49	0.00	18.49	18.10	0.39

^a Undisbursed balance was cancelled and loan account was financially closed on 1 March 2015.

c. Grant Amount (\$ million)^a**Grant 0153-KGZ(SF)**

Category	Original Allocation	Last Revised Allocation	Amount Increased/ (Canceled)	Net		Undisbursed Balance ^a
				Amount Available	Amount Disbursed	
Civil Works	18.00	20.52	0.50	21.02	21.02	0.00
Consulting Services						
Project Management	1.10	1.28	(0.30)	0.98	0.97	0.01
Capacity Development	0.20	0.20	(0.20)	0.00	0.00	0.00
Unallocated	2.70	0.00	0.00	0.00	0.00	0.00
Total	22.00	22.00	0.00	22.00	21.99	0.01

^a Undisbursed balance was cancelled and grant account was financially closed on 1 March 2015.

9. Local Costs (Financed), Loan 2253-KGZ(SF): Not applicable.
Local Costs (Financed), Grant 0153-KGZ(SF): Not applicable.

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
ADB Loan 2533-KGZ(SF)	28.00	27.81
ADB Grant 0153-KGZ(SF)	22.00	21.99
Government	12.50	11.33
Total	62.50	61.13

ADB = Asian Development Bank.

2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower Financed	12.50	11.33
ADB Financed: L2533-KGZ(SF)	27.00	27.41
G0153-KGZ(SF)	22.00	21.99
Total	61.50	60.73
IDC Costs		
Borrower Financed	0.00	0.00
ADB Financed: L2533-KGZ(SF)	1.00	0.40
Total	1.00	0.40

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

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

Component	Appraisal Estimate ^a	Actual ^b
A. Base Costs		
I. Physical Component		
1. Civil Works (km 365–400; km 439–479)		
G0153-KGZ(SF)	18.00	21.02
L2533-KGZ(SF)	22.00	26.21
Government	2.50	11.12
Subtotal Civil Works	42.50	58.35
2. Consulting Services		
a. Construction Supervision	2.00	
G0153-KGZ(SF)		0.83
L2533-KGZ(SF)		1.01
Government	0.00	0.14
b. Project Management (Support for the PIU)	0.50	
G0153-KGZ(SF)		0.14
L2533-KGZ (SF)		0.18
Government	0.00	0.07
Subtotal Consulting Services	2.50	2.37
Subtotal Physical Component	45.00	60.72
II. Nonphysical Component		
1. Consulting Services		
a. Project Management (Capacity Development)	0.50	
G0153-KGZ(SF)		0.00
L2533-KGZ(SF)		0.01
Government	0.00	0.00
Subtotal Nonphysical Component	0.50	0.01
III. Taxes and Duties ^c		
Government	6.00	0.00
Total Base Cost (A)	51.50	60.73
B. Contingencies		
1. Physical Contingency		
L2533/G0135-KGZ(SF)	4.00	0.00
Government	2.00	0.00
2. Price Contingency		
L2533/G0135-KGZ(SF)	2.00	0.00
Government	2.00	0.00
Total Contingencies (B)	10.00	0.00
C. Financing charges during construction:		
L2533-KGZ(SF)	1.00	0.40
Total Project Cost (A+B+C)	62.50	61.13

Note: Figures may not add up to the totals because of rounding.

^a Includes inspection facility at appraisal.

^b Actual includes civil works and construction supervision for At-Bashy road.

^c Actual taxes and fees are included in each government-financed item.

Source: Asian Development Bank and Ministry of Transport and Communications project implementation unit (PIU).

4. Project Schedule: L2533/G0153-KGZ(SF)

Item	Appraisal Estimate	Actual
Consulting Services		
Construction Supervision		
Procurement (Km 365–400; Km 439–479)	Q2 2009—Q4 2009	Q3 2009—Q2 2010
Implementation	Q1 2010—Q4 2013 ^a	Q3 2010—Q3 2014
Implementation of At-Bashy road		Q3 2013—Q4 2014
Date of contract (Km 365–400; Km 439–479)		19 July 2010
Date of Contract (At-Bashy road)		6 May 2013
Project Implementation Support		
Date of contracts:		
Software 1C Accountant		24 Sep 2010
Regional Coordinator		20 Dec 2011
Assistant Financial Manager		20 Dec 2011
Soils and Materials Engineer		20 Dec 2011
External Financial Auditor		25 May 2011
Capacity Development for implementing the road sector master plan		
Date of contract		14 Jun 2012
Civil Works		
Procurement (Km 365–400; Km 439–479)	Q2 2009—Q4 2009	Q3 2009—Q2 2010
Implementation	Q2 2010—Q4 2013 ^a	Q3 2010—Q3 2014
Implementation of At-Bashy road		Q3 2013—Q4 2014
Date of contract (Km 365–400; Km 439–479)		3 May 2010
Date of Contract (At-Bashy road)		6 May 2013

^a Includes one-year defects liability period

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From July 2009 to 31 December 2010	Satisfactory	Satisfactory
From 1 January 2011 to 30 November 2014	On track ^a	

^a From 1 January 2011 the project performance rating system was replaced with eOperations.

D. Data on Asian Development Bank Missions

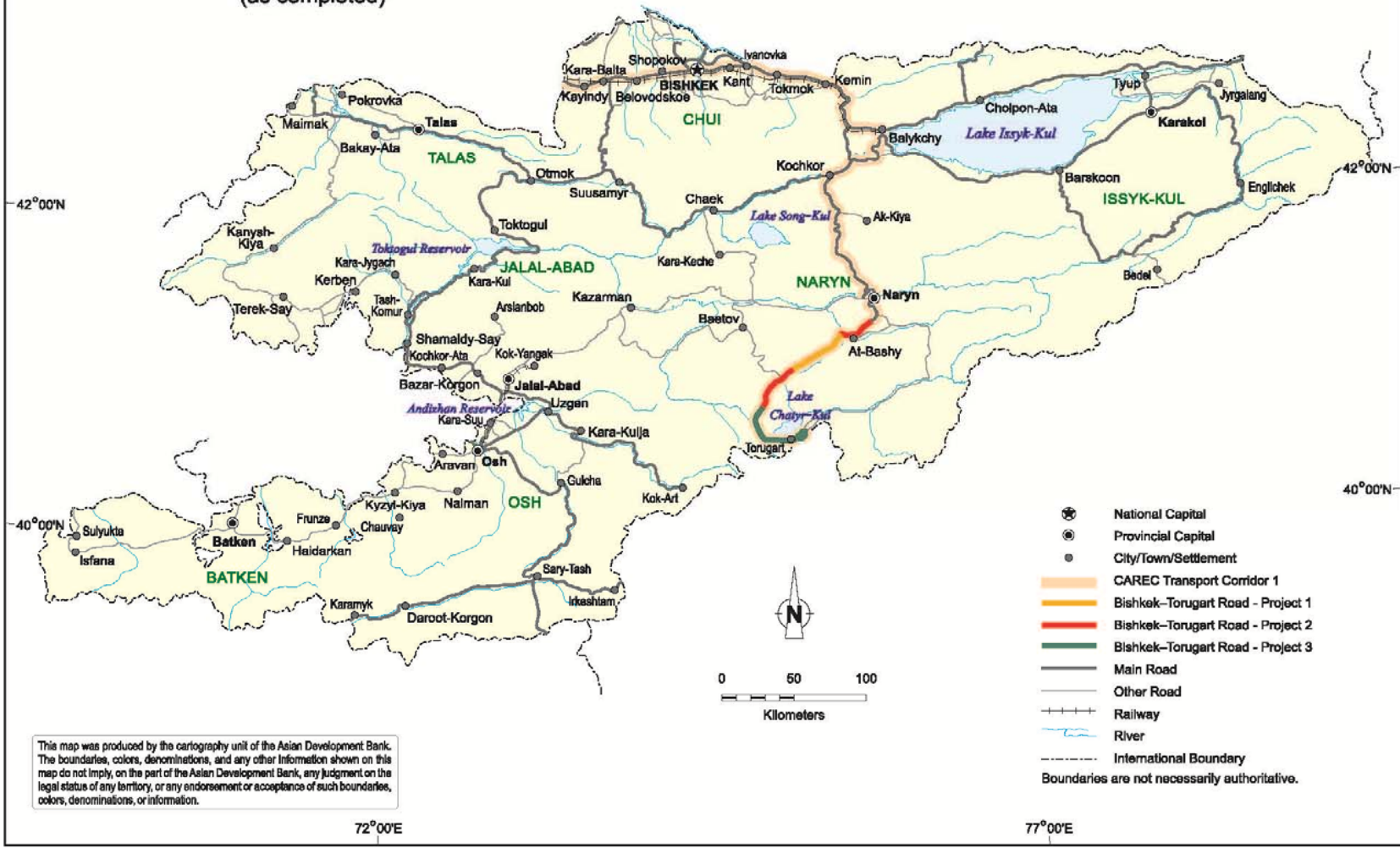
Name of Mission^a	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-Finding ^a	23 Feb–3 Mar 2009	3	18	a, b, c
Appraisal	Waived	0	0	
Inception	11–23 Nov 2009	3	39	a, d, e
Review 1	26–30 Apr 2010	3	15	a, d, e
Review 2 ^a	14–22 Jul 2010	2	18	a, e
Review 3 ^a	29 Nov–11 Dec 2010	4	52	a, g, d, e
Review 4 ^a	7–17 Feb 2011	3	27	f, g, e
Review 5 ^a	23–28 May 2011	6	36	f, g, h, i, j, d
Special Project Administration ^a	15–23 Jun 2011	1	9	K
Review 6 ^a	7–16 Feb 2012	6	60	b, a, l, g, k, d
Review 7 ^a	21–31 May 2012	3	33	b, l, k
Midterm Review 8 ^a	17–25 Oct 2012	4	36	b, k, d, l
Country Safeguards Review ^a	20 May–6 Jun 2013	2	36	l, u
Review 9 ^a	11–18 Nov 2013	3	24	b, k, l
Review 10 ^a	24–27 Feb 2014	5	20	b, m, q, d, k
Special Project Administration ^a	29 Apr–15 May 2014	4	51	b, l, k, t
Review 11	11–19 Aug 2014	3	24	m, u, k
Country Safeguards (ENV) Review ^a	12–27 Sep 2014	3	48	l, d, n
Review 12 ^a	12–17 Oct 2014	6	30	o, m, q, k, p, c
Project completion review	8–18 June 2015	4	32	b, q, r, s

a = principal transport specialist; b = transport specialist; c = country director (KYRM); d = project analyst; e = project implementation officer; f = senior transport specialist; g = social development specialist; h = senior advisor; i = environment specialist; j = senior project implementation officer; k = senior project officer; l = senior environment specialist; m = transport economist; n = consultant (social safeguard); o = lead portfolio management specialist/project administration unit head; p = resettlement specialist; q = associate project officer; r = associate project analyst; s = project officer; t = director (CWTC); u = social development specialist (safeguards).

^a Mission combined for other projects in the project area.

Note: in each mission team, the member mentioned first was also the team leader.

KYRGYZ REPUBLIC
**CAREC TRANSPORT CORRIDOR 1
 (BISHKEK-TORUGART ROAD) PROJECT 2**
 (as completed)



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I. PROJECT DESCRIPTION

1. **Introduction.** Between 2000 and 2007, the volume of traffic between Kyrgyz Republic and the People's Republic of China (PRC) grew rapidly, driven by sharp increases in demand for consumer and capital goods in the Kyrgyz Republic and neighboring countries. The total trade volume through the Torugart border crossing point—which accounted for about half of all trade between these two countries—increased from 100,000 tons in 2003 to over 280,000 tons in 2007.

2. The Kyrgyz Republic road network was largely developed under the former Soviet Union. However, insufficient funding for maintenance during the period 1990–2007 resulted in premature deterioration of large parts of the network. Under the Road Sector Development Strategy 2007–2010, the Kyrgyz Republic attempted to improve the situation by increasing financing of road maintenance, and improving eight road corridors including Bishkek to Torugart, which by 2009 was in urgent need of upgrading to cope with the increase in traffic flows and axle loads that were resulting from increased trade.¹

3. The entire Bishkek–Torugart road corridor is being modernized in 5 sections. The first section—Bishkek to kilometer (km) 272—was financed by the Export-Import Bank of China and completed in 2014. The second section—from km 272 to km 365—is being financed by the Islamic Development Bank and is scheduled to be completed in 2017. The 3 remaining sections are being financed by the Asian Development Bank (ADB) and form Central Asian Regional Economic Cooperation (CAREC) Transport Corridor 1 (Bishkek–Torugart road) project 1 (km 400-439),² project 2 (km 365-400 and km 439-479),³ and project 3 (km 479-539).⁴ Project 1 was completed in 2013, and project 3 implementation is ongoing and scheduled to be completed in 2017.

4. **Project description.** On 14 July 2009, ADB approved a grant of \$22 million and a loan of \$28 million (SDR 18.49 million equivalent) to the Kyrgyz Republic for the CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 2. The objectives of the project were to: (i) reduce transport costs between the Kyrgyz Republic and the PRC; (ii) foster regional trade and tourism; and (iii) enhance knowledge and skills in the transport sector. To realize these objectives, the project comprised physical investment and capacity development activities. The physical investment component included the improvement of 75 km of the Bishkek–Torugart road to standard single carriageway (2-lane) road, and the completion of a customs inspection facility at around km 479 of the Bishkek–Torugart road. The capacity development (nonphysical) component focused on enhancing the skill sets of Ministry of Transport and Communications (MOTC) staff and university graduates in the transport sector.

5. It was anticipated that the project's main quantifiable benefits would consist of savings in vehicle operating costs and travel time, which would reduce transport costs. The primary direct

¹ Government of the Kyrgyz Republic, Ministry of Transport and Communications. 2007. *Road Sector Development Strategy for 2007–2010*. Bishkek.

² ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Asian Development Fund Grant, Kyrgyz Republic: CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project*. Manila.

³ ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Asian Development Fund Grant, Kyrgyz Republic: CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 2*. Manila.

⁴ ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan, Kyrgyz Republic: CAREC Corridor 1 (Bishkek–Torugart Road) Project 3*. Manila.

beneficiaries would be transport operators and local road users. The improved transport system would also bring significant economic and social benefits, including lower cost of goods and improved access to services and job markets, to local communities.

6. In May 2013, ADB approved the use of contingency funds for the construction of 6 km of a 10 km upgraded link road from the project road to At-Bashy village, including rehabilitation of the main road through the center of the village. The other 4 km of this road was upgraded under a previous project (footnote 3). The upgraded road was expected to benefit residents of both At-Bashy and neighboring villages.

7. At appraisal, it was envisaged that the project would include provision of a multi-channel inspections facility in Torugart. Initial attempts were made to reach agreement on the location and facilities to be provided. However, in December 2013 the State Customs Service under the Government of the Kyrgyz Republic informed MOTC that the new customs facility would be developed at the site of the existing facility in Torugart, and financed by the PRC under military-technical cooperation. The planned improvements were therefore excluded from this ADB-financed project, but are scheduled to be completed using other sources of financing.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

8. The project's original design was highly relevant at appraisal. The Kyrgyz Republic has approximately 4,300 km of principal roads, and the Bishkek–Torugart road is of major importance, forming part of CAREC Corridor 1, which links the western part of the PRC (i.e., Xinjiang Uygur Autonomous Region) to Kazakhstan via the Kyrgyz Republic. The development of the Bishkek–Torugart corridor was outlined as a priority in both the government's Country Development Strategy for 2007–2010,⁵ and the Road Sector Development Strategy for 2007–2010 (footnote 2). To achieve targets outlined in these strategies, an estimated \$330 million is being made available during 2005–2015 for maintenance of the country's major road corridors (Appendix 7). The project was included in both ADB's Country Operations Business Plan⁶ and the Joint Country Support Strategy, 2007–2010.⁷

9. CAREC Corridor 1 is of both national and local importance, since it connects Bishkek to Balykchy (Lake Issyk-Kul) and to the eastern and southern parts of the country. The road condition was poor prior to upgrade, with an average international roughness index (IRI) value of 8.5. This resulted in low speeds, long delivery times, and hazardous road conditions, thus negatively impacting trade. The improvement of the road has contributed to increased regional trade and thus to regional economic integration and cooperation.

10. During and after implementation, the project's design was considered relevant to the government's objectives and policies, as well as to ADB's country strategy. During implementation, three main factors impacted project relevance: (i) the addition of 6 km of local roads linking the project road to At-Bashy village (para. 6); (ii) the decision by Kyrgyz Republic to proceed with the construction of the planned inspection facility using alternative financing (para 7); and (iii) weaknesses in the original project design standards, which resulted in cracks appearing on the project road (para. 13). At completion, 81 km of roads had been improved—75

⁵ Government of the Kyrgyz Republic. 2007. *Country Development Strategy (2007–2010)*. Bishkek.

⁶ ADB. 2009. *Country Operations Business Plan: Kyrgyz Republic, 2009–2011*. Manila.

⁷ ADB, Swiss Cooperation, United Kingdom's Department for International Development, United Nations Agencies, and World Bank Group. 2007. *Country Partnership Strategy: Joint Country Support Strategy, 2007-2010*. Manila.

km on the main Bishkek–Torugart corridor and the 6 km link road to At-Bashy. The project had a positive socioeconomic impact, based on the general perception of the respondents regarding the construction process, road safety, and the impact of the new road on economic activity (see Appendix 13). The design and monitoring framework showing the results is in Appendix 1.

B. Project Outputs

11. At appraisal, the project outputs were: (i) improvement of 75 km of the Bishkek–Torugart road, including a multi-channel inspections facility, and (ii) implementation of the human resource development recommendations of the transport sector master plan. The performance indicators for the human resource development component were: (i) at least 5 internships at MOTC offered by 2014 for university graduates seeking a career in transport, and (ii) at least 10 persons certified as transport professionals by 2014. Achievement of project outputs is summarized below.

12. **Physical works component.** At completion, 75 km of the Bishkek–Torugart road corridor were improved. The road section was designed and built to technical category III standard in accordance with the Kyrgyz road classification system, with 2-lanes totaling 7.0 meters width, a hard shoulder width of 2 meters on each side, and a design speed of 90 km per hour. Six kilometers of link road to At-Bashy, not envisaged at appraisal, were also completed (para. 6). The multi-channel inspections facility at the border crossing point was not achieved as part of the project, but is to be completed using alternative financing sources (para. 7).

13. During construction, the supervision consultants inspected and assessed the works to make sure that the specifications were met. The various ADB missions observed that the rehabilitated road was generally of good quality with appropriate safety and environmental protection features incorporated into project design and construction. However, during 2012–2013 winter season, when unusually low temperatures were recorded, frost heave cracking was noted. These cracks appear when water is absorbed into fill material and then freezes, resulting in cracking. A technical review was undertaken and a solution—involving use of less fine materials, increased embankment height, and improved drainage—was found for new projects, e.g. project 3 (footnote 4). For this project, additional drainage has been provided where possible and some ‘soft spots’ were removed. About half of the cracks that appeared during the winter season of 2012–2013 re-appeared during the winter of 2013–2014, and a few new cracks were observed (see Appendix 14). Since then, bitumen has been used to seal the cracks after snow melt. The cracks tend to disappear as the weather warms. Following each winter, cracks must be sealed with bitumen in order to ensure that further widening of the cracks is minimized.

14. **Nonphysical component.** The internship program envisaged at appraisal was successfully completed in 2012 by Kyrgyz State University of Construction and Architecture. The main purpose of the internship program was to impart knowledge and skills to students through a combination of theoretical studies and practical training. The training and internship program, which consisted of 12 days of desk-based lectures, fieldwork, and practical and laboratory classes, covered: project planning; engineering design; construction; and supervision. Eight students participated in the program, the content of which is summarized in Appendix 8. Three of the students who completed the course were subsequently hired by MOTC. Extensive training has been provided to MOTC staff, with funding from a variety of sources; however, the certification of transportation professionals was not achieved.

C. Project Costs

15. At appraisal, the total project cost was estimated at \$62.50 million including taxes, duties, and charges. Upon completion, the actual total cost was \$61.13 million, which is about 2% lower than estimated. The total cost for the road improvement civil works increased from \$42.50 million to \$58.35 million, primarily because of price adjustments to the civil works contract and the inclusion of At-Bashy road (at a cost of \$3.08 million). The total expenditure on consulting services was \$2.38 million. While \$0.50 million was allocated for the capacity development component, only about \$0.01 million of this was spent. A comparison of the actual project costs and the financing plan is in Appendix 2.

16. Under the financing plan, the project was to be financed by an ADB grant of \$22.00 million (35.2% of the total project cost), an ADB loan of \$28.00 million (44.8%), and government funds of \$12.50 million (20%). At completion, ADB had disbursed \$21.99 million of the grant amount and \$27.81 million of the loan amount; the funds were used mostly for road improvement and consulting services. The government contributed \$11.33 million for the financing of road improvement, associated consulting services, and all taxes and duties. The actual project financing was 36% from the ADB grant, 45% from the ADB loan, and 19% from government funds.

17. The main reasons for differences between cost estimates at appraisal and actual outcomes were: (i) the change in scope to include rehabilitation of 6 km of the At-Bashy road, (ii) the exclusion of the customs inspection facility, (iii) some change in works such as additional drainage, and (iv) lower than expected costs for the capacity development component.

D. Disbursements

18. Two separate imprest accounts were established for the grant and the loan, and managed by the Investment Projects Implementation Group (IPIG) in MOTC. The initial advance to the imprest accounts was deposited in May 2010. The imprest account was used mostly for project implementation unit (PIU) operating expenses, audits, training, and PIU salaries. The statement of expenditures procedure was used for liquidation and replenishment of eligible expenditures. For civil works contracts and consulting services, the direct payment procedure was applied.

19. The disbursement schedule was based on completion of civil works by the end of 2012, with disbursements during 2010–2012. However, the delay in recruitment of the supervision consultant and main contractor resulted in the loss of most of the 2010 construction season (para. 21), and therefore construction works on the Bishkek–Torugart road were completed only by the end of construction season 2013, about 9 months later than scheduled in the project administration memorandum. Disbursements were therefore slower than anticipated at appraisal, peaking in 2012 and continuing until final disbursement in Q1, 2015. The actual disbursement profile is shown in Appendix 4.

E. Project Schedule

20. The financing agreement was signed on 5 August 2009 and the project became effective on 30 October 2009. At appraisal, the supervision contract was to be signed in January 2010 and advanced contracting for construction was to be completed in December 2009. Civil works were to be implemented between April 2010 and December 2012, with the defects liability

period running until December 2013; and the grant and loan closing date was scheduled for 30 June 2014.

21. However, the supervision contract was signed on 19 July 2010, about 6 months behind schedule—due in part to a change in government—and the civil works contract on 3 May 2010. As temperature and weather conditions generally limit the construction season to between April/May and October, the late mobilization of the supervision consultant (August 2010) and main contractor resulted in little physical progress being reported for 2010, with activities mainly limited to routine preparatory works such as setting up camp and grubbing.

22. The pace of civil works activity picked up in 2011, and by the end of 2013 all major civil works on the main road (km 365–400 and km 439–479) had been completed. Due to the late change in scope to allow for construction of 6 km of the At-Bashy link road (para. 6), and some delays in works at At-Bashy due to on-site issues (para. 36), further time was required to complete these additional civil works. ADB therefore extended the grant and loan closing date by 5 months to 30 November 2014. The project was financially closed on 1 March 2015.

23. A contract for an internship program was awarded to Kyrgyz State University of Construction and Architecture and was implemented on schedule from May to November 2012. The human resource development component is discussed in further detail in Appendix 8.

24. A comparison of the project schedule at appraisal and actual is in Appendix 5. The chronology of major events is in Appendix 6.

F. Implementation Arrangements

25. MOTC was the executing agency for the project, with the MOTC's PIU the implementing agency for both the physical and nonphysical components. In 2010, the PIU was renamed the 'Investment Projects Implementation Group' (IPIG). IPIG was headed by an experienced director and provided adequate expertise in key aspects of project development and implementation, including planning, civil engineering, procurement, contract management, and social and environmental safeguards. IPIG provided efficient support in project implementation and supervision and helped to ensure project completion.

26. Appendix 15 shows the institutional framework for project implementation.

G. Conditions and Covenants

27. The project implementation complied with 19 of the 20 covenants specified in the project agreements. The government established a complete institutional framework with adequate staff and consultant support. IPIG was proactive in carrying out all project implementation tasks, including procurement, financial management, quality control, and environmental compliance. The government ensured that project implementation was of good quality. The financial audit reports for the project were submitted to ADB within the agreed period in the financing agreement. IPIG closely monitored project progress and regularly submitted the required progress reports.

28. One covenant was partly complied with: counterpart funds were not always provided in a timely manner, although this issue was rectified during the later stages of project implementation and did not substantially impact project delivery. In addition, a loan covenant relating to the allocation of sufficient funds for maintenance of the project road will need to be

monitored on an ongoing basis. Current maintenance needs are minimal and the project road is in good condition, as confirmed during the project completion report (PCR) review mission, but Kyrgyz Republic has not historically allocated sufficient funds to cover maintenance needs for the entire road network. The status of compliance with major loan and grant covenants is in Appendix 3.

H. Consultant Recruitment and Procurement

29. Consulting services were to be carried out over a period of about 48 months with total inputs of 406 person-months, comprising 32 person-months of international consulting services and 374 person-months of national consulting services. Upon completion, 470 person-months of consulting services were provided, comprising 47 person-months of international consulting services and 420 person-months of national consulting services. These services were delivered over 52 months from August 2010 to November 2014.

30. An international consulting firm—TERA International Group Inc.—was recruited on 19 July 2010 following the quality- and cost-based selection method in accordance with ADB's Guidelines on the Use of Consultants to provide construction supervision services. There were no major disagreements between MOTC and ADB on consultant selection, although a number of minor contractual issues were clarified prior to the signing of the contract (e.g., contract duration).

31. The civil works contract for the road improvement component, covering km 365-400 and km 439-479—was procured using international competitive bidding. Procurement activities began on 1 September 2009 and closed on 5 November 2009. The civil works contract was awarded to China Roads and Bridges Corporation (CRBC), on 3 May 2010, for a total contract amount of \$46.1 million (with 46% of the contract amount charged against Loan 2533, and 37% charged against Grant 0153). There were no significant problems encountered in packaging contracts, preparing tender documents, and evaluating bids. Details of contract packages financed by ADB are in Appendix 9.

I. Performance of Consultants and Contractors

32. **Consultants for construction supervision, monitoring, and evaluation.** The overall performance of the supervision consultants, TERA International Group, engaged to undertake construction supervision and social and environmental monitoring and evaluation, was *satisfactory*. TERA provided efficient supervision and coordination between IPIG and the contractor, despite challenges associated with working at high altitude (para. 35).

33. During project implementation, frost heave cracking was noticed on the project road and on the adjacent road (para. 13). This cracking was due to design standards that failed to adequately account for specific site factors (e.g., elevation, presence of frozen soil, temperature variations) and materials supply conditions. The supervision consultant hired an international expert, who examined the causes of pavement cracking and provided a list of remedial measures to address the issue (Appendix 14).

34. **Civil works contractor.** The performance of the main civil works contractor, CRBC, was *satisfactory*. CRBC completed the civil works in accordance with the design and specifications, mobilized the required staff and equipment, established a camp for accommodating its staff, set up laboratories and other engineering facilities, provided safety helmets and vests to its

workers, and installed road signage during the work as agreed with the local traffic management authority.

35. The project road is at an elevation of 2,000–3,000 meters above sea level. Physical challenges arising from working at such high altitudes include lower oxygen levels, increased levels of sunburn, frigid temperatures, high winds, as well as the risk of altitude related sickness. Despite these challenges, the physical works were successfully completed.

36. The emergence of cracks on the project road was due to issues with the Kyrgyz design standard and was not related to construction quality. During implementation, some slight issues arose on site (e.g., dust contamination and the need to fully restore borrow pits), but these were swiftly resolved. There were some disputes between At-Bashy residents and CRBC, which resulted in minor delays to the schedule and required an extension of the grant and loan closing period. The need for extension was partly a result of the poor performance of the local subcontractor who was initially contracted to undertake the civil works in At-Bashy. However, the main contractor subsequently took over responsibility for the works and completed the road to a good standard.

J. Performance of the Borrower and the Executing Agency

37. The performance of the borrower (Kyrgyz Republic) and the executing agency (MOTC) was *satisfactory*. Kyrgyz Republic and MOTC have considerable experience from other ADB road projects, and performed their respective roles appropriately during original project design, procurement, and implementation. There were some delays in the initial stage of project implementation, and delays with payment of counterpart funds, but these issues were addressed during the final stages of project implementation.

38. At appraisal, an adequate organizational framework was established for efficient project management. MOTC exercised efficient coordination and monitoring of project implementation. The IPIG was responsible for day-to-day project management and, with assistance from supervision consultants, prepared monthly and quarterly progress reports. The project accounts and financial statements were audited by an external audit firm, and the audit reports were submitted to ADB as required by the financing agreement. MOTC and IPIG provided strong support to all ADB's review missions.

39. Prior to the original project closing date of 30 June 2014, IPIG initially advised ADB that no extension of the loan and grant closing date would be needed. However, due to some remaining minor works at At-Bashy, ADB eventually had to extend the loan and grant closing date to 30 November 2014. IPIG acknowledged its oversight for the belated request to extend the grant and loan closing date.

K. Performance of the Asian Development Bank

40. Overall, the performance of ADB was *satisfactory*. The project was administered and supervised from ADB headquarters with assistance from the ADB resident mission in Bishkek. During implementation, ADB provided substantial guidance and support to MOTC on all aspects of project implementation. ADB fielded a total of 19 missions to assist with project development and implementation: (i) 1 fact finding mission; (ii) 1 inception mission; (iii) 12 review missions; (iv) 2 special project administration missions; (v) 1 country environmental safeguards review mission, (vi) 1 country social safeguards review mission, and (vi) 1 PCR mission.

41. The ADB safeguards team worked closely with the project team in identifying and resolving safeguard-related issues. When disputes between the contractor and At-Bashy residents delayed the finalization of the civil works at At-Bashy (para. 36), the ADB mission arranged a meeting between the main contractor and local residents and intervened to resolve the dispute between the parties. The ADB PCR mission confirmed that assistance given by ADB to IPIG on project implementation and technical issues was well appreciated by the government.

III. EVALUATION OF PERFORMANCE

A. Relevance

42. The project is rated *relevant*. The project was in line with the government's transport policy, as set out in the Road Sector Development Strategy for 2007–2010 (footnote 2) and the government's Country Development Strategy for 2007–2010 (footnote 6), which listed the Bishkek to Torugart road as one of eight key road corridors for development to improve access to regional and local markets. The completion of the Bishkek–Torugart corridor has also contributed to poverty reduction and enhancement of living standards, which is a central aim of the Country Development Strategy, with poverty levels in affected areas dropping sharply during the implementation period (see Appendix 1). The project was also in line with the ADB country operations business plan (footnote 7) and the country partnership strategy (footnote 8). The completion of the project has strengthened ties between the Kyrgyz Republic and the PRC, and promoted cross-border trade. When the final ADB section opens in 2017, the entire road corridor linking Bishkek to the border with the PRC will have been improved to an appropriate standard. The project has supported regional trade and economic integration by improving a key section of CAREC corridor 1.

43. The relevance of the project was strengthened by the addition of 6 km of local roads linking the project road to At-Bashy. This was in line with a key transport sector level output in the country partnership strategy (footnote 8), namely improved transport infrastructure that provides better access to local and regional markets. The addition of an improved link to At-Bashy was also in line with the government's Country Development Strategy for 2007–2010, which had as an objective that the “basic network of roads should meet higher working standards to minimize transportation costs for goods and services producers to ensure access to regional and local markets of goods and services, labor and social services.”⁸

44. The relevance of the project was, however, slightly reduced by some weaknesses in the design standards used, which led to the emergence of cracking on the project road, and the decision of the Kyrgyz government to implement the inspection facility using alternative financing sources.

B. Effectiveness in Achieving Outcome

45. On balance, the project was *effective* in achieving its aim of higher accessibility and mobility. The outcome indicators refer to travel times, traffic volumes, accessibility, time at inspection points, and value of performance-based maintenance contracts. In coming up with a final rating, a higher weight was given to the two main indicators: travel times and traffic volumes.

⁸ Page 41. Government of the Kyrgyz Republic. 2007. *Country Development Strategy (2007–2010)*. Bishkek.

46. On travel times, the outcome indicator in the design and monitoring framework refers to reductions in travel time between Naryn and Torugart from 5 to 4 hours by 2015. Based on data included in the MOTC's project completion report, the travel time in 2014 was between 2.5 and 3 hours.⁹ This indicator has therefore been achieved.

47. At appraisal, the indicator on traffic volumes was for average daily traffic originating from Naryn oblast (province) to increase from 700 to 1,000 vehicles by 2015. During implementation, this indicator was changed to average daily traffic from Naryn oblast increasing by 50% by 2015. At completion, the traffic on the project road (at Km 380) had increased from an average of 299 vehicles per day in 2008 to 968 per day in 2013, and is forecast to increase to 1,140 vehicles in 2015 (see Appendix 10). Therefore this indicator is deemed to have been achieved. A third outcome indicator—improved accessibility for 2.3 million people—was also achieved, based on the population in the oblasts through which the Bishkek to Torugart road corridor travels.

48. Two outcome indicators were not achieved on time. The indicator relating to average time spent at inspection points was not achieved as the facility was not completed as part of the project, though it is to be built using alternative sources of funding. The performance-based maintenance contracts were not awarded by 2013; however, they are to be awarded as part of the Bishkek–Osh road project currently under implementation.¹⁰

C. Efficiency in Achieving Outcome and Outputs

49. The project is rated *efficient* in achieving its intended outcome and outputs. The rating is based primarily on the results of the economic analysis that was carried out at appraisal.

50. **Traffic forecast.** Traffic flows on the project road at km 380 have more than tripled during 2008–2013 (para. 47). However, traffic growth forecasts at completion have been revised on the basis of updated economic growth projections, and are now lower than those at appraisal. In 2032, 3,697 vehicles per day are forecast to travel on the project road.

51. **Economic reevaluation.** The main civil works (75 km of Bishkek to Torugart road) were completed by the end of 2013 and, overall, the project came in slightly under budget—\$61.13 million as opposed to an estimate of \$62.50 million. At completion, an economic reevaluation was undertaken in compliance with relevant ADB guidelines.¹¹ The economic reevaluation was based on (i) final investment costs; (ii) revised demand forecasts; and (iii) inclusion of At-Bashy road. The economic internal rate of return estimated at reevaluation was 12.9%, marginally higher than that at appraisal (12.8%).¹² The revised economic analysis reflects higher traffic volumes than originally forecast but also lower traffic growth rates over the appraisal period. Further details on the economic reevaluation are contained in Appendix 10.

⁹ Ministry of Transport and Communications. Kyrgyz Republic. *Project Completion Report. CAREC Transport Corridor -1 (Bishkek – Naryn – Torugart Road) Project 2*. Unpublished.

¹⁰ ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant, Kyrgyz Republic: Central Asia Regional Economic Corridor 3 (Bishkek–Osh Road) Improvement Project, Phase 4*. Manila.

¹¹ ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

¹² The economic analysis undertaken at appraisal was a corridor analysis, which looked at the impact of the completion of the entire Bishkek to Torugart road corridor.

D. Preliminary Assessment of Sustainability

52. The project is considered *less than likely sustainable*. Apart from the emergence of frost heave cracks, which arose due to design standards that failed to adequately account for specific site factors, the project road is otherwise well designed and constructed. Following completion of the defects liability period, the project will now be maintained by local maintenance units operating under the MOTC. Road maintenance, including basic road cleaning, checking asphalt sealing, clearing road shoulders, and clearing snow in winter, is needed to maintain the road in good condition and to prevent the emergence of further cracking. Annual government allocations to road maintenance have increased over the past decade. However, the budget allocated for maintenance is believed to be insufficient to fully cover needs, though maintenance of important corridors is generally prioritized. Despite increased budget allocation (as measured in Som) for maintenance, due to the recent devaluation of the Som, the budget has actually decreased in US dollar terms since 2013 (Appendix 7). The government has pledged that adequate funds for maintenance will be provided for the main corridors in the country. However, this issue will require continuous monitoring.

53. Although an internship training program was conducted as part of the project in 2012 and succeeded in providing much needed technical training to university students, that specific program has not been continued. In order to enhance, and ensure the sustainability of, planning and construction capacity within MOTC, internship programs should be undertaken at regular intervals (e.g., every 1-2 years).

E. Impact

54. The impact of the project is rated *significant*.

55. **Economic development and trade.** The project forms a part of the modernization of the entire Bishkek to Torugart corridor, which is scheduled to be completed by the end of 2017. The project aimed to increase regional trade in Naryn oblast. The freight movement between the PRC and Kyrgyz Republic through Torugart in 2012 was 434,900 tons, which is larger than the performance target of 400,000 tons by 2015.¹³

56. **Socioeconomic and poverty impacts.** The project has contributed to poverty reduction and increased economic activity within the At-Bashy district. According to official data, the rate of extreme poverty in Naryn oblast declined from 12.8% in 2007 to 4.9% in 2013. The project has provided the local population with better access to markets, educational facilities, and local services (e.g., hospitals). The project has also assisted in improving connectivity to the PRC, thereby lowering the cost of trade and stimulating economic activity.

57. In order to better understand the impact that the project has had on the local population and trade, the PCR mission undertook a rapid appraisal of the social impact of the project for the residents of At-Bashy (Appendix 13). A total of 52 individual interviews (with 26 men and 26 women) were held with members of various groups, including At-Bashy youth and local entrepreneurs. Respondents expected a positive impact on local economic activity post construction, with lower transport costs benefiting local shops and industry. Although the majority of the population considers that the project will enhance road safety, some respondents expressed concern at the higher speeds enabled by the new road. Additional issues raised by

¹³ ADB. 2014. *Operationalizing Economic Corridors in Central Asia: A Case Study of the Almaty-Bishkek Corridor*. Manila.

respondents include the need to (i) conduct wider initial public consultations, (ii) address the cracking on the main road (para. 13), (iii) improve drainage design (as some cattle had fallen into the open drains and were killed or injured), and (iv) ensure that goods vehicles using the project road are not overloaded, so as to prevent premature deterioration of new pavement.

58. **Social safeguards impact.** At appraisal, the project was category C for involuntary resettlement. As the project involved improvement of the existing road and as the main road did not traverse any settlements, there were no affected persons or structures. There was also no land acquisition or resettlement needed at At-Bashy. The project had no impact on indigenous peoples and was therefore classified as category C.

59. **Environmental impact.** At appraisal, the project was classified as category B in terms of environmental impact. The initial environmental examination prepared by the government indicated that if the prescribed management and mitigation measures were implemented, the project would be unlikely to have substantial adverse environmental impact. The initial environmental examination provided for adequate environmental mitigation measures and an environmental monitoring program. Noise, vibration, dust, and air quality were regularly monitored and results reported in monthly progress reports and biannual environmental monitoring reports. Regular inspection of construction sites and workers' camps were carried out to ensure minimal environmental impact. Safety training was provided to construction workers. During implementation, key issues raised included dust suppression during construction, the need to ensure that camps were kept clean, and the need for borrow pits to be fully restored after use. These issues were resolved through cooperation between the contractor, supervision consultant, and PIU.

60. Corrective measures were taken for full restoration of the side drainage works, as requested by the ADB mission. All other reinstatement work has been completed for other project sites (e.g., borrow pits and workers' camps) except for one remaining asphalt plant, which is scheduled to be removed by end of October 2015. A post construction environmental audit is expected by end of October 2015.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

61. Overall, the project is rated *successful* (Appendix 12). The project formulation and design were relevant to the government's objectives and ADB's country partnership strategy. The main physical output (75 km of the Bishkek–Naryn–Torugart road) was successfully completed, and an additional 6 km link to At-Bashy was also delivered. In addition, the government of the Kyrgyz Republic advised ADB that commitment to fund the customs facility has been secured from the PRC government. The completion of the training and internship component provided valuable training to students starting their careers in the transport sector. The completion of the project roads has reduced poverty and supported economic development (particularly in At-Bashy village) and increased trade between the Kyrgyz Republic and neighboring countries.

B. Lessons

62. **Addition of At-Bashy road.** The final approval for constructing the At-Bashy access road was not provided until May 2013. The late addition of this component was part of the reason that the grant and loan closing date needed to be extended. Additional works of this

magnitude should be identified, appraised, and approved at an earlier project stage to ensure completion of all works within the allotted period.

63. **Communication.** During construction of At-Bashy road, some disputes arose between the contractor and the local population, causing late completion of minor but essential works e.g. sidewalks and drainage. Information on these incidents was not promptly reported to all parties concerned. Not being fully aware of the situation, IPIG initially advised ADB that there was no need to extend the loan and grant closing period. However, when the extent of remaining works to be completed became apparent, an extension was provided. This issue was swiftly resolved. It is important to ensure proper communication between contractors, consultants project implementation unit and, ADB by fielding an ADB mission to help dispute resolution. It is also vital to field ADB missions to coincide with the completion of physical works, to enable the mission to verify completeness of such works and assist in determining whether loan and/or grant extensions are needed.

64. **Inspection facility.** Construction on the proposed facility has not yet started. The inspection facility is planned to be delivered using alternative financing sources (para. 7). Cross-border facilities such as this require both expert inputs from, and coordination between, various government agencies. This can be difficult to achieve in a timely manner. In addition, specialist skills are needed for designing and implementing such projects.

65. **Frost heave cracking.** The combination of high altitude, low temperatures during winter and frozen ground beneath the project road resulted in the appearance of frost heave cracks. Cracks have been filled in with bitumen but will reappear after each winter. The cracking issue needs to be monitored on an ongoing basis with cracks filled in as they appear. To minimize risk of further cracking, snow needs to be removed entirely from the roadbed and not merely left on shoulders, and weight limits for goods vehicles need to be strictly enforced to ensure undue stress is not placed on the project road.

66. **Maintenance.** In order to sustain project benefits it is critical that the project road is appropriately maintained. The frost heave cracking issue needs to be monitored by MOTC on an annual basis and, in order to prevent further widening, cracks must be filled as they appear. Whilst maintenance budgets have increased, MOTC needs to allocate further resources to protect the substantial investment in road infrastructure that has occurred on this road corridor over the last decade.

67. **Capacity development component.** Originally a total of \$0.5 million was allocated to the capacity development component, but only \$0.01 million was actually spent. Additional attention could have been given at appraisal to properly identify and cost each part of the capacity development component.

68. **Consultation.** There is a need to ensure an appropriate level of public consultation during project development to enable the local population to have an input into project design and ensure greater 'buy-in', which would likely result in fewer disputes between the contractor and local population.

69. **Road Safety.** Despite the safety features (e.g., barriers) built into the project, the increased speeds resulting from the new road will likely have an impact on both the frequency and severity of road traffic collisions. Collisions on the project road will need to be monitored carefully by MOTC during 2015–2020 in coordination with the police force and, if and when

collisions start to occur, timely and appropriate remedial engineering measures may need to be put in place to counteract any increased risk.

C. Recommendations

1. Project Related

70. **Design standards.** The detailed design of road projects should consider all relevant project-specific factors (e.g., altitude, temperature and ground conditions). It is recommended that the Kyrgyz Republic's road design standards be reviewed and updated by 2018. In particular it is important that both an appropriate standard for roads over frozen ground at high altitudes, and a requirement for road safety audits, are introduced.

71. **Timing of the project performance evaluation report.** Given that the full rehabilitation of the Bishkek–Torugart road will be completed by end-2017, it is recommended that the project performance evaluation report be prepared in 2018.

2. General

72. **Strategic planning.** Improved strategic planning would be beneficial and would assist in determining an appropriate balance between investing in new roads and maintaining existing stock of roads. MOTC needs to develop and maintain tools that would enable it to allocate scarce resources in an efficient manner (e.g., road asset management systems). The roads sector needs broader institutional reforms in the road maintenance system to make it more effective, efficient, resilient and attractive for private participation.

73. **Training.** An internship program was held for new university graduates in 2012 and provided invaluable training and experience to students looking for a career in the road sector. Three of those who completed the program were subsequently employed by MOTC. To ensure that MOTC maintains a core team of experienced competent professionals, consideration should be given to holding such internship programs on a regular basis (e.g., every 1–2 years), funding for which could be provided by ADB and other development partners.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Indicators/Targets	Data Sources and/or Reporting Mechanisms	Status at Completion
<p>Impact Increased regional trade and reduced poverty in Naryn oblast</p>	<p>Freight movement between the PRC and the Kyrgyz Republic through Torugart increased from 300,000 tons in 2008 to 400,000 tons by 2015</p> <p>The level of extreme poverty in the project impact area declined from 25% in 2007 to 20% by 2015</p>	<p>State Customs Committee data</p> <p>National Statistics survey</p>	<p>Achieved. The freight movement between the PRC and the Kyrgyz Republic through Torugart in 2012 was 434,900 tons.^a</p> <p>Achieved. The level of extreme poverty (based on consumption) in Naryn oblast declined from 12.8% in 2007 to 4.9% in 2013.^b</p>
<p>Outcome Higher accessibility and mobility</p>	<p>Travel time from Naryn to Torugart is reduced from 5 to 4 hours by 2015</p> <p>Average daily traffic from Naryn oblast increased by 50% by 2015^d</p> <p>Average time at inspection point at Torugart reduced from 30 minutes per vehicle in 2009 to 15 minutes in 2013</p> <p>Performance-based maintenance contracts value increased to at least \$100,000 by 2013 through the help of certified transportation professionals</p> <p>2.3 million people's accessibility will be improved</p>	<p>Traffic and origin–destination surveys of MOTC</p> <p>Government statistics</p> <p>Government statistics</p> <p>ADB review missions and MOTC's progress reports</p>	<p>Achieved. Travel time from Naryn to Torugart was reduced to 2.5-3 hours in 2014.^c</p> <p>Achieved. Traffic on the project road increased from 299 vehicles per day in 2008 to 968 vehicles per day in 2013, which is an increase of 233%.^e</p> <p>Not achieved. Time to clear border and customs at Torugart is on average 3 hours in September 2013.^f</p> <p>Not achieved. Performance-based maintenance contracts have not yet been implemented.</p> <p>Achieved. 2.5 million people's accessibility improved^g</p>
<p>Outputs 1. Improved pavement in 75 km of 2-lane road (km 365 to 400 and km 439 to 479) to Category III standards, and improved bridges and inspections facility (border control).</p>	<p>Pavement roughness index is 3 or less by 2014</p>	<p>Contractor progress reports, field visits, and project completion report</p>	<p>Achieved. Pavement and bridges improved along 75km of 2-lane road with international roughness index of 2.0 in June 2015</p> <p>Not achieved. Inspections facility at border control not completed</p>

Design Summary	Performance Indicators/Targets	Data Sources and/or Reporting Mechanisms	Status at Completion
2. Improved pavement in 6 km of 2-lane At-Bashy Road (km 4.2 to km 10.2)	Pavement roughness index is 3 or less by 2014	MOTC's progress reports	Achieved. Pavement improved along 6km of 2-lane At-Bashy Road with international roughness index of 2.0 in June 2015. ^h
3. A development program for road sector professionals implemented according to the human resource development component of the transport sector master plan	At least 5 internship positions at MOTC offered by 2014 for university graduates seeking a career in transport At least 10 persons certified as transport professionals by 2014	MOTC's progress reports	Achieved. By 2014, MOTC offered 8 internship positions for university graduates. 3 interns were subsequently employed by MOTC. ⁱ Not achieved. There were no persons formally certified as transport professionals under the project.
Activities with Milestones		Inputs at Appraisal	Actual Inputs
1. Civil works implemented 1.1 Rehabilitation works on km 365-400 (35km) and km 439-479(40km) done, Q3 2014 1.2 Rehabilitation works on km 4.2-10.2 (6km) of At-Bashy feeder road done, Q3 2014 2. Nonphysical component 2.1 Development program for road sector professionals provided, Q3 2012		<ul style="list-style-type: none"> • ADB grant: \$22.00 million • ADB loan: \$ 28.00 million • Government: \$ 12.50 million Total: \$62.5 million.	<ul style="list-style-type: none"> • ADB grant: \$22.00 million • ADB loan: \$27.79 million • Government: \$11.34 million Total: \$61.13 million.

ADB = Asian Development Bank, km = kilometer, MOTC = Ministry of Transport and Communications, PRC=People's Republic of China.

^a CAREC. 2014. *Operationalizing economic corridors in central Asia: A case study of the Almaty-Bishkek Corridor*. Manila. See table 1, page 11.

^b According to the data from National Statistics survey on oblast level as of June 2015, the extreme poverty rate of 25% in 2007, which has been set as a baseline of the performance indicator, was not confirmed. Note that the level of extreme poverty (based on welfare payments) in At-Bashy rayon (district) decreased from 61.9% in 2007 to 47.8% in 2014, according to the data on welfare payments of the Department of Social Development of At-Bashy rayon (low-income population, I-III categories).

^c Ministry of Transport and Communications. Kyrgyz Republic. *Project Completion Report. CAREC Transport Corridor -1 (Bishkek – Naryn – Torugart Road) Project 2*. Unpublished. Page 20.

^d The original DMF indicator in the Report and Recommendation to the President was 'average daily traffic from Naryn oblast will increase from 700 to 1,000 by 2015'. This was revised to "average daily traffic from Naryn Oblast increasing by 50% by 2015". Naryn oblast is the largest region in Kyrgyz Republic covering an area of 45,200 square kilometers with an estimated population of 250,000. As collecting traffic data from all of Naryn oblast would require extensive and costly surveys, the number of vehicles on the project road was used as a proxy.

^e Ministry of Transport and Communications. Kyrgyz Republic. *Project Completion Report. CAREC Transport Corridor -1 (Bishkek – Naryn – Torugart Road) Project 2*. Unpublished. Page 36.

^f CAREC. 2014. *Operationalizing economic corridors in central Asia: A case study of the Almaty–Bishkek Corridor*. Manila. See table 2, page 13.

^g This indicator refers to the population in four oblasts impacted by the project: Bishkek (0.94 million); Chuy (0.87 million); Naryn (0.26 million); and Issyk Kul (0.46 million).

^h Ministry of Transport and Communications. Kyrgyz Republic. *Project Completion Report. CAREC Transport Corridor -1 (Bishkek – Naryn – Torugart Road) Project 2*. Unpublished. Page 21.

ⁱ The number of internship participants who work for MOTC as of June 2015.

PROJECT COST AND FINANCING PLAN
(Loan No. 2533-KGZ(SF) and Grant No. 0153-KGZ(SF))
Table A2.1: Total Project Cost
(\$ million)

Item	Appraisal Estimate			Actual Cost		
	ADB	Government	Total	ADB	Government	Total
A. Base Costs^a						
1. Physical Component						
a. Civil Works						
Km 365–400; Km 439-479; At-Bashy road ^b						
G0153-KGZ(SF)	18.00	0.00	18.00	21.02	5.00	26.02
L2533-KGZ(SF)	22.00	2.50	24.50	26.21	6.12	32.33
Subtotal Civil Works	40.00	2.50	42.50	47.23	11.12	58.35
b. Consulting Services						
i. Construction Supervision	2.00	0.10	2.10			
G0153-KGZ(SF)				0.80	0.01	0.80
L2533-KGZ(SF)				0.98	0.01	0.98
ii. Project Management ^c	0.50	0.10	0.60			
G0153-KGZ(SF)				0.17	0.00	0.18
L2533-KGZ(SF)				0.21	0.00	0.22
Subtotal Consulting Services	2.50	0.20	2.70	2.16	0.02	2.18
Subtotal Physical Component	42.50	2.70	45.20	49.39	11.14	60.53
2. Nonphysical Component						
Consulting Services(Project Management) ^d	0.50	0.00	0.50			
G0153-KGZ(SF)				0.00	0.00	0.00
L2533-KGZ(SF)				0.01	0.00	0.01
Subtotal Nonphysical Component	0.50	0.00	0.50	0.01	0.00	0.01
3. Taxes and Duties^e	0.00	6.00	6.00	0.00	0.19	0.19
Total Base Cost(A)	43.00	6.00	51.50	49.40	11.33	60.73
B. Contingencies						
1. Physical Contingency ^f	4.00	2.00	6.00	0.00	0.00	0.00
2. Price Contingency ^g	2.00	2.00	4.00	0.00	0.00	0.00
Total Contingencies (B)	6.00	4.00	10.00	0.00	0.00	0.00
C. Financial Charges During Construction^h						
L2533-KGZ(SF)	1.00	0.00	1.00	0.40	0.00	0.40
Total Project Cost (A+B+C)	50.00	12.50	62.50	49.80	11.33	61.13

ADB = Asian Development Bank, km = kilometer.

Source: Asian Development Bank and Ministry of Transport and Communications project implementation unit.

^a In mid-2008 prices.

^b Approved as minor change in scope in May 2013. Extension of civil works and construction supervision consultant contracts for At-Bashy road are included in the Actual Cost.

^c Contract administration and project implementation costs.

^d Transport master plan implementation support to the Ministry of Transport and Communications.

^e Value-added tax for all civil works and associated consulting services and import duties on materials and equipment.

^f Assumed to be approximately 12% of total base cost.

^g Assumed to be approximately 0.8% of foreign exchange costs and 12% of local currency costs; includes provision for potential exchange rate fluctuation under assumption of a purchasing power parity exchange rate.

^h Financing charges on the ADB loan.

Table A2.2: Project Financing
(\$ million)

Source	At Appraisal		Actual^a	
	Amount	%	Amount	%
ADB grant (Grant 0153)	22.00	35.0	21.99	36.0
ADB loan (Loan 2533)	28.00	45.0	27.81	45.0
Government	12.50	20.0	11.33	19.0
Total	62.50	100.0	61.13	100.0

^a Actual includes rehabilitation of At-Bashy road.

Source: Asian Development Bank and Ministry of Transport and Communications project implementation unit.

STATUS OF COMPLIANCE WITH LOAN AND GRANT COVENANTS

LOAN/GRANT COVENANTS COMPLIANCE LOAN 2533/GRANT 0153-KGZ(SF) (PROJECT 2)

Covenant	Reference to Financing Agreement	Status of Compliance
The Beneficiary shall (i) maintain separate accounts for the Project, including separate accounts for the Loan and the Grant; (ii) have such accounts and related financial statements audited annually by independent auditors acceptable to ADB; (iii) furnish to ADB not later than 6 months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors, including the auditor's opinion on the use of the Loan and Grant proceeds and compliance with financial covenants of the Financing Agreement, as well as the on the use of the imprest accounts and statement of expenditures procedures; and (iv) furnish to ADB such other information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.	Section 4.02 (a)	(i) Complied. Separate accounts were set up in 2009 and maintained until project closing. (ii), (iii), & (iv) were complied with. Auditors were engaged following ADB procedures. The first audited financial statement for FY 2009 and 2010 (combined) was submitted and approved by ADB. Thereafter, audit reports for succeeding fiscal years were submitted timely and regularly, until the last audit report for FY 2014.
The Beneficiary shall enable ADB to discuss the financial statements for the Project and its financial affairs related to the Project, with the auditors appointed by the Beneficiary, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB.	Section 4.02 (b)	Complied.
The Beneficiary shall enable ADB's representatives to inspect the Project, the Goods financed out of the proceeds of the Loan and/or the Grant, and any relevant records and documents.	Section 4.03	Complied. Twelve review missions were conducted where field visits were undertaken to inspect the project. In each of the missions, EA account records were reconciled with ADB's records.
Implementation Arrangements The MOTC shall have the overall responsibility for the implementation of the Project.	Schedule 5, para. 1	Complied. MOTC served as the focal point for communication with ADB on all project-related matters. The Investment Projects Implementation Group (IPIG) under the MOTC served as the PIU for all components of the

Covenant	Reference to Financing Agreement	Status of Compliance
		project (except for the customs facility improvement component).
The PIU shall be responsible for managing day-to-day activities of the Project including (a) monitoring the progress of project implementation, (b) preparing withdrawal applications and project progress reports, (c) maintaining project accounts and other financial records for auditing the project, and (d) carrying out procurement. The Beneficiary shall ensure that 3 months before implementation of the first works contract, the capacity of the PIU is strengthened by increasing and recruiting adequate number of staff with specialization in the areas required for the project.	Schedule 5, para. 2	Complied. PIU staff (headed by a project director appointed by MOTC) with expertise in engineering, procurement, financial management, safeguards, and administration was recruited. Key PIU staff (7 individual consultants) were on board one month before the first civil works contract was implemented.
The Beneficiary shall ensure that (a) all staff involved in implementing the Project are fully aware of, and comply with, the Beneficiary's and ADB's relevant procedures, including procedures for implementation, procurement, use of consultants, disbursement, reporting, monitoring, and prevention of fraud and corruption; (b) the coordination and consultation between MOTC and other government agencies concerned during Project implementation are timely and effectively carried out; and (c) stringent oversight is maintained on all the consultants and contractors engaged under the Project so as to cause that the services and Works carried out under the relevant contracts conform to the standards and specifications required by the Project, and are of high quality.	Schedule 5, para. 3	Complied. All staff involved in project implementation was briefed about the relevant procedures during the project inception mission in November 2009. These procedures were reflected in the PAM. Procurement documents were thoroughly reviewed to ensure compliance with relevant procurement and consulting services guidelines.
Project Monitoring, Review and Evaluation The Beneficiary within 3 months from the Effective Date shall cause MOTC to establish and maintain a PPMS acceptable to ADB, based upon the PPMS indicators agreed upon between the Beneficiary and ADB. The Beneficiary, through MOTC, shall (a) monitor the PPMS indicators on a quarterly basis to determine the efficiency and effectiveness of the Project and its impacts, and (b) provide to ADB quarterly PPMS monitoring reports from the commencement of Project implementation until Project completion and on the third anniversary of Project completion.	Schedule 5, para. 4	Complied. MOTC was able to establish PPMS. Quarterly and monthly progress reports were submitted regularly until project completion. PPMS report for the third anniversary of project completion is due in October 2017.

Covenant	Reference to Financing Agreement	Status of Compliance
<p>The performance of the Project shall be reviewed at least once every year from the Effective Date. Such review shall be carried out jointly by the Beneficiary and ADB in consultation of MOTC, MOF and other relevant agencies as well as public and private representatives from the Project areas. Each review shall focus on the Project outputs, in particular those relating to institutional, administrative, technical, environmental, and social aspects to ensure that the Project is implemented according to relevant schedule and on budget. The Project's economic viability and other aspects that may have an impact on overall performance shall be assessed after completion of the Project, or as necessary during the implementation stage. Each review shall also examine the relevant implementation progress and compliance with the relevant covenants specified in the Financing Agreement.</p>	<p>Schedule 5, para. 5</p>	<p>Complied. A total of 12 review missions were conducted (3 in 2010, 2 in 2011, 3 in 2012, 1 in 2013, and 3 in 2014). During review missions, project site was visited to monitor project implementation progress. Safeguard issues were addressed especially during country safeguard review missions. Compliance with project covenants was regularly monitored and updated.</p>
<p>Auditing and Reporting The Beneficiary shall ensure that all entities involved in project implementation, including MOTC and the PIU, maintain separate records and accounts for the utilization of the respective proceeds of the Loan and Grant. The Beneficiary shall cause MOTC to prepare, and submit to ADB (a) within 20 days after each quarter, a quarterly report, and (b) within 30 days after each year, an annual report, each on the implementation status and progress of the project. Each of such reports shall be submitted in such form and in such details as ADB shall reasonably require.</p>	<p>Schedule 5, para. 6</p>	<p>Complied. No annual reports were submitted; however, quarterly and monthly reports were submitted to ADB. These reports reflect the required information, hence, annual reports became redundant and unnecessary. Therefore, this covenant is deemed complied. Financial audit reports requirement was also met (see Section 4.02[a] above).</p>
<p>Consultation Ensure that consultations with the residents and officials in the Project areas are regularly conducted on matters of social and cultural significance during the project implementation period.</p>	<p>Schedule 5, para. 7</p>	<p>Complied. Consultations with residents were conducted on matters of social concerns during project review missions. A grievance redress mechanism (GRM) was established to address social concerns and issues. GRM would continue functioning even after 2 years after project closing.</p>

Covenant	Reference to Financing Agreement	Status of Compliance
<p>Counterpart Funding Ensure that all funds and other resources required for implementing the Project are provided on a timely basis in accordance with the financing plan agreed for the Project.</p>	Schedule 5, para. 8	<p>Partly Complied. In some instances, counterpart funding was not timely provided, resulting to delayed payments to contractors. However, towards the end of the project implementation, this issue was addressed.</p>
<p>Services, Operation and Maintenance Ensure that (a) all relevant government entities coordinate with each other to maintain regular and quality services on the road sections under Part 1 of the project during and after rehabilitation, (b) sufficient funds for the operation and maintenance of works under part 1 of the project after their completion are allocated and made available on a timely basis, and (c) the operation and maintenance are carried out in line with applicable standards and best international practices.</p>	Schedule 5, para. 9	<p>Complied.</p> <p>a) Inter-agency coordination was maintained.</p> <p>(b) PCR mission noted project road is currently in good condition. However current maintenance requirements are minimal and the issue of allocation of sufficient budget for maintenance in future needs to be monitored on an ongoing basis.</p> <p>(c) Operation and maintenance is carried out in accordance with current standards.</p>
<p>Funding for Rehabilitation of Remaining Sections of the Bishkek-Torugart Road Ensure that funding is made available to rehabilitating the remaining sections of the Bishkek-Torugart Road to allow rapid and uninterrupted flow of international passenger and freight traffic.</p>	Schedule 5, para. 10	<p>Complied. All Bishkek-Naryn-Torugart road sections have necessary funding.</p>
<p>Illegal Trafficking and Border Control Ensure to fully implement the measures already in place to detect and prevent trafficking of humans, wildlife, endangered species, and illegal substances, and particularly on the Project road, and report to ADB any incidents and action taken to prevent such incidents.</p>	Schedule 5, para. 11	<p>Complied. Measures were in place to prevent illegal trafficking of humans, wildlife, endangered species, and controlled substances.</p>
<p>Anti-corruption The Beneficiary and any and all other government offices, organizations and entities</p>	Schedule 5, para. 12	<p>Complied. No record of any irregularities was reported during project</p>

Covenant	Reference to Financing Agreement	Status of Compliance
<p>involved in implementing the project to comply with ADB's policy relating to enhancing ADB's role in combating money laundering and the financing of terrorism. The Beneficiary (a) acknowledges ADB's right to investigate, any alleged corrupt, fraudulent, collusive or coercive practices relating to the project; (b) agrees to cooperate with such investigation; (c) agrees to refrain from engaging in money laundering activities or financing of terrorism; and (d) shall allow ADB to investigate any violation or potential violation of the aforesaid undertakings concerning combating money laundering and financing of terrorism.</p>		<p>implementation period.</p>
<p>The Beneficiary shall (a) ensure that MOTC conducts periodic inspections on the contractors' activities related to fund withdrawals and settlements; and (b) ensure that all contracts financed by ADB in connection with the project include provisions specifying the right of ADB to audit and examine the records and accounts of all contractors, suppliers, consultants and other service providers as they relate to the project.</p>	<p>Schedule 5, para. 13</p>	<p>Complied. MOTC has conducted regular inspections of contractor's activities. Audit requirements have been met.</p>
<p>Transparency and Good Governance The Beneficiary shall disclose to the public, and update annually, the current status of the road fund enacted by the Beneficiary in 1998, its annual financial statement and future plans through local media and on the websites of MOF and MOTC respectively. The Beneficiary shall ensure that MOTC discloses (a) its annual financial statement regarding the funds that it receives from the central government budget, and (b) the status and implementation of all donor-funded investment projects concerning the road sector. The Beneficiary shall cause MOTC to disclose on its website information on how the proceeds of the Loan and the Grant are used. For each contract financed under the project, MOTC shall also disclose on its website (a) the list of participating bidders, (b) name of the winning bidder, (c) basic details on bidding procedures and procurement methods adopted, (d) the amount of contract awarded, © the list of goods/services, consulting services procured, and (f) the intended and actual utilization of the Loan and grant proceeds under each contract.</p>	<p>Schedule 5, para. 14</p>	<p>Complied. The MOTC website became operational in July 2010, where relevant information was published such as funds utilization, implementation status of donor-funded projects, business opportunities, contract awards, etc.</p>

Covenant	Reference to Financing Agreement	Status of Compliance
<p>Environment The Beneficiary shall ensure that Part 1 of the project is designed, carried out, maintained and monitored in accordance with (a) the Beneficiary's relevant laws and regulations, (b) the requirements of ADB's Environment Policy, and (c) the EMP for the project, including the mitigation measures and monitoring requirements arising from the implementation of the environmental assessment and review procedures outlined in the IEE prepared under the project. The Beneficiary shall ensure that (a) all works contracts include requirements to comply with the environmental mitigation measures contained in the IEE and the EMP; and (b) all works contractors are supervised to ensure compliance with the requirements of the IEE and the EMP.</p>	Schedule 5, para. 15	<p>Complied. The supervision consultant arranged for regular inspection of camps and construction sites, and conducted road safety audits. Noise, vibration, air and water sources were regularly tested and findings reflected in monthly and biannual reports. ADB conducted a country environmental safeguards review missions in 2014 to check compliance with the IEE and EMP requirements. The final environmental monitoring report included a post construction audit.</p>
<p>Land Acquisition and Resettlement The Beneficiary shall ensure that the implementation of the project is carried out on state-owned land and within existing rights-of-way and does not trigger any application of ADB's Policy on Involuntary Resettlement. If any land acquisition and resettlement are determined to be required for the project after the commencement of the project implementation, the Beneficiary shall ensure that a relevant land acquisition and resettlement plan is prepared and implemented. The Beneficiary shall ensure that no works contract is awarded for the relevant land and/or rights-of-way required for the execution of any works for such component of the project have been obtained by MOTC and subsequently provided to the relevant contractor.</p>	Schedule 5, para. 16	<p>Complied. The project was category C (limited or no impact) as the rehabilitation did not pass through any towns or villages. Nevertheless, a due diligence report was prepared which confirmed that there were no affected persons or structures.</p>
<p>Equal Opportunities/Labor The Beneficiary shall ensure that the contractors and consultants engaged under the project are required to provide maximum possible opportunities for employment of the project area residents. The Beneficiary shall also ensure that each of the works contractors of the project complies with all applicable labor, health, and safety laws and regulations of the Beneficiary. MOTC shall ensure that each of the works contracts contain (a) provisions prohibiting use of</p>	Schedule 5, para. 17 Schedule 5, para. 18	<p>Complied. Contractors and consultants provided maximum opportunities to residents in the project area. Contractor ensured that Kyrgyz laws prohibiting child labor, employment of illegal immigrants, etc. was met, including providing safe and secure working</p>

Covenant	Reference to Financing Agreement	Status of Compliance
<p>child labor, employment of illegal immigrants, and differentiation in wages between male and female workers for work of equal value, (b) includes mandatory provisions requiring contractors and consultants to provide health, safe and secure working conditions as well adequate medical, life and disability insurance for employees, and (c) has a requirement to conduct periodic awareness campaigns on sexually transmitted diseases and HIV/AIDS for employees as well as service providers during relevant contract period. The Beneficiary shall further ensure that all contactors and their employees observe local protocols concerning acceptable behavior toward the local population.</p>		<p>conditions for the workers, and conducting health information campaigns. These requirements were included in the works contracts. Local protocols and acceptable behavior towards the residents in the project area were observed throughout project implementation. No untoward incident was noted.</p>

DISBURSEMENT OF ADB LOAN AND GRANT PROCEEDS
(Loan No. 2533-KGZ[SF] and Grant No. 0153-KGZ[SF])

Table A4.1: Annual and Cumulative Disbursement of ADB Loan and Grant Proceeds^a
 (\$ million)

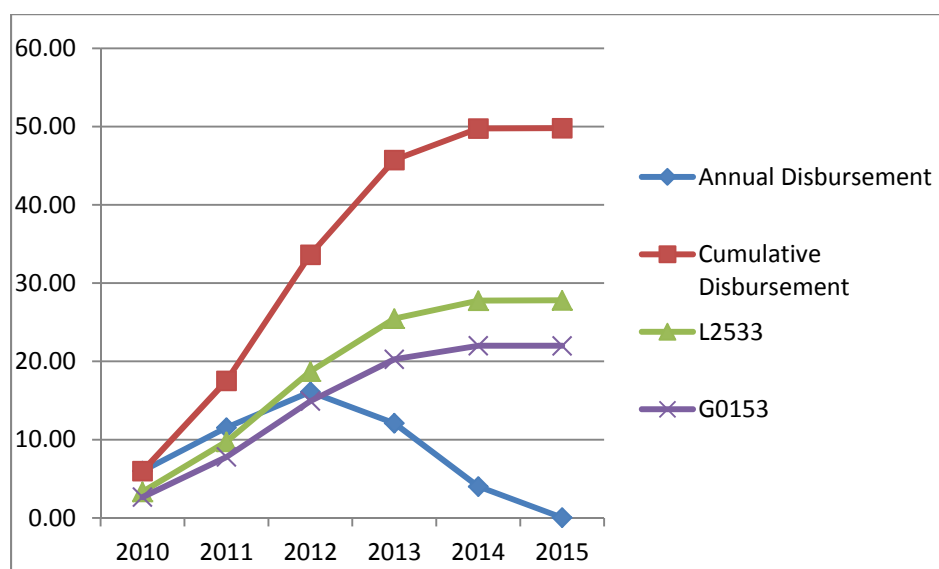
Item	2010	2011	2012	2013	2014	2015
Annual Disbursement	5.95	11.56	16.09	12.12	4.04	0.03
L2533	3.29	6.43	8.95	6.78	2.31	0.03
G0153	2.66	5.13	7.14	5.34	1.73	0.00
Cumulative Disbursement	5.95	17.51	33.60	45.72	49.75	49.78
L2533	3.29	9.72	18.67	25.45	27.76	27.79
G0153	2.66	7.79	14.93	20.27	21.99	21.99

ADB = Asian Development Bank.

^a As of 13 March 2015.

Sources: ADB financial information system and eOperations.

Figure A4.1: Annual and Cumulative Disbursement of ADB Loan and Grant Proceeds



Source: ADB financial information system and eOperations.

PROJECT IMPLEMENTATION SCHEDULE

Item		2009				2010				2011				2012				2013				2014			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Consulting services for project supervision and evaluation																									
Recruitment	Project road (Km 365-400; Km 439-479)		■	■	■																				
	At-Bashy feeder road																								
Implementation	Project road (Km 365-400; Km 439-479)					■	■	■	■	■	■	■	■	■	■	■	■	///	///	///	///				
	At-Bashy feeder road																								
Civil works for road improvement																									
Procurement	Project road (Km 365-400; Km 439-479)		■	■	■																				
	At-Bashy feeder road			■	■	■	■																		
Implementation	Project road (Km 365-400; Km 439-479)					■	■	■	■	■	■	■	■	■	■	■	■	///	///	///	///				
	At-Bashy feeder road																								

■ At appraisal /// Defects Liability Period ■ Actual

Source: Asian Development Bank and Ministry of Transport and Communications.

CHRONOLOGY OF MAJOR EVENTS

Date	Main Events
2009	
23 Feb-3 Mar	Fact-finding mission fielded
27 April	Management review meeting held
21–22 May	Loan and Grant negotiations held
14 Jul	RRP approved
5 Aug	Loan and Grant agreement signed
30 Oct	Loan and Grant effectiveness declared
11–23 Nov	Inception mission fielded
2010	
1 Feb	PIU renamed Investment Projects Implementation Group
26–30 Apr	1 st Review mission fielded
3 May	Civil works contract awarded
20 May	Imprest account established
14–22 Jul	2 nd Review mission fielded
9 Aug	Construction supervision consulting services contract awarded
4 Aug	Construction supervision consulting services mobilized
	Notice to commence issued to civil works contractor
29 Nov–11 Dec	3 rd Review mission fielded
2011	
7–15 Feb	4 th Review mission fielded
4 Apr	Start of construction season
23–28 May	5 th Review mission fielded
15 Jun	Financial audit contract awarded
15–23 Jun	Special loan administration mission fielded
2012	
7-16 Feb	6 th Review mission fielded
21–31 May	7 th Review mission fielded
14 Jun	Consulting services contract for Training and Internship Program awarded
10-29 Sep	Internship program conducted
16 Oct	Internship Training Report submitted by KSUCTA
17–25 Oct	8 th Review (mid-term) mission fielded
2013	
24 May	Minor change to rehabilitate 6 km At-Bashy Road approved
11–18 Nov	9 th Review mission fielded
31 Dec	Original project completion
2014	
24–27 Feb	10 th Review mission fielded
30 Jun	Original project closing date
11–19 Aug	11 th Review mission fielded

Date	Main Events
29 Aug	Project closing date extended from 30 June 2014 to 30 November 2014
12–17 Oct	12 th Review mission fielded
21 Nov	All major civil works completed including At-Bashy rehabilitation
30 Nov	Revised project closing date
2015	
18 Feb	Last financial audit for FY 2014 approved by ADB
1 Mar	Loan and Grant accounts financially closed
5-18 Jun	PCR mission fielded

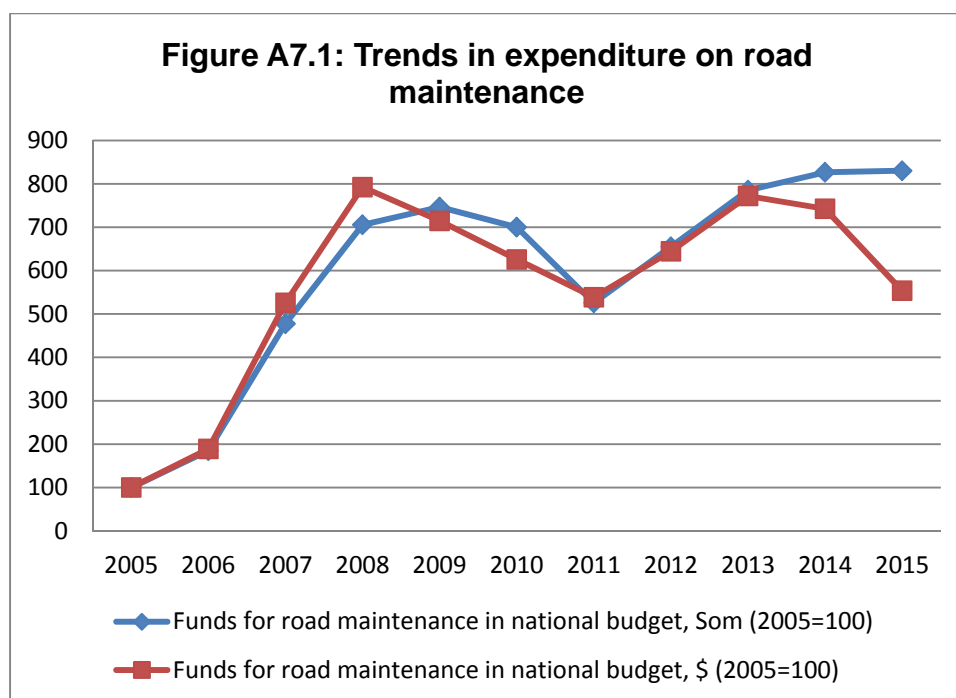
ADB = Asian Development Bank; FY = fiscal year; KSUCTA = Kyrgyz State University for Construction, Transport and Architecture; PCR = project completion review; PIU = project implementation unit; RRP = report and recommendation of the President.

ROAD SECTOR EXPENDITURE

Table A7.1: Funds Allocated for Road Maintenance
(Som million)

Years	National budget (Som million)	Funds for Road Maintenance in national budget (Som million)	Share of road maintenance in national budget (%)	Funds for road maintenance (\$ million)
2005	16,813	222	1.3	5.4
2006	20,479	410	2.0	10.2
2007	34,137	1,059	3.1	28.4
2008	44,699	1,565	3.5	42.8
2009	48,106	1,655	3.4	38.6
2010	65,666	1,553	2.4	33.8
2011	86,100	1,165	1.4	29.1
2012	101,522	1,452	1.4	34.8
2013	96,680	1,741	1.8	41.7
2014	102,899	1,833	1.8	40.1
2015	107,657	1,841	1.7	29.9

Source: Ministry of Transport and Communications of Kyrgyz Republic.



Source: Ministry of Transport and Communications of Kyrgyz Republic.

Table A7.2: Funds Budgeted for Road Maintenance by Corridor

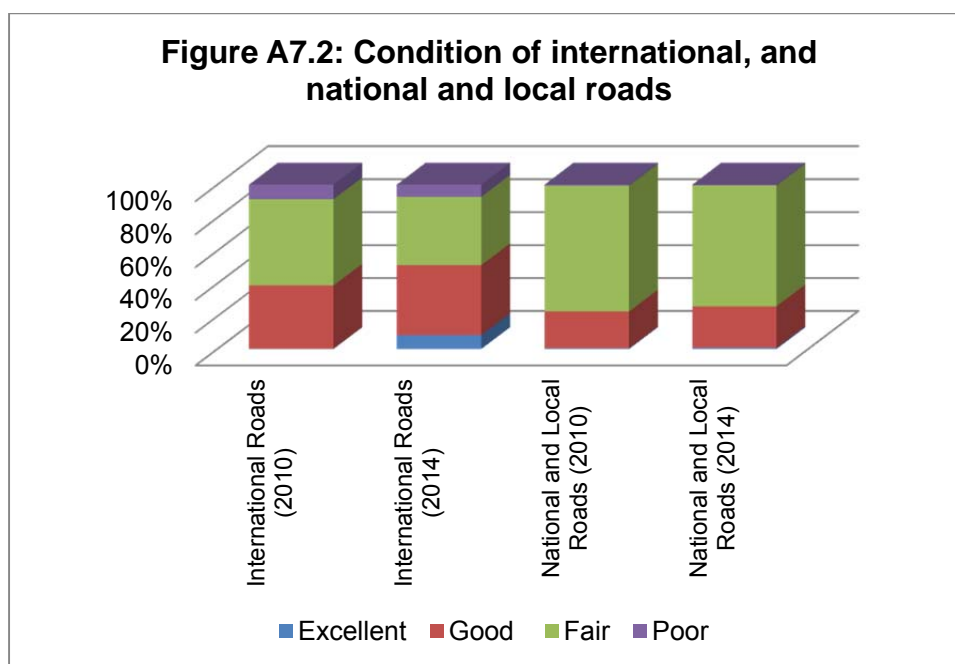
Corridor	Length (km)	Total Budget (Som million)	Budget per km (Som)	Budget per km (\$)
Bishkek–Naryn–Torugart	539	14	26,067	419
Bishkek–Osh	673	181	269,306	4,333
Osh–Sarytash–Irkeshtam	258	12	47,868	770
Sarytash–Karamyk	136	10	72,059	1,159
Osh–Batken–Isfana	260	46	178,462	2,871
Bishkek–Georgievka	21	2	116,967	1,882
Total	1,887	266	141,123	2,271

Source: Ministry of Transport and Communications of Kyrgyz Republic.

Table A7.3: Condition of Road Network, 2010 and 2014
(%)

	International Roads (2010)	International Roads (2014)	National and Local Roads (2010)	National and Local Roads (2014)
Excellent	0.2	8.5	0.4	0.8
Good	38.6	42.7	22.5	25.3
Fair	52.3	41.5	76.5	73.5
Poor	8.9	7.4	0.6	0.4
Total	100.0	100.0	100.0	100.0

Source: Ministry of Transport and Communications of Kyrgyz Republic.



Source: Ministry of Transport and Communications of Kyrgyz Republic.

HUMAN RESOURCE DEVELOPMENT COMPONENT

1. An internship program run by Kyrgyz State University of Construction, Transport and Architecture was conducted for 8 students. The program consisted of 12 days of desk-based lectures, fieldwork, and practical and laboratory classes.¹

2. The main purpose of the internship was to consolidate through practical application the professional knowledge and skills obtained during theoretical training, or to develop such knowledge and skills and put them into practice during the internship. The internship was conducted from 10 to 29 September 2012, with onsite practice taking place on the Bishkek–Naryn–Torugart Road. The subjects taught as part of the internship are shown in tables A8.1, A8.2 and A8.3.

Table A8.1 Content of Lectures Held

<i>Lecture</i>	<i>Subject</i>	<i>Hours</i>
1.	The standard-legal basis for organization of road construction works	2
2.	Designing highways	2
3.	Cross-section. Longitudinal profile	4
4.	Methods for planning and organizing work	2
5.	Material suppliers and contractors as service providers	2
6.	Organizational and legal procedures for ensuring quality of road construction	2
7.	Quality control for construction materials	2
8.	Laboratory requirements; sampling, reporting and documenting	2
9.	Organizational, administrative, executive and technical documentation	2
10.	Action Plan for Environmental Protection	2
11.	Measuring the amount of work	1
12.	Acceptance	1

Source: Ministry of Transport and Communications.

Table A8.2 Content of Practical Classes Held

<i>Practical classes</i>	<i>Subject</i>	<i>Hours</i>
1.	Road cross section. Geometric parameters for highways	6
2.	Structures (drainage, culverts, aqueducts, bridges)	6
3.	Pavement	4
4.	Asphalt concrete bases and cover: a) Coarse gravel b) Fine gravel and filler c) Bituminous materials and quality indicators	4
5.	Pavement roughness, carrying capacity	4

Source: Ministry of Transport and Communications.

¹ Among the 8 students who participated in the internship, 3 are working for MOTC as of June 2015.

Table A8.3 Content of Laboratory Classes Held

Lab classes	Subject	Hours
1.	Determination of the maximum soil density and optimum moisture content of soil	4
2.	Determination of grain-size distribution	4
3.	Determination of liquid limit and plasticity of the soil	4
4.	Determination of bearing capacity of soil	4
5.	Determination coefficient of consolidation (sand cone method) Location: Bishkek–Naryn–Torugart Highway	4
6.	Selection of mixture composition for base layers	4
7.	Determination of specific gravity and water absorption material	4
8.	Selection of asphalt mixture ingredient. Location: Bishkek–Naryn–Torugart Highway	4

Source: Ministry of Transport and Communications.

PROJECT CONTRACT PACKAGES

Table 1: Loan 2533-KGZ(SF): CAREC Transport Corridor 1 (Bishkek–Torugart Road), Project 2

PCSS No.	Contractor/ Consultant	Description	Procurement Mode	Contract Date	Contract Issued			Actual Cost ^a		
					Currency of Contract	Contract Amount	\$ Equivalent	Currency of Contract	Amount Disbursed	\$ Equivalent
0001	Various	PIU Staff Salary for Various Positions	Others	18-Mar-10	Som	4,467,070.31	94,339.47	Som	4,467,070.31	94,339.47
0002	Various	PIU Various Operational Expenses	Others	18-Mar-10	\$	21,176.65	21,176.65	\$	21,176.65	21,176.65
0003	China Road & Bridge Corporation	Civil Works for Sect 1: Km 365–Km400; Sect 2: Km 439–Km479; At-Bashy Rd	ICB	3-May-10	\$	26,208,432.69	26,208,432.69	\$	26,208,432.69	26,208,432.69
0004	TERA International Group, Inc.	Construction Supervision & Project Management Consulting Services	QCBS	19-Jul-10	\$	976,450.61	976,450.61	\$	976,450.61	976,450.61
0005	Praktika, Ltd.–Y. Akkuzhin	PIU Software 1C-Based Accountant	Direct Contract	24-Sep-10	Som	71,655.00	1,513.31	Som	71,655.00	1,513.31
0006	Ruslanbek Satybaldiev	PIU Regional Coordinator	Consultant Qual.	20-Dec-11	Som	998,648.80	20,854.78	Som	998,648.80	20,854.78
0007	Nafisa Khalibaeva	PIU Assistant Financial Manager	Consultant Qual.	20-Dec-11	Som	298,128.55	6,415.86	Som	298,128.55	6,415.86
0008	Kasiet Irgebaeva	PIU Assistant Accountant	Consultant Qual.	20-Dec-11	Som	308,257.26	6,625.16	Som	308,257.26	6,625.16
0009	Elmir Dosaliev	Soils & Materials Engineer	Others	25-May-11	Som	899,985.98	18,754.60	Som	899,985.98	18,754.60
0010	Marka Audit Bishkek, Ltd.	Annual Audit of Project Accounts FY 2010–FY 2014	Consultant Qual.	30-May-11	\$	36,434.91	36,434.91	\$	36,434.91	36,434.91
0011	Kyrgyz State University of Construction, Transport and Architecture	Training and Internship Program	Single Source	14-Jun-12	\$	5,374.18	5,374.18	\$	5,374.18	5,374.18
Total						27,396,372.22		27,396,372.22		

CQS = consultant qualification system; FY = fiscal year; ICB = international competitive bidding; PCSS = procurement contract summary sheet; PIU = project implementation unit; QCBS = quality- and cost-based selection; Som = the basic monetary unit of Kyrgyz Republic ; SSS = single-source selection.

^a As of 13 May 2015. Civil works and extension of construction supervision consultant for At-Bashy road are included in the Actual Cost.

Sources: ADB financial information system and eOperations.

Table 2: Grant 0153-KGZ: CAREC Transport Corridor 1 (Bishkek–Torugart Road), Project 2

PCSS No.	Contractor/ Consultant	Description	Procurement Moc	Contract Date	Contract Issued			Actual Cost ^a		
					Currency of Contract	Contract Amount	\$ Equivalent	Currency of Contract	Amount Disbursed	\$ Equivalent
G04173	Various	PIU Staff Salary for Various Positions	Others	18-Mar-10	Som	3,678,762.35	77,691.31	Som	3,678,762.35	77,691.31
G04210	Various	PIU Various Operational Expenses	Others	18-Mar-10	\$	17,444.86	17,444.86	\$	17,444.86	17,444.86
G04426	China Road & Bridge Corporation	Civil Works for Section 1: Km 365–Km400 and/or Section 2: Km 439–Km479	ICB	3-May-10	\$	21,019,998.60	21,019,998.60	\$	21,019,998.60	21,019,998.60
G04845	TERA International Group, Inc.	Construction Supervision & Project Management Consulting Services	QCBS	19-Jul-10	\$	804,135.76	804,135.76	\$	804,135.76	804,135.76
G05189	Praktika, Ltd.–Y. Akkuzhin	PIU Software 1C-Based Accountant	Direct Contract	24-Sep-10	Som	59,010.00	1,246.25	Som	59,010.00	1,246.25
G05427	Ruslanbek Satybaldiev	PIU Regional Coordinator	Consultant Qual.	20-Dec-11	Som	822,416.65	17,174.53	Som	822,416.65	17,174.53
G05428	Nafisa Khalibaeva	PIU Assistant Financial Manager	Consultant Qual.	20-Dec-11	Som	245,517.64	5,283.66	Som	245,517.64	5,283.66
G05429	Kasiet Irgebaeva	PIU Assistant Accountant	Consultant Qual.	20-Dec-11	Som	253,858.92	5,456.03	Som	253,858.92	5,456.03
G06203	Elmir Dosaliev	Soils & Materials Engineer	Others	25-May-11	Som	741,165.47	15,444.97	Som	741,165.47	15,444.97
G06232	Marka Audit Bishkek, Ltd.	Annual Audit of Project Accounts FY 2010–FY 2014	Consultant Qual.	30-May-11	\$	30,005.22	30,005.22	\$	30,005.22	30,005.22
G07979	Kyrgyz University of Construction, Transport and Architecture	State of Internship Program	Single Source	14-Jun-12	\$	4,439.54	4,439.54	\$	4,439.54	4,439.54
Total							21,998,320.73		21,998,320.73	

CQS = consultant qualification system; FY = fiscal year; ICB = international competitive bidding; PCSS = procurement contract summary sheet; PIU = project implementation unit; QCBS = quality- and cost-based selection; SSS = single-source selection; Som = the basic monetary unit of Kyrgyz Republic.

^a As of 13 May 2015. Civil works and extension of construction supervision consultant for At-Bashy road are included in the actual cost.

Sources: ADB financial information system and eOperations.

ECONOMIC REEVALUATION

A. Background

1. At appraisal, the project comprised two main outputs: (i) physical works including upgrading 75 kilometers (km) over two sections of the Bishkek–Torugart road with geometry and pavement structure to category III standard and an inspection (border control) facility close to km 479, and (ii) a professional development program for road sector professionals. Category III standard is for a two-lane road, with a carriageway width of 7 meters (m)—with 2 lanes each 3.5 m wide—and a roadbed width of 15 m.

2. The first section of the Bishkek to Torugart road to be upgraded starts at km 365 and ends at km 400, and the second starts at km 439 and ends at km 479. Both sections are located near At-Bashy in the Naryn oblast (province) of the Kyrgyz Republic.

B. Economic Analysis at Appraisal Stage

3. At appraisal, an economic analysis covering the upgrading of the entire corridor—from the Bishkek bypass (km 9) to the border with the People’s Republic of China (PRC) at km 539—was undertaken. The following economic benefits were identified and monetized at appraisal: (i) vehicle operating costs (VOC), and (ii) time savings. A distinction was made between normal and generated traffic. Financial costs were converted to economic costs by application of a conversion factor of 0.85.¹ A five-year construction period—2009 to 2013—was assumed for completion of all works along the corridor, with benefits calculated over a 20-year period.

4. The economic analysis presented the 2008 traffic volumes along the entire Bishkek–Torugart corridor, which ranged from 4,385 vehicles per day near Bishkek to 90 at the border crossing point with the PRC. The surface quality varied by section in the without-project scenario, ranging from an international roughness index (IRI) of 5.0 (for the section closest to Bishkek) to 10.0 at the border with the PRC.

C. Economic Reevaluation

5. The Asian Development Bank (ADB) project completion review (PCR) mission conducted an economic reevaluation of CAREC Transport Corridor 1 (Bishkek–Torugart), Project 2 to ascertain whether the project remained economically viable. The reevaluation was undertaken in accordance with standard ADB appraisal methodology that compares the incremental benefits derived from reductions in VOC and travel times resulting from the project’s construction, against the initial investment costs and changes in operation and maintenance costs over the appraisal period. Key economic indicators reported are benefit to cost ratio (BCR), economic internal rate of return (EIRR), and economic net present value (NPV) at a 12% discount rate. The economic analysis used the domestic price numeraire.

6. The following project benefits were calculated: time and VOC savings. Benefits arising from generated traffic were calculated using the rule of a half. The project costs and benefits have been calculated over a 20-year appraisal period, after which a residual value—equal to

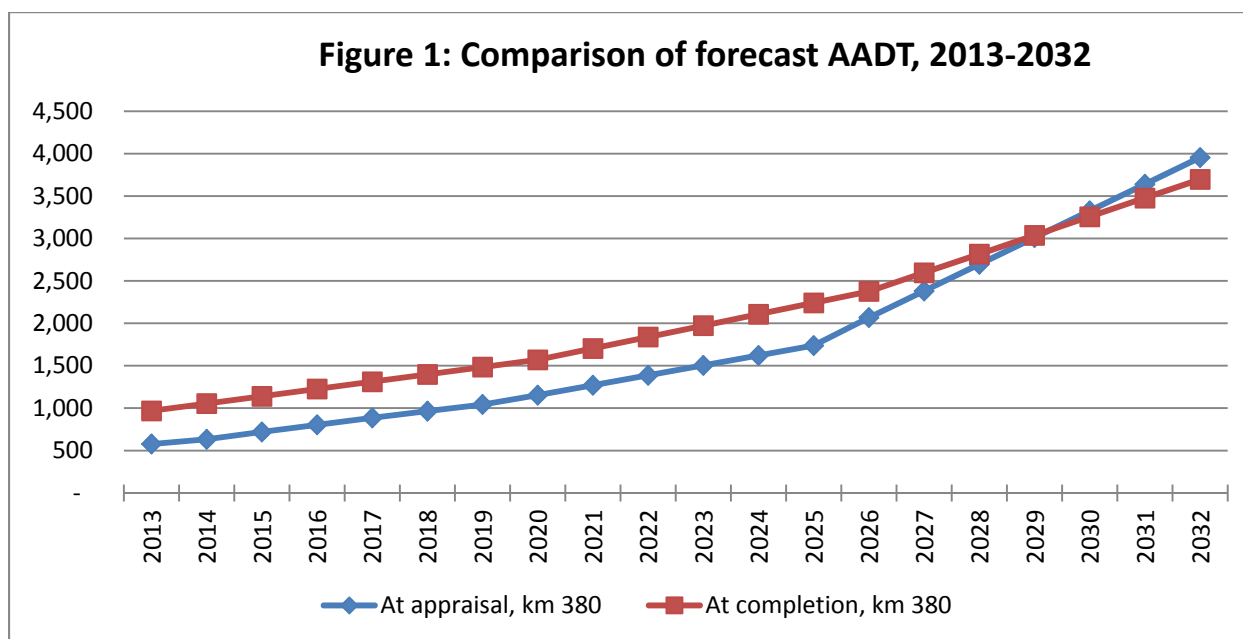
¹ This was not in strict compliance with Section VII of ADB guidance—ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila—but was adopted from economic analysis undertaken for CAREC Transport Corridor 1 (Bishkek-Torugart Road) Project 1.

about 30% of investment costs and designed to capture the benefits of the project in the post-appraisal period—is considered.

D. Demand estimation

7. The demand analysis at appraisal was based on estimates of annual average daily traffic (AADT) derived from traffic counts taken in 2007, with demand forecasts based on forecast growth rates ranging from 10.7% to 2%, depending on vehicle type and year.

8. The demand analysis for the economic reevaluation is based on 24-hour counts undertaken by the supervision consultant in 2013. The traffic surveys were carried out at 5 locations: Naryn (km 348); Naryn (km 351); At-Bashy bridge (km 399), Kara Buluun village (km 420), and the customs post (km 478). The collected 7-day 24-hour traffic counts were converted to annual average daily traffic by application of seasonal adjustment factors. Traffic forecasts used in the economic reevaluation were based on those produced by the supervision consultant as part of the Ministry of Transport and Communications' project completion report. Revised forecasts are shown in Figure 1, which compares estimated traffic flows at appraisal with actual outturn for 2013 at km 380, and applies revised traffic growth assumptions to forecast traffic flow.² Figure 1 shows that traffic flow at km 380 was above the appraisal forecast, and gives a revised more conservative traffic growth forecast with traffic predicted to grow at a slower rate up to 2032.



AADT = annual average daily traffic, km = kilometer

Source: Consultants economic analysis report, and Asian Development Bank estimates.

E. Economic Costs

9. At appraisal, the total project cost was estimated at \$62.5 million. At completion, total expenditure was \$61.128 million. The reasons for cost changes during implementation are: (i)

² In the revised traffic forecast, demand is predicted to increase at an average rate of 7% over the appraisal period, as opposed to the 11.4% estimated at appraisal.

the requested change in scope (i.e. the replacement of the customs inspection facility with 6 km of link road to At-Bashy), (ii) underspending on the human resource development component, and (iii) some changes in costs arising from small changes to design (e.g., additional drainage required as a result of the frost heave cracking issue).

Table A10.1: Financial Cost
(\$ million)

Component	Appraisal Estimate	Actual
Civil Works	42.5	58.4
Consulting Services	2.5	2.4
Nonphysical Component	0.5	0.01
Taxes and Duties	6.0	0.0 ^a
Physical Contingency	6.0	0.0
Price Contingency	4.0	0.0
Financial Charges During Construction	1.0	0.4
Total Project Cost	62.5	61.1

^a Taxes and duties included in civil works, consulting services and nonphysical component.
Source: Ministry of Transport and Communications, and Asian Development Bank estimates.

10. The economic analysis of the road development component includes the following costs: (i) capital investment (i.e. civil works, project management and supervision); and (ii) the difference in operation and maintenance costs between the with- and without-project scenarios. Costs related to the nonphysical component, taxes, duties, and financing charges during implementation have been excluded. Costs and benefits were converted from financial to economic prices in line with official ADB guidelines.³ A shadow exchange rate factor of 1.029⁴ and a shadow wage rate factor of 0.83 were applied.

11. Investment costs were separated into foreign and local cost components. Foreign costs in US dollars were converted to 2014 prices by application of an appropriate foreign price index (US construction cost index from the US Census Bureau) and then converted to 2014 Som using the average official exchange rate for 2014. Local costs were converted to 2014 prices by using the GDP deflator index.⁵ Maintenance costs for the with-project scenario have been estimated at \$1,126/km for routine and winter maintenance plus \$16/m² for patching.

F. Economic Benefits

12. The benefits considered in the economic reassessment are savings in VOC and improvements in travel time. As the project used the existing alignment, the calculation of time savings was not based on any reduction in vehicle-km travelled, but only on expected increases in average speed. The calculation of time savings benefits did not include crew costs, because they form part of the VOC calculations. Benefits from generated trips are considered to be worth half the per-trip savings calculated for existing travelers.

³ ADB. 1997. *Guidelines for the Economic Analysis of Investment Projects*. Manila.

⁴ Calculated in line with the methodology contained in ERD Technical Note 11. ADB. 2004. ERD Technical Note Series No. 11. *Shadow Exchange Rates for Project Economic Analysis: Toward Improving Practice at the Asian Development Bank*. Manila.

⁵ IMF. World Economic Outlook Database. <http://www.imf.org/external/data.htm> (accessed 28 June 2015).

13. Savings in VOC are calculated for the project and derive from improvements to the surface conditions and roughness on the upgraded sections, relative to the existing sub-standard sections. The unit rates for VOC/km for both the without- and with-project scenarios, which vary by pavement condition (e.g. international roughness index, IRI), were provided by the supervision consultants based on highway development model 4 (HDM-4) outputs and in the with-project scenario vary from \$0.30 for cars to \$0.98 per km (2014 economic prices) for articulated goods vehicles.

14. The economic analysis used hourly values of time of \$2 for work travel for cars, \$3 for goods vehicles, and \$1 for buses, in line with a recent economic analysis for additional financing for project 3.⁶ As the VOC unit rates do not include a crew cost component, the time savings calculation included savings in terms of vehicle crew. The calculation of savings from reductions in the number of road collisions was based on accident rates and numbers derived from HDM-4.

15. **Results of economic reevaluation.** The results of the economic reevaluation covering the full appraisal period are in Table A10.2. The principal reasons for the differences in the economic indicators between the appraisal and completion stages are (i) changes to project scope (i.e. addition of the At-Bashy road and exclusion of the customs inspection facility), and (ii) higher baseline traffic but lower traffic growth forecasts at completion.

Table A10.2: Project Economic Indicators

Section	BCR (ratio)	NPV	EIRR (%)
At Appraisal ¹	-	\$ 14.139 million (2009 prices)	12.8%
At Completion	1.09:1	Som 511 .3 million (2014 domestic prices)	12.9%

BCR = benefit to cost ratio; EIRR = economic internal rate of return, NPV = net present value.

Source: Asian Development Bank estimates, project preparatory technical assistance consultant's report.

¹ Economic analysis at appraisal is a corridor analysis and is an economic analysis of the completion of the entire corridor. The results presented above for the appraisal economic analysis did not include a residual value, the inclusion of which would bring the EIRR to 14.4%.

16. Sensitivity tests and calculations of switching values were carried out to determine the effect of variations in key input parameters on the key economic indicators. Table A10.3 shows a switching value of -9.8% with respect to vehicle operating costs.

⁶ ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Asian Development Fund Grant, Kyrgyz Republic: CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 3–Additional Financing*. Manila.

Table A10.3: Result of the Sensitivity Analysis

Scenario	NPV	EIRR (%)	Switching Value (%)
	(Som million, 2014 domestic prices)		
Base	511.3	12.9	
Vehicle Operating Costs –10%	-11.0	12.0	-9.8
Value of time –10%	412.0	12.7	-51.5

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

Source: Asian Development Bank estimates.

17. In summary, the economic reevaluation was undertaken in line with the ADB guidance. The EIRR at completion is 12.9%, which is marginally above that calculated at appraisal (12.8%), although the appraisal economic analysis was based on completion of the entire corridor. Since the EIRR exceeds the 12% threshold, the project remains economically viable.

Table A10.4: Detailed Results of the Economic Analysis
(Som million, 2014 domestic prices, undiscounted)

Year	Investment Cost	Operation and Maintenance	VOC	Time Savings	Generated Traffic	Net Benefits
2010	623.0	-				(623.0)
2011	1,072.6	-				(1,072.6)
2012	1,452.4	-				(1,452.4)
2013	1,103.4	-	228.7	44.0	6.8	(823.9)
2014	387.2	(6.4)	250.1	49.8	7.5	(73.4)
2015	4.4	(6.4)	286.6	56.1	8.6	353.3
2016	-	(6.9)	325.5	62.9	9.7	405.0
2017	-	(8.5)	366.7	70.0	10.9	456.2
2018	-	(9.6)	410.4	77.7	12.2	509.8
2019	-	(10.1)	456.4	85.8	13.6	565.9
2020	-	(9.0)	504.8	94.5	15.0	623.3
2021	-	(10.1)	573.1	106.9	17.0	707.1
2022	-	(12.2)	645.3	120.1	19.1	796.7
2023	-	(2.1)	721.2	134.2	21.4	878.9
2024	-	2.7	800.9	149.2	23.8	971.2
2025	-	6.9	884.4	165.2	26.2	1,069.0
2026	-	6.9	971.7	182.3	28.8	1,175.9
2027	-	4.3	1,102.6	207.6	32.8	1,338.8
2028	-	2.7	1,240.0	234.7	36.9	1,508.8
2029	-	5.8	1,383.6	263.5	41.2	1,682.5
2030	-	7.4	1,533.7	294.3	45.7	1,866.3
2031	-	(23.9)	1,690.1	327.2	50.4	2,091.6
2032	(1,392.8)	(28.7)	1,852.9	362.2	55.4	3,692.0
					EIRR	12.9%
					NPV	Som 511.3 million

EIRR = economic internal rate of return, NPV = net present value, VOC = vehicle operating cost.

Note: sections of road were opened to the public when completed. 2013 is taken as the start date as this is reflective of the average date when sections of the road were opened.

Source: Asian Development Bank estimates.

CONTRIBUTION TO THE ADB RESULTS FRAMEWORK

No.	Level 2 Result Framework Indicator	Target	Aggregate Output	Methods/Comments
Transport				
1	Use of roads built or upgraded (average daily vehicle-kilometers [km] in first full year of operation)	43,275 vehicle-km per day in 2013	45,121 vehicle-km per day in 2013	Asian Development Bank calculation based on traffic surveys undertaken in 2013.
2	Expressways and national highways built or upgraded (km)	Improved pavement in 75km of 2-lane road (km 365 to 400 and km 439 to 479) Improved pavement in 6 km of 2-lane At-Bashy Road (km 4.2 to km 10.2)	Pavement improved in 75km of 2-lane road (km 365 to 400 and km 439 to 479) Pavement improved in 6 km of 2-lane At-Bashy Road (km 4.2 to km 10.2)	Based on contractor progress reports, field visits, and project completion report
Regional Cooperation and Integration				
1	Cross-border cargo volume facilitated (tons per year)	Freight movement between the PRC and the Kyrgyz Republic through Torugart increased from 300,000 tons in 2008 to 400,000 tons by 2015	The freight movement between the PRC and the Kyrgyz Republic through Torugart was 434,900 tons in 2012	Based on State Customs Committee data

^a This is a standard transport sector indicator for Level 2 (Output and Outcome) as defined in ADB's Results Framework: Interim Update to Align with the Midterm Review of Strategy 2020 (2014).

^b The target value is listed in the project design and monitoring framework.
Source: ADB project completion review mission.

PROJECT OVERALL ASSESSMENT

Criterion	Weight (%)	Assessment	Score^a	Weighted Rating
Relevance	25	Relevant	2	.50
Effectiveness	25	Effective	2	.50
Efficiency	25	Efficient	2	.50
Sustainability	25	Less than likely	1	.25
Overall Assessment^b		Successful		1.75

^a Rating range: 3 = highly relevant/effective/efficient/most likely; 2 = relevant/effective/efficient/likely; 1 = less than relevant/less than effective/less than efficient/less likely; 0 = irrelevant/ineffective/inefficient/unlikely.

^b Highly successful: Overall weighted average is greater than or equal to 2.7. Successful: Overall weighted average is greater than or equal to 1.6 and less than 2.7. Less than successful: overall weighted average is greater than or equal to 0.8 and less than 1.6. Unsuccessful: Overall weighted average is less than 0.8.

Source: ADB. 2006. *Guidelines for preparing performance evaluation reports for public sector operations*. Manila.

PROJECT SOCIOECONOMIC IMPACT

1. **Background.** The impact of the project on poverty and local economic activity was monitored during implementation by the supervision consultant. In addition, the ADB PCR mission carried out a small socioeconomic survey to determine the impact of CAREC transport corridor 1 (Bishkek–Torugart road) project 2, on the local community and commerce.¹

A. Survey of impact of the project on local economy and population

2. **Survey methodology.** During the PCR mission, the team met with members of the following groups living or working in At-Bashy, including representatives of: (i) the local youth population (18–35); (ii) local entrepreneurs; and (iii) the female population. A total of 52 individual interviews were conducted during the mission (on 12 June 2015), including 26 women, 20 representatives of the local youths, and 26 individual entrepreneurs with shops and businesses along the 6 kilometer (km) link road to At-Bashy.

3. **Purpose of the assessment.** The purpose of the survey was to assess local residents' perception of the project. Basic questions were asked to each survey participant, including: (i) the extent of initial public consultation; (ii) impact during construction; (iii) impact on road safety; and (iv) impact on local economic activity. For each question the respondents were asked to rate impacts into one of four categories: excellent, good, satisfactory, and not satisfactory. The interviewer also wrote down comments from each interviewer and these were subsequently reviewed by the team.

4. **Findings on consultation.** In relation to initial consultations, only 5% of the respondents confirmed their participation and indicated that consultations held were either satisfactory or good. The remainder did not participate in any consultations. A number of respondents commented that they heard about consultations but could not participate due to other appointments on the days in question.

5. **Impact during construction.** Sixty percent of the respondents indicated that there was no impact of the new road on local commerce during the construction period. Seventeen percent indicated a satisfactory impact, 16% good and 2% excellent. Several respondents noted that they had new business from the construction workers. Four percent of the respondents indicated that their business was adversely impacted during the construction period.

6. **Road safety.** Fifty-six percent of respondents rated the safety provided by the new road as good; 23% satisfactory; 11% considered that there was no change; and 10% indicated an unfavorable impact on road safety. A review of the latter's responses indicated that many of these people felt that the number of accidents may increase due to high speeds on the new road. Several of the respondents noted the cracking on the main project road and that made them worry about the future quality of the road. Some of the respondents indicated that there were not enough signs on the roads, including pedestrian walk signs and speed bumps that could help to reduce average speeds and therefore the number of collisions.

¹ ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Asian Development Fund Grant, Kyrgyz Republic: CAREC Transport Corridor 1 (Bishkek–Torugart Road) Project 2.* Manila.

7. **Impact on local economic activity (post construction).** Thirty-seven percent of respondents indicated that there were no changes in economic activity arising from the project; 13% rated the impact of the new road on economic activity as excellent, 35% good, and 15% as satisfactory. Several respondents noted that there had been an increase in the number of tourists and visitors to the livestock market over the last 5 years, though it is not certain if this increase was directly related to the new road.

8. **Other issues.** Some respondents expressed dissatisfaction with the quality of the concrete ditches adjacent to the roads, and it was noted that there were a limited number of cases where cattle had been injured or killed due to being trapped in the deep drainage ditches.

B. Socioeconomic impact monitoring

9. Three project benefit monitoring and evaluation exercises were conducted during project implementation using the criteria of the project performance management system (PPMS), with the last being conducted in September 2013. Socioeconomic data were also collected from the At-Bashy rayon (district) administration.

10. The project road passes through rural areas of north-eastern Kyrgyz Republic, where agriculture is the main source of income and poverty incidence is among the highest in the country (63.1 in 2013). The population in At-Bashy rayon—one of the most isolated areas in Kyrgyz Republic—totaled 54,411 in 2013, living in 13,250 households. A total of 75 km of the Bishkek-Torugart corridor was improved (km 365–400 and km 439–479), which has resulted in considerably improved connectivity. Average vehicle speeds are now about 80 km/hour compared to 30 km/hour prior to the road rehabilitation. Travel time between the capital city, Bishkek, and At-Bashy has been reduced from 7 hours to about 4.5 hours. Travel time between At-Bashy and Torugart (border with the PRC) has been reduced from 2.5 hours to 1.75 hours. The project road is all-weather, meaning that the road is to be kept open throughout the winter season with minimal interruption, unlike previously where road closures were frequent during unfavorable weather conditions.²

11. **Road Safety.** There were 9 traffic accidents in At-Bashy Rayon in 2008, 5 in 2010, 15 in 2011, and 22 in 2012, the last year for which complete data are available. For 2012, these resulted in 8 deaths and 32 injured (footnote 1).

12. **Environment.** There were no adverse environmental impacts during project implementation. The main issues arising during construction, including dust and site restoration, have all been corrected.

13. **Project Impacts on Women and Children.** Females accounted for 50.5% of the At-Bashy population in 2013. There were 21 schools with 10,847 students (4,338 students in grades 1-4, 5,039 in grades 5-9, and 1,420 in grades 10-11) in 2013, representing 93% of all school-age children (footnote 1). The improved road has resulted in improved access to social services, markets, and goods, and this has benefited the entire At-Bashy population. At the peak of construction in 2012, there were 21 females employed by the construction contractor.

² Ministry of Transport and Communications. Kyrgyz Republic. *Project Completion Report. CAREC Transport Corridor -1 (Bishkek – Naryn – Torugart Road) Project 2*. Unpublished.

C. Conclusions and recommendations

14. Notwithstanding low participation in the consultation process and some minor negative impacts in terms of drainage, the general perception of the respondents regarding the project was favorable, with most indicating the project had a positive impact on road safety and the local economy (post construction). For future projects, larger public consultation sessions should be held, an improved drainage design—replacing the open drains included as part of the project—and additional road safety features, including some basic road safety awareness and training courses, could be built into the project design.

FROST HEAVE CRACKING

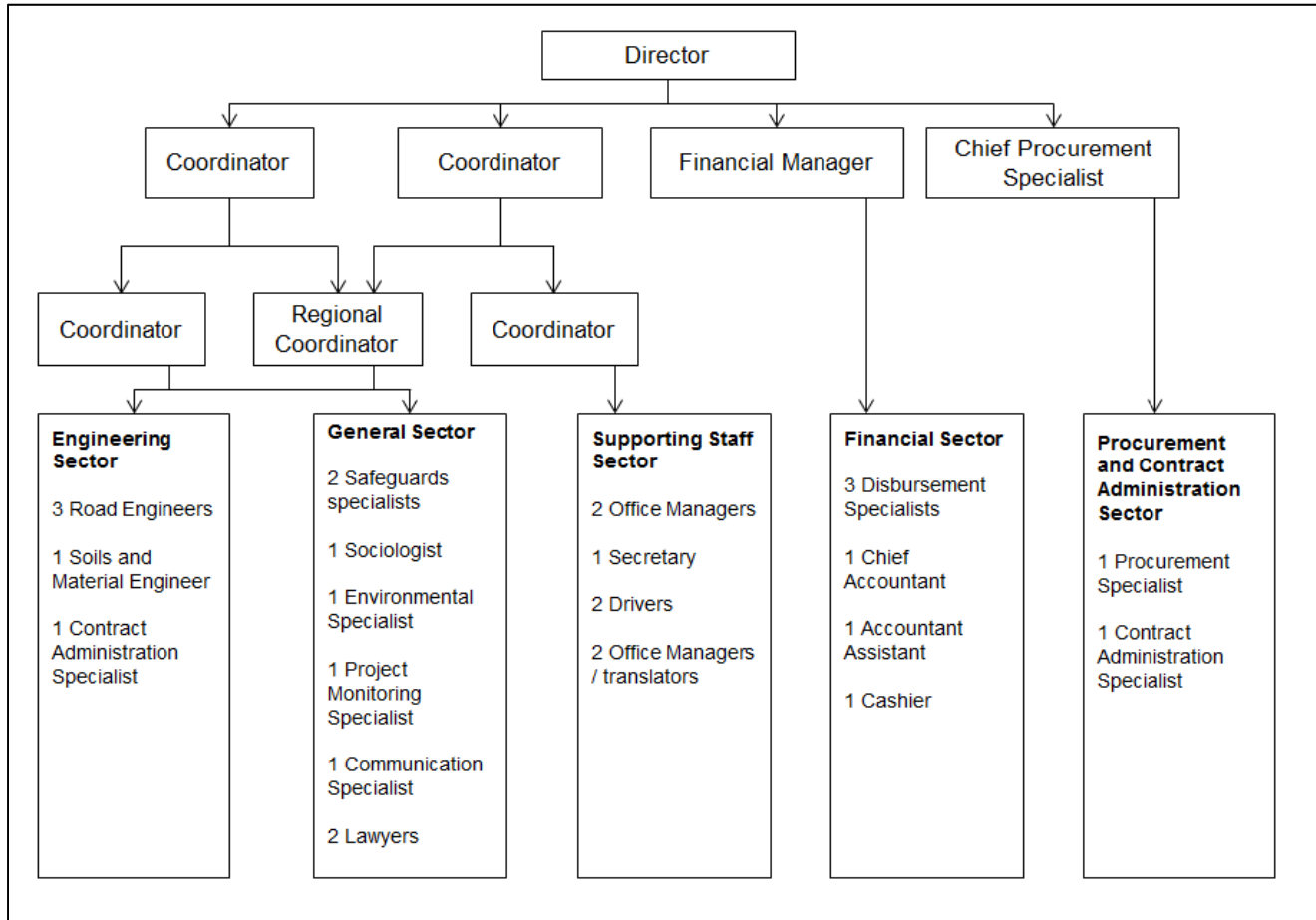
1. **Issue.** During December 2012 and January 2013, frost heave cracks appeared on sections of both CAREC Transport Corridor 1 (Bishkek–Torugart), Project 1 (BNT-1) and CAREC Transport Corridor 1 (Bishkek–Torugart), Project 2 (BNT-2). The cracks were generally about 2–3 cm wide. BNT-2 is at an altitude of between 2,000 and 3,000 meters, and the severe climate results in permanently frozen ground about 2 meters below the surface. After the first appearance of cracking, 4 trial pits were excavated and it was found that the cracks penetrated all the way to the depth of the frozen layer.
2. **Analysis and measures.** An analysis was conducted by a leading international expert, Dr. Geoffrey Rowe, who also reviewed climatic data for the period from early November 2012 to late March 2013. From mid-November to early March, temperatures never climbed above freezing and lows exceeded -30 C. Based on the excavations and climatic data, he concluded that frost penetration occurred between 1.8 and 2 meters in depth.
3. Based on these conclusions, he recommended additional drainage for the already-paved BNT 2, which was completed in 2013. The cracks were treated with bitumen in March and April 2013 in order to prevent moisture seeping into the cracks, which would result in further cracking as it froze. This is the common practice in other cold weather countries such as Canada, Mongolia, People’s Republic of China (PRC), and the United States. As the temperature rises, the cracks close and bitumen is expelled. Some of the cracks re-opened during the 2014–2015 winter, and were again treated with bitumen. Treating cracks with bitumen will have to be done on an annual basis after snow melt.
4. **Design.** One of the issues that arose during the investigation was the fact that the road design standards were general and are used for the entire country without referencing specific site factors (e.g., elevation, presence of frozen soil, temperature variations) and material supply conditions. Both BNT-1 and BNT-2 projects are subject to extremely cold temperatures during winter, and this affects both the roadbed and the road surface. The types of materials used in BNT-1 and BNT-2 projects were less than ideal; the fine materials content allowed under the contract was about 30%, and this is the material that absorbs the moisture that leads to the cracking.
5. The design standards were followed by the contractor with identified “soft spots” removed as the budget allowed. And as noted, additional drainage was constructed during 2013.
6. **Design changes.** Although the cracking issue was found too late to allow changes to the engineering design of either BNT-1 or BNT-2, lessons learned were incorporated into the design of BNT-3 (which completes the last 60 km of the corridor and finishes at the border with the PRC at an altitude of over 3,000 meters). For BNT-3, the height of the roadbed was raised to 1.8 meters and both the length and depth of the drainage were greatly increased. The permissible fine materials content was reduced to a maximum of 10%. Collectively, these design changes substantially increased costs and necessitated additional funding from ADB, but as a result, a large reduction in cracking is expected.¹ Cracks will still occur, as they do on all road projects, but the potential for widespread cracking—similar to that witnessed on BNT-1 and BNT-2—has been greatly reduced.

¹ ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant for Additional Financing, Kyrgyz Republic: CAREC Corridor 1 (Bishkek–Torugart Road) Project 3*. Manila.

7. **Other measures.** An additional factor accelerating and exacerbating the frost heave cracking is that many trucks entering the Kyrgyz Republic at the border with the PRC are overloaded. This additional weight causes rapid stress on the pavement and the roadbed. This is a secondary, but nonetheless important, contributor to the appearance of cracks. In some cold weather countries, weight/load limits are reduced in order to lessen damage to the road surface. It is recommended that weighing facilities be included in the customs facility to be financed by the PRC, and that all vehicles are weighed upon entering the Kyrgyz Republic, with overweight vehicles being required to either reduce their cargo or turn back.

8. In order to reduce frost heave cracking, it is also necessary to ensure timely removal of snow both from the road and the shoulder. There has been evidence of cases in the Kyrgyz Republic where the snow was removed only up to the edge of the pavement. As a result, when the snow melts, water is trapped and remains on the road, which negatively impacts the carriageway and can result in ice patches (when water freezes at night), thus presenting a potential road safety issue. It is recommended that snow be regularly removed during the winter, with none being left on the road shoulder.

**ORGANIZATION CHART, INVESTMENT PROJECTS IMPLEMENTATION GROUP
OF THE MINISTRY OF TRANSPORT AND COMMUNICATIONS**



Source: Ministry of Transport and Communications.