Completion Report

Project Number: 30271
Loan Number: 2085-LAO (SF)
March 2014

Lao People's Democratic Republic: Roads for Rural Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – kip (KN)

		At Appraisal (14 May 2004)	At Project Completion (17 June 2013)
KN1.00	=	$0.00009	$0.00012
$1.00	=	KN10,468	KN7,695

ABBREVIATIONS

ADB	–	Asian Development Bank
ADT	–	average daily traffic
BME	–	benefit monitoring evaluation
CDP	–	community development plan
CEMP	–	construction environmental management plan
DBST	–	double bituminous surface treatment
DOR	–	Department of Roads
DPWT	–	Department of Public Works and Transport
EIRR	–	economic internal rate of return
IEE	–	initial environmental examination
Lao PDR	–	Lao People's Democratic Republic
MCTPC	–	Ministry of Communications, Transport, Post, and Construction
MPWT	–	Ministry of Public Works and Transport
NDF	–	Nordic Development Fund
NFE	–	nonformal education
NTFP	–	nontimber forest products
OFID	–	Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development
RMF	–	Road Maintenance Fund
RUC	–	road user cost
SAP	–	social action plan
SBST	–	single bituminous surface treatment
SED	–	Social and Environmental Division
STD	–	sexually transmitted disease
TA	–	technical assistance

NOTE

(i) The fiscal year (FY) of the Government of the Lao PDR ends on 30 September. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2004 ends on 30 September 2004.

(ii) In this report, "$" refers to US dollars.

Vice President	S. Groff, Operations 2
Director General	J. Nugent, Southeast Asia Department (SERD)
Country Director	S. Nicoll, Lao People's Democratic Republic (Lao PDR) Resident Mission, SERD
Team leader	P. Chanthirath, Senior Project Officer (Infrastructure), Lao PDR Resident Mission, SERD
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BASIC DATA

A. Loan Identification

1.	Country	Lao People's Democratic Republic (Lao PDR)
2.	Loan Number	2085-LAO(SF)
3.	Project Title	Roads for Rural Development
4.	Borrower	Lao PDR
5.	Executing Agency	Ministry of Public Works and Transport
6.	Amount of Loan	SDR12,148,000 ($17,700,000 equivalent) as the original loan amount and SDR12,139,763 ($18,798,295 equivalent) as the net loan amount
7.	Project Completion Report Number	PCR: LAO 1437

B. Loan Data

1.	Appraisal	
	– Date Started	10 November 2003
	– Date Completed	21 November 2003
2.	Loan Negotiations	
	– Date Started	28 April 2004
	– Date Completed	29 April 2004
3.	Date of Board Approval	28 June 2004
4.	Date of Loan Agreement	15 December 2004
5.	Date of Loan Effectiveness	
	– In Loan Agreement	15 March 2005
	– Actual	30 June 2005
	– Number of Extensions	1
6.	Closing Date	
	– In Loan Agreement	30 June 2012
	– Actual	17 June 2013
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	1.0% during grace period and 1.5% during principal amortization
	– Maturity	32 years
	– Grace Period	8 years
8.	Terms of Relending	
	– Interest Rate	No relending
	– Maturity	
	– Grace Period	
	– Second-Step Borrower	

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
13 March 2007	7 June 2013	75 months
Effective Date	**Original Closing Date**	**Time Interval**
30 June 2005	30 June 2012	84 months

b. Amount SDR12,139,763 ($18,798,295 equivalent)

Cat. No.	Category or Subloan	Original Allocation	Partial Cancellation	Last Revised Allocation	Amount Disbursed	Undisbursed Balance
(1)	(2)	(3)	(4=3–5)	(5)	(6)	(7=5–6)
01A	Pakxane–Thasi road	1,235,000	807,079	427,921	427,921	0
01B	Other roads and UXO clearance	7,550,000	(3,479,460)	11,029,461	11,029,461	0
01C	Periodic maintenance	549,000	404,597	144,403	144,403	0
01D	Construction of forest product control	69,000	69,000	0	0	
02	Equipment	69,000	(896)	69,896	69,896	0
03	Consulting services	206,000	206,000	0	0	0
04	Interest charge	755,000	286,917	468,084	468,084	0
05	Unallocated	1,715,000	1,715,000	0	0	
	Total (SDR)	**12,148,000**	**8,237**	**12,139,763**	**12,139,763**	**0**
	Total ($ equivalent)	**17,700,000**	**12,526**	**18,798,295**	**18,798,295**	**0**

( ) = negative, UXO = unexploded ordnance, SDR = special drawing right.

10. Local costs (financed by the Asian Development Bank)

- Amount ($ million) 0.73
- Percent of local costs 4.89%
- Percent of total cost 1.48%

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign exchange cost	27.60	34.51
Local currency cost	11.60	14.95
Total	**39.20**	**49.46**

2. Financing Plan ($ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower financed	8.20	14.35
ADB financed (including IDC)	17.70	18.79
OFID	6.00	6.00
NDF financed	7.30	10.32
Total	**39.20**	**49.46**
Interest During Construction		
ADB financed	1.10	0.72
Total	**1.10**	**0.72**

ADB = Asian Development Bank, IDC = interest during construction, NDF = Nordic Development Fund, OFID = OPEC Fund for International Development.

3. Cost Breakdown by Project Component ($ million)

Component	Appraisal Estimate	Actual
A. Base Cost		
1. Land acquisition and resettlement	0.20	0.25
2. Civil works[a]	23.40	39.27
3. Consulting services[b]	7.00	5.74
4. Equipment	0.10	0.11
5. Project management	1.00	0.08
Subtotal	**31.70**	**45.45**
B. Contingencies		
1. Physical	3.10	0
2. Price contingencies	1.90	0
Subtotal	**5.00**	**0**
C. Interest During Construction	1.10	0.72
D. Taxes and Duties	1.40	3.29
Total	**39.20**	**49.46**

[a] Civil works included rural development roads and periodic maintenance.
[b] Including (i) construction supervision, (ii) social action plan, (iii) project preparation services,(iv) strengthening social and environmental management, and (v) road safety program.

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of contract with implementing consultants	July 2005	August 2006
Civil works contract C02: Xaisetha–Sanxai road		
Date of award	June 2006	October 2006
Completion of work	April 2010	December 2010
Civil works contract C01: Pakxane–Thasi road		
Date of award	June 2006	October 2006
Completion of work	April 2010	December 2010
Civil works contract C03: Pakton–Ban Vang road		
Date of award	January 2007	December 2006
Completion of work	April 2010	March 2010
Civil works contract C05: Sayabury–Hongsa road		
Date of award	November 2006	December 2006
Completion of work	December 2011	December 2010
Other milestones		
Road safety program		
Date of award	January 2005	July 2006
Completion of work	December 2007	June 2009

5. Project Performance Report Ratings

	Ratings	
Implementation Period	**Development Objectives**	**Implementation Progress**
From 30 June 2005 to 31 December 2005	Satisfactory	Satisfactory
From 1 January 2006 to 31 December 2006	Satisfactory	Satisfactory
From 1 January 2007 to 31 December 2007	Satisfactory	Satisfactory
From 1 January 2008 to 31 December 2008	Satisfactory	Satisfactory
From 1 January 2009 to 31 December 2009	Satisfactory	Satisfactory
From 1 January 2010 to 31 December 2010	Satisfactory	Satisfactory
From 1 January 2011 to 31 December 2011	Satisfactory	Satisfactory
From 1 January 2012 to 31 December 2012	Satisfactory	Satisfactory
From 1 January 2013 to 23 June 2013	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days[a]	Specialization of Members[b]
Fact finding mission	21 Apr–2 May 03	5	25	a, b, d, k, l
Appraisal mission	10–21 Nov 03	2	10	a, h
Special administration mission	18–29 Apr 05	5	55	a, f, g, k, l
Inception mission	14–24 Nov 05	5	50	a, c, f, k, i
Review mission	3–12 May 06	5	25	a, c, f, k, l
Review mission	23 Oct–2 Nov 06	4	32	a, c, e, f
Review mission	17–18 Sep 07	5	9	a, c, e, f, k
Review mission	1–9 Apr 08	3	18	c, e, k
Joint review mission ADB–NDF	24–27 Jun 08	3	12	e, h, k
Review mission	10–20 Nov 08	2	13	e, g
Review mission	12–25 Feb 09	4	27	e, g, j, k
Review mission	19–29 Oct 09	4	36	e, i, k, l
Midterm review mission	17 Feb–5 Mar 10	5	55	e, g, i, k, l
Review mission	19–29 Oct 10	3	18	e, g, l
Review mission	1–11 Apr 11	2	12	e, g
Review mission	3–7 Nov 11	2	10	e, g
Special administration mission	28 Dec–3 Jan 12	1	5	e
Review mission	17–26 Dec 12	2	12	e, g
Project completion review mission[c]	5–15 Jun 13	3	30	a, e, g

ADB = Asian Development Bank, NDF = Nordic Development Fund.

[a] Mission person-days estimated from aide-mémoire.

[b] a = transport specialist or economist, b = financial analyst, c = poverty reduction specialist, d = counsel, e =project implementation officer, f = operation officer, g = associate project analyst , h = NDF officer, i = resettlement specialist, j = country director, k = portfolio management specialist, l = environmental specialist.

[c] The project completion report was prepared by Phomma Chanthirath, senior project officer (infrastructure) and mission leader; and Thiphasone Donekhamyoy, associate project analyst; and assisted by consultant (a transport economist).


LAO PEOPLE'S DEMOCRATIC REPUBLIC
ROADS FOR RURAL DEVELOPMENT PROJECT
(as completed)
PEOPLE'S REPUBLIC OF CHINA
MYANMAR
VIET NAM
THAILAND
CAMBODIA
Mekong River
Nam Ngum Res.
102°00'E
106°00'E
20°00'N
16°00'N
PHONGSALY
LUANGNAMTHA
BOKEO
OUDOMXAY
LUANGPRABANG
HOUAPHANH
XIENGKHOUANG
VIENTIANE
VIENTIANE CAPITAL
XAYABOULY
BOLIKHAMXAY
KHAMMOUAN
SAVANNAKHET
SARAVAN
XEKONG
CHAMPASACK
ATTAPEU
C01
C02
C03
C05
Kaysone Phomvihane
0 50 100
Kilometers
National Capital
Provincial Capital
City/Town
Project Road
National Road
Paved Provincial Road
River
District Boundary
Provincial Boundary
International Boundary
Boundaries are not necessarily authoritative.
This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

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I. PROJECT DESCRIPTION

1. The Roads for Rural Development Project has contributed to economic growth and poverty reduction in the Lao People's Democratic Republic (Lao PDR) by providing access to poor rural districts through improvement of the transport network.[1] The areas served by these rural roads were among the poorest in the Lao PDR in terms of access to health care, education, and other services. Each project road provided improved access to one of the 47 priority poorest districts in the country. Most of the local populations in the project area had high levels of disease, malnutrition, and illiteracy, and few areas had access to safe water, sanitation, and electricity. The project relieved the isolation of these areas by reducing travel costs and time and eliminated the disruption of traffic during the wet season. The improved access enables continuous trade and economic exchange and undisrupted access to schools, medical facilities, as well as other social and civil services. The project components were consistent with the priorities agreed to in the Government of the Lao PDR's National Poverty Eradication Program,[2] the Asian Development Bank (ADB) Medium-Term Transport Strategy for the Lao PDR,[3] and the Northern Region Infrastructure Development Strategy[4] prepared through ADB technical assistance (TA).

2. Under the project (i) 287.3 kilometers (km) of selected roads to remote rural regions were rehabilitated, (ii) supplementary funding for road maintenance was provided through the Lao PDR Road Maintenance Fund (RMF) for an ADB-approved road, and (iii) a program for improved road safety was executed.[5] The upgraded rural roads were (i) the Pakxane–Thasi road (Borikhamxay province, 78.0 km); (ii) the Xaisetha–Sanxai road (Attapeu province, 54.4 km); (iii) the Pakton–Ban Vang road (Vientiane province, 42.7 km); and (iv) the Sayabury–Hongsa–Thaxoan road (Sayabury province, 112.2 km). The project also included provision of vehicle weighing equipment, establishing forest check points and vehicle weigh stations, implementing resettlement plans and social action plans (SAPs), and environmental management.

3. The landlocked Lao PDR is poor, mountainous, and sparsely populated. Most of the poor people live in rural areas with limited access. Road access is a key condition that underlies the potential for poverty reduction in the Lao PDR, both in terms of the ability to cost-effectively target services to the poor as well as the benefits in poverty reduction that result from economic growth. Improved road access removes cost barriers to the provision of social services and enhances the ability of the poor to benefit from overall economic growth. Thus, poverty reduction through improved accessibility can be both direct and indirect, with multisector implications, especially in education and health.

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[1] ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Lao People's Democratic Republic for the Roads for Rural Development Project*. Manila (Loan 2085-LAO[SF], approved on 28 June 2004).

[2] Lao PDR. 2003. *The government's National Poverty Eradication Program.* Vientiane.

[3] ADB. 2001. *Transport Sector Development: A Medium-Term Transport Strategy for the Lao People's Democratic Republic*. Manila.

[4] ADB. 2002. *Technical Assistance to the Lao People's Democratic Republic for Northern Region Strategic Action Plan.* Manila (TA 3969-LAO, $700,00, approved on 4 November, financed from the TASF)

[5] A fourth intended component—to provide a study of tariffs and policies for transport services to promote increased efficiency in road transportation—was deleted in August 2010 as agreed during the joint ADB–Nordic Development Fund (NDF) review mission in March 2009 because this has been addressed through a World Bank diagnostic study which was commissioned by ADB and funded by the Public–Private Infrastructure Advisory Facility. The consultant report was submitted by R. Allan. (R. Allan. 2005. Institutional and Regulatory Framework for Road Transport Services in Lao PDR - Descriptive and Diagnostic Analysis of Road Transport in Lao PDR. Vientiane, December.)

4. The goal of the project was to induce economic development and social integration, and thereby reduce poverty through the connection of all district and provincial centers in the Lao PDR, both to each other and to the national economy. This network of all-weather roads is to be well maintained and is to support efficient transport services. The purpose of the project was to increase access to adequate, reliable, affordable, and safe all-year road transport in remote rural regions.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. The project was consistent with ADB's country strategy and program,[6] as well as the country's development objectives. At appraisal, the Lao PDR faced a number of transport-related challenges that were broadly subdivided into four major groups: (i) the need to develop reliable road access throughout the country to promote economic development and cohesion and reduce poverty; (ii) the need to improve road management, especially road maintenance and its funding, to secure existing and future road assets; (iii) the need to reduce the high and growing number of road accidents, with the rapidly growing associated economic and social costs; and (iv) the provision of efficient transport services.

6. The government strategy at appraisal gave high priority to improving the road transport system to facilitate (i) the movement of agricultural products from surplus to deficit areas, (ii) the flow of consumer goods and agricultural inputs to rural areas, (iii) the marketing and export of cash crops and other produce, and (iv) participation in regional and international trade. The government targets for physical infrastructure development included (i) completing the national road network, (ii) improving the provincial road network, (iii) upgrading transit routes, and (iv) establishing a sustainable maintenance system to preserve the country's transport infrastructure. All-weather access was provided to 16 of the government's list of the 46 poorest districts under current or committed ADB projects, including the Xieng Khuang Road Improvement Project[7] and the Rural Access Roads Project[8]. Under an ongoing plan as part of the National Poverty Eradication Program, the former Ministry of Communications, Transport, Post, and Construction (MCTPC) was addressing the improvement of access to the districts that lack year-round road access and provision of road access to areas that lack it entirely.

7. At appraisal, the ADB strategy for the road subsector in the Lao PDR proposed that ADB's main development focus for the medium term was to induce rural development through increasing access of rural areas to markets. Priority was to be given to providing access to provinces with poor connections to the main road network, and to completing missing links in the road network. These priorities were consistent with those proposed in the government's National Poverty Eradication Program, prepared in 2003, and the draft Northern Region Infrastructure Development Strategy being prepared under ADB TA.[9]

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[6] ADB. 2003. *Country Strategy and Program: Lao People's Democratic Republic, 2004–2008.* Manila.

[7] ADB. 1997. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Lao People's Democratic Republic for the Xieng Khouang Road Improvement Project*. Manila

[8] ADB. 2000. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Lao People's Democratic Republic for the Rural Access Roads Project*. Manila

[9] ADB. 2002. *Northern Region Strategy Action Plan*. Manila.

8. The project preparatory TA[10] for the project was well executed and provided a solid base for project formulation. The project design also benefited from previous lessons learned in the Lao PDR road subsector, and included advance action and detailed engineering design components in preceding projects. Roads for the project were identified through initial screening based on provincial priorities, poverty indicators, and links to the national road network. This initial screening was further refined using a multicriteria analysis that took into account traffic; impact on poverty; agricultural potential; links to the national road network, external trade, and other development projects; social and environmental sensitivity; and gender issues. The final selection was confirmed during project preparation. Detailed design and contract documents were available for the Pakxane–Thasi road (79.4 km) and Xaisetha–Sanxai road (53.8 km). An outline description of work required for the Pakton–Ban Vang road (42.8 km) was available, though more detailed design work was required. Full documentation was available for the Sayabury–Hongsa–Thaxoan road (113.0 km).

9. The government and ADB transport sector strategies remain the same today, as the Lao PDR's development plans have consistently supported the expansion of the road network, with an emphasis on regional connectivity. ADB's strategy has evolved to focus more on regional roads to improve connectivity with neighboring countries. ADB's investment in rural roads is not only through its transport sector portfolio but also through its agriculture and rural development lending window. ADB's completed and ongoing assistance has contributed to the improvement of about 2,536 km of such roads in the Lao PDR, and the quality of outputs has generally been assessed *satisfactory*.[11]

B. Project Outputs

1. Rural Development Roads

10. Under the rural development roads component of the project, provincial and national roads were upgraded to provide access to rural areas that, at appraisal, had inadequate access to markets. The original scope of pavement comprised road sections to be of paved gravel[12] in flat terrain near villages and steep slopes, and gravel[13] in flat and/or rolling terrain away from villages. During implementation, unusual climate conditions in the Lao PDR resulted in widespread flooding[14] that damaged gravel roads, including some of the project roads. It then became one of the government's high priorities to complete all project road sections with paved gravel to reduce the risks and as far as possible limit the recurrent high maintenance costs for gravel roads. Consequently, in December 2009, the Ministry of Public Works and Transport[15] (MPWT) decided to replace all gravel with paved gravel throughout whole sections (necessary variation orders were issued in January and March 2010). The original scope and actual pavement constructed is summarized in Appendix 2, Table A2.1. The total actual road length constructed was slightly less than expected at appraisal because of realignment done during

[10] ADB. 2001. *Technical Assistance to the Lao People's Democratic Republic for preparing the Roads for Rural Development Project.* Manila (TA 3756-LAO, $400,000, approved on 30 October, financed from the Japan Special Fund).

[11] ADB. 2010. *Sector Assistance Program Evaluation for the Transport Sector in the Lao People's Democratic Republic*. Manila.

[12] Paved gravel comprised sub-base, base, and double bituminous surface treatment (DBST) on the road carriageway and single bituminous surface treatment (SBST) on road shoulders.

[13] Gravel comprised sub-base material with California bearing ratio (CBR) greater than 35%.

[14] Typhoon Ketsana (29 September–2 October 2009) flooded the provinces of Sekong and Attapeu, including the Xaisetha–Sanxai project road (km 0–km 7) and engineer's camp. Storms in 2010 also flooded and damaged roads and bridges in Sayabury province, north of the Sayabury–Hongsa–Thaxoan project road.

[15] At appraisal, it was the MCTPC and it was renamed the MPWT in October 2007.

implementation. The paved gravel scope (186 km) was significantly exceeded (226 km), including additional paved gravel funded by the government, with the long-term benefits of lower annual maintenance costs, lower vehicle operating costs, and shorter travel times for road users. Three forest checkpoints and vehicle weigh stations were established during the project extension period in 2012, using savings through contract variations. The check points and weigh stations were located in places where logging trucks were using project roads.[16]

2. Resettlement

11. The resettlement component financed implementation of resettlement plans for all project roads. At appraisal, full resettlement plans for the Pakxane–Thasi, Xaisetha–Sanxai, and Sayabury–Hongsa roads were prepared to comply with ADB's Involuntary Resettlement Policy (1995) and Handbook on Resettlement[17]. A resettlement framework was prepared for the remaining project roads, full resettlement plans were prepared, and full compensation was paid during project implementation prior to commencement of civil works on these road sections. In June 2009, the government decided to realign the approach road to Nam Houng Bridge in Ban Natak on the Hongsa side to improve the road geometry. The project resettlement committee and district authority conducted consultation meetings with the affected persons and a resettlement survey of the affected households to determine the total resettlement costs. During implementation, 187 affected persons were compensated compared with the estimated 328 at appraisal, and the remaining affected persons were either not affected or withdrew voluntarily[18] in accordance with the resettlement plans updated during implementation. Resettlement monitoring reports were disclosed to the affected communities with the participation of local people and authorities. Detailed resettlement activities and outputs are summarized in Appendix 3.

3. Periodic Maintenance

12. The project included funding for the RMF to help address funding deficits until domestic funds met the requirements of a sustainable network. The financing was applied to a periodic maintenance contract identified by the RMF's road maintenance management system, and ADB approved the contract based on evaluations prepared using standard RMF procedures that were accepted on previous projects. The output related to emergency works for repairs of structures and box culverts along 139 km of national road 2W from Oudomxay to Pakbeng in Oudomxay province, costing $220,000 and completed in March 2008. Since completion, the government has continued to support the project road maintenance under a performance-based 3-year periodic maintenance contract for KN59.16 billion (equivalent to $7.40 million), as well as labor-based contracts for routine maintenance totaling KN261 million (equivalent to $30,000) so that the project roads can be accessed all year round. Appendix 12 details road maintenance contracts.

4. Project Preparation Services

13. At appraisal, project preparation services included consulting services for (i) preparing detailed implementation documentation for the Paxton–Ban Vang and Hongsa–Thaxoan roads, (ii) revising documentation for the Sayabury–Hongsa road, (iii) preparing detailed

[16] One each for contract C01 (Pakxane–Thasi road), C03 (Pakton–Ban Vang road), and C05 (Sayabury–Hongsa road).
[17] ADB. 1995. A Guide to Good Practice. *Handbook on Resettlement.* Manila.
[18] Some affected persons elected to make voluntary contributions of affected land that complied with resettlement.

implementation documentation for future subprojects for transport network improvement projects, and (iv) conducting a tariff study to determine the viability and affordability of transport services. Prior to the recruitment of consultancy services, the first three of these tasks had already been prepared. Therefore, only the detailed engineering designs and procurement documentation had been reviewed and/or finalized by the consultants. During implementation,[19] the Transport Services Tariff and Policy Study was covered under a separate project financed by ADB[20] and, therefore, was not carried out under the project, as agreed during the joint ADB–Nordic Development Fund (NDF) review mission in March 2009. The deletion of the above component resulted in cost savings in the consulting services package, which were utilized to cover the shortfall in payments of civil works under contract C01 (Pakxane–Thasi road).

5. Road Safety Program

14. The project aimed to (i) start the implementation of the National Road Safety Strategy through the detailed action plan prepared under ADB's Road Safety in the Association of Southeast Asian Nations TA;[21] (ii) help the government establish a national road safety council to coordinate all road safety issues; (iii) develop mechanisms to administer road safety activities, including sustainable funding and private sector partnerships; (iv) disseminate educational and advisory materials on road safety, especially to the provinces; (v) establish a road accident database accessible by all road safety agencies; (vi) establish demonstration projects on identification, analysis, and elimination or alleviation of accident black spots; (vii) develop capabilities in emergency services and incident response; (viii) provide enforcement equipment; (ix) provide driver training and vehicle inspection; and (x) identify road safety issues that impact specifically on the poor.

15. On completion of this project component, the basis for an effective road safety organization was established; the National Road Safety Committee (NRSC) and Provincial Road Safety Committee (PRSC) and secretariat were established; the Road Safety Fund, Road Safety Auditing, and Road Accident Information System were introduced and an emergency call center was established; the training and capacity development on road safety were provided to staff of the MPWT, DPWTs, and Department of Traffic Police (DOTP); and 15 tasks of the road safety action plan were prioritized, including further recommendations. Appendix 4 gives further details.

6. Social Action Plan

16. The project included a SAP to implement social safeguard requirements of the Lao PDR and ADB. This component comprised community development plans (CDPs) for ethnic minorities on two roads and a resource management plan for nontimber forest products for one road. For all roads there were programs to secure land tenure, a community road safety awareness program, and programs for awareness. As the road improvements rendered the mainly ethnic minority communities along the Xaisetha–Sanxai and Sayabury–Hongsa roads vulnerable (because of their low numbers and low literacy rates), the project included ethnic minority development plans as required by ADB's Indigenous Peoples Policy. The ethnic minority plans were called CDPs because the ethnic minority families were integrated with the nonminority population. CDPs were prepared for the Xaisetha–Sanxai and Sayabury–Hongsa

[19] A minor change in project scope was approved on 5 August 2010.
[20] The study was commissioned by ADB and funded by the Public–Private Infrastructure Advisory Facility. Expenditure of the funds was managed by the World Bank. ADB. 1995. *Institutional and Regulatory Framework for Road Transport Services in Lao PDR: Descriptive and Diagnostic Analysis of Road Transport in Lao PDR.* Manila.
[21] ADB. 2002. *Road Safety in the Association of Southeast Asian Nations*. Manila.

roads, where two-thirds of the populations are of various ethnic minorities. These CDPs included nonformal education and social marketing. A policy framework was also prepared to guide preparation of CDPs for the Pakton–Ban Vang and Hongsa–Thaxoan roads. All communities along all project roads benefited from awareness and prevention programs for HIV/AIDS, human trafficking, and traffic safety. There were no cases of human trafficking connected to the road construction because a great number of service women, construction workers, and peer educators have increased their knowledge on the dangers of human trafficking. This information was provided by project working teams and peer educators during the project implementation period. Details are provided in Appendix 5.

7. Environmental Management

17. After approval of the project environmental management plan and prior to commencement of the civil works, all contractors prepared a construction environmental management plan and surplus material disposal plan that were designed to mitigate environmental effects. In general, the road section subprojects have been satisfactorily managed environmentally during implementation and the result has been positive for the local population. In all contracts, as a result of roadway excavations and landslides in the mountainous sections during 2007-2009, some surplus materials were uncontrollably pushed onto the lower slopes and river banks, particularly during urgent removal of landslides to open roads to traffic. Most of the slopes have now revegetated naturally. Some areas require further trimming of the few remaining cut materials on slopes left during construction. Several borrow pits have been opened on all road sections, with the agreement of the landowners and local government authorities. In general, the opening of borrow pits and storage areas has not created significant environmental impacts. A negative indirect impact from the Pakxane–Thasi road subproject is the apparent increase in logging. Many of the logging trucks use the project road from Thasi to Borikhan, and this requires enforcement of the Forestry Law of Laos. To alleviate this problem, equipment for axle load control was procured under the project to enable vehicle axle load checking. During project implementation, the consulting services have supported capacity building for the Social and Environmental Division (SED) of the Department of Roads and DPWTs, and an external training course on contract management and environmental management was provided to a group of 10 MPWT staff. To date, the capacity building of the SED staff has developed and they have been providing social and environmental management for ongoing ADB-financed road projects.

C. Project Costs

18. Components of the appraised and actual project costs are detailed in Appendix 6 and summarized in the following table, together with an outline of the financing plan. Annual expenditure by loan category is also in Appendix 6. At appraisal, 58% of total project costs were associated with rural roads development,[22] while actual total project costs were $49.5 million (79% of total project costs), $10.3 million higher than appraisal estimates. This higher project cost was due to government decisions to (i) change the design gradients on steep road sections,[23] and (ii) upgrade all designed gravel roads to double bituminous surface treatment (DBST) or paved gravel standard.[24] The government funded all higher project costs[25] after allowance for currency

[22] Including contingencies and excluding interest.
[23] The government initiated road gradient changes from 22% to a maximum of 16%–18% on the steeper road sections for safety purposes in April 2008.
[24] The government approved additional funds of $3.4 million for an additional 91 km of DBST pavement works in June 2010.

gains associated with the ADB loan ($1.1 million). With the delayed project implementation and the increased funding of periodic road maintenance through the RMF, this project component was reduced from $1.0 million to $280,000 and the funds reallocated to civil works.[26] The increased NDF funding included a supplementary credit to cover the civil works funding shortfall.[27] The appraisal and actual division of costs was broadly the same at 70% foreign and 30% local currencies.

Appraisal and Actual Project Expenditures
($ million)

Source	Cost Estimates at Appraisal				Actual Expenditure at Completion[b]			
	Foreign	Local	Total	%	Foreign	Local	Total	%
ADB	16.10	1.60	17.70	45	18.44	0.35	18.79	38
Cofinancing								
OFID	6.00	0.00	6.00	15	6.00	0.00	6.00	12
NDF	5.50	1.80	7.30	19	10.07	0.25	10.32	21
Government	0.00	8.20	8.20	21		14.35	14.35	29
Total[a]	**27.60**	**11.60**	**39.20**	**100**	**34.51**	**14.95**	**49.46**	**100**

ADB = Asian Development Bank, NDF = Nordic Development Fund, OFID = OPEC Fund for International Development.
[a] Includes taxes and duties.
[b] Includes government disbursements to upgrade project gravel roads to paved gravel.
Sources: ADB's Loan Financial Information System, OFID disbursement records, NDF disbursement records, government disbursement records.

D. Disbursements

19. Following project approval on 28 June 2004 and effectiveness on 30 June 2005, the first ADB loan disbursement for project activities was on 13 March 2007,[28] 1 year later than estimated. Projected and actual disbursements are compared in Appendix 7, and the comparison shows that, despite the initial delay in disbursement commencing, actual cumulative disbursement was slightly higher than estimated throughout, and in 2011 (the estimated date for the final disbursement), 97% of the final sum had been disbursed. The final loan amount disbursed ($18.8 million) was higher than estimated ($17.7 million) as a result of exchange rate fluctuation against the loan currency.

20. Loan disbursements for all contracts for consulting services and civil works that were bid under international competitive bidding procedures, for local competitive bidding for civil works contracts and for incremental expenditures, were through direct payment procedures defined in ADB's *Loan Disbursement Handbook* (2007).

[25] The government fund was increased to cover additional DBST pavement of about 41 km to reduce maintenance cost in future, as approved by the government on 2 July 2010.
[26] Reallocation covered foreign exchanges cost in accordance with request of the Ministry of Finance (MOF), on behalf of the Borrower, dated 27 April 2007 as a result of the increased funding of the RMF being adequate to fund the periodic maintenance costs originally planned to be provided by the project.
[27] Following the joint ADB–NDF review mission on 25–27 March 2009, the NDF loan savings and a supplementary credit of €1.5 million were approved by the NDF on 8 April in response to the request of the MPWT dated 6 April 2009.
[28] Consulting services and resettlement costs were covered by NDF financing and the first disbursement by the NDF was on 10 November 2006. The first disbursement from OFID financing for civil works was on 18 May 2007.

E. Project Schedule

21. Appendix 8 provides a chronology of main events during project implementation. At appraisal, it was estimated that the project would be implemented over 8 years. The original closing date was 30 June 2012. Appendix 9 outlines a comparison of the time-based appraisal and project administration manual implementation schedules[29] with actual implementation. Limited preparatory tasks were completed in the first year after loan approval until loan effectiveness on 30 June 2005. Despite this one-year delay, the loan closing date only had to be extended by 6 months to 31 December 2012. Thus, the project implementation period was 7.5 years, 6 months less than the implementation period envisaged at appraisal.

F. Implementation Arrangements

22. The implementation arrangements at appraisal designated the MPWT as the executing agency and the Department of Roads (DOR) as the implementing agency. A project management unit was established, headed by a project manager[30] who was directly responsible for project supervision and was accountable to the DOR director general. The departments of public works and transport[31] (DPWT) in each province where a project component was implemented provided counterparts to work with the project management unit. The team leader of the construction supervision consultants was the engineer's representative for the civil works, and provided support to the project management unit. These arrangements yielded effective project management throughout implementation as the DOR had extensive experience in implementing externally funded projects.

23. The implementation arrangements as designed at appraisal were assessed *adequate* to deliver project outputs and achieve the project purpose. Procurement and consulting recruitment procedures were adequate for decentralized implementation in the remote rural areas where the road sections were located. These implementation arrangements resulted in timely and effective performance at national and provincial levels, with the availability of suitable technical resources, and future similar projects should adopt this implementation framework.

G. Conditions and Covenants

24. The project has consistently and fully complied with loan covenants. Appendix 10 presents an overview of compliance with loan covenants. Loan effectiveness was delayed by 12 months after loan approval because of the time required for the cofinancing agencies—the NDF and the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development (OFID)—to complete effectiveness conditions of their loans. The audited project accounts[32] were submitted to ADB on time and, in practice, all procurement was undertaken in conformity with the ADB guidelines. No imprest account was established and no statements of expenditures produced. All payments were made from ADB directly to the contractors. No case

[29] The revised project administration manual implementation schedule was prepared during the project inception mission in November 2005, thus updating the appraisal implementation schedule to reflect the 1-year delay awaiting loan effectiveness.

[30] At appraisal, the then MCTPC confirmed the full-time appointment of the project manager.

[31] At appraisal these departments were known as departments of communications, transport, post, and construction.

[32] A qualified audit report was submitted because (i) there were three checkpoints and vehicle weigh stations established in the project roads in accordance with loan covenants, contradictory to the government's notice (Ref. no. 1179/GOL of 17 June 2011) to cancel 26 out of 39 checkpoints in the Lao PDR; and (ii) procurement of equipment for controlling overloaded trucks was undertaken with shopping method of $100,000 following the ADB guidelines on procurement but, in the auditor's opinion, national competitive bidding should have been used.

of fraud and/or corruption was found in the project because all the purchasing and bidding processes were undertaken in conformity with both ADB's Guidelines on the Use of Consultants and Procurement Guidelines, and any changes in project scope or proposed variations were reviewed and approved by both the MPWT and ADB.

H. Consultant Recruitment and Procurement

25. At appraisal it was estimated that 188 person-months of international consultant services and about 1,589 person-months of national consultant services were required to assist in the following: (i) construction supervision, including implementing the community safeguards, developing plans for resettlement and ethnic minority development, and developing the environment management program; (ii) project performance monitoring and evaluation; (iii) project preparation services, including preparing feasibility studies, plans for resettlement and ethnic minority development, and detailed engineering designs; (iv) managing social and environmental impacts; (v) developing and implementing a road safety program; (vi) implementing a SAP for local resource management, nonformal education, road safety awareness, and developing awareness and prevention programs for HIV/AIDS, sexually transmitted diseases, and human trafficking; and (vii) graduate education for environmental and social staff.

26. The consultants were to be recruited as an association of international and national firms or individuals, as appropriate, engaged by the government. The consultants were to be recruited in accordance with ADB's Guidelines on the Use of Consultants and other arrangements satisfactory to ADB on the engagement of national consultants or, for NDF-funded services, in accordance with NDF recruitment guidelines. Services were divided into four packages: (i) construction supervision, projection preparation, and SAPs. Recruitment for this package of services was to be based on NDF guidelines; (ii) strengthening of social and environmental management**.** Recruitment for this package was based on procedures for the recruitment of individual consultants following ADB guidelines; (iii) road safety program. Recruitment for this package of services was based on NDF guidelines; (iv) graduate education for environmental and social staff**.** Recruitment for this package was based on direct selection following ADB guidelines.

27. Consultant recruitment through NDF-financed packages was to begin upon approval of the NDF loan. During implementation, the consulting services for strengthening of social and environmental management to be funded by ADB was undertaken under the construction supervision consultant package financed by the NDF,[33] as requested by the MPWT. The ADB allocated budget was reallocated to civil works in July 2007.

28. All consulting services were eventually financed under the NDF loan and selection was in accordance with NDF recruitment guidelines. Recruitment commenced in January 2005, prior to NDF loan effectiveness (29 June 2005) and ADB loan effectiveness (30 June 2005). Recruitment of the road safety consultants was completed in July 2006, while the construction supervision consultant package recruitment was completed in July 2006. The NDF also funded a separate small consulting contract ($150,000) for institutional strengthening at the MPWT. Procurement of all civil works contracts was done in accordance with ADB's Procurement Guidelines*.* Bidding for civil works contracts of $1 million and more followed international

[33] External and internal training courses were provided to staff of the Social and Environmental Division (SED) of the MPWT and DPWTs during implementation. As a result, the SED staff are able to supervise and/or monitor both resettlement and environmental activities for ongoing projects financed by ADB and other development partners.

competitive bidding procedures (four civil works contracts), and contracts of civil works of less than $1 million followed national competitive bidding procedures (periodic road maintenance).

I. Performance of Consultants, Contractors, and Suppliers

29. Overall, the performance of the consultants was *satisfactory*, as reflected in the ADB review mission's back-to-office reports. The consultants mobilized in a timely manner and made several replacements without impacting on project performance. The consultants were, however, late in conducting the benefit monitoring evaluation (BME) baseline surveys, which were undertaken during December 2008–February 2009, after civil works had commenced on all project road sections.[34] This has made it difficult to make accurate impact assessments on the project outputs. The BME surveys conducted during December–February 2008 and 2010 were satisfactorily completed and provide a basis for project impact assessment over this period.

30. The wide geographical spread of the project road segments presented the consultants with challenges and required extensive travel between the civil works locations. The budget allocations for the SAPs were likely inadequate for the geographical spread of work required of the consultants responsible for these tasks. Because of civil works design changes and the increased scope of work, the consultant's contract was extended from September 2010 until 31 May 2011, but this work was managed within the original contract price for consulting services.

31. The performance of the civil works contractors was assessed *satisfactory* overall. A summary evaluation of contractor performance on each road section contract is provided in Appendix 2. Contractors for the first two contracts—the Pakxane–Thasi and Xaisetha–Sanxai roads—completed their civil works satisfactorily and on time, despite some adverse weather that impacted the Xaisetha–Sanxai road during the 2009 and 2010 wet seasons. The original contractor for the Pakton–Ban Vang road performed poorly but, after the MPWT took timely action and reassigned some of the contract sections to the contractor who worked on the Pakxane–Thasi road, this road section was completed satisfactorily within time, allowing for the contract variation to upgrade all road sections to paved gravel. The original joint-venture contractors for the Sayabury–Hongsa road also performed poorly but, after the MPWT took timely action and reassigned some of the contract sections to the contractor who worked on the Pakxane–Thasi road, this fourth road section was completed satisfactorily within time, allowing for the contract variation to upgrade all Sayabury–Hongsa road sections to paved gravel and to add the Hongsa–Thaxoan road section. Prior to the start of civil works, all land encumbrances were cleared by the contractors after receiving written instructions from the construction supervision consultant based on the approval of the project resettlement committee and village authorities. At the completion of all road civil works, the quality of civil works was rated *good* by the MPWT.

J. Performance of the Borrower and the Executing Agency

32. The performance of the borrower and the MPWT as executing agency was *satisfactory*. The MPWT (i) followed ADB procedures for procuring goods and equipment; (ii) successfully coordinated the activities of the DOR (as implementing agency) and the provincial DPWTs; (iii) undertook timely action to handle the nonperformance of several civil works contractors; (iv)

[34] Under a loan covenant, a BME baseline survey was to have been undertaken within 1 year of loan effectiveness (by 29 June 2006). However, the consultants were not recruited and mobilized until July 2006. Despite several requests from ADB review missions, the consultants did not submit an acceptable BME program to ADB until April 2008. The final BME program outline was completed in June 2008.

provided increased financing support for additional pavement to reduce road maintenance costs and continued to maintain project roads after completion; and (v) continued to implement road safety action plans and management of the road accident information system.

33. The engineering and technical skills of the executing and implementing agency were adequate for sound project implementation management. It appears that the project administration staff in the DOR and provincial DPWTs have developed stronger implementation capacity as a result of this project.

34. The lack of appreciation of the BME system and the need to regularly assess project impacts (as measured in the project framework) within the MPWT, DOR, and provincial DPWTs was apparent during project implementation. During the project completion review mission, discussions with the director general of the DOR in the MPWT indicated that the MPWT now better understands the importance of these tasks and would address these issues in future projects.

K. Performance of the Asian Development Bank

35. ADB's overall performance is rated *satisfactory*. The inception mission was conducted 4 months after loan effectiveness. ADB undertook 14 review missions to monitor, supervise, and administer the project.[35] These provided advice on technical issues; procurement procedures; bid preparation, documentation, and evaluation; civil works quality assurance; and loan administration. ADB responded adequately to (i) requests to reallocate loan proceeds, including those related to cofinancing loans and additional government project cost contributions; (ii) requests to approve contract variations to facilitate completion of the civil works program; and (iii) issues raised through review mission memoranda of understanding. Throughout the project, ADB worked to facilitate progress in resolving procurement and contracting delays. The MPWT's project completion report rated ADB's role in achieving the project targets and intended benefits as *satisfactory*. The MPWT noted that ADB had visited all four project sites together with officials of the MPWT, consultant, DOR project management team, and contractors. The MPWT also noted that the ADB Lao PDR Resident Mission assisted and advised the MPWT in the timely approvals of many variations ordered and the subsequent reallocation of loan proceeds within the project administration manual guidelines.

III. EVALUATION OF PERFORMANCE

A. Relevance

36. At both appraisal and completion, the project design was *highly relevant* to government and ADB policies and strategies to provide rural poor people with better access to markets, employment, and social facilities to thus contribute to economic growth and poverty reduction. The provision of new and improved rural roads linking the rural poor with nearby markets provided farmers improved access to raw material inputs as well as possibilities for sale of agricultural and other home-based production, thus lowering input costs and improving rural household earnings. The improved transportation access yielded additional social benefits for rural poor people in terms of better access to community, health, and education services.

37. The appraisal work used to justify this project intervention was soundly based on extensive analysis and evaluation, including participation of all stakeholders, as well as

[35] Including several joint review missions with NDF personnel.

consideration of constraints on achieving the expected project outcomes. Lessons learned from previous rural roads and rural development projects were incorporated in the project design. The financing instruments chosen were appropriate to provide a balanced input from cofinancing partners and involved additional integrated inputs from other development partner agencies,[36] Lao PDR community groups,[37] and nongovernment organizations.[38]

B. Effectiveness in Achieving Outcome

38. The project was assessed *effective* in achieving the access infrastructure outcome, with 226 km of paved gravel rural roads and 61 km of gravel roads against a target of 186 km, though the total was only 287 km against a target of 289 km, of which 103 km was only planned at gravel road standard. The small shortfall was due to shorter road alignments[39] and was compensated for by the additional 40 km of gravel roads upgraded to paved gravel standard. This improved road surface standard provides lower-maintenance roads and adds to the sustainability of roads. The improved pavement standards will also generate savings in vehicle operating costs and road user travel time. The project completion review mission noted the significant new agricultural, commercial, and residential development occurring along all project roads and the increased size of the village commercial centers.

39. All other project outputs were assessed *effective*. The periodic maintenance subproject was achieved on schedule with repairs to structures and box culverts along 139 km of national road 2W. The Road Safety Program achieved all important outputs including the creation of enabling legislation to establish the National Road Safety Committee (NRSC) and secretariat, and the Road Safety Fund. Implementation of the National Road Safety Strategy and Action Plan was achieved, provincial road safety committees established, a road accident data system introduced, and a significant training program completed. All resettlement activities were completed in advance of civil works commencement and all compensation payments made. The SAP was successfully implemented and comprised CDPs[40] for ethnic minorities and a resource management plan for nontimber forest products (NTFPs). No cases of human trafficking can be connected to the project civil works program. Not all project outputs were achieved, including the operation and implementation of axle load control and forestry checkpoints[41] and the issue of land use rights certificates.[42]

C. Efficiency in Achieving Outcome and Outputs

40. The project remained *efficient* and details of the economic reevaluation are in Appendix 11. The project completion review mission reexamined the methodologies, assumptions, and results of appraisal; followed the same methodology; and benefited from having actual project costs and post-project survey data. The project recorded an economic internal rate of return (EIRR) of 20.8%, higher than the 17.8% estimated during appraisal, exceeding the benchmark discount rate of 12.0%. The major benefits stream is related to road user cost savings derived

[36] Swedish International Development Cooperation Agency and International Fund for Agriculture Development.
[37] Women's Union, Youth Union, and Development and Cooperation in Central Asia.
[38] INGO Luxemburg.
[39] Realignments shortened the Pakxane–Thasi and Sayabury–Hongsa roads during the implementation period.
[40] Including nonformal education and social marketing.
[41] Failure to achieve these outputs were impacted by government actions to restrict axle load and forestry checkpoints to border stations, though temporary stations with mobile weighing scales are being implemented on selected roads.
[42] The process of land registration and land utilization and/or occupancy to be undertaken in rural areas including those on the project roads by the state is still awaiting further funding. This needs to be followed up during the conducting of BME after 2 years of loan closure.

from the smoother road surfaces provided under the project. The range of EIRRs for the separate road sections was 15.8% to 23.2%. A reappraisal sensitivity analysis indicated that the base-case EIRR remained above the 12% benchmark when benefits were diminished by up to 38%, thus suggesting that the project is robust. The project completion review mission visits found that most project road sections were being maintained under the 3-year performance-based contracts for periodic and routine maintenance under the supervision of provincial DPWTs where the project road is located, and this is likely to be increasing road user benefits and keeping the project road accessible in all weather conditions.

D. Preliminary Assessment of Sustainability

41. Sustainability of the project road sections is *likely* in view of the implementation of an effective road maintenance funding mechanism by the government through the RMF and annual budget allocations to provincial governments for rural road maintenance. Appendix 12 details the current 3-year performance-based management contracts[43] and labor-based management contracts already in place for these project road sections. The funding base for the RMF is broadening and annual expenditure allocations increasing, giving some confidence of future sustainability. The project completion review mission noted some maintenance work in progress during field visits, though the more significant road maintenance activity occurs after the annual rainy season.

E. Impact

42. Project environmental management plans, community environmental plans, and surplus materials disposal plans were successfully implemented and all civil works were satisfactorily managed environmentally.

43. The project's resettlement activities were successfully completed and there are no further resettlement impacts associated with the project. As outlined in Appendix 3, only 187 persons were impacted by the project, without any resettlement or severe impacts, and all affected persons were adequately compensated. No indigenous peoples were negatively affected.

44. Household incomes of the general population increased 13% between FY2009 and FY2011 and likely exceeded the project framework target of 20% if baseline data had been collected prior to civil works commencing. Poverty indicators for the project area were not available but anecdotal evidence suggests that there has been increased agricultural, commercial, and residential activity along most road sections, which would have led to an improvement in poverty indicators. New agricultural developments have arisen, particularly when integrated with other agricultural development projects.[44]

[43] Two of these contracts have been recently cancelled after 1 year of implementation as a result of these roads being part of a national road. Future funding of these now national roads will be through the RMF subject to yearly allocation based on the actual works done by contractors.

[44] Particularly the road extension to Sanxai, where an active agricultural coffee development project under the International Fund for Agricultural Development has generated new estate developments.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

45. The project was rated *successful* because it achieved all significant outputs and, despite a 1-year delay in loan effectiveness, was completed only 6 months later than expected at appraisal. All rural roads—the major project component accounting for 78% of total project costs—were completed in a timely manner, with MPWT interventions to reassign civil works contract allocations away from nonperforming contractors to performing contractors in a timely manner. Road maintenance funding has been ensured through appropriate funding mechanisms, and 3-year periodic maintenance contracts have been awarded. Where these contracts were subsequently cancelled, especially for the project roads built as a part of national roads, maintenance activity will continue subject to yearly allocation based on the actual works done by contractors. This ongoing funding will be sourced directly from the RMF for national roads and provincial contribution for provincial roads.

46. The project design was *highly relevant* and its outcome *efficient*. The project achieved positive economic and social outcomes and output, as borne out in the economic reevaluation. Details of the project ratings are given in Appendix 11.

B. Lessons Learned

47. The project demonstrated that the improvement and upgrading of rural roads in the poorer districts of the Lao PDR is a viable delivery mechanism for the planning, development, and management of rural access roads to yield developmental benefits to poorer and remote communities. While project cost escalations compared with appraisal estimates are difficult to anticipate, a primary lesson learned was the benefit of advanced design and tender document readiness for civil works being prepared at appraisal. This allows early civil works contracting and mobilization, ensuring appraisal loan completion dates can be achieved.

48. The difficulty of accurately assessing the full economic impact and poverty reduction benefits of this project because of the delay in conducting baseline benefit monitoring[45] highlights the need to ensure the immediate commencement of baseline data measurement prior to civil works commencement. This lack of focus on the BME system within both the MPWT and implementing consultants is a lesson learned in that future projects need to include BME capacity building and training with executing agencies at both national and provincial level.

49. Project implementation delays in the civil works for contracts C03 (Pakton–Ban Vang road) and C05 (Sayabury–Hongsa–Thaxoan road), requiring the reallocation of a part of civil works to the performing contractor for contract C01 (Pakxane–Thasi road) to expedite and complete works in a timely manner, indicates a lesson learned that executing agencies of future projects need to identify and replace nonperforming contractors at an early stage. An additional lesson learned is that executing agencies need to more carefully scrutinize the financial, management, and equipment capacities of bidders during bid evaluation.

50. Another important lesson learned from the project was the successful integration with complementary agricultural development programs such as the Sanxai coffee estate developments under the International Fund for Agricultural Development project. To more

[45] The initial benefit monitoring survey for this project was conducted after 2 years of civil works construction had occurred.

directly facilitate agricultural development activities along rural roads being developed in future, consideration could be given to developing selected rural development schemes to directly support communities located along the rural roads.

C. Recommendations

1. Project Related

51. **Future monitoring**. DOR should be encouraged to conduct annual traffic counts and sample surveys of project roads to provide continuing project impact data that should be integrated into a road asset management system. This survey monitoring should incorporate an analysis of periodic maintenance activities and maintenance requirements. Particular focus should be given to ensuring small potholes and drainage blockages are addressed quickly, rather than being left till major maintenance work commences after the rainy season. There is an opportunity for capacity building support to the executing agencies to undertake these activities.

52. **Further action on covenants**. The covenant for the three forest product checkpoints and vehicle weigh stations should be followed up to ensure that ownership of these facilities is transferred from the DOR to the Department of Transport in accordance with Government policy. Additionally, ADB should follow up on the covenant requirement that the borrower shall provide annual reports on the status of load enforcement measures; incidence of vehicle overloading; and movement of forest products, endangered species, and rare wildlife commencing one year after establishing the first checkpoint on any project road. These reports should be submitted annually starting early 2014.

53. **Additional assistance.** Consideration should be given to providing capacity building support to the executing agency at both national and provincial level under ongoing ADB-financed road projects to develop BME system capacity as well as capacity development on road maintenance management under the new project preparatory TA[46] for Road Sector Governance and Maintenance.

54. **Evaluation**. In accordance with the loan documents, a third impact survey is to be implemented no later than two years after project completion.

2. General

55. In future, consideration should be given to limit the geographical spread of individual road segments to reduce the travel time and costs for project implementation and supervision personnel. This will have benefits in grouping and focusing resources devoted to SAPs and related Community Development Plans (CDPs).

56. The absence of an effective BME system, including the collection of detailed information on project performance variables, should be remedied in future projects of this nature, as this would form the basis for more effective executing agency's project completion report.

[46] ADB. 2013. *Technical Assistance to the Lao People's Democratic Republic for Road Maintenance.* Manila (TA 8492-LAO, $750,000, approved on 24 October, financed from the Trust Fund).

PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	Achievements	Assumptions and Risks
Goal Facilitate economic and social integration of isolated areas and populations to promote overall economic growth and poverty reduction	Increased economic growth leading to at least 20% higher income in the project ZOI. Reduction in the incidence of rural poverty in ZOI.	13% household income growth recorded between December 2008 and December 2010. Poverty reduced in ZOI.	
Purpose Increase access to all-year road transport that is adequate, reliable, affordable, and safe in remote rural regions	Upgrading of about 290 km of roads to all-weather standard. Extension of transport services along project roads. Average vehicle operating costs on project roads reduced by about 60% for cars and 30% for trucks. Within 2 years of completion of improvement works, bus fares reduced by an average of 10%, and freight rates by 20%, in real terms. For each project road a road safety audit has been completed before civil works begin. Recommendations are implemented before construction ends.	287 km of all-weather standard roads created (226 km of paved gravel versus 186 km of designed paved gravel and 61 km of gravel roads versus 103 km of designed gravel); 3 km road length reduction because of road realignment. Some extensions to transport services observed. Estimated average vehicle operating costs reduction for cars was 26%, for medium-sized trucks 24%, and for medium-sized buses 44%. Price reductions in bus fares of 14%–40% on longer journeys with no changes on Sayabury–Hongsa road. BME did not collect freight rates because no data was available before and upon completion and will be collected after 2 years from the project completion. Road safety audits were	Transport benefits transmitted to road users. Adequate funds for road maintenance are available. Lower than expected traffic levels. Quality of construction and supervision is good. Funds from domestic sources contribute 90% of requirements for maintenance of national road network by end of 2009.

Design Summary	Performance Indicators/Targets	Achievements	Assumptions and Risks
		conducted on the project roads and recommendations were implemented.	
Outputs 1. Roads to remote regions rehabilitated	Roads rehabilitated to agreed design standards within 3 years of start of civil works.	All major activities had been achieved within 3 years.	No delays in procurement. Road safety program successfully implemented.
2. Affected people resettled and fully compensated	For each project road, all affected households resettled and compensated, without loss of livelihoods, before civil works begin on that road.	Final settlement payments were made in February and March 2007.	Affected persons accepted the compensation packages offered in cash. The government budget is sufficient to cover compensation costs. The government supported the plan and provided adequate staff.
3. Periodic maintenance performed through RMF	Priority periodic maintenance, valued at $2 million, is performed.	Repair works to structure box and pipe culverts on national road identified by the RMF's road maintenance management system were completed in March 2008. Three-year performance-based periodic maintenance contracts have been signed for all road sections (after completion) between local private companies and DPWT where the project roads are located, with a total budget of KN59.16 billion (equivalent to $7.40 million). In addition, labor-based contracts for routine	Systems being implemented under RMF continue to operate.

Design Summary	Performance Indicators/Targets	Achievements	Assumptions and Risks
		maintenance budget funds were established at a cost of KN261 million (equivalent to $33,000).	
4. Implementation of social action plan • Nonformal education program • Management program for NTFPs • Land titling program • Community road safety awareness program • HIV/AIDS and STD awareness and prevention program • Trafficking of women and children awareness and prevention program	The target communities and groups have participated in the programs. All vulnerable groups have participated in the HIV/AIDS, STD, and trafficking of women and children awareness and prevention programs within 6 months of commencement of civil works for each road. Qualitative assessments of impact of programs. Establishment and fully functioning village NTFPs associations by end of project. Incomes from NTFP sales have not decreased. All households within a predetermined corridor are issued land use rights certificates, on request, within 1 year after civil works begin. Increased road safety awareness.	All target communities participated in programs. All vulnerable groups participated in HIV/AIDS, STD, and trafficking of women and children awareness and prevention programs during April 2007–March 2010. Increased the knowledge and awareness on HIV/AIDS, STD, and human trafficking prevention programs. A village development group plan on NTFPs was prepared by village committee and shared with the provincial and district agriculture and forestry department. NTFP sales have provided more than 30% cash income of the project villages in contract C01: Pakxane-Thasi road. Most people living along the project roads have land use right certificates. Road safety campaigns were undertaken in all villages along project roads in 2008 and 2010.	Successful implementation of programs for • nonformal education, • NTFP management, • land titling, • road safety, • HIV/AIDS and STD awareness, and • trafficking of women and children awareness and prevention

Design Summary	Performance Indicators/Targets	Achievements	Assumptions and Risks
5. Implementation of project preparation services	Full implementation documentation completed for project roads. Feasibility studies and engineering documentation completed for two future projects (neither exceeding $20 million)	Feasibility studies were prepared during project preparation under another ADB-financed road project, and the detailed engineering designs had been reviewed and finalized under the project as well as procurement documentation. Feasibility studies and engineering documentation for the ongoing Northern GMS Transport Network Improvement were prepared during the implementation.	Two feasible transport projects for a total of $20 million can be identified.
6. Strengthened social and environmental management administration	Capacity building program implemented. Selected staff graduate from post-graduate courses.	Capacity building program was implemented through SED of MPWT and DPWTs. A group of 10 MPWT project staff had undertaken course in contract management and environmental management in September 2007 for 11 weeks in Denmark.	Ongoing commitment by executing agency to improving social and environmental management skills is maintained. Appropriate courses for training of social and environmental staff can be identified.
7. Initial implementation stages of road safety program action plan begin	Priority tasks under road safety action plan completed. National Road Safety Council established, and secretariat engaged. Medium- and long-term budgeted plans for road safety activities prepared.	Achieved and 15 tasks were prioritized. NRSC established 6 November 2006 and secretariat 15 June 2008. Budget plans established are part of formal government budget process.	The government's ongoing commitment to road safety activities.

Design Summary	Performance Indicators/Targets	Achievements	Assumptions and Risks
	Establishment of road safety database.	Established road accident information system in May 2009.	
Activities	**Milestones**	**Milestones**	
	Started / Completed	Started / Completed	
(i) Rehabilitation of rural development roads	(i) Q4 2005 / Q4 2011	(i) Q3 2006 / Q4 2010	Delays in procurement. Slow progress by contractors.
(ii) Periodic maintenance	(ii) Q1 2005 / Q4 2006	(ii) Q1 2007 / Q1 2008	
(iii) Monitoring and enforcement of ADB	(iii) Q1 2005 / Q4 2010	(iii) Q1 2006 / Q4 2010	Poor performance by the construction supervision consultant.
(iv) Project preparation services	(iv) Q1 2005 / Q4 2007	(iv) completed prior to project implementation	
(v) Social and environmental impact administration	(v) Q1 2005 / Q2 2007	(v) Q2 2007 / Q4 2010	Adverse social and environmental impacts will be prevented or mitigated.
(vi) Road safety initiative	(vi) Q1 2005 / Q4 2007	(vi) Q3 2006 / Q2 2010	Resettlement satisfactorily implemented.
Inputs			
Civil works contracts	$22.7 million	$39.3 million	Cofinancing forthcoming.
Consulting services	$7.70 million	$5.74 million	
Project funding	ADB loan of $17.7 million equivalent	ADB loan of $18.8 million equivalent	Competent consultants are recruited, and their advice is followed.
	Nordic Development Fund loan of $7.3 million equivalent	Nordic Development Fund loan of $10.3 million equivalent	
	OFID loan of $6.0 million equivalent	OFID loan of $6.0 million equivalent	Counterpart staff is available.
	Government of Lao PDR contribution of $8.2 million	Government of Lao PDR contribution of $14.3 million	Counterpart budget is available when required.

ADB = Asian Development Bank, BME = Benefit Monitoring and Evaluation, DPWT = Department of Public Works and Transport, GMS = Greater Mekong Subregion, km = kilometer, Lao PDR = Lao People's Democratic Republic, MPWT = Ministry of Public Works and Transport, NRSC = National Road Safety Committee, NTFP = non-timber forest product, OFID = OPEC Fund for International Development, Q = Quarter, RMF = Road Maintenance Fund, SED = Social and Environmental Division, STD = sexually transmitted disease, ZOI = zone of influence.
Source: Asian Development Bank estimates.

RURAL DEVELOPMENT PROJECT ROADS

1. At appraisal, the original scope of pavement comprised road sections to be of paved gravel[1] in flat terrain near villages and steep slopes, and gravel[2] in flat and/or rolling terrain away from villages. In recent years, unusual weather events have occurred more often in the Lao People's Democratic Republic (Lao PDR), causing widespread flooding[3] that has damaged gravel roads, including some of the project roads. Responding to this, the Government of the Lao PDR assigned a high priority to complete all project roads in paved gravel to reduce the risks and as far as possible limit the recurrent high maintenance costs for gravel roads. Consequently, in December 2009, the Ministry of Public Works and Transport (MPWT) decided to replace all gravel with paved gravel throughout whole sections (necessary variation orders were issued in January and March 2010). The original scope and actual pavement constructed is summarized in Table A2.1.

Table A2.1: Project Roads Civil Works Outputs

(km)

	Contract			Actual		
Road Section	**Paved Gravel**	**Gravel**	**Total**	**Paved Gravel**	**Gravel**	**Total**
Pakxane–Thasi	70.5	8.9	79.4	78.0	0	78.0
Xaisetha–Sanxai	38.8	15.0	53.8	17.4	14.6 22.4[a]	54.4
Pakton–Ban Vang	14.9	27.9	42.8	42.7	0	42.7
Sayabury–Hongsa	61.8	25.6	87.4	86.6	0	86.6
Hongsa–Thaxoan		25.6	25.6	1.5	24.1[b]	25.6
Totals	**186.0**	**103.0**	**289.0**	**226.2**	**37.0**	**287.3**

km = kilometer.
[a] gravel of subgrade quality with California bearing ratio (CBR)>15%<35%.
[b] rehabilitated existing gravel road.
Source: Project consultant's project completion report, March 2011.

2. Bridges are listed in Table A2.2 and were completed according to the original scope, except that a new concrete superstructure for the Nam Xan Bridge on the Pakxane–Thasi road was added as a contract variation.

Table A2.2: Project Roads Civil Works – Bridges Constructed

		Submersible Bridges	
Road Section	**PSC Bridges[a]**	(number)	**Total**
Pakxane–Thasi	9	4	**13**
Xaisetha–Sanxai	5	2	**7**
Pakton–Ban Vang	2		**2**
Sayabury–Hongsa	3	15	**18**
Hongsa–Thaxoan			
Totals	**19**	**21**	**40**

PSC = prestressed concrete.
[a] Prestressed concrete girders are a composite with reinforced concrete deck slab.
Source: Project consultant's project completion report, March 2011.

[1] Paved gravel comprised sub-base, base, and double bituminous surface treatment (DBST) on the road carriageway and single bituminous surface treatment (SBST) on road shoulders.
[2] Gravel comprised sub-base material with CBR>35%.
[3] Typhoon Ketsana (29 September–2 October 2009) flooded the provinces of Sekong and Attapeu, including C02 project road (km 0–7) and engineer's camp. Storms in 2010 also flooded and damaged roads and bridges in Sayabury province, north of the C05 project road.

A. Details of Road Improvements

1. Pakxane–Thasi, Provincial Road 700, Borikhamxay Province

3. About 78 kilometers (km) of existing gravel and earth road was upgraded to paved gravel standard. This road section started at the junction of the project road with Road 13 near Pakxane. This is km 0 for the Pakxane–Thasi project, which ends at the junction with Road 1D near Thasi.

4. From km 0.0 to the district center of Borikhan at km 21.7, the existing gravel road was upgraded to paved standard, comprising two lanes each 3 meters (m) wide with paved shoulders 1 m wide. The terrain on this section is gently rolling, and its horizontal and vertical alignment was generally followed with only minor improvements, generally contained within the right of way of the existing roads. The exception is the final 500 m within the settlement of Ban Vathad, where the road becomes urban in character, with housing and commercial development close to the road edge. Here the cross-section was modified to suit the available corridor width, but the scope also included a 1-km bypass on a more direct alignment that was built to the same standard as the rest of the road from Pakxane. Three single-span Bailey bridges (a total span of 57 m) were dismantled and replaced with beam and concrete slab structures. Pavement construction consisted of a 200-millimeter (mm) crushed aggregate base course on a 125-mm aggregate sub-base. The pavement was sealed with double-surface dressing, and shoulders with single-surface dressing. Design speed is 80 kilometers per hour (km/h) in rural flat terrain and 40 km/h in urban areas and mountainous terrain.

5. Between Borikhan and the settlement of Ban Khen Yong at km 61.6, the existing gravel road was widened to a 7.5-m formation width. The terrain varies from mountainous, where an escarpment is crossed just north of Borikhan, to gently rolling over most of the remaining route, although there are steep approaches to some river crossings. The existing alignment was of sufficient standard to be followed over most of the route, with only minor adjustments to improve visibility and the approaches to structures sites. Shallow embankments were built over low-lying sections. The road was upgraded to a sealed standard with two lanes each 2.75 m wide and shoulders 1.0 m wide. A 150-mm crushed aggregate base course on a 150-mm aggregate sub-base was used. Double-surface dressing was applied to the carriageway and single-surface dressing to the paved shoulders. Six existing Bailey bridges (a total span of 120 m) were dismantled and replaced with either bridges (prestressed beam and reinforced concrete slab construction) or lower-level submersible crossings in reinforced concrete. Design speed for this section varies between 40 km/h and 60 km/h, depending on terrain.

6. A 100-m, four-span bridge was built across the Nam Xan River at km 61.3, with piers and abutments designed to carry a concrete deck 7 m wide. Bailey bridge sections were removed and replaced by prestressed concrete bridges.

7. From Ban Khen Yong to Thasi the road enters mountainous terrain, on the flanks of steep hills adjacent to the Nam Xan River. The existing narrow track was widened to accommodate a 3.5-m single-lane paved road with 0.5-m shoulders. Passing places were placed at 500 m and 1,000 m intervals. A new alignment was cut over the last 3 km to avoid multiple crossings of the Nam Xan River. Pavement construction was 150-mm crushed aggregate base on a 150-mm aggregate sub-base. All paving is double-surface dressing with single-surface dressing applied to shoulders where slopes exceed 10%. One bridge (25-m span) and one submersible crossing (12-m span) were built on this section, along with numerous box and pipe culverts. Design speed for this section is 40 km/h.

8. All existing pipe culverts were replaced or extended, with a total length of 3,075 m of new 1-m diameter concrete pipe culverts. Twenty-seven concrete box culverts of up to 3 m individual span were built. Materials were sourced from previously identified borrow pits and from river deposits.

2. Xaisetha–Sanxai Provincial Road 970, Attapeu Province

9. About 54 km of road was constructed, either by upgrading existing earth and gravel roads and tracks, or by building new alignments in mountainous terrain. This road section started at the turnoff to Ban Paam on Road 18B, about 3 km east of Xaisetha (which is about 10 km east of Attapeu).

10. From km 0 to Ban Paam at km 17 the road traverses a flat plain and was widened and raised on shallow embankment to accommodate a new carriageway comprising two lanes 2.75 m wide with shoulders 1.0 m wide. The existing alignment was followed with only minor modifications that were accommodated within the designated road reserve. Shoulders were paved through two small settlements and through Ban Paam itself. One bridge and one submersible crossing were built before the road reaches Ban Paam. Crossing of the Nam Pa River, at km 15.7, was by a two-span bridge about 50 m long. Pavement construction was a 150-mm crushed aggregate base course on a 175-mm aggregate sub-base with double-surface treatment on the carriageway and single-surface treatment on paved sections of shoulder. The design speed is 80 km/h on the rural flat sections and 40 km/h within Ban Paam.

11. From km 17.0 the road enters mountainous terrain where an existing 3-m wide earth and gravel track continues to about km 34.0. From there, an alternative alignment was located so that the climb to the plateau (about 600 m) was at about 12% gradients. The contractor designed this section during execution of the works. About 3 km of new alignment is required. The existing track is then rejoined at about km 43 (measured on the new alignment), then followed along an undulating ridge to the village of Ban Chauleunxai. Two settlements were bypassed on the ridge, one to limit intrusion.

12. The road cross-section from km 17.0 onwards was selected on the basis of vertical alignment and topography. Where slopes exceed 5%, the road was constructed to 3.5-m single-lane paved standard with 0.5-m shoulders. Shoulders were sealed where gradients exceed 10%. Flatter sections were constructed to 5.5-m wide gravel standard. Passing places were provided at 500–1,000 m intervals on the 3.5-m paved sections. Pavement construction consisted of a 150-mm crushed aggregate base course on a 150-mm aggregate sub-base. Four bridges and two submersible crossings were constructed with a combined span of 142 m. The box culvert at km 28.4 has a span of 6 m. Structures were 7 m wide.

13. Earthworks beyond km 16.6 were kept to a minimum by following existing road levels wherever possible. New alignments were benched in, cut on the steep slopes with due regard for slope stability. All new alignment construction was paved to 3.5 m wide. Some 1,742 m of concrete pipe culverts were required, along with nine box culverts. Design speed in the mountainous section is 40 km/h.

14. The area is one of the most highly contaminated by unexploded ordnance in the Lao PDR, so extensive clearance was necessary, particularly on sections of new alignment. Surveys were undertaken to determine the extent of clearance necessary.

3. Pakton–Ban Vang, National Road 11, Vientiane Municipality and Province

15. About 42.8 km of road were built. This project road begins at the Nam Sang Bridge at km 0 (NR 11). New construction was required between the settlement of Ban Houayhang and Ban Nam Hi.

16. From the bridge, the existing track, 3.0–4.0 m wide, was widened to accommodate a 5.5-m wide (6.0 m wide in villages) paved gravel pavement with double bituminous surface treatment (DBST) on the carriageway and single bituminous surface treatment (SBST) on the shoulders. Other improvements to this section were the removal and replacement of two existing Bailey bridges with 25-m single-span prestressed concrete bridges with 7.0-m wide decks. A free-draining capping layer was placed on sections where water from springs seeps into the subgrade. For erosion protection, rock-filled gabion baskets were installed on vulnerable sections where the bank of the Mekong River is unstable. A total of 1,737 m of pipe culverts and 12 box culverts were constructed on this section.

17. Design speed for the road is 40 km/h on mountainous sections and 60 km/h on flat sections.

4. Sayabury–Hongsa, National Road 4A, Sayabury Province

18. **Sayabury–Hongsa.** From the start of the road at Sayabury (junction NR4 at Ban Thana) to Ban Natak at km 4.5 the existing seasonal track was improved to a 5.5-m carriageway with DBST with 1.0-m paved shoulders. A new 100-m long, 7-m wide bridge was constructed over the Nam Houng River at Ban Natak. From Ban Natak to Ban Namone the existing gravel and earth road was improved to varying standards depending on the topography and presence of villages. Pavement over this 23.9-km section comprised (i) 15.3 km of 3.5-m carriageway with DBST and 0.5-m shoulders with SBST widened to 1.5 m through villages, and (ii) 8.6 km of 5.5-m carriageway with DBST and 1.0 m shoulders with SBST.

19. From Ban Namone the road enters severe mountainous terrain and realignment of the existing road after the crossing of the Nam Ngone River was required to reduce gradients to less than 12%. Pavement construction between Ban Namone and Hongsa (63.5 km with realignments) comprised (i) 41.7 km of 3.5-m carriageway with DBST in sections where gradients exceed 5% and 0.5 m wide shoulders with SBST where gradients exceed 10% and through small settlements; (ii) 2.3 km of 5.5-m carriageway with DBST with 1.0 m sealed shoulders with SBST through larger villages and Hongsa itself; and (iii) 19.5 km of 5.5-m carriageway in gravel on flatter sections with gradients of less than 5%.

20. The project road included (i) two prestressed “I” beam in situ slab bridges, including the 100-m bridge over the Nam Houng River at Ban Natak, and one reinforced concrete bridge (15-m span) at Nam Prong; (ii) 15 reinforced concrete submersible crossings with a total length of 192 m; (iii) two reinforced concrete box culverts; and (iv) multiple 1-m diameter reinforced concrete pipe culverts for other cross-drainage requirements.

21. **Hongsa–Thaxoan.** The original design of the section from Hongsa to Thaxoan was as follows: between Hongsa (km 0.000) and Ban Sibounhuang (km 0.825) the road was to be paved to 5.0 m width (3.50 m carriageway in DBST with 0.75 m shoulders in SBST). Between Ban Sibounhuang and Ban Kiousala (km 16.75) the road was to be built to 5.0-m gravel standard but sections with gradients of more than 5% or which pass through settlements were

to be paved to 3.50 m wide with DBST and have 0.75-m shoulders in gravel. It was estimated that approximately 2.50 km of the total 15.92 km of this section would require paving. From Ban Kiousala to Thaxoan (km 25.63), the road was to be widened to 4.5 m. Passing bays were to be provided at approximately 500-m intervals. Where gradients exceed 5%, the carriageway was to be paved to 3.5 m with DBST with shoulders in gravel.

22. The alignments, both horizontal and vertical, were to follow existing ones, except in sections where the vertical profile had to be raised to provide for more effective cross-drainage and to minimize the risk of flooding in the wet season. The extent of widening of the road through villages, if any, was to be determined on the basis of developments at the time of construction. The design speeds for the road were to be either 60 km/h or 40 km/h, depending on terrain and presence of settlements.

23. In February 2007 during the early stages of implementation and the Asian Development Bank (ADB) mission of January 2007, it was agreed to suspend the works from Hongsa to Thaxoan as the fund allocations after award of contract C05 (and C03) were inadequate to provide project contingencies and/or routine maintenance. The intention was to resume works if funds became available. However, in the succeeding year, costs were increasing because of sharp fluctuations in prices and diesel fuel. A cost overrun of approximately $3 million was forecast in 2008. In June 2008, a variation was ordered to delete the Hongsa–Thaxoan section, but works could be resumed if some project savings were realized before contract completion.

24. In early February 2011, savings from ADB category 04 (interest charges) proceeds were forecast and therefore a last variation (No. C05-08) was ordered to undertake some works to rehabilitate the existing 21.4 km gravel road from Hongsa to Thaxoan and construct 1.5 km of paved gravel in Hongsa, within available fund savings.

B. Civil Works Contract Details

25. The ADB civil works comprised four road improvement subprojects. The contract summary details are in Table A2.3.

Table A2.3: Contract Summary Details

Item	Contract Details
Contract Number: Contractor:	RRD/C01: Pakxane–Thasi (Borikhamxai province) Joint Venture for Road Construction 20-8
Commencement Date:	8 November 2006
Completion Date:	7 May 2010 (extended to 31 December 2010)
Contract Price: Contract Length:	$8,214,914.06 (including contingencies) 79.4 km
Contract Number: Contractor: Commencement Date:	RRD/C02: Xaisetha–Sanxai (Attapeu province) Chitchareurne Construction Company 8 November 2006
Completion Date:	7 November 2009 (extended to 31 December 2010)
Contract Price: Contract Length:	$5,181,697.14 (including contingencies) 53.8 km
Contract Number: Contractor: Commencement Date:	RRD/C03: Pakton–Ban Vang (Vientiane province) Namtha Road and Bridge Construction Company 2 January 2007
Completion Date:	1 January 2010 (extended 31 March 2010)
Contract Price: Contract Length:	$4,791,419.87 (including contingencies) 42.8 km
Contract Number: Contractor: Commencement Date:	RRD/C05: Sayabury–Hongsa–Thaxoan (Sayabury province) LSPD Joint Venture (Lao Development Construction, Savannakhet Road & Bridge Construction, Phonesak Road & Bridge Construction and Douangpaseuth Construction and Maintenance Company) 15 January 2007
Completion Date:	14 July 2010 (extended to 31 December 2010)
Contract Price: Contract Length:	$9,984,498.64 (including contingencies) 87.4km Sayabury–Hongsa, and 25.6 km Hongsa–Thaxoan

Source: Project consultant's project completion report, March 2011

1. Contract C01: Pakxane–Thasi

26. Mobilization of construction equipment and plant and installation of crushing plant was completed during the first 2 months after commencement of civil works. Earthworks, fabrication of pipe culverts, and bridge construction also commenced during that period. In the first dry season, pipe installation, crushing of base aggregates and sub-base, and base construction commenced. Bituminous surface treatment construction started in December 2007. When construction of drainage and pavement works by one of the partners (Road 20 Construction Enterprise) was very slow during the second year, Road 8 Construction Enterprise took over these works in December 2008 to accelerate progress.

27. Because of the additional Nam Xan Bridge concrete superstructure and 8.9 km of paved gravel ordered in February 2010, this contract was extended until 30 September 2010. However, progress slowed as it was affected by the heavy rains in the wet season of 2010 from May to October. Further extension was granted until 31 December 2010 because of these extreme weather conditions.

28. Pavement and bridge construction progress is summarized in Table A2.4.

Table A2.4: Contract C01: Completed Pavement and Bridge Works

Year	Sub-Base (km)	Base (km)	SBST/DBST (km)	PSC Bridges (no.)	Submersible Bridges (no.)
2007	17.0	5.0			
2008	22.1	24.5	28.5	4	
2009	22.6	26.6	27.8	8	3
2010	16.3	21.9	19.7	1	1
2011			2.0		
Total	**78.0**	**78.0**	**78.0**	**13**	**4**

DBST = Double bituminous surface treatment, km = kilometer, no. = Number, PSC = Prestressed concrete, SBST = Single bituminous surface treatment.

Source: Project consultant's project completion report, March 2011.

29. This contract was on schedule throughout. During the first 2 years of the contract there were some delays in OFID payments that have affected contractor's cash flow but were later resolved with the assistance of ADB. The whole of the works was substantially completed on 28 February 2010 and a taking-over certificate has been issued. Construction of the new concrete superstructure of the five 25-m prestressed concrete span Nam Xan Bridge was completed in 6 months (January–June 2009).

30. Variations were ordered to reduce the engineer's facilities and transport and to carry out additional subsoil investigations for the bridges. A variation was also issued to construct a concrete bridge superstructure for the Nam Xan Bridge instead of reusing the old Bailey steel structure as specified in the original contract. This variation was approved and paid from cost savings under the Nordic Development Fund credit for consulting services. Variations are summarized in Table A2.5.

Table A2.5: Contract C01 Variations

($)

Variation	Description	Cost Effect
C01-01	Changes to engineer's facilities and transport	(178,395)
C01-02	Additional confirmatory subsoil investigations	19,412
C01-03	Concrete superstructure for Nam Xan Bridge	431,669
C01-04	Revised bill of quantities – estimated BOQ value	9,413,413
C01-05	Additional pavement works – estimated new contract price	12,450,690

( ) = negative, BOQ = Bills of quantities.
Source: Project consultant's project completion report, March 2011

31. **Assessment of contractor performance.** Overall, the contractor's performance was satisfactory. The whole of the works were completed to a good quality and standard. The C01 contractor made an early start in the planning and execution of the works by commencing earthworks, drainage, and bridge construction, including setting up crushing plants to produce concrete and base course materials. There was sufficient construction equipment and experienced personnel mobilized during the first 6 months of construction. As a result, good progress was achieved from the commencement of civil works on this road section. This indicated sound management and great efforts of the contractor's team, both in management and in the field. Even during the time that the other joint-venture partner was performing poorly, progress was maintained by the other partner taking over some of the critical operations. Despite some delays in payments, the contractor has managed to inject funds in order to

maintain timely procurement of necessary construction materials and diesel to maintain the civil works progress.

2. Contract C02: Xaisetha–Sanxai

32. Unexploded ordinance path finding and clearance, survey and setting out, and mobilization of equipment was completed during the first 6 months after commencement, and by February 2007 the road section was cleared of unexploded ordinance and earthworks commenced. Construction of box culverts and installation of pipe culverts started in 2007. Redesign of the road alignment between km 32 and km 38 started in October 2007 and was completed in January 2008. Delays in setting up the crushing plant and production of crushed aggregates for base course and cover materials for double bituminous surface treatment (DBST) affected the start of pavement works in the first construction year. Sub-base construction commenced in February 2008, and base construction commenced in May 2008. Civil works proceeded on schedule after the program was revised in January 2008, but slowed from June 2009 because of extreme weather conditions. Heavy continuous rainfall caused massive landslides from km 30 to km 39 and delayed the ongoing pavement and drainage construction. The physical progress of pavement and bridgeworks is summarized in Table A2.6.

Table A2.6: Contract C02: Completed Pavement and Bridge Works

Year	Sub-Base (km)	Base (km)	SBST/DBST (km)	PSC Bridges (no.)	Submersible Bridges (no.)
2007					
2008	17.0 8.0 (GS)[a]	17.0	17.0	2	1
2009	15.0 14.4 (GS)	0.4	0.4	2	1
2010				1	
2011					
Total	**32.0 + 22.4 (GS)**	**17.4**	**17.4**	**5**	**2**

CBR = California bearing ratio, DBST = Double bituminous surface treatment, GS = Gravel of subgrade , km = kilometer, no. = Number, PSC = Prestressed concrete, SBST = Single bituminous surface treatment.

[a] Gravel of subgrade quality, CBR >15%<35%.

Source: Project consultant's project completion report, March 2011.

33. Typhoon Ketsana severely flooded large areas of Attapeu province, including the first 7 km of the Xaisetha–Sanxai section, with up to 3 m of water that damaged parts of the completed base and DBST in several locations. These were later repaired by the Department of Public Works and Transport (DPWT) under its calamity funding during the defects notification period of part A works (km 0+000 to km 30+000). Because of the additional paved gravel works that were ordered in March 2010, the contractor was awarded an extension until 31 December 2010. Part A works were substantially completed and a taking-over certificate issued in June 2009, and Part B works (km 30+000 to km 54+400) were substantially completed on 31 December 2010. Defects were satisfactorily completed for part A works in December 2010.

34. Variations ordered for contract C02 are summarized in Table A2.7.

Table A2.7: Contract C02 Variations
($)

Variation	Description	Cost Effect
C02-01	Changes to engineer's transport	(56,600)
C02-02	Revised bill of quantities - estimated BOQ value	6,912,409
C02-03	Deleted	
C02-04	Additional pavement works - estimated new contract price	10,447,255

( ) = negative, BOQ = Bills of quantities.
Source: Project consultant's project completion report, March 2011.

35. **Assessment of contractor performance.** In general, the contractor's performance has been satisfactory and the quality of construction good. In the beginning, despite some delays in mobilizing necessary construction plant for base course and delays due to survey and alignment adjustment requirements of the contract, the contractor took actions to commence drainage and bridge construction early after commencement. Difficulties in roadway excavation in very steep terrain and removal of landslides after heavy unusual storms in 2008 and 2009 wet seasons was managed effectively by the contractor. The contractor carried out the execution of large volumes of earthworks on the project. Despite the scarcity of pavement materials on site, the contractor has also moved materials onto steep slopes to maintain the civil works progress. The heavy rainfall and major flooding that occurred in 2009 greatly affected the contractor's progress but has not lessened the resolve of the contractor to continue working when weather permits.

3. Contract C03: Pakton–Ban Vang

36. Mobilization of construction equipment and personnel by the contractor, the Namtha Road and Bridge Construction Company, was greatly delayed. Mainly earthworks and fabrication of drainage pipes were carried out during the first dry season, starting in June 2007. As a result, critical pavement construction did not start until January 2009, 1 year after commencement, when more earthmoving and paving equipment was mobilized. Notices were issued by the engineer to correct the situation but the contractor failed to recover from the delays. By this time, it was no longer possible to complete works by the completion date. Because of this slow progress, the engineer instructed the contractor to engage subcontractors to accelerate progress. Three subcontractors were engaged in February 2008, though progress did not improve as planned because of the lack of funds for timely supply of construction materials and diesel fuel. Works progress was also affected by the heavy rainfall in the 2008 wet season.

37. In October 2008, when progress was only 42% complete with 64% planned (22% delay), a 15.7-km section was deleted from the contract and the executing agency nominated the contractor, Singviengthong Construction, to execute these works. Earthworks and drainage works improved and sub-base work commenced in December 2008, but this was not sufficient to recover from the earlier delays. By January 2009, the works were 38% delayed. In February 2009, upon recommendation of the engineer, a further 20-km section was deleted from the main contract and executed by another nominated contractor, Road No.8 Construction Enterprise. Starting in March 2009, with the participation of Road No.8 Construction Enterprise, progress in pavement, drainage, and bridge construction significantly improved. An additional 27.8 km of DBST works were ordered in September 2009 to pave all sections, which entitled the contractors to extensions until 31 March 2010. Pavement and bridge construction progress is summarized in Table A2.8.

Table A2.8: Contract C03: Completed Pavement and Bridge Works

Year	Sub-Base (km)	Base (km)	SBST/DBST (km)	PSC Bridges (no.)
2007				
2008				
2009	37.0	37.0	23.0	
2010	5.7	15.7	19.7	
2011				2
Total	**42.7**	**52.7**	**42.7**	**2**

DBST = Double bituminous surface treatment, km = Kilometer, PSC = Prestressed concrete, SBST = Single bituminous surface treatment.
Source: Project consultant's project completion report, March 2011.

38. The whole of the works were substantially completed by 31 July 2010 and the taking-over certificates have been issued.

39. Variations were issued mainly to delete sections from the original Namtha Road and Bridge Construction Company contract and these were executed by Singviengthong Construction and Road No.8 Construction Enterprise. These variations are summarized in Table A2.9.

Table A2.9: Contract C03 Variations
($)

Variation	Description	Cost Effect
C03-01	Deleted	
C03-02	Reducing works by Namtha Road and Bridge Construction Company	(1,546,592)
	and executed by Singviengthong Construction	1,546,592
C03-03	Reducing works by Namtha Road and Bridge Construction Company	(1,467,657)
	and executed by Road No.8 Construction Enterprise	1,467,657
C03-04	Revised Bill of Quantities (Namtha Road and Bridge Construction Company) - estimated BOQ value	2,624,162
C03-05	Additional pavement works (Road No.8 Construction Enterprise) - estimated new contract price	1,965,367
C03-06	Additional pavement works (Singviengthong Construction) - estimated new contract price	1,662,429

( ) = negative, BOQ = .Bills of quantities
Source: Project consultant's project completion report, March 2011.

40. **Assessment of contractor performance.** The performance of the Namtha Road and Bridge Construction Company's was poor. On the other hand, the performance of the Road No.8 Construction Enterprise was satisfactory, while that of Singviengthong Construction was partly satisfactory. Overall, the quality of work of all the three contractors was good. The original contractor performed poorly by not fully complying with contract requirements of mobilizing adequate construction equipment and experienced personnel. The contractor also had problems providing adequate cash flow to procure construction materials on time. This caused delays and the engagement of nominated contractors to take over part of the works.

41. As with contract C01, the nominated contractor, Road No.8 Construction Enterprise, performed very well on this project. The company mobilized adequate construction equipment and experienced personnel both in management and in the field. As a result, work progress was

accelerated. The completion of contract C03 was largely due to the efforts of Road No.8 Construction Enterprise.

42. The other nominated contractor, Singviengthong Construction, started very slowly because of an absence of experienced personnel so that work operation sequences were not properly coordinated. This caused delays and repetition of work. Near the end of the contract, Singviengthong Construction improved its running of this contract by finally employing very experienced staff who controlled the site works effectively.

4. Contract C05: Sayabury–Hongsa–Thaxoan

43. In July 2007, 7 months into the contract, the engineer issued a notice to correct when the contractor failed to mobilize crushing plants and had not commenced the crushing of aggregates for concrete and the base. The contractor complied with this notice in November 2007. Works carried out during the first 2 years were mainly roadway excavation and construction of embankment, drainage, sub-base (first 4 km), and the 100-m Nam Houng Bridge. Because of the contract requirement to realign the road and flatten the grades to a maximum of 12% from the 22% in the original design, deep earth and rock cuts were encountered. This resulted in increased volume of roadway excavation, which contributed to delays. The subsequent rate of progress was slow because of the lack of equipment; frequent breakdown of old equipment; poor equipment maintenance; lack of experienced operators and site engineers, supervisors, and/or quality control personnel; and poor planning and management of the works. The contractor finally mobilized more equipment and plant in October 2008 and progress on the construction of box culverts, pipe culverts, and submersible bridges improved slightly. Base and bituminous surfacing works began in October 2009 but continued slowly and, by December 2009, progress was only 60% against 82% programmed (22% delayed). This slipped further to a 26% delay in January 2010, despite efforts of the contractor to accelerate progress. Pavement and bridge construction progress is shown on Table A2.10.

TableA2.10: C05 Completed Pavement and Bridge Works

Year	Sub-Base (km)	Base (km)	SBST/DBST (km)	PSC Bridges (no.)	Submersible Bridges (no.)
2007					
2008					
2009	4.0	4.0	4.0	1	11
2010	72.7	31.9	16.0		4
2011	9.9	50.7	66.6	1	
Total	**86.6**	**86.6**	**86.6**	**2**	**15**

DBST = Double bituminous surface treatment , km = Kilometer, no. = Number, PSC = Prestressed concrete, SBST = Single bituminous surface treatment.
Source: Project consultant's project completion report, March 2011.

44. To complete all the works on time, the engineer recommended that the executing agency nominate contractor the Road No.8 Construction Enterprise to take over remaining pavement and drainage works on 20 km of the mountainous section. The variation was approved in March 2010 and Road No.8 Construction Enterprise commenced quarrying and stockpiling aggregates for base course as well as installing the crushing and base mixing plant. Further works were deleted from the LSPD (Lao Development Construction, Savannakhet Road & Bridge Construction, Phonesak Road & Bridge Construction and Douangpaseuth Construction and Maintenance Company) joint venture contract and transferred to Road No.8 Construction Enterprise in July and November 2010. Progress improved with the engagement of

Road No.8 Construction Enterprise. All civil works were substantially completed by 28 February 2011.

45. During the early stages of implementation, in February 2007, following the January 2007 ADB review mission, it was agreed to suspend the planned road works from Hongsa to Thaxoan, as the fund allocations after award of contract C05 (and C03) were inadequate to provide project contingencies and/or routine maintenance. The intention was that works would resume if funds became available. However in the succeeding year, costs were increasing because of sharp fluctuations in prices and diesel fuel. A cost overrun of approximately $3 million was forecast in 2008. In June 2008, a variation was ordered to delete the Hongsa–Thaxoan section. In early February 2011, savings from the ADB loan interest charges were forecast, and a last variation, No. C05-08, was ordered to undertake some works to construct 1.5 km of paved gravel in Hongsa, within available fund savings. The remaining 24.1 km of gravel road on the Hongsa–Thaxoan section was upgraded using government funds under a separate contract administered by the MPWT. Several variations were ordered, mainly to accelerate progress to complete works in the shortest time. These variations are summarized in Table A2.11.

Table A2.11: Contract C05 Variations

($)

Variation	Description	Cost Effect
C05-01	Suspension of works Hongsa–Thaxoan	
C05-02	Changes to main office, laboratory, engineer's accommodation, and transport	(522,296)
C05-03	Deleting works Hongsa–Thaxoan	
C05-04	Revised bill of quantities - estimated BOQ value	8,388,030
C05-05	Reducing works by LSPD joint venture	(836,323)
	and executed by Road No.8 Construction Enterprise	836,323
C05-06	Reducing works by LSPD joint venture	(1,406,990)
	and executed by Road No.8 Construction Enterprise	1,406,990
C05-07	Reducing works by LSPD joint venture	(248,770)
	and executed by Road No.8 Construction Enterprise	248,770
C05-08	Works for Hongsa–Thaxoan (25.6km) and - LSPD joint venture	(283,719)
	realignment near km 78 by Road No.8 Construction Enterprise	283,719
	Estimated new contract price LSDP joint venture	7,709,934
	Estimated new contract price Road No.8 Construction Enterprise	3,119,338

( ) = negative, BOQ = Bills of quantities, km = Kilometer, LSPD = Lao Development Construction, Savannakhet Road & Bridge construction, Phonesak Road & Bridge Construction and Douangpaseuth Construction and Maintenance Company.

Source: Project consultant's project completion report, March 2011.

46. **Assessment of contractor performance**. Overall the quality of completed works by the contractors was satisfactory. The original LSPD joint-venture partners did not plan well or commit to work as a team after the commencement of the civil works. For almost 3 years the partners could not agree on issues such as the allocation of responsibilities, equipment, personnel, and financial resources. Lack of equipment and personnel resources resulted in delays in the works. Despite notice warnings and advice from the engineer and executing agency to improve progress, the LSPD joint venture partners did not take any positive action. In the end, upon recommendation of the engineer, the executing agency nominated the Road No.8 Construction Enterprise to execute sections of the road construction and terminated the two nonperforming partners in order to complete as much of the work as possible by the completion date.

47. The performance of the LSPD joint venture was poor. As with contracts C01 and C03, Road No.8 Construction Enterprise showed great resolve in completing the works in its contract within the shortest possible time. It mobilized more construction equipment and personnel, and managed the resources of the Lao Development Construction Company (LDCC) and Savannakhet Road & Bridge Construction Company (SRBCC) (other joint venture partners) when it took control. The performance of the Road No.8 Construction Enterprise has been satisfactory.

RESETTLEMENT

1. The resettlement component financed implementation of resettlement plans for all roads under the rural development roads component. At appraisal, full resettlement plans for the Pakxane–Ban Thasi, Xaisetha–Sanxai, and Sayabury–Hongsa road sections were prepared to comply with the Asian Development Bank (ADB) Involuntary Resettlement Policy (1995) and the *Handbook on Resettlement*[1]. A resettlement framework was prepared for the remaining project roads and full resettlement plans were prepared during project implementation, prior to commencement of civil works on these road sections. In total, five resettlement plans were prepared for road sections as follows: (i) contract C01: Pakxane–Thasi; (ii) contract C02: Xaisetha–Sanxai; (iii) contract C03: Pakton–Ban Vang; (iv) contract C05: Sayabury–Hongsa; and (v) addendum to contract C05: Hongsa–Thaxoan. All resettlement plans were updated and approved by ADB and the updated resettlement plans and public information booklet were disclosed to affected persons.

2. The policy framework and entitlements were developed according to laws of the Lao People's Democratic Republic (Lao PDR) and ADB policy, mainly (i) the Lao Constitution (1991), (ii) the Land Law (1997), (iii) the National Policy and Decree for Resettlement and Compensation that was prepared under ADB's environment and social program loan,[2] (iv) ADB's Involuntary Resettlement Policy, and (v) government-approved resettlement plans for other ADB and World Bank projects. Provisions and principles adopted in the resettlement and community development plans for the project superseded provisions of decrees currently in force in the Lao PDR when a gap exists.

3. The project entitlements were designed to provide compensation, resettlement, and rehabilitation for lost assets, and to restore or enhance the livelihoods of all categories of affected persons. This includes both those who are directly and indirectly affected, and both title holders and nonholders. The entitlement matrix for the project (Table A3.1) summarizes the main types of losses and the support entitlement for each. Replacement costs and rates were established in consultation with village administrations along each route. These rates were used at appraisal as the basis for estimates of resettlement costs. Final rates were determined during the detailed measurement survey and replacement cost surveys.

4. Identification of primary and secondary stakeholders and the related consultation process was carried out in 2002–2003 during project preparation. Village meetings and focus group identification, discussions, and interviews were undertaken. All the village authorities and villagers were aware of the project. Land acquisition impacts and rehabilitation measures were assessed at an individual and community level. During the detailed design, every effort was made to reduce the need for relocation. The project assisted affected households and villages, through community mobilizers, to fence roadsides to prevent children and livestock from wandering onto the roads, fence vegetable gardens, expand rice paddy land, and establish fish ponds. The project assisted households that had to move by leveling land that the village administrations identified for homestead land plots and livestock pens. Affected persons were also assisted in relocating households through house dismantling and rebuilding. The project was designed to create awareness of land use rights in all project villages.

[1] ADB. 1995. A Guide to Good Practice. *Handbook on Resettlement.* Manila.
[2] ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Lao People's Democratic Republic for the Environment and Social Program*. Manila.

5. Agricultural households that were severely affected through loss of more than 20% of productive assets were provided with replacement land of equal productivity. While there was a shortage of paddy rice land in the villages along the roads, most communities had sufficient nonpaddy land, so the project assisted villages to prepare paddy land by clearing and providing "food for work." In consultation with villages, fish ponds were dug at appropriate locations in villages along the road. Agricultural extension assistance was provided to severely affected farmers to increase productivity on remaining and new land. Affected small businesses were helped to move back from the road and still carry out their businesses, but with better income potential. Under the community development plans, Attapeu and Sayabury villages were assisted with improvement of literacy, numeracy, and marketing and small-business skills. The nontimber forest products management program for Borikhamxai promoted sustainable management of the communities' nontimber forest product resources.

Table A3.1: Summary Entitlement Matrix

Type of Loss		**Entitlements**
Loss of land (homestead orchard or garden, agricultural, commercial)	(i)	Permanent loss of land. For severe impact (i.e., 20% or more total productive land area is lost), full title to replacement land as a priority, or cash compensation at replacement cost at current market value. For marginal losses (i.e., less than 20% of total productive land), cash compensation for lost land at replacement cost at current market value.
	(ii)	Temporary loss of land. Cash compensation for loss of net income, damaged assets, crops, and trees at current market value, and restoration of land to its former state.
Loss of Structures (residential and commercial structures, rice bins, simple shops)	(i)	Loss of structure compensated in cash or kind at full replacement cost at current market value, with no deductions for depreciation or salvaged materials.
	(ii)	For tenants of residential and/or commercial structures, cash assistance equivalent to 3 months rental allowance, transition subsistence allowance, and transport assistance (cash or kind) to the new site.
Loss of Standing Crops, Trees, and Fruits	(i)	For standing crops and fruits, cash compensation at current market price.
	(ii)	For young nonbearing fruit trees, a lump sum to cover the cost of maintenance and inputs.
	(iii)	For fruit-bearing trees, compensation at 3 years' production value at current market value.
	(iv)	For nonperennial trees (e.g., timber), compensation at current market value.
Transition Subsistence Allowance (food support)	(i)	For displacement without impact on business or source of income, cash equivalent to 3 months supply of rice per person.
	(ii)	For displacement with severe impact on productive assets or household incomes, cash equivalent to 6 months supply of rice per person.
Materials Transport Allowance	Assistance in cash or kind will be provided to move structures, salvaged and new building materials, and personal possessions to new sites.	
Repair Allowance	For partially affected structures where the remaining part is viable for continued use. In addition to cash compensation for affected structures, cash payment to cover the whole cost of repairs.	
Loss of Work-Day Income Allowance	For heads of households with structures affected but without business affected, cash compensation for loss of work days during the period of dismantling, moving, and rebuilding structures. The amount will be equivalent to the provincial daily wage.	
Agricultural Extension	Applies to severely affected farmers who lose more than 20% of their	

Assistance	productive assets, to increase productivity on remaining or new land.
Special Assistance for Vulnerable Groups	Special assistance to be provided under the community development plan, depending on the needs and priorities of the vulnerable group identified during the detailed measurement survey.

Source: Asian Development Bank estimates.

6. At appraisal, the phase 1 and 3 project roads[3] were estimated to require about 4.08 hectares (ha) of land acquisition, comprising 1.76 ha of rice paddy land and 2.32 ha of homestead land. This was to involve 328 persons,[4] including 201 structures (117 houses, 2 village offices, 37 small shops, and 45 rice bins). All were to be relocated within the same villages. Also, 76 trees were to be cleared from the construction corridors. Table A3.2 summarizes the anticipated impacts for phase 1 and 3. Impacts arising from phase 2 roads were to be determined under the project after detailed design.

7. The project was designed at appraisal to minimize the resettlement effects, reducing the number of affected households, by bypassing Borikhan town on the Borikhamxai road. Under the project, it is expected that every effort possible will continue to be made to reduce resettlement during implementation. The construction supervision consultants were to review the designs, and changes were to be made, if necessary. Based on the final design, the Department of Roads (DOR), together with the affected persons, resettlement consultants, and resettlement committees, were expected to conduct a census, detailed measurement surveys, and surveys of replacement costs.

8. The updating of the resettlement detailed measurement surveys in all road subproject sections was carried out immediately after the implementation consultants were mobilized in September 2006. During this period, the design review was carried out by the consultants' teams to support the early start-up of all the civil works contracts. They also carried out the quarterly updating of project costs and, in their monthly progress reports and review missions, notified the MPWT and ADB Lao PDR Resident Mission when overruns were being forecast. A summary of the final project resettlement outputs is provided in Table A3.3. During implementation, there was a significant reduction in the number of affected persons (only 187 affected persons compared with the estimated 328 at appraisal). The actual resettlement compensation payment of $83,500 (KN642.5 million) was considerably lower that the appraisal estimate of $200,000.

[3] The phase 1 roads were Pakxane–Thasi in Borikhamxai province and Xaisetha–Sanxai in Attapeu province. The phase 3 road was Sayabury–Hongsa in Sayabury province.

[4] Affected persons included affected persons, households, firms, and public and private institutions.

Table A3.2: Appraisal Estimate of the Loss of Land, Structures, and Trees

	Planned										Actual									
	Land Acquisition						Affected Persons (APs)				Land Acquisition						Affected Persons (APs)			
	Land Area	Plot	Agricultural Land		Homestead			Type of Impact per APs			Land Area	Plot	Agricultural Land		Homestead			Type of Impact per APs		
Road [a]	(ha)	(no.)	Area (ha)	Plots (no.)	Area (ha)	Plots (no.)	Total APs	Land Only	Land with Structures	Trees Only	(ha)	(no.)	Area (ha)	Plots (no.)	Area (ha)	Plots (no.)	Total APs [b]	Land Only	Land with Structures	Trees Only
Pakxane–Thasi	2.168		0.127		2.041		74	50	24	82	0.526		0		0.526		69	37	32	57
Saysettha–Sanxai	3.138		2.164		0.974		96	52	44	373	0.489		0		0.489		41	19	22	8
Pakton–Ban Vang	1.34		0.849		0.491		97	68	29	290	0.031		0.031		0		55	29	26	9
Sayabury–Hongsa–Thaxoan	2.349		1.403		0.946		314	13	301		0.167		0.122		0.045		15	2	13	0
Nam Houng Bridge	0.18		0		0.18		7	0	7	0	0.18		0		0.18		7	0	7	0
Total	**9.175**		**4.543**		**4.632**		**588**	**183**	**405**	**745**	**1.393**		**0.153**		**1.24**		**187**	**87**	**100**	**74**

AP = affected person, ha = hectare.

[a] Resettlement and community development plans for the Hongsa–Thaxoan road (Sayabury province) and the Pakton–Ban Vang road (Vientiane province) will be prepared in accordance with the resettlement framework. Detailed designs were to be prepared and submitted to the Asian Development Bank for approval under phase 1 and were implemented under phase 2 before civil works began.

[b] All affected persons in Borikhamxai and Attapeu were to be affected households, while affected persons in Sayabury included 114 households, 1 school, and 2 village offices. An affected person may lose more than one structure (e.g., house, shop, rice bin).

Source: ADB. 2001. *Technical Assistance to the Lao People's Democratic Republic for preparing the Roads for Rural Development Project.* Manila.

Table A3.3: Project Resettlement Outputs

	Planned			Actual			
Road	**Affected Persons/ Assets**	**Project Villages**	**Compensation Amount** (KN million)	**Affected Persons/ Assets**	**Project Villages**	**Compensation Amount** (KN million)	**Completed**
Pakxane–Thasi	101	13	1,112	69	13	122.6	February 2007
Saysettha–Sanxai	119	8	346	41	7	28.4	March 2007
Pakton–Ban Vang	97	8	117	55	7	107.2	March 2007
Sayabury–Hongsa–Thaxoan	319	20	368	15	5	57.6	February 2007
Nam Houng Bridge	7	1	326.7	7	1	326.7	July 2009
Total	**643**	**50**	**2,270**	**187**	**33**	**642.5**	

Source: Project consultant's project completion report, March 2011.

9. A high proportion of the affected ethnic minority groups[1] impacted by the project lived along the Sayabury–Hongsa and Xaisetha–Sanxai roads, so special attention was given to identifying and addressing their special needs. The resettlement plans for these two roads each included a community development plan prepared in accordance with ADB's Indigenous Peoples Policy. The resettlement plan for the Pakxane–Thasi road included a special action to help villages in nontimber forest product management. This special action was implemented as part of the project's social action plan (Appendix 5). Special attention was given to identifying and addressing the needs of all disadvantaged groups, including the landless, the poor, households headed by women, and the disabled.

10. In all roads civil works contracts, works in sections free of resettlement encumbrances were commenced first and work continued on the remaining areas after resettlement compensation payments were made according to the approved updated resettlement plans. Replacement costs were calculated through consultation with the district and village authorities during fieldwork. The resettlement activities were coordinated with the civil works programs and compensation payments were delivered in February and March 2007 with prior notices being issued by the MPWT. While civil works contracts were awarded prior to resettlement compensation payments, work was only commenced when free of resettlement encumbrances after compensation payments were paid and delivered. The budget for resettlement compensation payments was provided under the Nordic Development Fund Credit No. 426 through a variation in the consultancy services package.

11. The implementation of resettlement as implemented by the consultant and the MPWT is summarized for each road project in paras. 12–16. Beneficiaries and affected persons have participated in all consultation meetings. Each village has its own grievance mechanism implemented by the village resettlement committee. Community mobilizers assisted affected persons with necessary documentation required for grievance application, and these were submitted to village resettlement committees for a decision. If the affected person was not satisfied, the complaint grievance was reported to the district resettlement committee. If the affected person was still not satisfied, the application went to the Provincial Resettlement Committee (PRC) and Department of Roads (DOR) or Ministry of Public Works and Transport (MPWT) for further review and action. Resettlement and other social safeguards monitoring reports were prepared and submitted by the consultants during project implementation.

A. Resettlement - Contract C01

12. There were 69 assets from 13 project villages affected by the civil works under this contract. The remaining 32 affected persons mentioned in the resettlement plan 2006 were either not affected or withdrawn voluntarily, and/or the impacted areas of agriculture and residential lands and structures were reduced. All the affected persons received compensation toward the loss of affected assets as per the entitlements. All replacement costs have been estimated through consultation with district and village administrations during the resettlement fieldwork. The total land acquisition and resettlement for this project road section was KN122,593,000, including administrative costs that were paid in February 2007.

B. Resettlement - Contract C02

13. There were only 41 affected persons (and assets) from 7 project villages affected by the civil works under this contract. The remaining 78 affected persons mentioned in the resettlement

[1] Around 20% (25 persons) of total affected persons.

plan 2007 were either not affected or have withdrawn voluntarily. All the affected persons received compensation toward the loss of affected assets in accordance with their entitlements. The total cost of land acquisition and resettlement for this project road section was KN28,365,000, including administrative costs that were paid in March 2007 with prior notice issued by the MPWT.

C. Resettlement - Contract C03

14. There were 55 assets from 7 villages affected by the civil works under this contract. The remaining 42 affected persons mentioned in the resettlement plan 2007 were either not affected or have withdrawn voluntarily, and the impacted area of agriculture and residential land and structures was reduced. All the affected persons have received compensation toward the loss of affected assets in accordance with their entitlements. The total cost of land acquisition and resettlement for this road section was KN107,203,800 excluding administrative costs. All the compensation payments were made in March 2007 with prior notice issued by the MPWT.

D. Resettlement - Contract C05

15. There were only 15 assets from 5 villages affected by the civil works under this contract. The remaining 299 affected persons mentioned in the resettlement plan 2007 were either not affected or have withdrawn voluntarily. All the affected persons received compensation toward loss of affected assets in accordance with their entitlements. The total cost of land acquisition and resettlement for this road section was KN57,644,000 including administrative costs. All the compensation payments were delivered in February 2007 with prior issuance notice by the MPWT.

16. In June 2009, during the visit of the prime minister, it was decided by the government that the approach road to Nam Houng Bridge at the Hongsa side in Ban Natak would be realigned to further improve the road geometry. Consequently, as agreed by the ADB Lao PDR Resident Mission and the MPWT, during 1–20 July 2009 the resettlement committee and district authority conducted consultation meetings with affected persons and a resettlement survey for the 7 affected households. It was agreed that the following would be implemented: (i) relocation with land replacement to the opposite side of the road (KN53,961,000), (ii) relocation of electricity poles (KN14,628,000), (iii) compensation paid for affected structures and homestead (KN167,003,000), and (iv) land clearing for relocation sites (KN91,106,000). The total resettlement cost was KN326,698,000.

ROAD SAFETY ACTIVITIES

1. The road safety project, funded by the Nordic Development Fund (NDF) as a loan to the Lao People's Democratic Republic (Lao PDR), started on 17 July 2006 and was initially to run for 24 months. During the early stages of implementation, the Swedish International Development Agency (Sida) supported a 12-month extension of the project to July 2009.

2. The project was comprehensive, covering support for introducing a new road safety organization, procurement of equipment for the Ministry of Public Works and Transport (MPWT) and Department of Traffic Police (DOTP), training of staff at the MPWT and DOTP, and rebuilding of some dangerous roads to make them safer. A road safety audit and road accident information database were introduced and an emergency call center was established.

3. At the completion of this project component, the basis for a road safety organization that would work well was established. The National Road Safety Committee has representatives from all involved ministries and is powerful enough to take needed decisions and control implementation.

4. The Department of Transport has a Road Safety Division and is also responsible for the Road Safety Secretariat. The secretariat office is the implementing body for the National Road Safety Committee.

5. The traffic police have increased their staff and now have the human resources needed to carry out their task.

6. The prime minister has introduced a number of decrees involving the creation and functions of the road safety organization, road safety funding, and penalties for traffic offenders.

7. New donor-funded road construction has road safety as part of project implementation. The Department of Roads has staff working with the Department of Transport when doing road safety audits and improvements to dangerous spots.

8. Important activities for the near future were identified as follows:
   - (i) A road safety curriculum for all age groups at schools should be developed.
   - (ii) Road safety education nationwide should be introduced for at least primary and secondary schools.
   - (iii) The training of traffic police in modern, efficient, and safety-focused traffic surveillance should be continued.
   - (iv) Traffic police should be equipped with modern surveillance equipment.
   - (v) Frequent use should be made of radio broadcasting for road safety education. Many of these programs should be made at the provincial level and focus on common problems in the province.
   - (vi) Staffing levels of the newly established road safety organizations should be increased and staff trained on a regular basis.
   - (vii) All drivers must have a driving license. This means that the training and testing of drivers must increase and be able to take care of actual demand. It is unacceptable that many drivers drive without training or a license.
   - (viii) Road safety must be included in all new construction of roads, even at the design stage. Rehabilitation and maintenance of roads must include the road safety aspect.

(ix) As most upgrading of roads will increase the speed and number of vehicles, people living along these roads must get information and education on how to cope with the new road environment.
(x) The national road network has to be signed and marked in a consistent way. Therefore, the Lao PDR must adopt standard road signing and road marking. The network must also be audited for safety, and problems must be rectified.
(xi) The developed road accident information database needs to be maintained continuously with sufficient financing support and technical resources, so that the information can be accessed nationwide.

9. In the longer term, the following actions should be implemented:
(i) Introduction of a modern driver training and testing system.
(ii) Establishment of a road safety research institution.
(iii) Development of a modern standard for vehicles and more comprehensive vehicle inspection.
(iv) Development of a modern road safety standard for road design.

10. A number of constraints were identified:
(i) The road safety organization is still vulnerable. There are few staff working with road safety and even fewer have received any road safety training. The road safety organization still relies on a few people and if one of them leaves a lot of activities will come to a standstill.
(ii) Many traffic police lack training and have very little understanding of traffic and safety. They lack equipment and have no proper system for taking care of and maintaining complicated surveillance equipment.
(iii) There is corruption within the traffic police, vehicle inspections, and driving examinations, and this is affecting safety.
(iv) The driver training and testing cannot cope with the actual demand. There are probably at least 300,000 regular drivers who lack a driving license. Of these, almost half are under the age of 20. If the government is to train and test all these people, it must focus on the most dangerous (those most involved in accidents) group, i.e., those under 20 years of age. The only possible way is to give all persons over 20 years a license without a test. A statement from the chief in the village certifying that the person had more than 2 years of driving experience could perhaps be enough to get a motorcycle license. All drivers under 20 years of age should always have a proper driving test.

11. More comprehensive details of the work and outcomes of this road safety project component is provided in the consultant's report,[1] and Tables A4.1–A4.2 detail the various project reports completed and the training programs conducted.

[1] SweRoad, Ict, and Burapha Development Consultants. 2009. *Road for Rural Development Project: NDF-426-Lao; Consultancy Services for Package 3: Road Safety*. Vientiane.

Table A4.1: List of Project Reports

Item	Date	Subject	Submit to
1	11 Oct 06	Final inception report	SIDA, DOT, NDF, ADB
2	Monthly	Progress reports	DOT, DOR, NDF, SIDA, ADB
3	6 Nov 06	Road safety workshop report	DOT
4	29 Nov 06	Procurement of equipment for DOT, DPWT, Secretariat	DOT
5	11 Jan 07	Procurement of equipment for traffic police	DOTP
6	12 Jan 07	Variation order 1	DOT and SIDA
7	7 Feb 07	Proposal for setting up road safety audit team	DOT
8	9 Feb 07	Proposal for traffic police training in surveillance	DOT
9	12 Jan 07	Work plan	DOT
10	12 Feb 07	Propose black spot location on Road 13 North Vientiane–Luangprabang	DOT
11	16 Feb 07	Proposal for traffic police training in surveillance	DOT
12	19 Feb 07	Summary of the first 6 months, July–December 2006	DOT
13	23 Feb 07	Draft TOR for construction of median on road No. 2	DOT
14	12 Mar 07	Accident recording form for black spot investigation	DOT
15	12 Mar 07	Road accident cost	DOT
16	12 Mar 07	Needs assessment of road safety training of highway professionals	DOT
17	29 Mar 07	Proposal for introducing a computerized accident data system	DOT, DOR and DOTP
18	30 Mar 07	Proposal for remedy measures on road No. 13 North	DOT, DOR and VUDAA
19	30 Mar 07	Proposal for remedy measures on Mahosot road	DOT, DOR and VUDAA
20	10 Apr 07	Proposal for setting up an audit team	DOT and SIDA
21	24 May 07	Procurement of office and road safety equipment; category A: packages I–III; category B: packages I–VI	DOT
22	24 May 07	Introducing a medical emergency system in the Lao PDR	DOT
23	12 Jun 07	Black spot report	DOT and DOTP
24	18 Jun 07	Median design and construction supervision on road No. 2	LTEC and DOT
25	25 Jun 07	Road safety audit report June 07	DOT, PMD, DOR, ADB, NDF, SIDA
26	26 Jun 07	Kayson Phomvihan road safety project	DOR, DOT, PMD, VUDAA
27	7 Sep 07	Comments on draft traffic regulations	DOT, DOR, PMD, DOTP
28	7 Sep 07	Handouts at traffic police training	DOTP
29	23 Nov 07	Road safety audit report and road accident black spot in Vientiane	MPWT
30	6 Dec 07	Road safety audit report on road No. 9, road No. 1	MPWT, NDF, ADB, SIDA, and DOTP
31	14 Feb 08	Road safety audit training	DOT
32	5 Mar 08	Report on using of helmet survey and	MPWT, DPWT, DOT and UNICEF

Item	Date	Subject	Submit to
		traffic sign installation and road marking in capital of Luangprabang province	
33	5 May 08	Trial use of multiple choice questions for driving license testing	DOT
34	13 May 08	Approval on trial use of multiple choice questions for driving license testing	DOT
35	6 Jun 08	Delivery of road safety audit manual	DOT, DOR and RAD
36	25 Jun 08	Proposal for signing contract for computerized RADIS	DOT and DOR
37	30 Jul 08	Proposal for remedy measures on selected dangerous locations	DOT and DOR
38	25 Aug 08	Clarification about diving license rules for electric motorcycles	DOT
39	26 Aug 08	Remedy measures at Phonkheng Fuel Station intersection	DOT, DOR and VUDAA
40	26 Aug 08	Plastic covers on traffic signals	DOT, DOR and VUDAA
41	27 Aug 08	Repair of traffic signal at Nongnieng km 5.750 road No. 2	DOT, DOR and VUDAA
42	24 Oct 08	Investigation of road accident near Houay Mor Bridge	DOT and DOR
43	24 Nov 08	Road accident data to be computerized	DOT and DOR
44	27 Nov 08	Speed surveillance with stop watch	DOTP, DOT and DOR
45	28 Nov 08	Equipment for entering and storing road accident data	DOT and DOR
46	16 Dec 08	Civil works and design of a traffic training area	DOT and DOR
47	5 Jan 09	Training in producing radio programs	DOTP, DOT and DOR
48	30 Mar 09	Develop a sign and marking manual	DOT
49	13 Apr 09	Erecting guard rails and sign on road No. 8	DOT and DOR
50	04 May 09	Road safety audit on Northern GMS Transport Network Improvement Project Route 4	DOT and DOR
51	15 May 09	Development of road accident information system	DOT and DOR
52	21 May 09	Ideas how to distribute money between provinces	DOT and DOR
53	6 Jul 09	Develop a sign and marking manual	DOT

SIDA = Swedish International Development Cooperation Agency, MPWT = Ministry of Public Works and Transport, DPWT = Department of Public Works and Transport, DOT = Department of Transport, NDF = Nordic Development Fund, DOR = Department of Roads, DOTP = Department of Traffic Police, VUDAA = Vientiane Urban Development Administration Authority, RAD = Road Administration Division, PMD = Project Management Division, LTEC = Lao Transport Engineering Consultant, ADB = Asian Development Bank, and UNICEF = United Nations Children's Fund.
Source: SweRoad, Ict, and Burapha Development Consultants. 2009. *Road for Rural Development Project: NDF-426-Lao; Consultancy Services for Package 3: Road Safety*. Vientiane.

Table A4.2: Summary of Training within the Road Safety Project

Item	Date	Training	Remarks
1	2006–2007	Basic ideas for road safety	10 provinces
2	3–14 September 2007	10 days of course training of trainers for traffic surveillance	Representatives from 17 provinces
3	August–September 2007	Road safety audit training	Engineers and traffic police officers from 17 provinces
4	August–September 2007	Training in how to use equipment for publicity and public awareness	17 provinces
5	November 2007	Study tours to MIROS, Malaysia	Three staff from DOT
6	2007	Road safety audit training for engineers at ministry level, led by Surend Sarin and consultant	Engineers from DOR, DOT, VUDAA, DCTPC of Vientiane capital
7	20–21 February 2008	2 days course training of trainers for traffic police about traffic laws	Capital traffic police
8	March–April 2008	Road safety course in Sweden	One staff member from each of Ministry of Health and Traffic Police Department
9	March–June 2008	30 days course for traffic police	17 provinces
10	3 June 2008	Road accident information system	Traffic police from 17 provinces
11	14 July 2008	Road accident information system - how to analyze accident data	Traffic police, DOT, Road Safety Secretariat
12	October 2008	GRSP meeting in Malaysia	Two staff members from DOT, one from traffic police and two from Road Safety Secretariat
13	October 2008	Road safety course in Belgium	One staff member from Road Safety Secretariat
14	9 December 2008	Using new road accident form, training of trainers	Traffic police from 17 provinces
15	December 2008–January 2009	Training all traffic police in using new road accident form	Traffic police in all districts of Lao PDR
16	2008–2009	3-day courses for traffic surveillance	Traffic police from 140 districts in 17 provinces
17	2008–2009	Trained the examiners how to use the new theory and practical test	17 provinces
18	6–8 January 2009	Provincial road safety committee basic training in road safety	6 provinces in northern Lao PDR
19	19–21 January 2009	Provincial road safety committee basic training in road safety	6 provinces in southern Lao PDR
20	6–8 January 2009	Provincial road safety committee basic training in road safety	5 provinces in central Lao PDR
21	March–April 2009	Road safety course in Sweden	Two staff members from Road Safety Secretariat

DOT = Department of Transport, DOR = Department of Roads, DCTPC = Department of Communication, Transport, Posts and Construction (currently DPWT = Department of Public Works and Transport), VUDAA = Vientiane Urban Development Administration Authority.

Source: SweRoad, Ict, and Burapha Development Consultants. 2009. *Road for Rural Development Project: NDF-426-Lao; Consultancy Services for Package 3: Road Safety*. Vientiane.

SOCIAL ACTION PLAN

A. Nonformal Education and Social Marketing

1. The social action plan (SAP) of the project included design and implementation of community development plans (CDPs) for contracts C02 (Attapeu province) and C05 (Sayabury province) which also comprised nonformal education (NFE) and social marketing. Workshops were organized with communities along the Xaisetha–Sanxai and Sayabury–Hongsa roads to build the learning and teaching skills and techniques of identified NFE volunteers and to establish effective coordination with the existing formal education system. Training sessions conducted mainly focused on the identification and formation of groups of interested farmers in rice planting technique and livestock (poultry) management (Table A5.1).

Table A5.1: Nonformal Education and Social Marketing Outputs

	Nonformal Education				Social Marketing			
	Volunteers				Participants			
Road Section	Male	Female	Total	Villages	Male	Female	Total	Villages
Xaisetha–Sanxai	10	3	**13**	7	147	148	**259**	7
Sayabury–Hongsa–Thaxoan	32	11	**43**	14	99	75	**174**	14

Source: Project consultant's project completion report, March 2011.

2. NFE activities in villages along the Xaisetha–Sanxai road were coordinated with ongoing District Education Office and International Fund for Agricultural Development programs.[1] Existing NFE teachers, together with NFE volunteers, developed the concept and management for community learning centers to provide functional literacy and vocational training and skills (weaving, animal raising, vegetable gardening, health care, and hygiene). Two-week training programs for NFE teachers of grades 1–3 were conducted during July–August 2008, in collaboration with the District Education Office and International Fund for Agricultural Development. The outcome was that 13 NFE volunteers organized community learning centers in their respective villages. The International Fund for Agricultural Development provided technical support to these NFE volunteers. Under the social marketing program, demonstrations and lectures were arranged to learn the system of rice intensification and livestock management (poultry techniques), organized through agriculture technical assistance from both Xaisetha and Sanxai districts. An exposure tour was made to the Bolavean Plateau of Paksong district in Champassak province to learn more about new coffee production techniques. Ten representatives from project villages (including three females) participated in the tour program.

3. NFE activities in villages along the Sayabury–Hongsa–Thaxoan road included livelihood programs. Twenty people responsible for agriculture extension at the Sayabury and Hongsa district agriculture technical centers held demonstrations in the Sayabury and Hongsa districts covering rice and hog-raising techniques. Demonstrations covered eradication of animal diseases, especially for smallholders, as well as taking care of animal health to increase income.

4. A campaign was launched in all project villages in October 2008 on health awareness and promotion, especially on water quality and management. Health information messages were delivered on drinking water storage and handling, washing hands with soap before eating and after defecation, and the importance of community hygiene. Twenty eight village health volunteers (males and females) were trained during the campaign. Technical staff of district

[1] Implementation of agriculture development in five districts of Attapeu province.

public health departments were involved as facilitators. Village authorities made rounds at village and individual households to maintain sanitation measures such as keeping surroundings clean. Some villages conducted “clean house” competitions (Huaychoung village in Hongsa).

B. Nontimber Forest Product Management

5. At appraisal it was determined that the Ban Kin Yong and Ban Thasi communities at the Thasi end of the Pakxane–Thasi road harvest nontimber forest products (NTFPs), and that outsiders also harvest or buy NTFPs[2] in the area. Road improvements would threaten the NTFP resources, so the resettlement plan for the Pakxane–Thasi road included a plan to enable the two communities to sustainably manage those resources.

6. NTFP management was a special program included as part of the resettlement plan for contract C01 (Borikhamxai province), as NTFPs provide more than 30% of the cash income of the project villages, where most people use bamboo shoots for food and construct or repair their houses with local forest products. People in this area also use bamboo instead of wood, and palm or grass leaves for roofing. The NTFP findings by the consultant indicated the following trends: (i) a rapid increase in cross-border market demand for NTFPs (main markets for visited villages are Vietnamese); (ii) depletion of some natural NTFP resources such as tree bark, orchids, and rattan; (iii) increased market demand for NTFP because of growth in the population; and (iv) a need for livestock grazing and firewood.

7. Other issues that emerged identified the following: (i) there is no model of sustainable systems of NTFPs that contributes to the conservation of forest biodiversity; (ii) there is a lack of community collective efforts, e.g., no community-based organizations manage and/or monitor the use of their NTFP resources; (iii) there are no alternative products to reduce the impact on existing natural resources (alternative livelihood approach); (iv) there are no positive efforts being made toward people’s involvement in planning and management of natural resources and in the sharing of benefits (participatory planning approach); and (v) there is no intervillage conflict resolution system in the visited cluster.

8. In response to these findings, a village development group plan at zonal level was experimented with and forest use rules developed for a cluster of villages. A six-member committee prepared a plan and was responsible for development of this zone. LuxDevelopment, with joint participation of the Lao People’s Democratic Republic (Lao PDR), made efforts toward participatory land use planning. This plan mainly focused on further strengthening local communities to organize NTFP production and marketing by organizing producer associations after project completion. The plan was also shared with Borikhamxai province and the Borikhan District Agriculture and Forestry Department. The village development group plan is still not implemented because of lack of funds from Borikhamxai province. Two NTFP checkpoints (in Thasi and Pha Meuang) were established by Borikhamxai province in October 2010.

C. Land Utilization and Occupancy

9. The improved roads are expected to increase demand for land, with corresponding effects on land prices in the project impact area. The poor can benefit from price increases if

[2] NTFPs are classified into (i) plant foods (edible plant products such as forest fruits and seeds, flowers, tubers, roots, and barks), (ii) medicinal plants (used to treat people and their animals, to make and keep them healthy), (iii) fibers (from plants used to build, e.g., bamboo, or finish thatch and household implements such as brooms), and (iv) charcoal and wood fuel for heating or food preparation.

land tenure is secure, but if land tenure is insecure the poor will potentially be subject to land grabbing for the potential value of the land and its resources. If land grabbing occurs, many of the development impacts may not accrue to the poor, especially poor farmers. The Department of Lands under the Ministry of Finance has the mandate to carry out the design and supervision of national programs of land registration and titling through offices of the provincial services. The Department of Forestry, under the Ministry of Agriculture and Forestry, is responsible for implementing land use planning and land allocation in rural areas. Temporary land use certificates have been issued to more than 330,000 households through the district agriculture and forestry offices and district administration offices. The Department of Lands is responsible for registration of these rights. Most people who live along project roads have land use rights certificates (Form 01) issued by district authorities. This is basically a declaration and acknowledgement of occupancy and rights to use the land. The rights can be sold or bequeathed but not mortgaged. The responsibility of paying taxes comes with the land use rights certificates. The project should have facilitated the provision of land use rights certificates to all households that do not yet have them, and who want to pay taxes and receive education and information on land rights. The process of land registration and land utilization and occupancy to be undertaken in rural areas, including those on the project roads, by the state is still awaiting further funding. The current status of systematic land registration in the project areas is shown in Table A5.2.

Table A5.2: Status of Systematic Land Registration in Project Area

	Registration							
Province	**Male**	**Female**	**Conjugal**	**Common**	**Entity**	**State**	**Collective**	**Total**
Bolikhamxai	4,510	6,242	9,142	245	15	947	45	**21,046**
Attapeu	106	352	598	8	0	10	0	**1074**
Vientiane	18,984	29,416	21,279	1,783	1	3,680	46	**75,189**
Sayabury	5,583	12,244	9,142	466	23	1,653	2	**29,113**

Source: Summary Report, PY5 Land Titling Project, Phase II, 2008.

D. Road Safety Awareness

10. A number of accidents on the completed roads occurred because of higher operating speeds and villagers' limited knowledge of traffic rules and safety. To generate awareness and upgrade traffic knowledge of road users in villages, road safety campaigns were undertaken in all villages along project roads in 2008 and 2010. Road users, particularly the young population, were the main target group of the campaigns. The road safety programs were designed in collaboration with provincial and district traffic officials. The topics discussed in road safety training were based on issues found during needs assessment meetings. The main focus of the road safety education campaign was to enhance knowledge of road users regarding traffic rules and regulations, traffic signs and their meanings, and actions and/or precautions to be taken to enable users to cope with the dangers of traffic, and teach safer driving behaviors to reduce the risk of road accidents and injuries.

11. The key findings of this program were as follows:

(i) This was the first opportunity for villagers and local officials to learn and teach road safety rules and regulations.

(ii) Most participants were not familiar with road laws and various signals, signs, and markings.

(iii) In learning traffic signs and markings, people have asked that these are installed in their villages (no traffic signs near schools, health centers).

(iv) School teachers wanted to organize the same workshops more often for school children.
(v) Women participated more.
(vi) The number of vehicles, particularly motorcycles, is increasing rapidly in all project villages, which has also increased the number of accidents.

12. In contracts C01 and C03, road safety awareness campaigns were carried out in cooperation with DPWT officials, traffic police, and local authorities in 27 target villages. A total of 1,494 villagers (586 females) joined the village awareness meetings.

13. In contract C02, road safety campaigns were conducted in seven villages of Xaisetha and Sanxai districts where 1,707 old and young men and women participated, but particularly young people.

14. In contract C05, campaigns were conducted in 24 villages along the road in Sayabury and Hongsa districts. There were 1,819 old and young men and women who participated, but it was mostly young people.

E. HIV/AIDS and Human Trafficking Awareness and Prevention Program

15. The Lao PDR remains highly vulnerable to the spread of HIV/AIDS due to a number of factors. Mobility and HIV/AIDS vulnerability is firmly on the political agenda, resulting in the Government of the Lao PDR supporting the integration of HIV/AIDS and human trafficking prevention programs with the planned road project to minimize the vulnerability of those living and working in the road construction areas. These include local communities and incoming construction workers.

16. Prevention of HIV/AIDS and human trafficking was part of the SAP. There was an allocation of $50,000 for each road section over a period of 3 years (April 2007–March 2010) for programs to create awareness and prevention of HIV/AIDS and human trafficking. The goal of these programs has been to create awareness and an enabling environment among mobile populations and villages along the rural roads being constructed in order to mitigate the spread of HIV/AIDS and sexually transmitted diseases (STDs), and reduce the potential harm from migration and exploitation.

17. The implementation in each province at the field level was conducted by a project working team composed of local staff drawn from different local agencies (e.g., District Committee for the Control of AIDS (DCCA), women's union, youth union) with the responsibility of training and supporting peer educators in all villages affected by the road building. To support the project working teams, two service providers were engaged (each covering two sites) by contractors and two local consultant experts—one with expertise in HIV/AIDS and the other in human trafficking—supported and coordinated the work in all provinces. An international HIV/AIDS and human trafficking coordinator, who set up the project design, was attached to the program for an average of 3 months per year. The targets of the interventions have been people living in the affected villages along the road, the construction workers, and service women working in beer shops near the road construction. Information material and condoms were distributed among target groups, construction workers, and service women, and they received support visits on a regular basis. In addition, big events have been conducted every year during implementation to raise awareness on the dangers of HIV/AIDS and human trafficking. The monitoring of the outcome was done through distribution of questionnaires among the target groups and through interviewing individual people from all target groups. In general, the

knowledge and awareness on HIV/AIDS has increased in all target groups. Notwithstanding these actions, in all sites except the Sayabury–Hongsa road, the number of construction workers not using condoms when visiting service women has increased.

18. The picture of test behavior (for HIV/AIDS and STDs) among construction workers was mixed. In some sites more construction workers had been tested at the end of the project period than at the beginning, while at other sites fewer construction workers had been tested. Among the service women the picture was clearer; more service women had been tested for both STDs and HIV/AIDS at the end of the project period than before.

19. It was not possible from the data from health authorities to select cases of STD and HIV/AIDS connected to the road construction areas as these data are made on either province or district level, but there is no indication that cases of STDs or HIV/AIDS had increased because of the road construction. However, it is noted that 90%–95% of all STD cases are found among women, which suggests that a significant number of men have untreated STDs, and having untreated STDs means there is a much higher risk of getting infected with HIV/AIDS if one is exposed to it.

20. No cases of human trafficking can be connected to the road construction and a great number of service women, construction workers, and peer educators have increased their knowledge on the dangers of human trafficking during the project period.

21. The project design made in the initial phase of the project was too extensive as there was no funding in the consultant's budget to support all the activities suggested in the design, making it difficult for the service providers and the local consultants to prioritize. The documentation of project activities, especially the work done by project working teams and peer educators, has been poor and requires improvement in future projects.

22. Lessons learnt from this project to be aware of in future projects include the following:

(i) The set-up of the project was too extensive and beyond the original scope of work in the consultant's terms of reference.
(ii) Peer educators should involve all age groups and not only the youth.
(iii) Training and support of peer educators should have a higher priority as they are the focal point of knowledge dissemination among villagers.
(iv) Close cooperation with local and international nongovernment organizations and government agencies can increase the outcome of projects and prevent overlap of work.
(v) Systems to document project activities must be considered and implemented from the start of the project.
(vi) Mobile teams to test for STDs among construction workers should be considered in future projects.
(vii) Sustainability of activities and continued action from the communities should be considered in future projects.

PROJECT COSTS

Detailed Cost Estimates and Financing Plan

($ million)

Item		Project Cost						Financing Source							
		Cost Estimate at Appraisal			Actual Expenditure at Completion			At Appraisal				At Completion			
		Foreign Exchange	Local Currency	Total Costs	Foreign Exchange	Local Currency	Total Costs	Lao PDR	ADB	NDF	OFID	Lao PDR	ADB	NDF	OFID
A.	**Base Cost**[a]														
	1 Land Acquisition and Resettlement	0	0.2	0.2		0.25	0.25	0.2						0.25	
	2 Civil Works														
	a. Rural Development Roads	17.7	4.4	22.1	27.72	11.27	38.99	4.3	12.6		5.2	10.92	17.74	4.33	6
	i. Xaisetha–Sanxai	4.4	1.1	5.5	6.84	2.21	9.05	1.1	4.4			2.12	4.89	2.04	
	ii .Pakxane–Thasi	6.9	1.7	8.6	8.93	3.68	12.61	1.6	1.8		5.2	3.66	0.66	2.29	6
	iii. Pakton–Ban Vang	1.5	0.4	1.9	3.99	2.01	6	0.4	1.5			1.93	4.07		
	iv. Hongsa–Thaxoan	0.8	0.2	1			0	0.2	0.8						
	v. Sayabury–Hongsa	4.1	1	5.1	7.96	3.37	11.33	1	4.1			3.21	8.12		
	b. Periodic Maintenance	0.8	0.2	1	0.22	0.06	0.28	0.2	0.8			0.06	0.22		
	c. UXO Clearance		0.2	0.2			0		0.2						
	d. Forest Product Control and						0								
	Vehicle Weigh Station		0.1	0.1			0		0.1						
	3 Consulting Services				5.74	0	5.74							5.74	0
	a. Construction Supervision	1.5	0.5	2	3.7	0	3.7			2				3.7	
	b. Project Preparation Services	1.3	0.4	1.7	0.15	0	0.15			1.7				0.15	
	c. Social Action Plan	0.2	1	1.2			0			1.2					
	i. Nonformal Education	0.1	0.5	0.6			0			**0.6**					
	ii. Local Resource Management		0.1	0.1			0			0.1					
	iii. HIV/AIDS and STD Awareness														
	iii. HIV/AIDS and STD Awareness Campaig	0.1	0.3	0.4			0			0.4					
	iv. Community Road Safety Campaign		0.1	0.1			0			0.1					
	d. Strengthening Social and Environmental Managemen	0.2	0.1	0.3			0		0.3						
	e. Road Safety Progra	1.1	0.7	1.8	1.89		1.89			1.8				1.89	
	4 Equipment	0.1		0.1	0.11		0.11		0.1				0.11		
	5 Project Management	0	1	1		0.08	0.08	1				0.08			
	Subtotal (A)	**22.9**	**8.8**	**31.7**	**33.8**	**11.66**	**45.4**	**5.7**	**14.1**	**6.7**	**5.2**	**11.06**	**18.07**	**10.32**	**6**
B.	**Contingencies**														
	1 Physical[b]	2.3	0.8	3.1			0	0.6	1.4	0.6	0.5				
	2 Price	1.3	0.6	1.9			0	0.5	1.1		0.3				
	Subtotal (B)	**3.6**	**1.4**	**5**	**0**	**0**	**0**	**1.1**	**2.5**	**0.6**	**0.8**	**0**	**0**	**0**	**0**
C.	**Taxes and Duties**[c]	0	1.4	1.4		3.29	3.29	1.4				3.29			
D.	**Interest During Construction**	1.1	0	1.1	0.72		0.72		1.1				0.72		
	Total	**27.6**	**11.6**	**39.2**	**34.51**	**14.95**	**49.46**	**8.2**	**17.7**	**7.3**	**6**	**14.35**	**18.79**	**10.32**	**6**

ADB = Asian Development Bank, Lao PDR = Lao People's Democratic Republic, NDF = Nordic Development Fund, OFID = OPEC Fund for International Development, STD = sexually transmitted disease, UXO = unexploded ordinance.

[a] In April 2003 prices, minus taxes and duties.

[b] At 10% of base costs, excluding 2% right-of-way costs.

[c] Estimated as 6% of base cost of civil works.

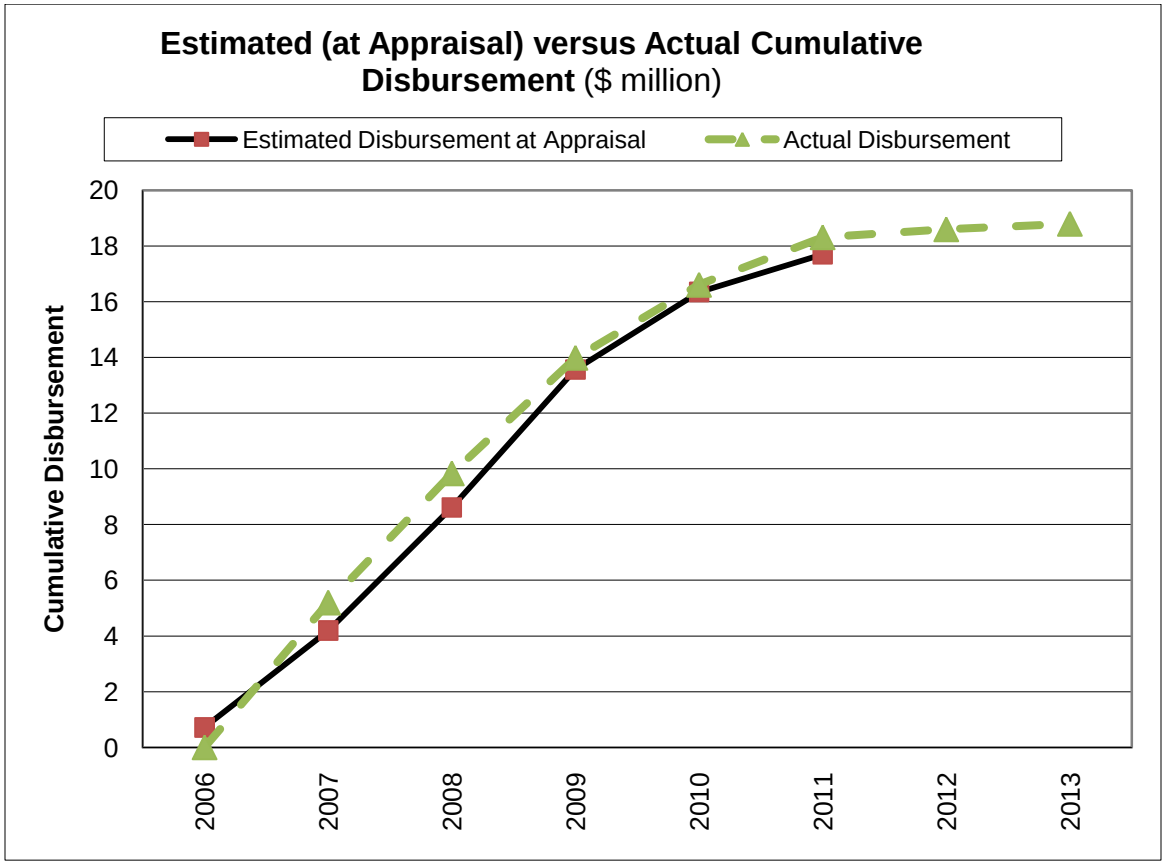
Source: Asian Development Bank estimates.

PROJECTED AND ACTUAL DISBURSEMENT

Projected and Actual Disbursements
($'000)

Year	Estimated Disbursement at Appraisal	Actual Disbursement
2006	0.72	0.00
2007	4.19	5.20
2008	8.61	9.84
2009	13.56	13.99
2010	16.35	16.61
2011	17.70	18.32
2012		18.60
2013		18.79

Note: Projected disbursement in the Asian Development Bank Loan Financial Information System totaled $21.4 million, exceeding the appraisal disbursement amount of $17.7 million. The Loan Financial Information System figures were adjusted pro rata annually to agree with the appraisal disbursement total.
Source: Asian Development Bank - Loan and Grant Financial Information System.



CHRONOLOGY OF MAIN EVENTS

Year	Date	Event
2001	30 October	Approval of PPTA (TA-3756-LAO)
2002	26 August	PPTA commencement
2003	30 April	PPTA completion
	21 April–2 May	Fact-finding mission
	27 October	Management review meeting
	16–20 November	Joint ADB–NDF loan appraisal mission
	15 December	NDF loan agreement signed
2004	25 February	Staff review committee meeting
	17 March	OFID loan approval
	28–29 April	Loan negotiations
	28 June	Loan approval
	6 July	Draft prequalification documents for the Xaisetha–Sanxai, Pakxane–Thasi, and Sayabury–Hongsa roads approved by ADB
	2–6 August	ADB fact-finding mission on infrastructure connections in the northern GMS SSTA, incorporating discussion on Roads for Rural Development Project loan
	15–19 November	ADB midterm review for Rural Access Road Project, including discussions on Roads for Rural Development Project loan
	15 December	ADB loan signing
	16 December	NDF loan signing
2005	1 January	Recruitment of consultants commenced
	1 April	Prequalification for the Xaisetha–Sanxai, Pakxane–Thasi, and Sayabury–Hongsa roads closed
	21 April	OFID loan agreement signed
	4–29 April	ADB review mission Rural Access Road Project, including discussions on Roads for Rural Development Project loan
	27 June	OFID loan effectiveness
	29 June	NDF loan effectiveness
	30 June	ADB loan effectiveness
	24 October	Bid documents for packages C01 Pakxane–Thasi and C02 Xaisetha–Sanxai issued to prequalified contractors
	4 November	Proposals due for construction supervision, project preparation, and social action plan consulting services and for road safety program consulting services
	14–24 November	Inception mission
	28 November	Pre-bid meetings for packages C02 Xaisetha–Sänxai and C01 Pakxane–Thasi
2006	1 January	Monitoring of affected people resettled commenced
	23 January	Bids due for packages C02 Xaisetha–Sänxai and C01 Pakxane–Thasi
	7 February	Closing date of bids for four road sections
	10 April	C04 Hongsa–Thaxoan road (25 km) included as addendum to C05 Sayabury–Hongsa–Thaxoan
	27 April	PAM submitted to executing agency
	31 March	MPWT submitted to ADB proposed locations for periodic maintenance works under Road Maintenance Fund
	3–12 May	ADB review mission
	17 July	Contract signed and work commenced for road safety program action plan
	25 July	EMPs for project roads approved by ADB
	3 August	Updated resettlement plans for C03 and C05 approved by ADB
	30 August	Recruitment of consultants completed
	1 September	Project supervising consultants commenced
	5 October	Updated resettlement plans for C01 and C02 submitted to ADB

Year	Date	Event
	6 October	Updated resettlement plans for C01 and C02 approved by ADB
	8 October	ADB approved contract for C01 Pakxan–Thasi road (78.3 km) civil works
	8 October	ADB approved contract for C02 Xaisetha–Sanxai road (57 km) civil works
	13 October	Contract signing for C01 Pakxane–Thasi road civil works
	13 October	Contract signing for C02 Xaisetha–Sanxai road civil works
	23 October–2 November	ADB review mission
	1 November	Nonformal education program commenced
	8 November	Road safety program commenced
	8 November	Contract C01 Pakxane–Thasi road civil works commenced
	8 November	Contract C02 Xaisetha–Sanxai road civil works commenced
	7 December	ADB approved contract for C03 Pakton–Ban Vang road (42 km) civil works
	14 December	ADB approved contract for C05 Sayabury–Hongsa–Thaxoan road (112.2 km) civil works
	15 December	Contract signing for C03 Pakton–Ban Vang road civil works
	26 December	Contract signing for C05 Sayabury–Hongsa–Thaxoan road civil works
2007	1 January	HIV/AIDS and antitrafficking of women and children program commenced
	2 January	Contract C03 Pakton–Ban Vang road civil works commenced
	4 January	ADB approved suspension of contract C04 (Hongsa–Thaxoan) and remains as addendum to contract C05
	10 January	Swedish International Development Agency provided $0.7 million to support part of road safety program.
	15 January	Contract C05 Sayabury–Hongsa–Thaxoan road civil works commenced
	20 February	Completion of resettlement compensation payments for C01 Pakxane–Thasi road
	1 March	Land titling program commenced
	5 March	Completion of resettlement compensation payments for C02 Xaisetha–Sanxai road
	15 March	Rehabilitation of national roads commenced
	21 March	Completion of resettlement compensation payments for C03 Pakton–Ban Vang
	21 March	Completion of resettlement compensation payments for C05 Sayabury–Hongsa–Thaxoan
	1 June	NTFP management program commenced
	9 July	Project design of HIV/AIDS and human trafficking awareness and prevention program submitted to ADB
	10 July	ADB approved reallocation of loan proceeds
	13 July	CEMP submitted for ADB approval
	1 August	ADB comments on CEMP provided
	3 August	All resettlement plans for C03 and C05 approved by ADB
	17–18 September	ADB–NDF joint review mission
	19 September	Proposed locations of forest checkpoints and weighbridges submitted to MPWT
	24 September	Revised CEMPs submitted to and approved by ADB
	12 October	Change in name of executing agency from Ministry of Communication, Transport, Posts and Construction to Ministry of Public Works and Transport
	3 October	Project EMP used to monitor contractors' implementation of the CEMPs approved by ADB
2008	1 February	Resource management plan for nontimber forest products prepared to support vulnerable ethnic minority communities in the project area of C01
	14 March	SAP: community development plans submitted to ADB and Lao PDR
	31 March	Resident Mission
		Rehabilitation of national roads completed
	1–9 April	ADB project review mission, identified a project road cost overrun of $9.63 million due to cost escalation, partly related to road design gradient changes

Year	Date	Event
		in steep areas
	10 April	ADB approved BME program, due under loan agreement by 30 June 2006
	28 April	ADB approved updated community development plans
	14 May	HIV/AIDS and human trafficking awareness and prevention program annual report year 1 (2007–2008) submitted to ADB and Lao PDR Resident Mission
	15 May	MPWT submitted details of checkpoints to control movements of forest products, endangered species and rare wildlife, and overloaded trucks to ADB, due under loan agreement by 31 December 2006
	16 June	BME program submitted to ADB and Lao PDR Resident Mission
	24–27 June	ADB–NDF joint project review mission, mission identified a project road cost overrun of $5.3 million and concern with progress on C03 Pakton–Ban Vang road and C05 Sayabury–Hongsa–Thaxoan road
	8 July	ADB approved details of checkpoints to control movements of forest products, endangered species and rare wildlife, and overloaded trucks
	9 June– 9 August	First environmental monitoring and data collection for environmental database
	1 October	ADB approved a minor change in implementation arrangements related to changing the name of the executing agency from Ministry of Communication, Transport, Posts and Construction to Ministry of Public Works and Transport
	17 October	ADB approved BME
	17 October	Proposal to split C03 Pakton–Ban Vang road to a nominated subcontractor to improve contract implementation submitted to ADB
	6 November	ADB approved proposal to split C03 Pakton–Ban Vang road to a nominated subcontractor
	6 November	ADB approved increasing the contract prices for civil work contracts C01, C02, C03, and C05 that will be financed by the NDF and the Government of the Lao PDR
	3 November	BME baseline field surveys commenced for all four sites
	3 November	Rapid assessment report on HIV/AIDS and human trafficking awareness and prevention program for contractors' personnel and people living along the road alignments submitted to ADB
	11–20 November	ADB review mission
	23 December	ADB approved a minor change in implementation arrangement regarding the direct payment to subcontractor C03–1 Singviengthong Construction Company
2009	14 January	MOF proposed to amend the financing percentage of OFID loan proceeds from 73% to 80% for contract C01 Pakxane–Thasi road civil works
	20 January	ADB's no-objection in principle on the contract variation C03 regarding subcontracting of a part of civil works to Road No. 8 Construction Enterprise
	5 February	BME field surveys completed
	12–25 February	ADB review mission
	13 February	OFID approved the amendment of the financing percentage of OFID loan proceeds
	25 February	Minor change to contract C03 Pakton–Ban Vang road civil works, value $1.5 million, approved
	27 February	EMP reports for project roads submitted to ADB
	27 February	First environmental database report submitted to ADB
	27 February	HIV/AIDS and human trafficking awareness and prevention program monitoring report submitted to ADB and Lao PDR Resident Mission
	20 March	CDP and SAP final reports submitted to ADB Nontimber forest products monitoring report submitted to ADB and Lao PDR Resident Mission
	25 March	Cost overrun for project roads due to sharp increase in construction inputs estimated at $5.35 million, NDF and government agreed to finance.

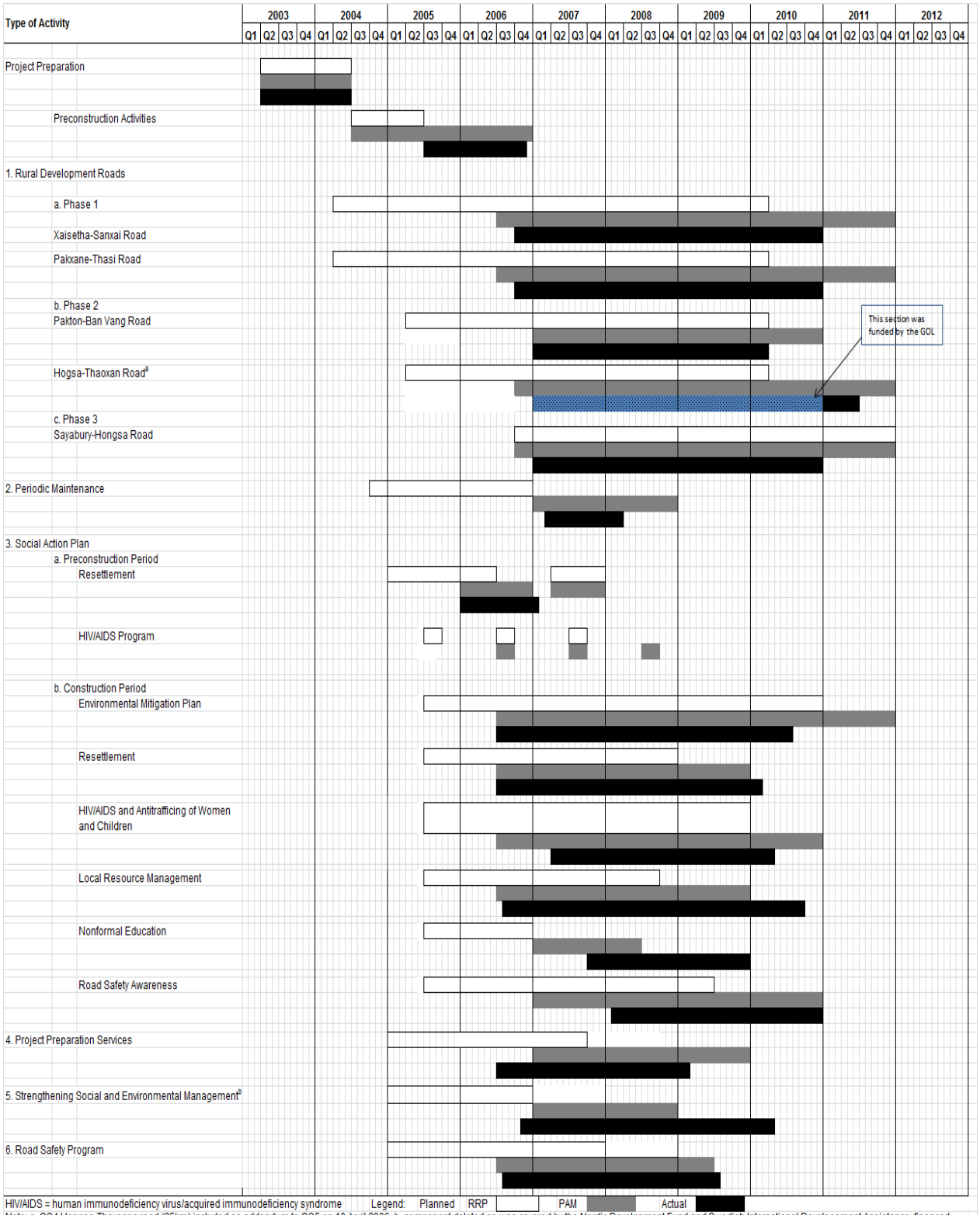
Year	Date	Event
	25–27 March	ADB–NDF joint review mission Study of tariffs and policy for transport services agreed not to be undertaken by consultants and transferred to new ADB TA to Department of Transport as well as under an earlier World Bank study
	10 July	Completion of resettlement payments for Nam Houng Bridge realignment
	17 July	Road safety program financed by the NDF completed
	4 August	HIV/AIDS and human trafficking awareness and prevention program annual report year 2 (2008–2009) submitted to ADB and Lao PDR Resident Mission
	7 September	MOF proposed to extend the OFID loan closing date from 30 April 2009 to 30 April 2010
	28–30 September	Typhoon Ketsana caused severe damage and flooding and landslides to sections of C02 Xaisetha–Sanxai road
	19–29 October	ADB project review mission
2010	1 January	Original completion date of contract C03 Pakton–Ban Vang road civil works (extended to 31 March 2010)
	28 January	Road accident information system unused and shut down because of lack of programing support
	8 February	Final report on resettlement activities presented to ADB
	17 February – 5 March	ADB midterm review mission
	4 March	MPWT terminated two nonperforming joint-venture partners and remaining works allocated to nominated contractor on contract C05 Sayabury–Hongsa–Thaxoan road
	15–21 March	Second environmental monitoring
	22 March	ADB approved a minor change in implementation arrangement regarding subcontracting a part of contract C05 to Road No. 8 Construction Enterprise
	31 March	Contract C03 Pakton–Ban Vang road civil works completed
	30 April	OFID loan closed
	30 April	NTFP management program completed
	7 May	Original completion date of C01 Pakxane–Thasi road civil works (extended to 31 December 2010)
	7 May	Original completion date of C02 Xaisetha–Sanxai road civil works (extended to 31 December 2010)
	24–31 May	Updating of C05 resettlement plan because of realignment of Nam Houng bridge
	31 May	HIV/AIDS and antitrafficking of women and children program completed
	1–30 June	Road safety training carried out in C01, C02, C03, and C05
	30 June	Second environmental monitoring report submitted to ADB
	22 June	HIV/AIDS and human trafficking awareness and prevention program final report submitted to ADB and Lao PDR Resident Mission
	2 July	Government approved additional funds of $3.4 million for additional 91 km of DBST pavement works
	14 July	Original completion date C05 Sayabury–Hongsa–Thaxoan road civil works (extended to 31 December 2010)
	14 July	NTFP management program completed
	15 July	ADB approved reallocation of loan proceeds from interest charges (category 04) to civil works (category 01B)
	30 July	ADB approved the reallocation of loan proceeds for contract C03 Pakton–Ban Vang road civil works
	5 August	Minor change in project scope deleting the study of tariffs and policies for transport services
	6 September	Updated resettlement plan in C05 and road safety awareness program in C01–C03 submitted to ADB and Lao PDR Resident Mission
	31 December	Nonformal education program completed
	31 December	Monitoring of affected people resettled completed

Year	Date	Event
	31 December	Contract C01 Pakxane–Thasi road civil works completed
	31 December	Contract C02 Xaisetha–Sanxai road civil works completed
	31 December	Contract C05 Sayabury–Hongsa–Thaxoan road civil works completed
	15 December 2010–15 February 2011	BME field surveys
2011	6–15 March	Final environmental monitoring
	11 April	Consultant's PCR submitted to ADB, Lao PDR Resident Mission, NDF, and OFID
	1–11 April	ADB project review mission
	20 April	ADB approved the contract variation for C05 regarding improving Hongsa–Thaxoan road (C04), including paved gravel of 1.5 km and graded gravel road of 25.6 km
	31 May	Project supervising consultants completed
	24–26 June	Storm damage to C01 Pakxane–Thasi and C02 Xaisetha–Sanxai road sections
	8 August	ADB approved a minor change in implementation arrangement regarding changing of procurement method from direct contract to shopping for procurement of mobile weighing scales
	3–7 November	ADB project review mission
	14 November	Design and monitoring framework reviewed and modified for uploading to ADB e-Operation system
	28 December 2011–3 January 2012	ADB special project administration mission
2012	11 June	Contract C03 Pakton–Ban Vang road defects liability certificate issued
	25 June	Loan closing date extended to 31 December 2012
	30 June	Original loan closing date
	5 June	Procurement and delivery to provincial DPWTs of mobile weighing scales for Attapeu and Borikhamxai provinces and Vientiane city
	12 July	Contract C01 Pakxane–Thasi road defects liability certificate issued
	18 October	ADB approved the contract variation for C05 Sayabury–Hongsa–Thaxoan road civil works of additional $119,371 to complete three weighing stations and repair works for contract C02 Xaisetha–Sanxai road.
	12 November	Contract C02 Xaisetha–Sanxai road defects liability certificate issued
	10 December	Contract C05 Sayabury–Hongsa–Thaxoan road defects liability certificate issued
	17–26 December	ADB project review mission
	31 December	Final loan closing date
2013	16 May	Final reallocation of loan proceeds to cover the payment of contract variation C05–09 regarding the establishment of forest checkpoints and vehicle weigh stations and repair works for contract C02 (Xaiseth–Sanxai)
	27 May–28 June	PCR mission
	29 May	Submission of executing agency PCR
	17 June	Project account closing date

PPTA = Project preparatory technical assistance, GMS = Greater Mekong Subregion, SSTA = Small-scale technical assistance, CEMP = Construction environmental management plan, EMP = Environmental management plan, PAM = Project administration manual, BME = Benefit monitoring and evaluation, MOF = Ministry of Finance, HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome, NTFP = Non-timber forest product, NDF = Nordic Development Fund, and OFID = OPEC Fund for International Development.

Source: Asian Development Bank, Aide Memoires, Back to Office Reports, and Memos.

PROJECT IMPLEMENTATION SCHEDULE



HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome Legend: Planned RRP PAM Actual

Note: a. CO4 Hongsa-Thaxoang road (25km) included as addendum to CO5 on 10 April 2006. b. component deleted as was covered by the Nordic Development Fund and Swedish International Develpopment Assistance financed consulting services.

Source: Asian Development Bank

STATUS OF COMPLIANCE WITH LOAN COVENANTS
LOAN 2085-LAO: ROADS FOR RURAL DEVELOPMENT PROJECT

	Covenant	Reference	Status of Compliance
Sector covenants			
1.	The Borrower shall cause the Project to be carried out with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental, road construction, operations and maintenance, road safety and safe working practices.	Art IV, Sec 4.01.	Complied with
2.	Within 18 months of effective date, the Borrower shall propose details of checkpoints to control movement of forest products, endangered species and rare wildlife, and overloaded trucks. The checkpoints for each Project road shall be fully operational before civil works for such roads have been completed. The Borrower shall provide annual reports on the status of load enforcement measures, incidence of vehicle overloading and movement of forest products, endangered species and rare wildlife commencing from one year after establishing the first checkpoint on any Project road.	Sched. 6, para 14.	Complied with, but delayed MPWT submitted the proposed details of checkpoints by mid-May 2008. It was approved in July 2008. Three forest product checkpoints and vehicle weigh stations were constructed on the project roads under contract C01 (Pakxane–Thasi) in Borikhamxai province, C03 (Pakton–Ban Vang) in Vientiane city and C05 (Sayabury–Hongsa) in Sayabury province. Three mobile weighing scales were procured and delivered to provincial DPWTs (one each for Vientiane city and Attapeu and Borikhamxai provinces). On 17 June 2011 the government issued the notice to cancel operation of 26 vehicle weigh stations in the territory of the Lao PDR, and the remaining 13 stations located on the border with neighboring countries remain in operation. Accordingly, for the project, there were three checkpoints established on three roads based on the request of the executing agency according to the actual condition, and

	Covenant	Reference	Status of Compliance
			on the other two roads no checkpoints were established because there was no movement of forest products, no endangered species and rare wildlife, and no overloaded trucks.
3.	DOR shall be responsible for the operation and maintenance of the Project roads through proper technical supervision and adequate fund allocation. The completed Project roads shall be maintained at a standard consistent with the Borrower's national road network standards adopted under the Road Maintenance Program.	Sched. 6., para 15.	Complied with Four completed project roads are being maintained by local private construction companies under performance-based contracts for 2012–2015. This is funded by the government. Routine maintenance is also being undertaken by villagers under labor-based contracts. The fifth road, Hongsa–Thaxoan, is being maintained by a local private company funded by the government.
4.	The Borrower shall undertake benefit monitoring and evaluation surveys designed under the Project (i) as a baseline within one year of the Effective date; (ii) upon completion of the Project; and (iii) will after no less than two years from the Project completion.	Sched. 6, para 20.	Complied with, but late The proposed BME program was approved by ADB on 10 April 2008. The baseline survey commenced in November 2008, and the inputs of the baseline survey data were completed in July 2009. The consultants conducted and completed BME in March 2011 and the report was provided in April 2011.
Environmental Covenants			
5.	The Borrower shall cause the Project to be carried out with due diligence and efficiency and in conformity with the environmental practices.	LA Art IV, Sec. 4.01.	Complied with
6.	ADB will not approve award of any civil works	Sched. 4,	Complied with

	Covenant	Reference	Status of Compliance
	for road rehabilitation or construction unless ADB has approved an environmental plan for that road.	para 8.	EMPs for the project roads were approved on 25 July 2006. The first environmental monitoring was completed in August 2008 and the second in December 2009. The report for each was submitted to ADB in February 2009 and June 2010.
7.	The Borrower shall cause the Project's civil works contractors to prepare a detailed CEMP for each of the Project roads and ensure that the CEMPs will (i) be based on the recommendations set out in the Project's initial IEE; (ii) follow the requirements under ADB's environmental policies; and (iii) be submitted to ADB and MCTPC(current MPWT) for their approval.	Sched. 6, para 10.	Complied with CEMP submitted on 13 Jul 2007 for ADB approval. Comments provided on 1 August. Updated version received by ADB on 24 September 2007 and it was approved.
8.	The Borrower shall (i) prepare PEMPs to monitor the contractors' implementation of the CEMPs; (ii) ensure that specific provisions are included for the preparation, implementation and monitoring of the CEMPs in civil works, and PEMPs in consulting services contracts, together with budget allowances for these provisions; (iii) ensure that the environmental mitigation measures in the IEE will be adequately implemented by the contractors; and (iv) make provision under the civil works contracts to measure for payment of any specific, measurable activities that are required under the IEE.	Sched. 6, para 11.	Complied with Updated version received by ADB on 24 September 2007 and it was approved.
9.	The Borrower shall ensure that the implementation of the CEMPs and PEMPs are adequately monitored by the Project EA and Project consultants with regular reporting the Borrower's environmental regulatory authority and ADB.	Sched. 6, para 12.	Complied with The environmental mitigation was being done under all contracts. SED and consultant carried out the first environmental monitoring by June 2008 and completed it in August 2008. The report was submitted to ADB in February 2009. The second environmental monitoring

	Covenant	Reference	Status of Compliance
			was carried out by local consultants jointly with SED and ADB LRM environmental consultant in March 2010 and the report was submitted to ADB in June 2010.
Social Covenants			
10.	ADB will not approve award of any civil works contracts for any road to be financed from the loan proceeds unless the Government has satisfactorily completed for each road (a) a detailed measurement survey and validated compensation unit rates for all categories of losses and allowances, (b) provided to ADB a final database of affected persons, summary of the detailed measurement survey data, and replacement costs tables for each road; and (c) an updated RP, incorporating the above has been submitted to, and approved by, the ADB.	Sched. 4, para 8.	Complied with The updated resettlement plans for contracts C01 and C02 were submitted on 5 October 2006 and approved by ADB on 6 October 2006. Updated resettlement plans for contracts C03 and C05 were approved on 3 August 2007.
11.	Before RPs are implemented, the Borrower shall (i) prepare updates of the RPs in full consultation with affected persons and disclose to the affected persons prior to submitting to the Bank; and (ii) submit the updated RPs to the Bank for approval.	Sched. 6, para 4.	Complied with Fully implemented. All affected persons are satisfied with (i) the road improvement that will help them earn more and give access to public service all year round; and (ii) compensation provided by the project in cash in accordance with the confirmation given by the ADB LRM resettlement consultant, who interviewed affected persons during the review mission on 19–25 October 2009.
12	If a significant realignment that will involve resettlement or land acquisition is required at any time after the approval of the RPs, the Borrower shall (i) revise and update the RP for such Project road to accommodate the realignment; and (ii) submit it to the Bank for approval before any land acquisition activities	Sched. 6, para 5.	Not applicable, as there was no realignment, excluding the updating of resettlement plans for the approach road alignment to Nam Houng bridge in C05 (Ban Natak) which were

	Covenant	Reference	Status of Compliance
	begin for the realigned section of the road.		submitted to ADB. All affected persons were compensated and satisfied. No issues were raised in the resettlement.
13	The Borrower shall take all measures necessary to implement all RPs, Community Development Plans and the Social Action Plan, including (i) full implementation of specific provisions for ethnic minorities; and (ii) provision of adequate counterpart funding to cover actual costs.	Sched. 6, para 7.	Complied with Resettlement plan fully implemented. CDP and SAP were implemented and completed. The revised internal monitoring and final report was submitted to ADB in January 2010.
14	The Borrower shall ensure that provisions will be made in civil works contracts for Project roads, regarding (i) preparation of land for use as resettlement sites or for agricultural use; and (ii) provision of materials to affected persons as set out in the detailed measurement survey in such amount as set out in the updated RPs. The Borrower shall ensure that affected persons are informed of the activities to be undertaken by civil works contractors.	Sched. 6, para 8	Complied with Provisions made in civil works contracts regarding resettlement requirements.
15	The Borrower shall not issue notices to commence civil works to the civil works contractors for any section of the Project road, unless the Borrower has (i) satisfactorily completed, in accordance with the approved updated RP for that Project road, compensation payment and relocation of affected persons to new sites; and (ii) ensured that the rehabilitation assistance is in place and the area required for the civil works is free of all encumbrances.	Sched. 6, para 9.	Complied with Fully compensated and satisfied.
16	The contractor shall ensure, for the Project that contractors will not differentiate wages between men and women for works of equal types, and that child labor is not permitted in the Project's construction activities and camps. The Borrower shall ensure that all civil works contracts contain provisions to this effect.	Sched. 6, para 13.	Complied with Provisions are included in the contract documents, and were monitored by the consultants and the project manager.

	Covenant	Reference	Status of Compliance
17	The Borrower shall take all measures necessary to implement, to the Bank's satisfaction, the Social Action Plan (SAP) component described in Schedule 1 of the loan agreement. The SAP shall be developed and approved for the Project in a community participatory manner by using committees. The Borrower shall use its best endeavors that women shall comprise no less than fifty percent of the membership of the committees.	Sched. 6, para 16.	Complied with SAP was implemented and complied with. Of the membership of the committees involved in the SAP participatory programs, 50% were women.
18	The Borrower shall ensure that all civil works contracts contain provisions for contracting a qualified non-governmental organization to conduct information and education campaigns on HIV/AIDS and other sexually transmitted diseases and on trafficking in women and children. The information and education campaigns shall be conducted among construction workers and the population along the Project roads as part of the health and safety program at campsites during construction.	Sched. 6., para 17.	Complied with Provisions for contracting a qualified NGO included in civil works documents. HIV/AIDS and human trafficking coordinator and local consultant's counterparts, contractor's HIV/AIDS service providers, and SED have completed activities of year 1, year 2, and year 3 program. Campaigns and trainings were implemented and conducted among construction workers and the community along the project roads.
Financial Covenants			
19	The Borrower shall make available, promptly as needed, the funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project and for the operation and maintenance of the Project facilities.	LA Art IV, Sect 4.02	Complied with Government funds were provided following the agreed financing percentage, and additional funds were provided to all civil work contracts for additional pavement work to reduce road maintenance cost in future.
Others			
20	A full time project manager shall head the PMU. The project manager shall be accountable to the director-general of DOR, and be directly responsible for supervising the	Sched. 6, paras 2 and 3.	Complied with A full-time project manager was appointed by the

	Covenant	Reference	Status of Compliance
	Project. Each of the DCTPC (current DPWT), office of education and offices of agriculture and forestry, if necessary in the Project Provinces shall provide suitable counterparts qualified for administration of road construction, operation and maintenance to assist the PMU.		MPWT, who was assisted by a deputy project manager appointed by each DPWT where the project was being implemented.
21	Services of consultants shall be utilized in the carrying out of the Project with regard to (a) Construction supervision, project preparation and Social Action Plan. (b) Strengthening social and environmental management administration (c) Road safety, and (d) Graduate education for environmental/ social staff. Consulting services for(a) and (c) will be financed under the NDF Loan and will be engaged in accordance with NDF's consultants recruitment guidelines. The TOR of the consultants shall be determined or modified by agreement between ADB, the NDF and the Borrower. Within 12 months of the Effective Date, MCTPC (current MPWT) shall recruit, and sign a contract with the consultants for (a) and (c).	Sched. 5, paras 1&2, Sch. 6, para 18.	Complied with Graduate education for environment and social staff was implemented by other development partners as agreed in July 2007 between the executing agency and ADB.
22	For items (b) and (d) of covenant 2 above, the selection, engagement and services of the consultants shall be subject to provisions of Schedule 5 of the Loan Agreement and the provisions of the "Guidelines on the Use of Consultants by ADB and its Borrowers dated April 2002, as amended from time to time, which have been furnished to the Borrower and MCTPC (current MPWT).	Sched. 5, para 3.	Not applicable as allocation of items (b) and (d) were reallocated to civil work in July 2007 based on the request of the borrower, and item (d) is undertaken under items (a) and (c).
23	Where consulting firms are to be engaged, the consultants shall be selected and engaged as a firm by MCTPC (current MPWT) using the quality-and-cost-based selection (QCBS) method in accordance with the following procedures. (a) The RFP and all related documents shall be submitted to the ADB for approval, Three copies of the draft RFP, names of consultants to be short-listed, the proposed criteria for evaluation of both proposals, a draft	LA, Sched. 5, para 4 (a).	Not applicable as consultants for package 1 (Construction Supervision) and package 3 (Road Safety) are financed and procured using NDF procedures.

	Covenant	Reference	Status of Compliance
	consultancy contract and other related documents shall be submitted to the ADB. A period of at least 60 days shall be allowed for submission. A copy of the final RFP as issued, together with all related documents, shall be furnished to the Bank for information promptly after issuance. The validity period for the technical and financial proposal as provided in the RFP shall not exceed 6 months from the date specified for submission for the technical and financial proposals. The approval of the Bank shall be obtained for any request to extend the validity period. Except as the ADB may otherwise agree, the validity period, including any extensions, shall not exceed a maximum period of 9 months. If the contract is not signed within the validity period in accordance with the Guidelines of the Use of Consultants, the selection shall be invalid and the selection and engagement process as provided in this para shall be followed again.	LA, Sched.5, para 4 (b).	
	(b) Immediately after the technical proposals have been evaluated and scored; approval of the Bank shall be obtained to the evaluation and scoring of the technical proposals. For this purpose, the Bank shall be furnished with three copies of the technical proposals.	LA, Sched 5, para. 4 (c).	
	(c) The financial proposal of the firms whose technical proposals meet the minimum qualifying technical score shall be opened publicly after adequate notice is given to such firms or their representatives to attend the opening of the financial proposals.	LA, Sched 5, para 4 (d).	
	(d) After the financial proposals have been evaluated and scored, the ranking of the technical and financial proposals shall be made. Before negotiations are started with the first-ranked consultants, approval of the Bank shall be obtained to the evaluation and scoring of the financial proposals and the ranking of the technical and financial proposals. For this purpose, the Bank shall be provided with three copies of (i) the evaluation and scoring of the financial proposals; (ii) the ranking of the technical and financial proposals.	LA, Sched 5 para 4	

	Covenant	Reference	Status of Compliance
	(e) After the conclusion of negotiations but before the signing of the contract, the Bank shall be furnished with the contract as negotiated for approval. Promptly after the contract is signed, the Bank shall be furnished with 3 copies of the signed contract. If any substantial amendment of the contract is proposed after its execution, the proposed changes shall be submitted to the Bank for prior approval.	(e).	
24	The ADB has agreed that the internationally-recruited consultants shall collaborate with domestic consultants and the specific arrangements relating to the collaboration shall be included in the proposals to be submitted to the ADB pursuant to the provisions of para 4. Where individuals are selected, the consultants shall be selected and engaged by MCTPC (current MPWT) as follows: (a) a list of the candidates together with their qualifications and a draft contract shall be furnished to the ADB for approval before the selection of consultants; (b) Promptly after the contract is signed, the ADB shall be furnished with the evaluation of the candidates and a brief justification for the selection, together with three copies of the signed contract. (c) If any substantial amendment of the contract is proposed after its execution, the proposed changes shall be submitted to the Bank for prior approval.	LA, Sched 5, para 6.	Not applicable as consultant was financed and selected by NDF.
25	Where consultants are directly selected, the consultants shall be selected and engaged in accordance with arrangements satisfactory to the ADB, and the selection and engagement of the consultants shall be subject to the prior approval of the ADB with regard to their competence and experience for carrying out the assignment. Promptly after the contract is signed, the ADB shall be furnished with three copies of the signed contract. If any substantial amendment of the contract is	LA, Sched 5, para. 7.	Not applicable as consultant was financed and selected by NDF.

	Covenant	Reference	Status of Compliance
	proposed after its execution, the proposed change shall be submitted to the Bank for approval.		
26	Recruitment for consultants under Item 1(b), will be under procedures for recruitment of individual consultants as set out in para 6.	LA, Sched 5, para. 8.	Not applicable as allocation of item (b) was reallocated to civil work in July 2007 as requested by the borrower.
27	Recruitment for services under item 1(d) will be on a direct selection basis under procedures set out in para 7. Prior to the selection of the consultant, the Borrower shall submit to the ADB a report containing full details of the proposed courses in terms of: details of institution, proposed course, course length, curriculum, qualifications gained, costs, and an analysis demonstrating the appropriateness of the course to the needs of the Borrower.	LA, Sched 5, para. 9.	Not applicable as item (d) was reallocated to civil work in July 2007 and it was undertaken by the consulting services for construction supervision and road safety as requested by the borrower.
28	The Borrower shall ensure that all ADB-financed contracts with consultants contain appropriate representations, warranties and, if appropriate, indemnities from the consultants to ensure that the consulting services provided do not violate or infringe any industrial property or intellectual property right or claim of any third party.	LA, Sched 5, para. 10.	Not applicable as consultant was financed and selected by NDF.
29	The Borrower shall furnish, or caused to be furnished, to the ADB quarterly reports on the carrying out of the Project and on the operation and management of Project facilities.	LA, Sect 4.07.	Complied with Monthly progress report was submitted until substantial completion of civil work contract by March 2011. Subsequently, PCR was submitted by the consultant in April 2011.

MPWT = Ministry of Public Works and Transport (formerly MCTPC = Ministry of Communication, Transport, Posts and Construction) CEMP = Construction environmental management plan, EMP = Environmental management plan, BME = Benefit monitoring and evaluation, LA = Loan Agreement, and HIV/AIDS = Human immunodeficiency virus/acquired immunodeficiency syndrome.

Source: Project consultant's project completion report, March 2011

ECONOMIC REEVALUATION

A. Subproject Population Affected

1. Within the immediate zone of influence of the four road improvement sections in 2008 there were 59 villages comprising 7,291 households with a total population of 43,828. The population densities range between 134 per kilometer (km) of road and 221/km of road for the four subprojects roads, although the population on the Xaisetha–Sanxai road (C02) is almost entirely settled on the first 17.4 km of the road, which results in a population density of 423/km. This road, however, leads to a large area of relatively unpopulated land with potential for development of agriculture or mineral extraction. The villages, the number of households, and populations are summarized in Table A11.1.

Table A11.1: Villages, Households, and Population in Project Areas

Subproject	Villages	Households	Population	km	Pop/km
C01: Pakxane–Thasi	19	2,955	17,227	78	221
C02: Xaisetha–Sanxai	12	1,023	7,363	54	135
C03: Pakton–Ban Vang	8	1,086	5,608	42	134
C05: Sayabury–Hongsa	20	2,227	13,630	86	158
Total	**59**	**7,291**	**43,828**	**260**	**168**

km = kilometer, pop = population.
Source: Project consultant's project completion report, March 2011.

B. Economic Evaluation Assumptions and Method

1. General

2. The approach taken for the reevaluation is based on that used at appraisal[1] and the subsequent appraisal documents prepared by the project consultants.[2] The main economic benefits of the subprojects consisted of savings in vehicle operating costs for normal traffic and benefits from generated traffic. The principal difference from the previous evaluation is that actual construction costs have been used and the benefits are based on measured traffic volumes, taken during June 2013. Forecast traffic levels have been based on the new counts and, as a result, a better estimate of future traffic is possible. All benefits and costs are measured in constant 2007 prices, at the completion of construction.

2. Economic Costs

3. The economic construction costs comprise capital costs and maintenance costs derived from project disbursement costs including price inflation. These costs are taken as current prices in the disbursement year and were adjusted to 2007 constant prices. The financial costs have been converted to economic costs by applying a standard conversion factor of 85% as was used at appraisal. No maintenance was carried out on the roads in the first year following completion of construction because works were under contractor guarantee. Periodic maintenance interventions have been assumed as the roads approach a roughness level of 6 meters (m) per km. In the absence of any data on road condition, roughness was assumed to

[1] ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Lao People's Democratic Republic for the Roads for Rural Development Project*. Manila.
[2] Ministry of Public Works and Transport, Department of Roads. March 2011. *Roads for Rural Development Project (ADB/10) Project Completion Report*. Vientiane.

increase on average by 0.5 m/km per year from the estimated average roughness levels of 3.0 m/km at project completion.

C. Economic Benefits Approach

1. General

4. For three of the subprojects, economic benefits are generated from improved road conditions which reduce vehicle operating costs and increase travel speeds. These impacts also increase trip rates and trading propensities, which generate additional benefits in the areas in which the roads are located.

2. Traffic Forecasts

5. For each subproject, traffic volumes have been compiled for several years from a range of sources based on actual counts or projections made in previous studies. Different sources have been presented in different categories, so appropriate adjustments have been made to present them in a format compatible with the traffic counts carried out during the project benefit monitoring evaluation (BME) and project completion review mission. It was also assumed that data presented as average daily traffic have been adjusted from 12-hour counts to 24-hour-equivalent counts. The data considered and the sources of the data are summarized in Table A11.2.

Table A11.2: Years and Sources of Traffic Counts on Project Roads

Year	Source
1999	Rural Access Roads Improvement Project
2002	Roads for Rural Development Final Report Vol. 2.
2003	Projection (normal year 3) Rural Access Roads Improvement Project
2008	Benefit Monitoring for Roads for Rural Development Project
2010	Benefit Monitoring for Roads for Rural Development Project
2013	PCR mission traffic counts

Source: Project consultants and project completion review mission.

6. At appraisal, the 1999 forecasts for 2003 only considered the normal traffic for each road in the year following construction. Generated traffic was assumed to be a proportion of normal traffic and the maximum generated traffic levels were projected for the third year following completion (2005) as percentages of normal traffic. Generated traffic for the Pakxane–Thasi road was not considered because the road was already open to relatively high volumes of traffic. In this reevaluation, the traffic assumptions generated at appraisal have been adjusted to reflect recorded traffic levels.

7. No diversion traffic was identified on any of the subproject roads at appraisal, but two small diversions were identified—on the Pakton–Ban Vang road subproject (13 vehicles saving 100.0 km) and Sayabury–Hongsa road subproject (182 vehicles including motorcycles saving 6.2 km)—in the 2003 ADB project formulation study.[3] Diverted traffic is not considered in this reevaluation because the current traffic levels are significantly higher than projected diversion traffic, and it is not possible to define how much of the traffic was diverted.

8. The traffic data presented in Table A11.3 shows considerable variations in traffic levels, both over time and between subproject areas. High growth rates can partly be explained by the

[3] ADB. 2003. *Roads for Rural development Project Final Report Volume 1.* Manila (TA3756-LAO).

low traffic base levels observed in 1999, and partly by generated traffic following completion of the roads. A detailed analysis of traffic data is provided in the project consultant's project completion report.[4]

Table A11.3: Traffic Levels in 1999, 2008, 2010, and 2013 and Traffic Forecast for Project Roads

AADT Traffic Levels	Motorcycle/ Tuk-tuk	Car/ Jeep/ Taxi	Pickup	Minibus	Medium Bus	Light Truck	Medium Truck	Heavy Truck	Total (excl. MC)	Total Motorized
Subproject C01: Pakxane–Thasi										
Actual 1999	238	77	14	69	13	8	32	17	230	468
Actual 2008	668	41	275	97	11	26	38	97	585	1,253
Actual 2010	871	35	357	95	6	64	45	25	627	1,498
100% Normal	871	35	357	95	6	64	45	25	627	1,498
0% Generated	0	0	0	0	0	0	0	0	0	0
Actual 2013	1,116	0	606	12	133	0	221	143	1,115	2,231
100% Normal	1,116	35	357	95	6	64	45	25	627	2,231
0% Generated	0	0	0	0	0	0	0	0	0	0
Forecast 2015	1,230	0	668	13	147	0	234	152	1,214	2,445
Forecast 2020	1,526	0	829	16	182	0	264	171	1,462	2,987
Forecast 2025	1,856	0	1,008	20	221	0	291	189	1,729	3,586
Subproject C02: Xaisetha–Sanxai										
Actual 1999	27	2	2	4	1	4	2	1	16	43
Actual 2008	484	12	91	24	0	17	27	11	182	666
Actual 2010	735	7	111	53	1	29	6	5	212	947
Normal	565	5	85	41	1	22	5	4	163	728
30% Generated	170	2	26	12	0	7	1	1	49	219
Actual 2013	1,974	24	192	114	0	31	0	39	400	2,374
Normal	1,382	17	134	80	0	22	0	27	280	1,662
30% Generated	592	7	58	34	0	9	0	12	120	712
Forecast 2015	2,501	30	323	192	0	0	49	62	656	3,158
Forecast 2020	4,266	52	732	435	0	0	99	125	1,443	5,709
Forecast 2025	5,984	73	1,027	610	0	0	127	159	1,995	7,979
Subproject C03: Pakton–Ban Vang										
Actual 1999	139	1	0	3	6	2	7	0	19	158
Actual 2008	219	5	69	8	1	47	21	9	160	379
Actual 2010	306	10	116	70	12	69	21	11	309	615
Normal	204	7	77	47	8	46	14	7	206	410
50% Generated	102	3	39	23	4	23	7	4	103	205
Actual 2013	1,337	27	656	0	86	198	0	99	1,066	2,403
Normal	669	14	328	0	43	99	0	50	533	1,202
50% Generated	669	14	328	0	43	99	0	50	533	1,202
Forecast 2015	1,677	34	823	0	108	0	240	120	1,324	3,001
Forecast 2020	2,577	52	1,265	0	166	0	336	168	1,986	4,563
Forecast 2025	3,615	73	1,774	0	233	0	428	214	2,722	6,336
Subproject C05: Sayabury–Hongsa–Thaxoan										
Actual 1999	35	7	15	6	2	6	10	3	49	84

[4] Ministry of Public Works and Transport, Department of Roads. 2011. *Roads for Rural Development Project (ADB/10) Project Completion Report*. Vientiane: Section 8, pp. 36–41.

Actual 2008		264	2	98	13	0	1	14	48	176	440
Actual 2010		702	1	242	79	0	83	28	17	450	1,152
	Normal	468	1	161	53	0	55	19	11	300	768
	50% Generated	234	0	81	26	0	28	9	6	150	384
Actual 2013		1,147	131	153	0	5	102	46	298	735	1,882
	Normal	574	66	77	0	3	51	23	149	368	941
	50% Generated	574	66	77	0	3	51	23	149	368	941
	Forecast 2015	1,363	156	182	0	5	0	117	53	512	1,875
	Forecast 2020	1,983	227	265	0	5	0	155	70	721	2,704
	Forecast 2025	2,782	318	371	0	5	0	198	89	980	3,762

AADT = annual average daily traffic, MC = motorcycle.
Notes: 20% of four-wheeled motorized traffic added to observed AADT traffic account for traffic outside the hours of 6 a.m to 6 p.m.
Sources: Rural Access Roads Improvement Project, Final Report, Volume 1; Feasibility Study, Intercontinental Consultants, July 1999; consultant's estimates: Lao PDR ADB/9 Rural Access Roads Project, Maunsell Limited, 2007; project completion review mission

9. Benefits from road developments are directly proportional to the forecast traffic levels, which depend on estimates of current traffic level and projections based on defined growth rates. Given the wide range of growth rates and traffic levels identified, forecasts have been based on a detailed analysis of each road individually. Table A11.3 presents the historical data for each subproject and a projection of 2013 normal and generated traffic, together with the estimated proportion of generated traffic in 2013. These levels have been derived to match the 2013 average daily traffic count data. The table also shows the projections in 2015, 2020, and 2025 based on growth rates defined for each road which reflect recent traffic growth while accounting for generated traffic. A detailed explanation of the traffic projections for each subproject is provided in the project consultant's project completion report.[5]

3. Vehicle Operating Cost Savings

10. Road user costs (RUCs) were estimated using the RUCKS model[6] using 2007 economic prices. Economic costs were derived from financial costs identified in the project baseline survey, which was carried out in 2008, and other data collected by the project consultants during the BME surveys. Fuel costs were estimated on a medium-term cost of $100/barrel equivalent to $0.85/liter at 2007 prices. It should be noted that in 2007 fuel prices increased to more than $147 per barrel.

11. The economic costs of operating road vehicles are based on the relationships to road roughness used in the HDM-4 vehicle operating cost model. They exclude taxes and duties and refer to unit prices in 2007, which approximates to the midterm date of works implementation. The evaluation of vehicle operating cost savings is based on costs for vehicles representative of those found on the road sections.

12. The benefits from normal traffic are the difference between the assumed roughness with and without the road improvement. In all cases a roughness index of 15 meters (m) per kilometer (km) was assumed for the without-project case. The roughness assumed on completion in 2010 is 2.5 m/km and is assumed to deteriorate by 0.5 m/km until it reaches 6.5

[5] Ministry of Public Works and Transport, Department of Roads. March 2011. *Roads for Rural Development Project (ADB/10) Project Completion Report*. Vientiane: Section 14.3, pp. 59–61.
[6] Road User Costs Knowledge System (RUCKS) HDM-4 RUC Model Version 2.00, 18 February 2010.

m/km, at which time periodic maintenance is applied to reduce roughness to 3.0 m/km.[7] RUCs include both vehicle operating costs and passenger time costs. The passenger time costs vary with the passenger occupancy and have been estimated to be about 11% of the total road user cost for the typical vehicle mix on project roads. Motorcycles have been included in the analysis since they represent over 50% of the project road traffic and, in due course, modal transfer to four-wheeled vehicle will occur as passenger transport develops.

13. Benefits to generated traffic are calculated on the basis of half the benefits per vehicle km for normal traffic. The RUCKs model was used to generate the RUCs for each road based on its assumed geometry. Contracts C01 and C02 (km 0.0–17.5) are considered as flat and/or rolling while contract C05 and the subsequent part of C02 are classified as mountainous. The width of all roads was taken as 5.5 m, with the exception of C02 which has a surfaced width of 7.0 m. This difference results in minor changes in RUCs.

4. Time Savings

14. The project road improvements have reduced travel times for passengers by increasing the travel speeds on the smoother roads. At appraisal, the value of time saved varied between 10% and 35% of vehicle operating cost savings for normal traffic for the various subprojects. The RUCKs model estimated the time savings based on data on vehicle passenger occupancy and the assumption of the economic value of labor. The vehicle operating time savings are higher with higher passenger occupancy. Time savings are estimated as an average value of 11% for the project vehicle mix.

D. Results of Economic Reevaluation

15. The net present values at a discount rate of 12% and the economic internal rates of return (EIRRs) have been calculated for each of the subprojects and for the four subprojects combined. These values are calculated from their respective streams of net benefits over the period of construction and their subsequent life to 2027. The results are summarized in Table A11.4 and presented in full in Tables A11.5–A11.10.

Table A11.4: Summary of Economic Evaluation for Subprojects

Subproject Road Section	Net Present Value at 12% ($ million)	Economic Internal Rate of Return (%)	Net Present Value at 12% ($ million)	Economic Internal Rate of Return (%)
	All RUC Benefits		Excluding Time Benefits	
C01: Pakxane–Thasi	10.4	23.2	7.8	20.6
C02: Xaisetha–Sanxai (km 0.0–17.4)	0.9	15.8	0.7	14.8
C03: Pakton–Ban Vang	4.9	22.5	3.6	20.0
C05: Sayabury–Hongsa–Thaxoan	1.8	16.5	1.1	14.8
All roads excluding C02 km 17.4–54.1	18.0	20.8	14.5	19.2
C02: Saysetha–Sanxai (km 17.4–54.1)	(3.9)	(5.3)	(3.9)	(5.4)
All roads including C02 km 17.4–54.1	14.1	18.0	10.5	16.6

( ) = negative, km = kilometer, RUC = road user cost.
Source: Project completion review mission.

[7] A more detailed outline of these costs is provided in the Ministry of Public Works and Transport, Department of Roads. 2011. *Roads for Rural Development Project (ADB/10) Project Completion Report*. Vientiane: Section 14.3, pp. 61–3.

16. Subprojects C01, C02 (km 0.0–17.4), C03, and C05 all have acceptable EIRRs: C01 23.2%, C02 (km 0.0–17.4) 15.8%, C03 22.5%, and C05 16.5%. Excluding time benefits from the analysis reduces the EIRR by 2–3 percentage points but it is still higher than the 12% EIRR benchmark. The EIRR on the four road subprojects is estimated at 20.8% if the unfinished C02 section is excluded but is reduced to 18.0% if all sections are included.

17. The negative return for C02 (km 17.4–54.1) results from the very low traffic levels currently observed and also to the unpaved surfaced of the road, which results in higher average roughness and deterioration. The analysis at appraisal assumed 21 vehicles per day induced traffic, 48 vehicles per day suppressed traffic, and an unspecified level of normal and generated traffic. These figures were derived as a proxy to a consumer surplus approach for which there was insufficient time to implement a detailed study. There is clearly a considerable area of productive agricultural land and probably mineral resources now accessible via this subproject road, but the low population density in the area means that new developments will be slow unless significant nonroad investments are made.

Table A11.5: Economic Evaluation of Subproject C01: Pakxane-Thasi
($ million, 2007 values)

Year	Capital Cost	Maintenance Cost	Normal RUC Benefits	Generated Traffic Benefits	Net Benefits	Time Savings (VOT)	Net Benefits excluding VOT
2007	(3.41)				(3.41)		(3.41)
2008	(5.71)		2.11	0.00	(3.60)	0.23	(3.83)
2009	(5.16)		2.05	0.00	(3.10)	0.23	(3.33)
2010	(1.38)		2.04	0.00	0.66	0.22	0.44
2011		(0.05)	2.09	0.00	2.04	0.23	1.81
2012		(0.05)	2.13	0.00	2.08	0.23	1.85
2013		(0.05)	4.13	0.00	4.08	0.45	3.63
2014		(0.05)	4.19	0.00	4.14	0.46	3.68
2015		(0.05)	4.25	0.00	4.19	0.47	3.73
2016		(0.05)	4.29	0.00	4.24	0.47	3.76
2017		(0.05)	4.31	0.00	4.26	0.47	3.79
2018		(1.53)	4.28	0.00	2.75	0.47	2.28
2019		(0.05)	5.47	0.00	5.42	0.60	4.82
2020		(0.05)	5.53	0.00	5.48	0.61	4.87
2021		(0.05)	5.58	0.00	5.53	0.61	4.92
2022		(0.05)	5.62	0.00	5.57	0.62	4.95
2023		(0.05)	5.64	0.00	5.59	0.62	4.97
2024		(0.05)	5.64	0.00	5.59	0.62	4.97
2025		(0.05)	5.63	0.00	5.58	0.62	4.96
2026		(0.05)	5.60	0.00	5.55	0.62	4.93
2027		(0.05)	5.54	0.00	5.49	0.61	4.88
NPV at 12%	**(12.14)**	**(0.61)**	**23.13**	**0.00**	**10.39**	**2.54**	**7.84**
Economic Internal Rate of Return					**23.2%**		**20.6%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

18. The result for this road subproject is due to the relatively high existing traffic level on C01 prior to the project (627 four-wheeled vehicles per day in 2010 and 1,115 in 2013) even though the forecast assumes relatively low traffic growth reflecting the recent levels.

Table A11.6: Economic Evaluation of Subproject C02: Xaisetha–Sanxai (km 0.0–17.4 km)

($ million, 2007 values)

Year	Capital Cost	Maintenance Cost	Normal Traffic RUC Benefits	Generated Traffic Benefits	Net Benefits all RUC	Time Savings (VOT)	Net Benefits excluding VOT
2007	(1.88)				(1.88)		(1.88)
2008	(0.75)		0.12	0.02	(0.61)	0.01	(0.63)
2009			0.13	0.02	0.15	0.01	0.14
2010			0.14	0.02	0.17	0.01	0.15
2011		(0.01)	0.18	0.03	0.20	0.02	0.18
2012		(0.01)	0.23	0.03	0.26	0.02	0.24
2013		(0.01)	0.27	0.06	0.32	0.03	0.30
2014		(0.01)	0.34	0.05	0.38	0.03	0.35
2015		(0.01)	0.42	0.06	0.48	0.04	0.44
2016		(0.01)	0.53	0.08	0.60	0.05	0.55
2017		(0.01)	0.66	0.10	0.75	0.06	0.69
2018		(0.26)	0.67	0.10	0.52	0.06	0.46
2019		(0.01)	0.90	0.13	1.02	0.08	0.94
2020		(0.01)	0.93	0.14	1.07	0.09	0.98
2021		(0.01)	0.97	0.15	1.11	0.09	1.02
2022		(0.01)	1.01	0.15	1.15	0.09	1.06
2023		(0.01)	1.04	0.16	1.19	0.10	1.09
2024		(0.01)	1.07	0.16	1.22	0.10	1.13
2025		(0.01)	1.10	0.17	1.26	0.10	1.16
2026		(0.01)	1.13	0.17	1.29	0.10	1.19
2027	0.71	(0.01)	1.15	0.17	2.03	0.11	1.93
NPV at 12%	**(2.21)**	**(0.10)**	**2.83**	**0.43**	**0.95**	**0.26**	**0.69**
Economic Internal Rate of Return					**15.8%**		**14.8%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

19. The lower EIRR of subproject C02 (km 0.0–17.4) is the result of relatively low existing four-wheeled traffic (212 per day in 2010 and 400 in 2013) and despite fairly optimistic forecast growth compared with recent rates. The lower return also reflects the relative cost of the road compared with the other roads. The cost was $140,000/km, which is about the same as that for C01 but more than the $114,000/km for C03 and $89,000/km for C05.

Table A11.7: Economic Evaluation of Subproject C03: Pakton–Ban Vang
($ million, 2007 values)

Year	Capital Cost	Maintenance Cost	Normal Traffic RUC Benefits	Generated Traffic Benefits	Net Benefits all RUC	Time Savings	Net Benefits excluding VOT
2007	(1.41)				(1.41)		(1.41)
2008	(0.92)		0.24	0.03	(0.65)	0.04	(0.68)
2009	(2.03)		0.30	0.06	(1.66)	0.05	(1.72)
2010	(1.52)		0.37	0.09	(1.06)	0.06	(1.12)
2011		(0.02)	0.40	0.20	0.58	0.08	0.49
2012		(0.02)	0.44	0.22	0.63	0.09	0.54
2013		(0.02)	1.00	0.50	1.48	0.21	1.27
2014		(0.02)	1.09	0.54	1.61	0.23	1.38
2015		(0.02)	1.18	0.59	1.74	0.25	1.49
2016		(0.02)	1.27	0.63	1.88	0.27	1.61
2017		(0.02)	1.36	0.68	2.02	0.29	1.73
2018		(0.70)	1.39	0.70	1.39	0.29	1.09
2019		(0.02)	1.83	0.92	2.73	0.39	2.34
2020		(0.02)	1.91	0.95	2.84	0.40	2.44
2021		(0.02)	1.98	0.99	2.95	0.42	2.54
2022		(0.02)	2.05	1.03	3.06	0.43	2.63
2023		(0.02)	2.12	1.06	3.16	0.45	2.71
2024		(0.02)	2.19	1.09	3.26	0.46	2.80
2025		(0.02)	2.24	1.12	3.34	0.47	2.87
2026		(0.02)	2.30	1.15	3.42	0.48	2.94
2027	1.80	(0.02)	2.34	1.17	5.29	0.49	4.79
NPV at 12%	**(4.23)**	**(0.28)**	**6.38**	**3.00**	**4.87**	**1.31**	**3.55**
Economic Internal Rate of Return					**22.5%**		**20.0%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

20. C03 is a major arterial road to the west, and has significant traffic (more than 300 vehicles per day in 2010 and more than 1,000 in 2013) and forecast traffic growth is relatively high in the short term.

Table A11.8: Economic Evaluation of Subproject C05: Sayabury–Hongsa–Thaxoan
($ million, 2007 values)

Year	Capital Cost	Maintenance Cost	Normal Traffic RUC Benefits	Generated Traffic Benefits	Net Benefits all RUC	Time Savings	Net Benefits excluding VOT
2007	(1.64)				(1.64)		(1.64)
2008	(1.36)		0.54	0.07	(0.75)	0.05	(0.80)
2009	(2.49)		0.78	0.16	(1.55)	0.08	(1.62)
2010	(3.66)		1.03	0.26	(2.37)	0.10	(2.48)
2011		(0.04)	1.09	0.55	1.60	0.13	1.47
2012		(0.04)	1.16	0.58	1.70	0.14	1.56
2013		(0.04)	0.68	0.34	0.98	0.08	0.90
2014		(0.04)	0.71	0.36	1.03	0.09	0.94
2015		(0.04)	0.74	0.37	1.08	0.09	0.99
2016		(0.04)	0.77	0.39	1.12	0.09	1.03
2017		(0.04)	0.80	0.40	1.17	0.10	1.07
2018		(1.17)	0.82	0.41	0.06	0.10	(0.04)
2019		(0.04)	1.11	0.56	1.63	0.13	1.50
2020		(0.04)	1.15	0.57	1.68	0.14	1.54
2021		(0.04)	1.18	0.59	1.73	0.14	1.59
2022		(0.04)	1.21	0.61	1.78	0.15	1.64
2023		(0.04)	1.24	0.62	1.83	0.15	1.68
2024		(0.04)	1.27	0.64	1.87	0.15	1.72
2025		(0.04)	1.30	0.65	1.91	0.16	1.76
2026		(0.04)	1.32	0.66	1.95	0.16	1.79
2027	3.30	(0.04)	1.34	0.67	5.28	0.16	5.12
NPV at 12%	**(6.34)**	**(0.47)**	**6.07**	**2.54**	**1.80**	**0.69**	**1.11**
Economic Internal Rate of Return					**16.5%**		**14.8%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

21. C05 also has relatively high traffic (450 in 2010 and 735 in 2013) and has shown considerable growth in recent years, which is forecast to continue in the short term.

Table A11.9: Economic Evaluation of Four Subprojects Combined (Excluding C02 km 17.7 to km 54.1)
($ million, 2007 values)

Year	Capital Cost	Maintenance Cost	Normal Traffic RUC Benefits	Generated Traffic Benefits	Net Benefits	Time Savings	Net Benefits excluding VOT
2007	(8.34)				(8.34)		(8.34)
2008	(8.74)		3.01	0.12	(5.61)	0.25	(5.86)
2009	(9.67)		3.27	0.24	(6.17)	0.28	(6.45)
2010	(6.56)		3.58	0.37	(2.61)	0.32	(2.92)
2011		(0.12)	3.76	0.77	4.42	0.36	4.05
2012		(0.12)	3.96	0.83	4.67	0.38	4.29
2013		(0.12)	6.09	0.90	6.87	0.56	6.31
2014		(0.12)	6.33	0.95	7.16	0.58	6.58
2015		(0.12)	6.59	1.02	7.49	0.61	6.88
2016		(0.12)	6.85	1.10	7.83	0.64	7.20
2017		(0.12)	7.13	1.18	8.19	0.67	7.53
2018		(3.66)	7.17	1.21	4.71	0.67	4.04
2019		(0.12)	9.31	1.61	10.80	0.87	9.93
2020		(0.12)	9.52	1.67	11.07	0.90	10.17
2021		(0.12)	9.72	1.73	11.32	0.92	10.41
2022		(0.12)	9.89	1.78	11.55	0.93	10.62
2023		(0.12)	10.05	1.84	11.76	0.95	10.81
2024		(0.12)	10.18	1.89	11.95	0.97	10.98
2025		(0.12)	10.28	1.94	12.09	0.98	11.12
2026		(0.12)	10.35	1.98	12.21	0.99	11.22
2027	5.81	(0.12)	10.38	2.02	18.09	0.99	17.10
Net Present Value at 12% Discount Rate =					**18.00**		**14.45**
Economic Internal Rate of Return					**20.8%**		**19.2%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

22. The EIRR on the four road projects is estimated at 20.8% if the unfinished C02 section (km 17.4–54.1) is excluded (Table A11.9), but is reduced to 17.9% if all sections are included (Table A11.10).

Table A11.10: Economic Evaluation of Four Subprojects Combined (Including C02 km 17.7 to km 54.1)

Year	Capital Cost	Maintenance Cost	Normal Traffic RUC Benefits	Generated Traffic Benefits	Net Benefits	Time Savings	Net Benefits excluding VOT
2007	(8.338)				(8.338)		(8.338)
2008	(12.205)		3.013	0.116	(9.076)	0.250	(9.326)
2009	(11.605)		3.265	0.242	(8.097)	0.281	(8.378)
2010	(6.977)		3.579	0.371	(3.027)	0.316	(3.343)
2011		(0.129)	3.774	0.780	4.425	0.364	4.060
2012		(0.129)	3.969	0.837	4.677	0.384	4.292
2013		(0.129)	6.106	0.909	6.886	0.561	6.325
2014		(0.129)	6.348	0.958	7.177	0.584	6.593
2015		(0.129)	6.609	1.034	7.514	0.611	6.903
2016		(0.129)	6.875	1.110	7.856	0.639	7.217
2017		(0.129)	7.155	1.191	8.217	0.668	7.550
2018		(3.656)	7.184	1.214	4.743	0.672	4.071
2019		(0.129)	9.342	1.622	10.836	0.877	9.958
2020		(0.129)	9.550	1.682	11.103	0.899	10.205
2021		(0.129)	9.742	1.741	11.354	0.919	10.435
2022		(0.129)	9.916	1.797	11.583	0.937	10.646
2023		(0.121)	10.084	1.858	11.822	0.955	10.866
2024		(0.129)	10.213	1.909	11.993	0.970	11.023
2025		(0.129)	10.312	1.955	12.139	0.981	11.157
2026		(0.129)	10.379	1.996	12.246	0.990	11.256
2027	7.268	(0.129)	10.409	2.029	19.578	0.995	18.583
Net Present Value @ 12% Discount Rate =					**13.84**		**10.53**
Economic Internal Rate of Return =					**17.9%**		**16.6%**

NPV = net present value, RUC = road user cost, VOT = vehicle operating time.
Source: Project completion review estimates.

E. Sensitivity Analysis

23. A sensitivity analysis was carried out on the main benefit streams to test the assumptions made. Since this is a post-construction analysis, testing is limited to the assumptions made and excludes the testing of parameters with actual recorded data. Table A11.11 shows the results of the analysis.

24. **Traffic growth.** The traffic levels in the analysis are based on actual traffic data recorded in 2013, and the traffic growth from 2013 is projected by annual percentage rates in two bands—2013–2017 and 2018–2027. The rates were defined by project area based on recent history of growth. The growth rates following construction are also dependent on the assumptions made relating to generated traffic. The appraisal analysis assumed generated traffic to be the equivalent of 100% of normal traffic in the fourth year after completion of the works for C02, C03, and C05. In the reevaluation analysis, the recent growth (2008–2013) in traffic confirms that this is realistic with C03 and C05 but current traffic on C02 could only allow generated traffic to be about 30% of normal traffic. Increasing traffic growth assumptions by 2% of the defined growth levels can be seen to increase the EIRR by around 1 percentage point; decreasing traffic growth assumptions by 2% of the defined growth levels can be seen to decrease the EIRR by around 1 percentage point. The analysis shows that it is not a particularly sensitive parameter.

Table A11.11 Sensitivity Analysis for Subproject Roads

Subproject	Base Case				Traffic growth +2%				Traffic growth -2%			
	All RUC Benefits		Excl. Time Benefits		All RUC Benefits		Excl. Time Benefits		All RUC Benefits		Excl. Time Benefits	
	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)
C01: Pakxane–Thasi	10.4	23.20%	7.8	20.60%	12.3	24.20%	9.6	21.70%	8.7	22.10%	6.3	19.50%
C02: Xaisetha–Sanxai km 0.0–17.4	0.9	15.80%	0.7	14.80%	1.1	16.30%	0.8	15.30%	0.8	15.30%	0.5	14.30%
C03: Pakton–Ban Vang	4.9	22.50%	3.6	20.00%	5.8	23.60%	4.4	21.10%	4	21.30%	2.8	18.80%
C05: Sayabury–Hongsa–Thaxoan	1.8	16.50%	1.1	14.80%	2.4	17.60%	1.7	15.90%	1.3	15.40%	0.6	13.60%
All roads excluding C02 km 17.4–54.1	18	20.80%	14.5	19.20%	21.7	21.80%	17.9	20.20%	14.8	19.80%	11.5	18.10%
C02: Saysetha–Sanxai km17,4–54.1	(3.9)	(5.7%)	(3.9)	(5.4%)	(3.9)	(5.7%)	(3.9)	(5.1%)	(3.9)	(5.7%)	(3.9)	(5.6%)
All roads including C02 km 17.4–54.1	14.1	18.00%	10.5	16.60%	17.8	19.10%	14	17.60%	10.9	17.00%	7.6	15.50%

Subproject	No Further Generated Traffic after 2010				Generated Traffic 20% higher after 2010				Generated Traffic 20% lower after 2010			
	All RUC Benefits		Excl. Time Benefits		All RUC Benefits		Excl. Time Benefits		All RUC Benefits		Excl. Time Benefits	
	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)
C01: Pakxane–Thasi	10.4	23.20%	7.8	20.60%	10.4	23.20%	7.8	20.60%	10.4	23.20%	7.8	20.60%
C02: Xaisetha–Sanxai km 0.0–17.4	0.9	15.80%	0.7	14.80%	1	16.10%	0.8	15.10%	0.9	15.50%	0.6	14.50%
C03: Pakton–Ban Vang	3.5	20.20%	2.4	17.80%	5.5	23.50%	4.1	20.90%	4.3	21.40%	3	19.00%
C05: Sayabury–Hongsa–Thaxoan	0.7	13.80%	0.1	12.20%	1.8	16.50%	1.1	14.80%	1.8	16.50%	1.1	14.80%
All roads excluding C02 km 17.4–54.1	15.6	19.80%	12.2	18.20%	18.7	21.10%	15.1	19.40%	17.3	20.50%	13.8	18.90%
C02: Saysetha–Sanxai km17,4–54.1	(3.9)	(5.7%)	(3.9)	(5.4%)	(3.9)	(5.7%)	(3.9)	(5.4%)	(3.9)	(5.7%)	(3.9)	(5.4%)
All roads including C02 km 17.4–54.1	11.7	17.10%	8.3	15.70%	14.8	18.30%	11.2	16.80%	13.4	17.80%	9.9	16.30%

Subproject	RUC Benefits Reduced by 20%				Road User Costs Benefits Increased by 20%			
	All RUC Benefits		Excl. Time Benefits		All RUC Benefits		Excl. Time Benefits	
	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)	NPV at 12% ($ million)	EIRR (%)
C01: Pakxane–Thasi	6	18.60%	3.9	16.40%	14.8	27.70%	11.8	24.60%
C02: Xaisetha–Sanxai km 0.0–17.4	0.4	13.60%	0.2	12.70%	1.5	17.70%	1.2	16.70%
C03: Pakton–Ban Vang	3.6	20.00%	2.5	17.70%	6.1	24.80%	4.7	22.10%
C05: Sayabury–Hongsa–Thaxoan	0.6	13.40%	0	12.00%	3	19.70%	2.2	17.60%
All roads excluding C02 km 17.4–54.1	10.5	17.30%	7.6	15.90%	25.5	24.20%	21.3	22.40%
C02: Saysetha–Sanxai km17,4–54.1	(3.9)	(5.7%)	(3.9)	(5.4%)	(3.9)	(5.7%)	(3.9)	(5.4%)
All roads including C02 km 17.4–54.1	6.6	14.90%	3.7	13.60%	21.6	21.00%	17.4	19.40%

EIRR = economic internal rate of return, excl. = excluding, NPV = net present value, RUC = road user cost.

Source: Project completion review mission.

25. **Generated traffic.** Generated traffic assumptions are also critical to the forecast of future traffic levels. Sensitivity was carried out on this by assuming an increase of 20% in the estimated generated traffic from 2013 or, alternatively, limiting generated traffic to the percentage of normal traffic defined in 2013. Assuming no additional generated traffic after 2013 does not affect C01, where no generated traffic is projected, nor C05 since its generated traffic was projected to be constant after 2013. C02 and C03 are both projected to have additional generated traffic so this test increases the EIRR by only 1 percentage point. The analysis shows that it is not a particularly sensitive parameter.

26. **Road user cost assumptions.** In the absence of a national calibration for HDM-4, any projections of road user costs are dependent on the assumptions made in the calibration used. For this reason, sensitivity has been carried out using 20% increase or decrease in the estimated road user costs. For comparison between subprojects, the calibration will have little effect on relative viability but can have significant impact on absolute viability at the marginal rates. Since this is the major component of measured benefits, the EIRR is fairly sensitive to changes in the assumed level of road user costs. An increase in road user costs by 20% raises the EIRR for the project as a whole, from 18% to 21%. A decrease by 20% causes the EIRR to fall to 14.9%, but still above the 12.0% EIRR benchmark. The switching value requires a 38% reduction in road user cost benefits, demonstrating the robustness of the project overall.

DETAILS OF ROAD MAINTENANCE CONTRACTS

No.	Project Road	Length (km)	Maintenance Cost (KN million)	Implementation Period	Contractor	Supervisor	Remarks
1	C01: Pakxane–Thasi	Km 48+500–78+000	1,692.70	2012–2013	Thanasay Construction Sole Company	DPWT, Borikhamxai Province	Performance-based contract
	C01: Pakxane–Thasi	Km 0+000–78+000	110.6	2012–2014	Eight households living along the road	OPWT, Borikhan District	Labor-based contract
2	C02: Xaisetha–Xansai	Km 0+000–17+000	912.2	2011–2015	Douangdy Roads and Bridges Construction Sole Company	DPWT, Attapeu Province	Performance-based contract
	C02: Xaisetha–Xansai	Km 17+000–54+400	49,460.60	2011–2015	Somxai Chaleunxai Roads and Bridges Construction Sole Company	DPWT, Attapeu province	Performance-based contract including DBST pavement for 37 km graveling course
3	C03: Pakton–Ban Vang	Km 0+000–19+000	1,588.50	2012–2015	Sengpheth Roads and Bridges Construction Sole Company	DPWT, Vientiane City	Performance-based contract
		Km 0+000–9+500	12.4	2011–2012	One household living along the road	OPWT, Sangthong District	Labor-based contract
		Km 19+000–42+700	1,480.30	2012–2015	Duangchampa Roads and Bridges Construction Sole Company	DPWT, Vientiane Province	Performance-based contract
		Km 19+000–42+700	26.8	2012–2013	Two households living along the road	OPWT, Meune District	Labor-based contract
4	C05: Sayabury–Hongsa	Km 0+000–45+000	1,982.60	2012–2015	Phonethavong Roads and Bridges Construction Sole Company	DPWT, Sayabury Province	Performance-based contract
		Km 0+000–45+001	54.4	2012–2013	Nine households living along the road	OPWT, Sayabury District	Labor-based contract
		Km 45+000–86+600	2,048.10	2012–2016	Phanthamith Roads and Bridges Construction Sole Company	DPWT, Sayabury Province	Performance-based contract
		Km 45+000–86+600	57.2	2012–2013	Nine households living along the road	OPWT, Hongsa District	Labor-based contract
5	C05: Hongsa–Thaxoan (Addendum)	Km 0+000–25+600	1,416.0	2012–2013	Phonthavong Roads and Bridges Construction Company	OPWT, Hongsa District	Emergency maintenance contract

DBST = ,Double bituminous surface treatment, DPWT = Department of Public Works and Transport, km = kilometer, OPWT = Office of Public Works and Transport .

Source: Project completion review mission.

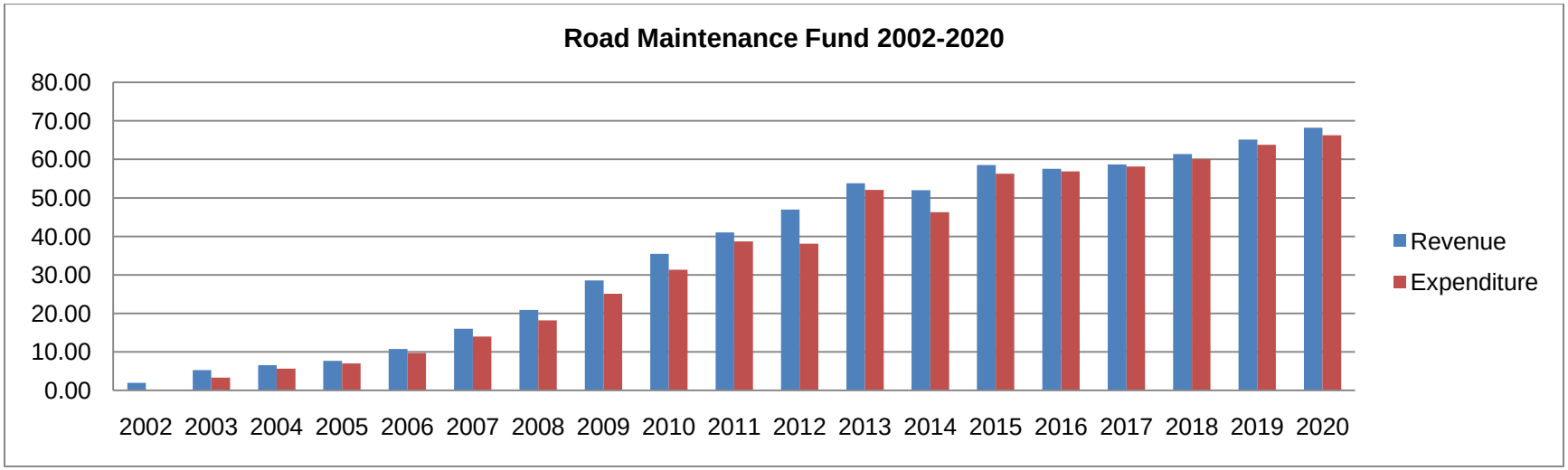
Summary of Revenue and Expenditures of the Road Maintenance Fund, 2002–2020

($ million)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	2.00	5.25	6.58	7.67	10.76	16.00	20.93	28.60	35.46	41.06	46.99	53.77	52.03	58.51	57.56	58.67	61.35	65.12	68.25
Expenditure	0.11	3.34	5.66	7.04	9.73	14.00	18.23	25.07	31.32	38.74	38.09	52.05	46.25	56.25	56.87	58.12	60.00	63.75	66.25
Balance	1.89	1.91	0.92	0.63	1.02	2.00	2.70	3.52	4.14	2.32	8.90	1.73	5.78	2.26	0.68	0.54	1.35	1.37	2.00

Notes: Revenue of Road Maintenance Fund includes balance from previous year.

Source: Ministry of Public Works and Transport. 2013. *Road Maintenance Fund* .



Source: Ministry of Public Works and Transport. 2013. *Road Maintenance Fund*. Vientiane.

PROJECT EVALUATION MATRIX

Overall Project Rating				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Road Contract C01 (Pakxane–Thasi)				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Road Contract C02 (Xaisetha–Sanxai)				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Road Contract C03 (Pakton–Ban Vang)				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Less efficient	1	0.3
Sustainability	20%	Likely	2	0.4
Overall Rating				1.9
Road Contract C05 (Sayabury–Hongsa–Thaxoan)				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Less efficient	1	0.3
Sustainability	20%	Likely	2	0.4
Overall Rating				1.9
All Road Civil Works Contracts				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Periodic Maintenance				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Project Preparation Services				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Road Safety Program				

Criterion	Weight	Assessment	Rating Value	Weighted Rating
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Less effective	1	0.3
Sustainability	20%	Less likely	1	0.2
Overall Rating				1.7

Resettlement				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2
Social Action Plan				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Less effective	1	0.3
Efficiency	30%	Less efficient	1	0.3
Sustainability	20%	Less likely	1	0.2
Overall Rating				1.4
Strengthening Social and Environmental Management				
Criterion	**Weight**	**Assessment**	**Rating Value**	**Weighted Rating**
Relevance	20%	Highly Relevant	3	0.6
Effectiveness	30%	Effective	2	0.6
Efficiency	30%	Efficient	2	0.6
Sustainability	20%	Likely	2	0.4
Overall Rating				2.2

Assessment	**Rating Value**
Relevance	
Highly Relevant	3
Relevant	2
Partly relevant	1
Irrelevant	0
Effectiveness	
Highly effective	3
Effective	2
Less effective	1
Ineffective	0
Efficiency	
Highly efficient	3
Efficient	2
Less efficient	1
Inefficient	0
Sustainability	
Most likely	3
Likely	2
Less likely	1
Unlikely	0

Assessment	
(weighted average of above criteria)	
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
Partly 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