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Report No: PADHI00263

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT ON A PROPOSED CREDITS

IN THE AMOUNT OF SDR42.3 MILLION (US\$56 MILLION EQUIVALENT)

TO THE

LAO PEOPLE'S DEMOCRATIC REPUBLIC

FOR A

LAO PDR CLIMATE RESILIENT ROAD CONNECTIVITY IMPROVEMENT PROJECT (P179284) SEPTEMBER 6, 2024

Transport East Asia And Pacific

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CURRENCY EQUIVALENTS

(Exchange Rate Effective August 19, 2024})

Currency Unit = LAO KIP LAK 22133 = US\$1 US\$1.32842 = SDR 1

FISCAL YEAR January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AM	Accountability Mechanism
APA	Alternate Procurement Arrangements
APB	Agriculture Promotion Bank
ASEAN	Association of Southeast Asian Nations
СВА	Cost Benefit Analysis
ССКР	Climate Change Knowledge Portal
CERC	Contingent Emergency Response Component
CHS	Community Health and Safety
CRRCIP	Climate Resilient Road Connectivity Improvement Project
Dol	Department of Inspection
DOP	Department of Personnel
DoR	Department of Roads
DOT	Department of Transport
DPF	Department of Planning and Finance
DPWT	Department of Public Works and Transport
E&S	Environment and Social
EGDF	Ethnic Group Development Framework
EIRR	Economic Internal Rate of Return
EPD	Environmental Protection Department
ESCP	Environment and Social Commitment Plan
ESMF	Environment and Social Management Framework
ESP/PTI	Environment and Disaster Prevention Division of the Public Works and Transport
	Institute
ESRS	Environment and Social Review Summary
ESS	Environmental and Social Standards
ESU	Environmental and Social Unit
FEM	Financial and Economic Management
FI	Financial Intermediaries
FM	Financial Management
FMM	Financial Management Manual
GBV	Gender Based Violence
GDP	Gross Domestic Product
GESI	Gender and Social Inclusion
GHG	Greenhouse Gas Emissions
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HDM-4	Highway Development and Management Model
HEIS	Hands on Expanded Implementation Support
Hybrid PBC	Hybrid Performance-based Contract
ICR	Implementation Completion and Results Report
ICT	Information and Communication Technology
IDA	International Development Association
IPF	Investment Project Financing

ISWS	Implementation Support and Work Supervision
Lao PDR	Lao People's Democratic Republic
LIC-DSF	Low-Income Countries Debt Sustainability Framework
LMP	Labor Management Procedures
LSP	Local Services Program
M&E	Monitoring and Evaluation
MFD	Maximizing Finance for Development
MPA	Multiphase Programmatic Approach
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
NDC	Nationally Determined Contributions
NPV	Net Present Value
NRA	National Regulatory Agency
ODA	Official Development Assistance
OHS	Occupational Health and Safety
OPBRC	Output and Performance-Based Road Contracts
PAs	Protected Areas
РВА	National Performance Based Allocations
РВС	Performance Based Conditions
PCE	Private Capital Enabling
POM	Project Operational Manual
РРР	Public-Private Partnership
PPSD	Project Procurement Strategy for Development
PRoMMS	Provincial Road Maintenance and Management System
PTI	Public Works and Transport Institute
PWT	Offices of Public Works and Transport
RCP	Representative Concentration Pathway
RF	Road Fund
RFB	Request for Bids
RPF	Resettlement Policy Framework
SDR	Special Drawing Rights
SEA	Sexual Exploitation and Abuse
SEA/SH	Sexual Exploitation and Abuse and Sexual Harassment
SME	Small and Medium-sized Enterprises
SOP	Series of Projects
STEM	Science, Technology, Engineering, and Mathematics
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VAC	Violence Against Children
VDC	Village Development Committee
VOC	Vehicle Operating Costs
WB Group	World Bank Group
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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	(ies) Operation Name s Lao PDR Climate Resilient Road Connectivity Improvement Project		
Lao People's Democratic Republic			
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P179284	Investment Project Financing (IPF)	Moderate	

Financing & Implementation Modalities

$[\checkmark]$ Contingent Emergency Response Component (CERC)
[] Fragile State(s)
[] Small State(s)
[] Fragile within a non-fragile Country
[] Conflict
[] Responding to Natural or Man-made Disaster
[] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
27-Sep-2024	30-Aug-2030
Bank/IFC Collaboration	
No	

Proposed Development Objective(s)

To improve climate resilient road access in Targeted Provinces, enhance capacity to manage the road network, and, in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

Components

Component Name



Climate Resilient Road Access	50,900,000.00
Project Management	3,300,000.00
Institutional Development	2,000,000.00
Contingent Emergency Response	0.00

Organizations

Borrower:	Lao People's Democratic Republic
Implementing Agency:	Ministry of Public Works and Transport

PROJECT FINANCING DATA (US\$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	No
Is this project Private Capital Enabling (PCE)?	No

SUMMARY

Total Operation Cost	56.20
Total Financing	56.20
of which IBRD/IDA	56.00
Financing Gap	0.00

DETAILS

World Bank Group Financing	
International Development Association (IDA)	56.00
of which IDA Recommitted	0.80
IDA Credit	48.00
IDA Shorter Maturity Loan (SML)	8.00
Non-World Bank Group Financing	
Counterpart Funding	0.20



Borrower/Recipient	0.20
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IDA Resources (US\$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	48.00	0.00	8.00	0.00	56.00
Total	48.00	0.00	8.00	0.00	56.00

Expected Disbursements (US\$, Millions)

WB Fiscal Year	2025	2026	2027	2028	2029	2030	2031
Annual	3.00	12.00	14.00	14.00	5.00	5.00	3.00
Cumulative	3.00	15.00	29.00	43.00	48.00	53.00	56.00

PRACTICE AREA(S)

Practice Area (Lead)

Contributing Practice Areas

Transport

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)		
Risk Category	Rating	
1. Political and Governance	 Substantial 	



2. Macroeconomic	 High
3. Sector Strategies and Policies	 Substantial
4. Technical Design of Project or Program	 Moderate
5. Institutional Capacity for Implementation and Sustainability	 Substantial
6. Fiduciary	 Substantial
7. Environment and Social	 Moderate
8. Stakeholders	 Moderate
9. Overall	 Substantial

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[] Yes [√] No

Does the project require any waivers of Bank policies? []Yes [√] No

ENVIRONMENTAL AND SOCIAL

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant
ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant



ESS 8: Cultural Heritage	Relevant
ESS 9: Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

LEGAL

Legal Covenants

Sections and Description

Section I.A.2 of Schedule 2 to the FA: "The Recipient shall, through MPWT, not later than three (3) months after the Effective Date (or such later date as may be agreed in writing between the Recipient and the Association), establish, and thereafter maintain throughout the Project implementation period, the Project Coordination Committee ("PCC") satisfactory to the Association."

Section I.A.4 of Schedule 2 to the FA: "The Recipient, to ensure clear assignment of roles and responsibilities and accountability for Project results, shall, through MPWT, not later than six (6) months after the Effective Date, and in any case prior to the commencement of Project implementation activities in the respective Targeted Province, ensure that the Minister of MPWT and the Governor of each of the Targeted Provinces will sign a Memorandum of Understanding on Project implementation, acceptable to the Association."

Section I.A.6 of Schedule 2 to the FA: "The Recipient shall, through MPWT, not later than three (3) months after the Effective Date (or such later date as may be agreed in writing between the Recipient and the Association), establish, and thereafter maintain throughout the Project implementation period, a Procurement Evaluation Committee, with mandate, composition, and terms of reference acceptable to the Association, as set forth in the POM."

Section I.B of Schedule 2 to the FA: "Counterpart Funding: The Recipient shall, through MPWT, cause the Targeted Provinces to commit a total amount of not less than two hundred thousand United States Dollars (\$200,000) for the exclusive purpose of providing its own financing for all activities under Part 2(h) of the Project".

Section I.C of Schedule 2 to the FA: "Project Operations Manual: The Recipient, through MPWT, shall: (a) maintain throughout the Project implementation period, the Project Operations Manual ("POM") satisfactory to the Association; and (b) ensure that the Project is carried out in accordance with the arrangements and procedures set out in the POM, which include, inter alia, detailed arrangements and procedures for: (i) institutional coordination and day-to-day execution of the Project; (ii) disbursement and financial management, including the MPWT updated Financial Management Manual; (iii) procurement; (iv) relevant environmental and social standards; (v) monitoring, evaluation, reporting and communication; (vi) the districts in which the activities will be implemented as agreed between the Recipient and the Association; and (vii) such other administrative, financial, technical and organizational arrangements and procedures as shall be required for the Project. The Recipient, through MPWT, shall not amend, abrogate, suspend, or waive all or part of the Project Operations Manual without the prior approval in writing of the Association.

Section I.D of Schedule 2 to the FA: "Annual Work Plan: The Recipient shall (a) prepare, not later than December 31 of each year, an annual work plan and budget ("Annual Work Plan and Budget") for the Project for the following Fiscal Year, in a manner and substance acceptable to the Association, covering the activities and expenditures proposed for the subsequent year of Project implementation, and the source(s) of financing of such activities and expenditures; which plan and budget shall be of such scope and detail as the Association shall have reasonably requested, except for the Annual Work Plan and Budget for the first Fiscal Year which shall be furnished to the Association prior to the



commencement of the relevant activities under the Project; and (b) thereafter implement the activities under the Project during the relevant Fiscal Year in accordance with such plan and budget as agreed with the Association." Section I.E of Schedule 2 of the FA: "Environmental and Social Standards: the Recipient, through MPWT, shall (i) ensure that the Project is carried out in accordance with the Environmental and Social Standards and the ESCP (including the management tools and instruments referred to therein) in a manner acceptable to the Association, and (ii) not amend, repeal, suspend or waive any of their provisions unless the Association agrees otherwise, and report on their status of implementation as part of the project reports. The Recipient, through MPWT, shall ensure that: (a) all measures necessary are taken to collect, compile, and furnish to the Association through regular reports, with the frequency specified in the ESCP, and promptly in a separate report or reports, if so requested by the Association, information on the status of compliance with the ESCP and the environmental and social instruments referred to therein, all such reports in form and substance acceptable to the Association, setting out, inter alia: (i) the status of implementation of the ESCP; (ii) conditions, if any, which interfere or threaten to interfere with the implementation of the ESCP; and (iii) corrective and preventive measures taken or required to be taken to address such conditions; and (b) the Association is promptly notified of any incident or accident related to or having an impact on the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers, in accordance with the ESCP, the environmental and social instruments referenced therein and the Environmental and Social Standards."

Section I.F of Schedule 2 to the FA: "Contingent Emergency Response Financing Agreement: In case of an Eligible Crisis or Emergency, the Recipient shall (i) adopt a CERC Manual for implementation of Part 4 of the Project and prepare and adopt an Emergency Action Plan; both in form and substance satisfactory acceptable to the Association and ensure that the activities under the said part are carried out in accordance with such manual and plan and all relevant safeguard instruments; and (iii) not amend, suspend, waive or abrogate, repeal or waive any provisions of the manual unless the Association agrees otherwise in writing" The Recipient shall ensure that the structures and arrangements referred to in the CERC Manual are maintained throughout the implementation of the Contingent Emergency Response Part, with adequate staff and resources satisfactory to the Association. The Recipient shall ensure that: (a) the environmental and social instruments required for the Contingent Emergency Response Part are prepared, disclosed, and adopted in accordance with the CERC Manual and the ESCP, and in form and substance acceptable to the Association; and (b) the Contingent Emergency Response Part is carried out in accordance with the environmental and social instruments in a manner acceptable to the Association.

Section II.B of Schedule 2 to the Financing Agreement "A. Project Reports: The Recipient, through MPWT, shall furnish to the Association each Project Report not later than forty-five (45) days after the end of each calendar semester, covering the calendar semester. B. Mid-term Review: The Recipient, through MPWT, shall: (a) on or about the date thirty (30) months after the Effective Date, prepare and furnish to the Association a mid-term report, in such detail as the Association shall reasonably request, documenting progress achieved in the carrying out of the Project during the period preceding the date of such report, taking into account the monitoring and evaluation activities performed pursuant to this Part A, and setting out the measures recommended to ensure the continued efficient carrying out of the Project and the achievement of its objectives during the period following such date; and (b) review with the Association such mid-term report, on or about the date forty-five (45) days after its submission, and thereafter take all measures required to ensure the continued efficient implementation of the Project and the achievement of its objectives during of the Project and the achievement of its objectives of the measures of the Project and the achievement of its objectives during the period of the Project and the achievement of its objectives during the period of the Project and the achievement of its objectives, based on the conclusions and recommendations of the mid-term report and the Association's views on the matter.



Туре	Citation	Description	Financing Source
Disbursement	Financing Agreement: Schedule 2, Section III.B.1(b)	The Recipient shall not make any withdrawal for Emergency Expenditures under Category (2) unless and until all of the following conditions have been met in respect of said expenditures: (i) (A) the Recipient has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Association a request to withdraw Financing amounts under Category (2); and (B) the Association has agreed with such determination, accepted said request and notified the Recipient thereof; and (ii) the Recipient has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Association.	IBRD/IDA



I. STRATEGIC CONTEXT

A. Country Context

- Lao People's Democratic Republic's (Lao PDR) economic growth averaged about 7 percent over the two decades to 2019 but the economy's growth pattern was capital-intensive, resource-driven, and debt-fueled¹. Growth was predominantly driven by large foreign investments in hydropower, mining, and construction of transport infrastructure. The domestic private sector has been hampered by an unfavorable business environment, particularly by limited competition and transparency.
- 2. Economic growth was severely affected by the COVID-19 pandemic but is recovering gradually. Real Gross Domestic Product (GDP) growth declined sharply from 5.5 percent in 2019 to 0.5 percent in 2020, owing to the wide-ranging economic impacts of COVID-19, including the collapse of international tourism². Growth has gradually recovered to an estimated 3.7 percent in 2023, supported by tourism, transport and logistics services, mining, and foreign investment. However, the recovery remained vulnerable, undermined by macroeconomic instability, with high inflation and a sharp currency depreciation, which weakens incomes, consumption, and investment. Labor shortages, due to emigration to neighboring country, are also affecting labor intensive sectors in Lao PDR.
- 3. The World Bank assesses Lao PDR to be in debt distress with an unsustainable outlook under the Low-Income Countries Debt Sustainability Framework (LIC-DSF).³ High public debt levels have contributed to persistent macroeconomic instability, which is undermining development prospects. Lao PDR is facing both solvency and liquidity challenges owing to significant financing needs, limited financing options, low foreign exchange reserves, and considerable depreciation pressures. Public and publicly guaranteed debt amounted to 108 percent of GDP at the end of 2023, or above 110 percent of GDP if domestic expenditure arrears and a swap arrangement are included. Debt exposure is concentrated, with a single bilateral creditor accounting for about half of the external public debt stock and repayments scheduled for 2024–2028. The energy sector, mostly represented by Electricité du Laos, has played an important role in public debt accumulation, accounting for about 43 percent of total external public and publicly guaranteed debt in 2023. There are also substantial contingent liabilities associated with public-private partnerships and non-guaranteed borrowing of state-owned enterprises. The Ministry of Finance started to monitor these risks, though they have not been adequately quantified yet. The ratio of total debt service (i.e., principal and interest on domestic and external debt after deferrals) to domestic revenue increased from 35 percent in 2017 to 57 percent in 2023. Without deferrals, the ratio would have reached 68 percent. In the absence of debt service deferrals, interest payments would have overtaken social spending levels in 2023.⁴ Debt sustainability is contingent on the outcome of ongoing debt negotiations with key creditors.
- 4. Consumer price inflation accelerated in 2023, driven largely by the weaker Lao Kip (LAK). Average annual consumer price inflation reached 31 percent in 2023, compared to 23 percent in 2022. Higher food, transport, restaurant, and hotel prices were key contributors. Headline inflation remained high at about 25 percent between August 2023 and June 2024, much higher than in its regional peers. High inflation significantly undermines the purchasing power of households. High inflation was largely driven by LAK depreciation, particularly in the parallel

¹ Country Partnership Framework for the Lao People's Democratic Republic for the Period FY 2023 – FY 2026, The World Bank Group.

² World Bank Staff estimates. The Lao authorities estimated GDP growth in 2020 at 3.3 percent.

³ See the 2023 Debt Sustainability Analysis, jointly conducted by the IMF and the World Bank.

⁴ Debt service deferrals (of principal and interest owed to a single bilateral creditor) have provided important temporary relief between 2020–2023. These deferrals had accumulated to about 16 percent of GDP in 2023.



market, which has a persistent 10 -17 percent gap between the official and parallel rates. In 2023, the annual average official LAK/US dollar exchange rate weakened by 31 percent, while the average parallel rate depreciated by 27 percent. The Bank of the Lao PDR tightened monetary policy and introduced administrative measures to manage the exchange rate in early 2023, but the exchange rate has continued to depreciate in 2024.

- 5. The persistent parallel market exchange rate premium is a symptom and cause of macroeconomic imbalances. Limited foreign exchange liquidity and low official reserves contribute to foreign exchange rationing by banks and substantial trading in the parallel market. The gap between the parallel market and commercial bank rates for the US dollar was above 15 percent during July-October 2021, May-September 2022, and September-October 2023. As of September 2024, however, it had fallen to 6 percent. Although the Bank of the Lao PDR widened the US dollar exchange rate band from ±0.25 percent in 2021 to ±7.50 percent in 2023, a persistent premium indicates that the official market is still unable to meet the demand for foreign exchange. This foreign exchange rate premium may impact development financing and reduce a project's value for money through the conversion of forex to the local currency at a suboptimal rate and increase governance risks. However, the gap between the official and the parallel foreign exchange rates is highly volatile and it is therefore not possible to quantify with any degree of certainty the cost to donors. The World Bank has been advocating for greater exchange rate flexibility and structural reforms to boost the supply of foreign exchange.
- 6. Decades of remarkable progress in poverty reduction have been undermined by COVID-19 and rising inflation. Lao PDR made remarkable progress in reducing poverty during the past decades: from 46.0 percent in 1992 to 18.3 percent in 2018. During this period, the Gini coefficient increased from 30.5 to 38.8, reflecting lower gains for the bottom 40 percent in a growth model heavily dependent upon hydropower and mining with limited jobcreation. Since then, COVID-19 is expected to have set back progress on reducing poverty, and mounting inflation weighed negatively on households' purchasing power. Despite improvement in farm incomes, poverty remains highly concentrated in agriculture. The estimated poverty rate among agricultural households was around 25 percent in 2018.
- 7. Poverty incidence varies largely across districts, even those within the same province as per a recent study conducted by the Lao Statistics Bureau⁵. The other key findings of the study are: (i) poverty is high in districts located in mountainous areas bordering Viet Nam and low in districts located on the Mekong River plain and areas bordering People's Republic of China; and ii) districts with the highest number of poor people are mainly located in the provinces of Savannakhet, Khammouan, and Saravan.
- 8. Lao PDR is highly vulnerable to climate change risks. From 1970 to 2010, 33 natural hazard events (mostly floods and droughts) were registered, affecting almost the entire population, and causing economic damages of over US\$400 million⁶. Flooding, storms, landslides, and drought are the top four hazards occurring in the country, and 46 percent of the villages (approximately 3 million people) having been exposed to at least one hazard⁷. Current annual expected losses from flood events in Lao PDR range between 2.8 percent and 3.6 percent of GDP⁸. The northern and north-western parts of Laos are vulnerable to drought. Five droughts have affected the country over the past 40 years. It is estimated that around 188,000 households in Lao PDR are at risk of food insecurity caused by drought. The locations most vulnerable to flooding are the plain areas along the Mekong River in the central and southern parts. Five storms or tropical cyclones have reached and affected the country over the last two decades. Fifteen floods have occurred in Lao PDR from 1970 to 2010. Three of the five costliest natural disasters

⁵ Report titled 'Where Are The Poor In Lao PDR?' Lao Statistics Bureau and the World Bank.

⁶ Climate Change Knowledge Portal, The World Bank Group

⁷ UNHABITAT. 2021. Lao PDR National Climate Change Vulnerability Assessment

⁸ Recovery and Resilience in Lao PDR, The World Bank Group, Feature Story, April 9, 2019.

https://www.worldbank.org/en/news/feature/2019/04/09/recovery-and-resilience-in-lao-pdr



have taken place since 2009, including two floods in 2013. The 2015-16 El Nino phenomenon impacted the country through lower agricultural yields, reduced hydropower production, and infrastructure damages. The floods in 2018 were severe, and over half of the reported losses and damages were to the transport infrastructure, costing about US\$190 million.

- 9. Climate change projections indicate further increases in temperature as well as the intensity and frequency of extreme events, including increased rainfall and flooding risks. Due to a combination of political, geographic, and social factors, Lao PDR is recognized as vulnerable to climate change impacts, ranked 142 out of 181 countries in the 2020 ND-GAIN Index⁹. Temperature rise in Lao PDR is expected to be broadly in line with the global average. The World Bank Climate Change Knowledge Portal (CCKP) model ensemble points to a rise of around 4.1°C by the 2090s over the 1986–2005 baseline, under the highest emissions pathway (Representative Concentration Pathway 8.5 RCP8.5¹⁰). Rises in and annual minimum and maximum temperatures are expected to be more rapid than the rise in average temperature, with monthly minimum temperatures typically rising 10–20 percent faster. While uncertainty in the seasonal variation of temperature rises remains high, the CCKP model ensemble suggests that rises may be greatest in the hottest months of April and May. While considerable uncertainty surrounds projections of local, long-term future precipitation, some global trends are evident. The intensity of sub-daily extreme rainfall events appears to be increasing with temperature, a finding supported by evidence from different regions of Asia. The CCKP model ensemble projects that the average largest 5-day cumulative rainfall could increase from around 135 mm to over 150 mm under RCP6.0 and RCP8.5 emissions pathways, respectively.
- 10. The labor market in Lao PDR exhibits some gender gaps, which vary in nature and size. Overall, there are gender gaps in the labor market, with 41.9 percent of women aged 15 and above and 52.6 percent of men for the same age category participating in the labor force¹¹. However, there is a socially construed divide between where women and men work and the type of jobs they do. Women tend to be concentrated in manufacturing, trade, and social services, while men dominate other sectors, such as transport, construction, and energy. The gender-based occupational segregation could be one additional factor contributing to a gender pay gap in the country where women earn 23 percent less than men, are overrepresented in low-skill occupations, and spend a disproportionate amount of time five times more than men on unpaid family and care work¹². Just 21.9 percent of Wembers of Parliament are women, and the number is even lower at subnational levels (less than 2 percent of village heads are women). More than one-third of ever-partnered women in Lao PDR reported experiencing one form of violence (physical, sexual, or psychological) in their lifetime, and less than 2 percent of women reported it to authorities, according to the 2014 study on Violence Against Women¹³.

B. Sectoral and Institutional Context

⁹ University of Notre Dame (2019). Notre Dame Global Adaptation Initiative. URL: <u>https://gain.nd.edu/our-work/country-index/</u> The ND-GAIN Index ranks 181 countries using a score which calculates a country's vulnerability to climate change and other global challenges as well as their readiness to improve resilience. The more vulnerable a country is, the lower its score is, while the more ready a country is to improve its resilience, the higher it will be.

¹⁰ RCP 8.5 refers to the concentration of carbon that delivers global warming at an average of 8.5 watts per square meter across the planet. The RCP 8.5 pathway delivers a temperature increase of about 4.3°C by 2100, relative to pre-industrial temperatures.

¹¹ Labor Force Survey 2022, Lao Statistics Bureau (2023).

¹² Gender Equality and Women's Empowerment in LAO PDR. https://www.undp.org/laopdr/gender-equality-and-womensempowerment

¹³ Ibid. UNDP



- 11. The transport sector grew at 6.5 percent per year during the last decade and contributes to about 3.6 percent of the country's GDP¹⁴. Transport demand has more than doubled between 2004-2018. Over this period, the numbers of registered passenger cars every year has grown from 59,000 to 433,800 and that of motorcycles has also increased from 293,600 to 1,633,700. Likewise, those of passenger buses have increased from 2,200 to 5,500 and trucks have increased from 13,100 to 60,400. In total, the accumulated number of all the types of registered motor vehicles has increased from 367,900 at year 2004 to 2,133,500 at year 2018.
- 12. Lao PDR has a wide range of modes of transport. Lao PDR has 59,943 km of road network. The country's rail network is about 425 km consisting of 414 km of the standard gauge Lao China railway and 11 km of meter gauge railway connecting to the Thailand railway system. Of the total 14 airports, 9 have scheduled flights and 3 have international flights. Lao PDR has about 2,000 km of inland waterways and 29 river ports. The river ports are along the Mekong River and its main tributaries such as Nam Ou, Nam Ngum, Nam Kading, and Xe Bang Fai. The main river port is Laos-Japan friendship port, called Lak Si port. Before 1996, inland water transport was the most prominent mode of transport in Lao PDR, but it lost its share of transport because of shallow water levels in dry season, high current flows during rainy season, lack of concrete berths, lack of tools and equipment for loading and unloading, and difficulties at Khonephapheng falls¹⁵.
- 13. The transport sector is a major energy consumer in the country and one of the largest sources of Greenhouse Gas (GHG) emissions as well as one of the principal sources of ambient air pollution. Since 1990, emissions from the transport sector have grown by 135 percent¹⁶ and now account for 37 percent of GHG emissions. Motorcycles/Motor Bikes are the most widely used mode of passenger transportation, accounting for nearly 80 percent of all the registered vehicles in the country. The capital city of Vientiane accounts for nearly 40 percent of the total country's vehicle population. E-mobility deployment is being intensified, with a target of 30 percent Electric Vehicle penetration rate by 2030 at an estimated cost of US\$500 million, as set forth in the Government's Clean Energy Transportation Strategy. To facilitate this transition, a comprehensive regulatory and institutional framework needs to be established.
- 14. Road transport is the dominant mode of transport carrying about 86 percent of freight traffic and 98 percent of passenger traffic and is central to the policy of 'landlocked' to 'land linked'. The country's total road network is 59,943 kilometers (km) in 2017¹⁷ with a paved road network of 9,251 km (15.5 percent). It consists of a primary network of 7,515 km of National Roads, a secondary network of 8,597 km of Provincial Roads, a tertiary network of about 33,318 km of District Roads and Rural Roads, 3,537 km of Urban Roads, and 6,975 km of Special Roads¹⁸. Only 15 percent of the total road network is paved. 40 percent of paved roads are classified as in poor or bad condition. 40 percent of unpaved roads are inaccessible during the rainy seasons.
- 15. Ministry of Public Works and Transport (MPWT) is responsible for administration of the National Road network and setting sector policies, regulations, and standards for the entire road network. The road network other than the National Roads is managed by provincial road authorities. MPWT has the overall responsibility but has delegated certain project management and maintenance responsibilities to departments of public works and transport (DPWTs) in each province, with subsidiary offices in districts. Similarly, DPWTs in each province have delegated various tasks to offices of public works and transport in districts. DPWTs report to the provincial governor for provincial budget purposes but also to MPWT for road fund and compliance with national technical

¹⁴ Lao Statistics Bureau

¹⁵ https://www.unescap.org/sites/default/files/Country%20presentation%20-%20Lao%20PDR%20%283%29-1.pdf

¹⁶ European Commission (2019)

¹⁷ 5-Year Development Plan 2021-25, Ministry of Public Works and Transport

¹⁸ 'Special Road', as per the Road Design Manual of the Ministry of Public Works and Transport, means a road used specifically for the production and service of a sector of activities for the national defense and security and the forest preservation zone



standards¹⁹. Based on 5-year transport plans²⁰, the provinces prepare and submit annual implementation plans for transport projects to MPWT. In line with the national decentralization policy, DPWT in each province carry out local road maintenance prioritization using Provincial Road Maintenance and Management System (PROMMS), preparation of the local road improvement and maintenance budget, and manage the local road contracts with contract amount less than LAK 5 billion (around US\$300,000).

- 16. Funding constraints and channeling of most of the available funds towards the National Roads network is crowding out the maintenance of the secondary and tertiary networks, which primarily serve the rural population and agricultural areas, and are extremely vulnerable to climate risks. There are two sources of funding for the road sector - the Road Fund and budgetary support. In 2001, the Road Maintenance Fund (renamed the Road Fund) was set up to mobilize contributions from the road users for the maintenance of roads to ensure their sustainability. The Road Fund is managed by the MWPT and is partly used for disaster recovery under decree 130 dated June 2016. The Road Fund also funds emergency maintenance, immediate repairs and rehabilitation with revenue raised mainly from the fuel levy. Currently, the Road Fund budgets for emergency maintenance of the national and local road networks to address immediate repair or restoration from events such as flooding, clearing landslides, making retaining walls and reinstatement of washed away road sections. The yearly allocation to the sector from the Road Fund is capped at LAK 700 billion, with 72 percent earmarked for National Roads and only 18 percent for the rest of the network. Moreover, about 35 percent of the Road Fund allocations are spent on clearing existing arrears to contractors and only the remaining 65 percent are available for actual expenditure and payments. Due to depreciation of LAK against the US dollar, the yearly allocations for the road sector over the last couple of years have also been decreasing in real terms – from US\$66 million in 2020 to US\$44.4 million in 2022. Road Fund resources cover less than 30 percent of the maintenance need of entire road network. Currently, funding from multilateral and bilateral development agencies has been used mainly towards developing the National Road network. However, the funding needs are also very high for the more remote secondary and tertiary networks, which account for about 87 percent of the total road network. Investing in and keeping the National Road network in good condition is necessary as it largely benefits a major part of national and regional traffic but adequate investments for secondary and tertiary road networks are also required as rural road access and resilience directly support agricultural production and rural poverty reduction. With about 63 percent of Lao PDR's population living in rural areas, provision of all-weather road access is critical for improving economic and social wellbeing of the rural and remote areas of the country, agriculture supply chains, and overall economic development. The World Bank is currently undertaking a study on 'Lao Road Sector Financing Review' to provide analysis of road sector financing and funding options in Lao PDR. The emphasis will be on developing an optimized and sustainable financing model, keeping in mind the country's unique challenges and the need to ensure last-mile connectivity through improved local roads.
- 17. Only about 5.6 percent of the tertiary network of District Roads and Rural roads is paved, and rest of the network is either gravel surfaced or earthen. 40 percent of these roads are inaccessible for over six months in a year, and many have no redundancies for access during extreme climate events. More than 40 percent of villages are 6 km or more from the main road and nearly half are not accessible during the rainy seasons²¹. The network of District Roads and Rural Roads has (i) most of its cross-drainage structures in dilapidated condition, (ii) very few culverts, (iii) no longitudinal drainage facilities, and (iv) no adequate embankments. The focus of investment in these roads over the last two decades has been to increase the size of the network to improve connectivity. However, climate events have led to a deterioration in road conditions and maintenance funding has

¹⁹ For the activities funded by the Donors and Road Fund, DPWTs also report to the MPWT

²⁰ This is not fully operationalized at provincial level.

²¹ 5-year Development Plan 2021-25, Ministry of Public Works and Transport

not kept pace with the demands for road maintenance, rehabilitation, and repair leading to loss of these assets. These infrastructure deficiencies need to be urgently addressed to adapt to increasing climate risks on flooding.

- 18. Lao PDR's District Roads and Rural Roads are much prone to climate risks. About 80 percent of the country is mountainous and forms the catchment of the Mekong River and its several tributaries and the road network in these areas are highly prone to landslides and slope failures. In the plains, the network is prone to flooding, inundation, and asset loss because of unpaved pavements, inadequate cross-drainage structures, lack of drains, timber bridges etc. In 2019, heavy rains caused floods in the southern provinces (Saravan Province worst affected) and impacted 580,000 people and caused damages of about US\$50 million including many roads and bridges. 52 villages of the southern province of Savannakhet were flooded in October 2020 and affected over 10,000 people, several roads, and bridges. In 2021, floods and other national disasters impacted 70,000 people. In 2011, Typhoon Haima resulted in damages of over US\$35 million to the infrastructure sector and about 40 percent of these are to the transport sector²². In 2013, severe flooding was experienced in 12 of the country's 18 provinces due to five consecutive storm events resulting in damages of over US\$280 million²³. 60 percent of overall disbursements from the national contingency fund financed the recovery and rehabilitation of roads and bridges. In 2018, Tropical Storm Son-Tinh caused widespread flooding, damaging one-fifth of the country's road network, with overall transport sector damages estimated at approximately US\$100 million²⁴.
- 19. Institutional capacity constraints, including sufficient staff with relevant expertise as well as updated road asset data, pose challenges for climate resilient network planning and prioritization of capital investments and maintenance. There is no proper and updated inventory of District Roads and Rural Roads or a prioritization framework for selecting roads for rehabilitation/maintenance giving due consideration to technical, socioeconomic, and climate resilience. The institutional and technical capacities of the managing agencies are weak especially at the provincial and district levels, including lack of enough staff with required expertise for managing the network. At the MPWT, dedicated staff are not assigned to work on District Roads and Rural Roads. Apart from updating the asset data, skill enhancement in undertaking planning and prioritization exercise for the MPWT and DPWT staff would help in allocating available meagre resources to roads that are most critical for accessibility and vulnerable to climate risks. As the focus of the sector institutions is on international trade and logistics, there is not enough focus or priority in the institutional structure for the District Roads and Rural Roads which carry less traffic volumes and serve domestic needs. However, making these tertiary roads all-weather will not only increase the rural accessibility and better prices for the agricultural produce from the rural areas, but also connectivity to the railway and road trunk routes. The local contracting industry has grown during the last decade including augmentation of equipment and human resources but there are capacity gaps in the areas of contract management, road safety, and environmental and social management.
- 20. All-weather road accessibility is one of the necessary conditions for inclusion and socioeconomic opportunities. Safe and all-season road accessibility is critical to supporting inclusion and socio-economic opportunities by connecting all members of the community to social, education, health and financial services, labor markets, and economic opportunities. Farmers in rural areas and regional value chains need road access to access markets and

²² Typhoon Haima in the Lao People's Democratic Republic: Joint Damage, Losses and Needs Assessment, Aug 2011, Government of Lao PDR

²³ GFDRR. (2014). Lao PDR Strengthening institutional capacities for resilient recovery Country Case Study Series Disaster Recovery Framework Guide. Available at: https://www.gfdrr.org/sites/default/files/publication/rcfs-2014-laopdr.pdf.

²⁴ Post-Disaster Needs Assessment 2018 Floods, Lao PDR, Government of Lao PDR



distribution centers and to acquire agriculture inputs²⁵. Not having safe and weather-resistant roads undermines communities' prosperity and further exacerbates poverty of communities.

- 21. Road must be designed and managed considering all the diverse voices in the community. A major gender gap in the transport sector is related to employment. The female share of workers in the transport and logistics sector in the country is only 9.1 percent²⁶. Understanding the mobility needs that the communities have and addressing the risks that roads may entail is therefore of utmost importance. Listening to the needs to include the voices and perspectives of all groups in the community, including differentiated perspectives for men and women, vulnerable groups such as children, the elderly and people with disabilities, and all economic and social stakeholders that ultimate rely on the road asset. Recent studies demonstrate that road projects, if they incorporate community engagement and gender-balanced approaches, may leverage, especially for women, social inclusion, and incorporation of rural population to the political and social decision making while reducing sexual exploitation and abuse (SEA).²⁷
- 22. Within the MWPT, women constitute 24 percent of the total workforce nationwide with most of them employed in administrative functions. The share of women within the Roads and Bridges sector of the ministry is only 13 percent²⁸. It is notable that 16 percent (197) of the 1258 employees of the seven road construction companies are women, most of whom are accountants, environment and social specialists, human resource specialists, and 11 percent and 9 percent of the engineers and construction equipment operators of these companies are women, respectively. The issues that typically impede women's access to employment in the 'male-dominated' sectors such as transport include systematic gender stereotypes, which influence education choices that women and men make, affecting the number of girls who graduate with training in science, technology, engineering, and mathematics (STEM), inflexible male oriented conditions of employment, and workplace health and safety. In 2018, 29 percent²⁹ of all tertiary graduates from STEM were female in LAO PDR, which, apart from gender gaps in the fields of education, indicates that the employers in transport and logistics sector can tap into this existing talent pool graduating from the universities. There is very little participation of women in road improvement and maintenance activities. Women are also underrepresented in management jobs and business ownership in the sector with only a 9.6 percent share.
- 23. In 2014, MPWT endorsed the Ten Year Strategic Plan that set out six expected outcomes for addressing gender gaps: (i) Gender mainstreaming carried down to all MPWT agencies, (ii) Increased number of women in MPWT, (iii) Increased role of women in decision making and increased number of women in decision-making positions, (iv) Strengthened capacity and skills of women in MPWT, (v) Mechanisms to mainstream gender into sector planning established, and (vi) Uniform monitoring and evaluation system for gender mainstreaming developed. MPWT has established specific committees for women's advancement at the departmental, provincial and district levels with a gender focal point at each level. In 2021, women constituted slightly more than half of the committee members at the central and provincial levels. MPWT has set a goal to increase female staff to 30 percent in 2025. The current gender strategy of MPWT focuses on gender in the public sector, with targets and objectives not extended to the private sectors. Since February 2022, the responsibility to implement the Ten-Year Strategic Plan

²⁵ A recent study found that, in India, rural road construction increased middle school enrollment and educational performance. Adukia, A., Asher, S., & Novosad, P. (2020). Educational investment responses to economic opportunity: evidence from Indian road construction. American Economic Journal: Applied Economics, 12(1), 348-76.

²⁶ Lao PDR Population Census 2015

²⁷ World Bank. 2015. Roads to Agency: Effects of Enhancing Women's Participation in Rural Roads Projects on Women's Agency a Comparative Assessment of Rural Transport Projects in Argentina, Nicaragua, and Peru (English).

²⁸ 2023 statistics provided by the MPWT.

²⁹ World Bank Gender Data. Share of female tertiary graduates by field. <u>https://genderdata.worldbank.org/indicators</u>. Accessed on April 13, 2023.



has been transferred from the National Committee for the Advancement of Women to the Department of Personnel under MPWT. As it transpired during the World Bank team's preliminary discussions with the client, there is need to support the ministry to address the lack of qualified staff to promote Gender Equality and Social Inclusion (GESI) and limited resources to close the gap in policy implementation.

24. Lao PDR recorded 6,440 accidents in the year of 2022³⁰, resulting in 10,132 injuries and 947 fatalities. In the country, road crashes are a leading cause of death among children and young people, and the number one cause of disability across all age groups. The impact of road crashes on the national economy is estimated at five percent of GDP. In December 2022, Lao PDR approved a new National Road Safety Strategy and an action plan. A National Road Safety Committee chaired by a Deputy Prime Minister is in place and it meets regularly to monitor implementation of the road safety strategy. The country has an ambitious goal of reducing road traffic deaths by 50 percent by 2030, in line with the UN Decade of Action for Road Safety 2021-30. The District and Rural Roads have no road safety infrastructure including road signs and road markings. These dusty roads limit visibility of drivers and pedestrians which leads to road crashes. Another challenge linked to road safety is vehicle overloading. Logging trucks and international traffic on some road sections continue to be main sources of overloading. This leads to road damage, reducing the life of the road. Further, existing weigh stations on National Roads do not adequately enforce vehicle axle controls, while Provincial and Rural roads lack such stations³¹. Through other engagements, the World Bank is supporting the country in introducing safe system approach, speed management, safety awareness, enforcement, road crash database, and post-crash management.

C. Relevance to Higher Level Objectives

- 25. The proposed project is aligned with the 2023–2026 World Bank Group Country Partnership Framework³² for Lao PDR. The proposed project directly addresses the framework's (i) objective 4: increased connectivity through climate resilient infrastructure, and (ii) objective 7: improved inclusive access to quality health services. The proposed project also responds to the crosscutting theme: strengthened governance and institutions. As envisaged in objectives 4 and 7, the proposed project will improve domestic transport connectivity focusing on provinces and rural areas with high poverty rates, and on improving climate resilience and safety of prioritized roads which are critical to access key services such as schools, hospitals, markets, agriculture production areas, as well as other economic opportunities. Also, as envisaged in the crosscutting theme, the proposed project will contribute to policy, institutional, and capacity building of the sector institutions.
- 26. The project is consistent with the Country's strategies on climate change, including its Nationally Determined Contribution (NDC). In the latest NDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC), Lao PDR commits to reducing GHG emissions through key mitigation actions in the transport sector, including (i) the Lao-China Railway, and (ii) the new Bus Rapid Transport system in Vientiane Capital and associated Non-Motorized Transport component. Furthermore, conditional measures include (i) 30 percent Electric Vehicles penetration for two-wheelers and passenger cars in national vehicles mix, and (ii) biofuels to meet 10 percent of transport fuels. The proposed project does not hinder the achievement of these mitigation goals as it focuses on rehabilitation/upgrading of existing tertiary roads that provide essential access and connectivity to local rural communities. On adaptation, the two long-term adaptation objectives in the transport sector are: (i) Increase the resilience of urban development and infrastructure to climate change, including using green infrastructure and nature-based solutions, and (ii) promote ecosystem-based adaptation solutions. The National Adaptation Program

³⁰ 1053 in 2017, 995 in 2018, 1134 in 2019, 1031 in 2020, 831 in 2021

³¹ Sector Assistance Program Evaluation for the Transport Sector in the Laos PDR, Asian Development Bank

³² The World Bank Report No. 177311-LA



of Action (2009), the National Climate Change Strategy (2010) and the Climate Change Action Plan for Lao PDR for 2013 – 2020 also emphasize the need to build climate resilience in the most vulnerable sectors: agriculture, forestry and land use, water resources, transport and urban development, and public health. The National Green Growth Strategy to 2030 (2019) further places climate change adaptation as a cross-cutting focus area with the objective of reducing vulnerability of the country and of the population. The proposed project directly supports Lao's efforts in increasing the resilience of road infrastructure to climate change and is therefore consistent.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

27. To improve climate resilient road access in Targeted Provinces, enhance capacity to manage the road network, and, in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

PDO Level Indicators

- 28. The PDO level indicators are:
 - (i) Millions of people that benefit from improved access to sustainable transport infrastructure and services (corporate scorecard indicator),
 - (ii) Access disruption along the project roads due to climate hazards (number of days multiplied by section length per year), and
 - (iii) New road projects designed/prepared by the MPWT that include climate resilient designs (percentage).

B. Project Components

- 29. The proposed project will have the following components as detailed below.
- 30. **Component 1: Climate Resilient Road Access (Total: US\$50.9 million; IDA: US\$50.9 million):** The project will support (i) improvement of approximately 300 km of District Roads and Rural Roads in the provinces of Khammouan, Savannakhet, and Saravan to the Standards of Road Design Class V/VI as per MPWT's Road Design Manual, addressing climate and disaster resilience aspects, and maintenance of the Project roads post improvement during the Project period through Output and Performance-based Road Contracts ("OPBRC")³³ and/or Hybrid Performance-based Contracts ("Hybrid PBC") and, (ii) construction supervision of the project road improvement works.
- 31. Component 2: Project Management (Total: US\$3.3 million; IDA: US\$3.1 million, Government of Lao PDR: US\$0.2 million): This component will support (i) financial audit, (ii) technical audits of the project road improvement works during construction, (iii) environmental and social monitoring and audits, (iv) road safety audit of the project, road designs at three stages (at design, construction, and completion stages), and awareness campaigns,

³³ OPBRC is a type of road work contract where payments are made against measured outputs. The technical standards and service levels define the desired results; and the outputs satisfy defined functional needs in terms of road quality, quantity and reliability, including with respect to construction, rehabilitation, and maintenance.

(v) road user satisfaction surveys carried out at the start of implementation of works, at mid-term, and at the close of the project, (vi) incremental operating costs, (vii) technical and operational assistance for the day-to-day management, monitoring and evaluation of the Project, and (viii) land acquisition, resettlement, and rehabilitation costs, including the implementation of Resettlement Action Plan(s). The costs of land acquisition, resettlement, and rehabilitation will be exclusively financed by counterpart funds from the Government of Lao PDR.

- 32. **Component 3: Institutional Development (Total: US\$2 million; IDA: US\$2 million):** This component will support MPWT in (i) capacity building of local contractors in the areas of OPBRCs, climate resilience, road safety, and environmental and social risk management, (ii) a study on climate resilient road network planning and prioritization and capacity building of MPWT and DPWTs, (iii) preparation of a road sector financing strategy, (iv) capacity building of selected MPWT and DPWT staff on cross-cutting issues including road maintenance, OPBRC contract management, road safety, gender, citizen engagement, and climate disaster risk, (v) institutional support for a female internship program, and (vi) preparation of selected environmental, social, technical, and economic documents as well as feasibility studies, through the provision of technical advisory services in the road sector in Targeted Provinces.
- 33. Component 4: Contingent Emergency Response (Total: US\$0 million; IDA: US\$0 million): This component will support MPWT in case of an Eligible Crisis or Emergency in responding promptly and effectively to it as per the Contingent Emergency Response Manual. The Contingent Emergency Response Manual will consider climate risks on both mitigation and adaptation.
- 34. The proposed project will improve about 300 km of District Roads and Rural Roads in poor districts of Khammouan, Savannakhet, and Saravan provinces. These three provinces have been selected because (i) they have the highest poverty headcounts in the country Savannakhet ranks first with a poverty headcount of 296,400, followed by Saravan and Khammouan with poverty headcounts of 131,000 and 102,000 respectively³⁴, (ii) these provinces are in the central and southern parts, which are most vulnerable to flooding, (iii) they have a poor District Roads and Rural Roads network Savannakhet, Khammouan, and Saravan provinces have 88 percent, 81 percent, and 64 percent respectively of their District Roads and Rural Roads network in bad or poor condition³⁵, (iv) they are among the provinces with the highest percentage of farm households affected by floods and lack of road access during these climatic events for instance, in 2022, floods impacted 26 percent of farm households in Savannakhet, 25 percent in Khammouan, and 23 percent in Saravan³⁶, and (v) these provinces are among the top five producers in the agriculture sector contributing to about 46.7 percent of the national agricultural production and poor road access during extreme climatic events is contributing to severe economic losses for instance, in 2018, there were losses to the tune of LAK 457 billion in the three provinces, which is about 42 percent of the total loss in the agriculture sector in the country due to floods³⁷.
- 35. The MPWT in consultation with the DPWTs of the three provinces has analyzed the entire 3,600 km network of the District Roads and Rural Roads in ten districts with high poverty headcounts, using a geo-spatial analysis, and shortlisted about 100 km of roads in each of the provinces through a prioritization exercise to be the proposed project roads. The prioritization was based on aspects which include: (i) passing through a poor district based on poverty head count, (ii) criticality of the link for climate resiliency of the network, (iii) connectivity to agricultural areas, (iv) population served by the road, (v) traffic level, (vi) not passing through environmentally sensitive areas, and (vii) no resettlement of more than 200 people (or 40 households) and/or more than 40 households severely affected with 10 percent of productive assets owned by individual household lost in all three

³⁴ Report on 'Where are Poor in Lao PDR?' prepared by the Lao Statistics Bureau and the World Bank.

³⁵ PROMMS data, MPWT

³⁶ The Third Lao Census of Agriculture 2019/2020, The Ministry of Planning and Investment.

³⁷ The Third Lao Census of Agriculture 2019/2020, The Ministry of Planning and Investment.



target provinces. The proposed project roads are in the plain areas of the three provinces which are most vulnerable to flooding.

- 36. The impact of the proposed project roads on provision of climate resilient road access to basic facilities, was studied, utilizing existing data from the MPWT, Ministry of Planning and Investment (MPI), and the Food and Agriculture Organization. The study included calculation of travel times, for assessing accessibility in 'dry season' and 'wet season' under the scenarios of 'with project' and 'without project', between 718 villages in the districts to 109 Health Centers, 159 Secondary Schools, 10 District/Provincial Hospitals and 10 District Markets. The analysis revealed that, when traveling by car³⁸, during the 'wet season' under the 'without project scenario', 47 percent of the road users experience over 100 minutes to travel to the nearest District Hospital, 41 percent to the nearest District Market, 18 percent to the nearest Health Center and 2 percent to the nearest Secondary School. Improving the roads³⁹ is expected to result in about 63 percent reduction in the number of road users experiencing over 100 minutes to travel to the nearest District Market, 27 percent reduction to the nearest Health Center, and 100 percent reduction to the nearest Secondary School. The analysis revealed similar access improvements in connecting agricultural lands to the district markets. The methodology and results of the geospatial analysis are presented in Annex 2.
- 37. The proposed project provides connectivity to National Roads and access to the east west economic corridor between Viet Nam and Thailand thus increasing market linkages and contributing towards greater economic gains to the local communities. The proposed project provides access to the rural areas to the markets located mainly on the National Roads 9,13,1 and 11 in Savannakhet province, National roads 12,13,8,1, and 11 in Khammouan province and National Road 1,15 13 and 20 in the Saravan province. The proposed project activities are expected to provide year-round access to inter village mobility to access to 145 schools (120 primary and 25 secondary schools)⁴⁰ and 12 health centers⁴¹.
- 38. The project will endeavor to develop and implement a female internship program within the MWPT. The project could offer to at least 50 female university students in their last year and recent graduates, six-month paid internships in transportation and construction fields that are traditionally male dominated (e.g., engineering), by partnering with national universities that offer degrees in engineering and related fields. It will be the first time that such a program will be piloted by the ministry. The ministry and the National University will lead the design and overall implementation of the program in terms of developing program content, outreach to the universities and the interns 'placement. The details about the selection criteria and procedures will be further detailed as the project preparation progresses. Also, the project will amend the bidding documents by mandating the road construction companies to submit a gender action plan explaining what measures they will put in place to recruit and retain local women in their respective workforce with a particular focus on supporting women in mid and high-skilled technical roles, and list concrete actions that they will put in place to build a more inclusive workplace that supports greater gender equality. Importantly, the gender action plans will include quantitative female employment targets committing the proposer to employ 15 and 20 percent of local women in mid and high-skilled jobs in project works, respectively. Lastly and importantly, the project will support the MPWT to update its strategic plan on gender and will provide capacity building training to the ministry's Department of Personnel to implement the plan.

³⁸ Speed assumptions based on the Road design Manual for paved roads, for unpaved roads speed assumptions based on consultation with MPWT and World Bank.

³⁹ The Candidate Roads are only from 8 of the 10 districts analyzed. The MPWT did not select any Candidate Roads in Thakhek and Nakai Districts.

⁴⁰ Primary and Secondary school points, Ministry of Planning and Investment (MPI).

⁴¹ Health center and hospital points, Ministry of Planning and Investment. (MPI)



39. All training and capacity building activities to MPWT and DPWT will be coordinated with other World Bank funded projects as needed, such as the Southeast Asia Regional Economic Corridor and Connectivity Project, under which GESI capacity building modules and training materials for the project core teams, contractors and consultants have been developed.

C. Project Beneficiaries

40. The proposed project will indirectly benefit about 600,000 people (approximately 8 percent of country's population or 34 percent of the total population of the three project provinces) in poor districts of Khammouan⁴², Savannakhet⁴³, and Saravan⁴⁴ provinces. The rural population in these provinces is about 75 percent to 88 percent of the total population. Most of the District Roads and Rural Roads in this proposed project area are prone to flooding during rainy season. Improved connectivity will contribute to the improvement of human capital by enhancing the local communities' (including women and their household, Indigenous People, and other vulnerable groups) access to markets, job opportunities, and economic and social facilities. In addition, the works under the proposed project will also include additional facilities for ease of access of persons with disabilities in selected areas along the project's road investments, based on updated statistics and/or more detailed feasibility assessment⁴⁵, for example for those impacted by unexploded ordnance that show relatively high presence in the Savannakhet province.

D. Results Chain

41. Theory of Change: The World Bank has been supporting the Lao PDR in preparation and implementation of transport sector strategies, policies, and investment plans for sustainable and efficient road asset management within limited fiscal space. The World Bank is also supporting the country's aim to transform from landlocked to land linked through activities that promote trade facilitation, logistics, National Roads improvement, road safety, and cross-border transport. Inadequate maintenance funding and data systems that prohibit accurate prioritization of the rural road network is a key issue. The challenge to provide climate resilient road access in Khammouan, Savannakhet, and Saravan provinces is lack of all-weather District Roads and Rural Roads in the project areas. This is also compounded by the lack of adequate maintenance of the road infrastructure and the need to enhance the capacity and skills of MPWT and DPWT staff. The Project includes maintenance of the roads post construction during the project period. This operation contributes to the overarching goals by addressing these constraints. The critical assumption to achieve the theory of change is that adequate counterpart finances are provided by the GoL. To address this, the Targeted Provinces have agreed to contribute to the counterpart finances.

⁴² Nakai, Bualapha, Xebangfai, and Thakhek districts.

⁴³ Champone, Xongkhong, and Xepone disctricts

⁴⁴ Lao Ngarn, Toumlarn, and Saravan districts

⁴⁵ Disability Monograph of Lao PDR From the 2015 Population and Housing Census. Ministry of Planning and Investments. Lao Statistics Bureau. ; and statistics from the National Regulatory Agency for Unexploded ordinance and the disability and monograph census.



PDO: To improve climate resilient road access in targeted provinces, enhance capacity to manage road networks, and, in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.



Assumption: MPWT mobilizes sufficient resources in a timely manner for Land acquisition, resettlement, and rehabilitation.

E. Rationale for Bank Involvement and Role of Partners

42. The World Bank has been a key player in the development of Lao PDR's Road sector. The World Bank is a key partner with a long-standing commitment to strengthen the road sector in Lao PDR and is uniquely positioned to provide high-level strategic and policy support to the sector. For the past two decades, it has played a key role in the development of capacities for preparation and implementation of transport sector strategies, policies, and five-year investment plans. The World Bank also supported the Lao PDR in sustainable and efficient road asset management including the development of an institutional and organizational framework, establishment of the Road Fund, and road construction and maintenance. Given that the country has been experiencing an increase in climate change impacts, resulting in increased expenditures related to emergency repair and post-disaster recovery, the World Bank's engagement has expanded to further integrate climate resilience into asset management systems as well as further support to institutional strengthening measures to optimize expenditure, prioritize investments in the transport sector, and support the sustainability of the road network within limited fiscal space. The World Bank is also actively involved in the realization of the country's aim to transform from

landlocked to land linked. It is also supporting projects that promote trade facilitation, logistics, National Roads improvement, road safety, and cross-border transport. Another value-addition is to promote gender and social inclusion dimension in the road sector investments and institutions based on global good practices⁴⁶ and lessons and local knowledge.

- 43. The World Bank has a long history of and a lot of experience in the region and globally supporting the design and implementation of rural roads programs. The Bank has financed several rural roads programs and projects including through use of output and performance-based road contracts (OPBRC), climate resilient designs, and bio-engineering solutions.
- 44. The World Bank will continue to assist Lao PDR in managing growing climate risks to its road infrastructure, improving road safety and business processes, and strengthening the capacity of MPWT. Through ongoing projects,⁴⁷ the World Bank is supporting mainstreaming climate resilience into road asset management system and maintenance procedures, updating national road safety strategy and action plan, strengthening the institutional capacity for internal controls, financial and procurement systems, strategic planning, and modernization of the transport sector.
- 45. Several development partners have been active in the transport sector in Lao PDR⁴⁸. Most financing in the sector focuses on national roads, while the need for improving rural roads and last-mile connectivity, which serve a large part of the population, remains substantial. The World Bank will closely collaborate with development partners active in the rural roads sector, including KFW, EIB, and NDF. The World Bank has collaborated with JICA to enhance road asset management and vehicle overloading control measures, partnered with NDF on climate vulnerability assessments, worked closely with DFAT on formulating transport sector strategies, and joined forces with AIIB, EIB, and other partners to promote road safety and infrastructure improvement. The Government has instituted the Infrastructure Sector Working Group (ISWG), presided over by the Minister of Public Works and Transport (MPWT), to facilitate effective coordination among development partners. The World Bank will continue active participation in the work of ISWG and close collaboration with development partners in the road sector.

F. Lessons Learned and Reflected in the Project Design

46. The project incorporates the lessons learned from past projects for the improvement and maintenance of the local roads. OPBRC have been implemented under the ongoing Lao Road Sector Project 2 (P158504) and the National Road 13 Project (P163730) to enhance the effectiveness of life cycle asset management. A key lesson from implementing OPBRC in these projects is the necessity for a clearer risk management framework and division of roles and responsibilities among the key stakeholders including government entities, supervision consultants, and contractors, to ensure successful contract execution. The past projects experienced challenges related to

⁴⁶ For example: Casabonne,Ursula; Jimenez Mota,Bexi Francina; Muller,Miriam. *Roads to agency: effects of enhancing women's participation in rural roads projects on women's agency - a comparative assessment of rural transport projects in Argentina, Nicaragua, and Peru (English)*. Washington, D.C.: World Bank Group.

⁴⁷ Lao Road Sector Project 2 (P158504), National Road 13 Improvement and Maintenance Project (P163730), and South East Asea Regional Economic Corridor and Connectivity Project (P176088)

⁴⁸ These include the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the Australian Department of Foreign Affairs and Trade (DFAT), the European Investment Bank (EIB), the European Union (EU), Kreditanstalt für Wiederaufbau (KfW), the Neighbouring Countries Economic Development Cooperation Agency (NEDA), the Japan International Cooperation Agency (JICA), the Korea International Cooperation Agency (KOICA), the Nordic Development Fund (NDF), and bilateral financing from the Netherlands, Thailand, and China.



coordination among key agencies at both central and provincial levels, timely allocation of counterpart funds, and contract management. These issues will be addressed through incorporation of clear roles and responsibilities in a Memorandum of Understanding between the MPWT and the provinces, and the OPBRC. The project will also incorporate the lessons from mobilizing resources from the crisis response window to provide timely response to the severe flooding of 2018, which includes climate-resilient design, contracting modality, and the involvement of local communities in the design and monitoring.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

- 47. MPWT is the Project Implementing Agency. The Project will be implemented through Government structures (See Annex 1). The project will receive overall policy and strategic guidance from a Project Coordination Committee chaired by a Vice Minister of MPWT and comprising MPWT's Department Directors directly involved in project implementation and Director of Provincial DPWT involved in the implementation of the project. The Committee will be supported by a secretariat led by the Deputy Director General of MPWT's Department of Planning and Finance and comprising representatives of related departments.
- 48. **Project Oversight and Coordination.** Department of Planning and Finance (DPF) will coordinate with other MPWT departments providing supporting management functions including: (i) the Department of Inspection (DoI) which will apply internal controls to project activities, (ii) Public Works and Transport (PTI) which will be responsible for all aspects of safeguards preparation, supervision, monitoring environmental and social compliance and oversee and report on the implementation of the project grievance redress mechanism; (iii) Department of Transport (DoT) will be responsible for road safety audits and awareness campaigns; (iv) Department of personnel (DOP) will be responsible for training, and (v) ICT Division of the Permanent Office will provide IT support to all departments involved in the project implementation including disclosure of project documents on the MPWT's website.
- 49. Project Implementation. MPWT's Department of Roads (DoR) will be responsible for overseeing the implementation of Component 1 on climate resilient road access including procurement and management of road contracts and implementation support and work supervision (ISWS) contract, monitoring road work progress, reviewing work plans, and allocating funds to routine and periodic maintenance activities. DoR will also supervise data collection and will conduct data analysis. In line with the national decentralization policy, the role of the Department of Public Works and Transport (DPWT) in each participating Province will be to carry out local road maintenance prioritization using PROMMS, preparation of the provincial three-year rolling maintenance plan and provincial road sector budget, quality control, and reporting. Responsibilities for field data collection are with DPWT under the supervision of DoR. The design and supervision consultants managed by DoR will provide implementation support to DPWT for data collection, planning, day-to-day contract management, quality control, monitoring, and reporting, as well as building the technical capacities of DPWTs and district Offices of Public Works and Transport (OPWT) on a continuous basis. Dol will recruit consultants to conduct technical audit, financial audit, and internal control.
- 50. Various MPWT Departments will implement Component 2 and 3 activities as per their official mandates and under the overall coordination of DPF. The Environment and Disaster Prevention Division of the Public Works and Transport Institute (ESP/PTI) will lead safeguard supervision, monitoring, and safeguard training, including implementation of safeguards related activities for all project activities.



- 51. **Memorandum of Understanding**. To ensure clear assignment of roles and responsibilities, and accountability for project results, the Minister of MPWT and the Governor of each of the three participating provinces will sign a Memorandum of Understanding prior to the commencement of project implementation.
- 52. **Procurement Evaluation Committee.** Two Procurement Evaluation Committees will be established, chaired by the Director-General of DoR, comprised of representatives from DPF, DoR, DPWT, MOF and MPI with technical support from Project Procurement Secretariat chaired by the Deputy Director-General of DPF, comprised of representatives from DPF, DoR, and Line DPWTs. In MPWT's practice, there are two different procurement committees, one for procurement of Works, another one for procurement of Goods, Non-Consulting Services and Consultants. That is explained by the different profiles of specialists required in each of the two committees.
- 53. **Project Operational Manual.** The project will be implemented using a Project Operational Manual (POM). The POM will have detailed arrangements and procedures for: (i) institutional coordination and day-to-day execution of the Project; (ii) disbursement and financial management, including the MPWT updated Financial Management Manual that details the division of responsibilities for the fiduciary function between MPWT and DPWTs at provincial level; (iii) procurement; (iv) safeguards; (v) monitoring, evaluation, reporting and communication; (vi) the districts in which the activities will be implemented as agreed between the government of Lao PDR and the World Bank; and (vi) such other administrative, financial, technical and organizational arrangements and procedures as shall be required for the Project.

B. Results Monitoring and Evaluation Arrangements

54. The Project Results Framework forms the basis to track progress of activities to meet the PDO. Monitoring and Evaluation (M&E) will be performed through existing systems of the MPWT, which will be strengthened through project technical assistance. The implementing departments at MPWT and DPWT will provide the necessary data and submit to DPF who will consolidate semi-annual progress reports in line with the project indicators and milestones. These reports will include information on compliance with safeguards, institutional strengthening, and citizen engagement and grievance redress with necessary disaggregated data. Regular implementation support missions will assess the implementation. Annual independent financial audits of the special accounts will be carried out, and an Implementation Completion and Results Report (ICR) will be prepared within six months of the closing date of the IDA Credit. A midterm review will be carried out within 30 months after project effectiveness to assess the status of project implementation as measured against the performance indicators.

C. Sustainability

55. The project will help integrate climate adaptation measures into the road design to allow sustained road resilience and mitigate risks of accessibility disruptions during the rainy season. The OPBRC approach will cover road improvement and maintenance for project-financed assets (roads and bridges), thereby lowering life cycle asset costs with increased service quality and sustainability. At the institutional level, the project will support the MPWT in addressing upstream challenges through policy, strategy, and capacity development, including enhancing existing mechanisms such as the Road Fund (RF) to strengthen the sustainability of sector financing. Exploring additional sources of RF revenue and the effective use of the RF will become increasingly important as the maintenance backlog grows over time. At the same time, the project will support strengthening practices for planning and prioritization that mainstream disaster resilience and improve the condition of the roads. This will include enhanced coordination between national and sub-national levels and increased budget allocation for road maintenance. The project will use innovative approaches towards improving climate resilience with long-term



benefits for the country. These improved systems will remain beyond project completion, and thereby ensure the sustainability of the investment.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

- 56. **Procurement of a consulting firm to carry out a Feasibility study is ongoing.** The feasibility study, apart from technical and economic aspects, will also include preparation of environmental and social documents.
- 57. The proposed project will adopt the design standards specified in MPWT's Road Design Manual, include climate and disaster resilience aspects, provide all-weather river/stream crossing structures, and address climate risks. The Road Design Class is V/VI depending upon the traffic volume in the design year i.e., 100 – 300 passenger car units per day roads as Class V and 50 – 100 passenger car units per day roads as Class VI. The proposed project roads are in flat or rolling terrain and therefore their geometric design will be for a design speed of 60 kmph (flat terrain) or 40 kmph (rolling terrain). The cross-sectional parameters will be 2 lanes of 2.75 m width and 0.75 m wide shoulders on both sides for roads designed for Road Design Class V. For Road Design Class VI, the crosssectional parameters will be one lane of 3.5 m width and 1.5 m wide unpaved shoulders on both sides. The pavements will mostly have Double Bituminous Surface Treatment surfacing except for few stretches which will be laid with a concrete pavement. Many of the cross-drainage structures may need to be replaced with newly constructed small concrete bridges or box culverts as the existing structures are in dilapidated condition. The project roads will not have major realignments and generally follow the existing alignments. Accordingly, the embankments, cut slopes, pavement structure including its surface, drainage, cross-drainage structures, and hill slope protection works will be designed to address climate risks. The MPWT's Road Design Manual also recommends adding a 15 percent increase in flows to calculated 10, 25, 50, or 100-year return storm events to react to increases in short duration rainfall intensities. The proposed project will adopt contracting structures such as performance-based maintenance contracts that will ensure maintenance of the assets post construction and quicker actions in case of emergencies and natural disasters.
- 58. The risks and impacts of climate change will be identified, and mitigation measures will be incorporated during the project design including infrastructure design, material choices, and maintenance management. Project considerations linked to changes in infrastructure design and materials include use of improved asphalt mixtures during the construction of the road. The flood line will be determined having accounted for climate change and this will be used to inform the Finished Road Level of the pavement as well as the soffits of the bridge decks to reduce inundation and severe flooding of low-lying infrastructure. The subgrade of the pavement will be at least 0.5 m above the High Flood Level at the location. The design period for the pavement will be 20 years. The project design will also entail the upgrading of existing infrastructure drainage systems such as the side drains and increasing culvert capacity. Pipe culverts and box culverts less than 10 m span will be designed for a 25-year flood frequency and box culverts more than 10 m span and short bridges will be designed for a 50-year flood frequency. Hydraulic designs will consider a 15 percent increase to the calculated 25/50-year return storm events to factor in the short duration extreme rainfall events. The surface drainage system will also include side ditches, cut-off ditches to prevent erosion of embankments, and toe ditches. Bio-engineering measures such as top soiling and grassing will be used to arrest erosion of slopes of high embankments and steep cuts. Specific measures linked to operational changes may include shortening maintenance periods to accommodate changes in precipitation and temperature, increasing monitoring frequencies to ensure structures are enduring climate change pressures,



monitoring the deformations of the pavement layers, monitoring the bridge structures, increasing financial and technical resources for more frequent maintenance and repairs.

- 59. The design of proposed roads will include identification of road safety vulnerabilities and incorporating specific road safety engineering counter measures. These will include conducting road safety audits and installing road safety furniture such as road markings, traffic signs, marker posts, crash barriers, and safety fences. The counter measures will also include speed calming measures in sections passing through villages.
- 60. The project will undertake consultations with the key stakeholders including local communities, women, and road users during road design and implementation, and in the planning of other ancillary community infrastructure improvements. The consultations will be organized at times that are convenient to both women and men and in culturally accepted settings/in appropriate distance which women would feel comfortable to travel to and attend. The consultants will encourage the participants' 'meaningful' participation in consultations which goes beyond their mere attendance but involves ensuring safe and secure environment for all voices to be heard and avoiding allowing the consultations to be taken over by a few vocal community members. The consultations will explore the participants needs from road and bridge infrastructure which often differ by gender (e.g. wider and sealed road shoulders for walking and non-motorized transport; road alignments linking to feeder roads, or directly passing close to schools, health centers, markets and other facilities of importance to women's gender roles and daily activities; bridge design including ease of access to walking lanes with handrails for pedestrians and easy access to/from bridges such as steps on/off bridges). Importantly, the participants' genderand ethnicity disaggregated feedback will be documented and reflected into road works as much as possible. The project will undertake road user satisfaction surveys to track users' perception – disaggregated by gender and ethnicity - of the accessibility and safety of roads and will ensure that grievance committees at various levels are represented by both women and men. Community-level communications will build on existing experiences and awareness raising materials in the relevant language and produced and used in the country, as relevant.
- 61. The proposed project is aligned with the goals of the Paris Agreement on both mitigation and adaptation. Assessment and reduction of mitigation risks: the proposed project interventions support capacity building activities and rehabilitation of existing district and rural/tertiary roads, with low traffic volumes providing access to communities which currently do not have all-weather access without any risk of contributing to deforestation and are universally aligned. The proposed road improvement activities will have low impact on GHG emissions. This is because: (a) the proposed project roads have very low traffic volumes, (b) there are no alternative transport modes that can serve the access function, (c) the proposed roads are also used for non-motorized transport by the rural population, and (d) the proposed project roads provide critical access to unserved or underserved communities to markets and social services, facilitate rural and agriculture development, connect rural areas to nearby towns and promote rural-urban integration. Assessment and reduction of adaptation risks: the inherent physical climate risks to the project roads are high owing to severe exposure and vulnerability to flooding and expected increases in maximum temperature, as suggested by the result of the climate and disaster risk screening and informed by Lao PDR's overall vulnerability to climate change impacts. The project design will take into consideration the extreme heat, precipitation, and flooding risks, which will be managed and mitigated through targeted adaptation measures along the proposed project roads. Overall infrastructure improvements on the proposed project roads will also strengthen transport network redundancy, thereby enhancing the resilience of transport network in the event of climate-related shocks. Most importantly, these roads will improve access to critical services, such as hospitals and social services, for rural communities further improving their resilience and adaptive capacity against impacts of climate hazards. In addition, the proposed institutional strengthening activities related to climate and disaster risk management will enhance capacities of the implementation agency in strengthening practices for planning and prioritization to mainstream disaster resilience in management of the



infrastructure. Thus, the residual climate physical risks after project interventions are reduced to a moderate level and thus acceptable.

62. Project Costs. The following table gives the details of various activities and their estimated costs (in US\$ million).

Sr. No.	Sr. No. Description		Bank	GoL
		COST	financing	financing
Component 1: Climate Resilient Road Access			50.9	0
1	Improvement of about 300 km of District Roads and Rural Roads in the provinces of Khammouan, Savannakhet, and Saravan to the standards of Class V/VI roads as per MPWT's Road Design Manual and addressing climate and disaster resilience aspects, and maintenance of the project roads post improvement during	48	48	0
2	Construction supervision of the project road improvement works	2.9	2.9	0
Componer	nt 2: Project Management	3.3	3.1	0.2
3	Financial audit	0.15	0.15	0
4	Technical audits of the project road improvement works during construction	0.2	0.2	0
5	Environmental and social monitoring and audits	0.1	0.1	0
6	Road safety audit of the project road designs, and awareness campaigns	0.2	0.2	0
7	Road user satisfaction surveys carried out at the start of implementation of works, at mid-term, and at the close of the project	0.15	0.15	0
8	Incremental operating costs	1.44	1.44	0
9	Technical and operational assistance for the day-to-day management, monitoring and evaluation of the Project	0.86	0.86	0
10	Land acquisition, resettlement, and rehabilitation	0.2	0	0.2
Component 3: Institutional Development		2	2	0
11	Capacity building of local contractors in the areas of Output and Performance-based Road Contracts, climate resilience, road safety, and environmental and social risk management	0.2	0.2	0
12	Study on climate resilient road network planning and prioritization and capacity building of MPWT and DPWTs	1.1	1.1	0
13	Preparation of a road sector financing strategy	0.1	0.1	0
14	Capacity building of MPWT and DPWT staff on cross-cutting issues including road maintenance, OPBRC contract management, road safety, gender, citizen engagement, and climate disaster risk	0.1	0.1	0
15	Female internship program	0.1	0.1	0
16	Preparation of selected environmental, social, technical, and economic documents as well as feasibility studies, through the provision of technical advisory services in the road sector in targeted provinces	0.4	0.4	0



Sr. No.	Description	Cost	Bank financing	GoL financing
Component 4: Contingent Emergency Response Component		0	0	0
Total		56.2	56	0.2

- 63. Economic analysis was conducted based on a standard methodology applied for appraisal of road works, which demonstrates the economic internal rate of return (EIRR) of 14.1 percent and NPV US\$23.9 million. The economic evaluation focuses on the climate resilient road improvement of the project roads in the provinces of Khammouan, Savannakhet, and Saravan, as well as the maintenance costs. The Cost-Benefit Analysis (CBA) was conducted to calculate the economic internal rate of return (EIRR) and net present value (NPV) of the project over the period of 20 years (2024-2044). The impact of the parallel exchange rates in Lao PDR is approximately 12.8 percent of the total investment and maintenance costs. This translates into about 1.3 percentage point lower EIRR if the current premium persists. A high exchange rate premium, which results in parallel exchange rates, may impact project outcomes through inflated procurement costs, due to the conversion of foreign currency to local currency at an overvalued rate; and, increased governance risks, by creating opportunities for illicit currency trading with project funds. It is estimated that about 64.7 percent of the project investment will be spent in local currency and might be affected by an overvaluation of the official exchange rate. As of June 2024, the gap between the parallel market rate and the rate available to IDA projects was around 19.8 percent.⁴⁹ However, this gap is highly volatile, and it is therefore not possible to state with any degree of certainty the cost of overvaluation to the project over its life. The project's OPBRC and Hybrid PBC approaches will bring about efficiency and value-formoney to the climate resilient road investment, and by ensuring that the Financial Management manual incorporates adequate controls to prevent currency trading with project funds.
- 64. The major economic benefits of the project arise from reduced vehicle operating costs (VOCs) due to improved road condition, travel time saving to passengers and freight, avoided emergency maintenance costs in the case of without-project, and reduction in road accident rate. The project cost is assumed with the standard conversion factor of 0.92 for construction and 0.87 for maintenance, with the discount rate of 7.8 percent. Most economic benefits come from the vehicle operating cost (VOC) savings (46 percent) and the avoidance of emergency maintenance cost (due to climate resiliency; 31 percent). Time savings, both from passenger and freight (avoided delays) are 14 percent and 8 percent of total benefits, respectively. The benefits from improved road safety are about 1 percent of total benefits.
- 65. The sensitivity of the EIRR was also tested against three cost variation scenarios, which has confirmed the robustness of economic returns. The results of the sensitivity analysis are as follows.

Scenarios	EIRR	NPV (US\$ million)
	(percent)	
Base case	14.1	23.9
Maintenance cost increases by 20%	14	23.5
Construction cost increases by 20%	11.5	15.9
Both construction and maintenance costs increase by 20%	11.4	15.5
Benefits decrease by 15%	11.6	14

CBA Results and Sensitivity Analysis

⁴⁹ The premium is estimated by the World Bank in June 2024.



- 67. Climate Co-Benefits. Preliminary climate commitments assessment has been conducted for project and the total Climate Co-Benefits are estimated to be 49.64 percent. Climate and Disaster Risk Screening has been carried out and Climate Indicators have been included in the project design.
- 68. **Citizen Engagement.** The project will undertake regular consultations with all stakeholders and project-affected people during implementation. These activities will use community meetings and focus groups. Engagement will continue throughout the project including during the planning and design, construction, and post construction phases of physical works, as well as for technical assistance, and institutional strengthening activities. There will be an emphasis on participatory design, e.g., through focus groups, whereby local communities (both men and women and across ethnic groups) and affected landowners and occupiers participate in the decisions related to the design of improvements and interventions that affect them. The Project will also undertake regular citizens/road user satisfaction surveys to gauge the perception of road users and communities on the performance of the contractors and the project overall. The findings will be discussed in missions to agree on follow up actions and implementation enhancements. The MPWT will publish reports on the results of the road user satisfaction surveys, and the follow-up actions and implementation enhancements adopted to address survey outcomes. The Project will also have a grievance redress and beneficiary feedback mechanism with particular attention to women-headed households and certain ethnic groups who may have challenges in accessing and benefiting from the mechanism.

B. Fiduciary

(i) Financial Management

- 69. The Department of Finance and Planning (DPF) of the MPWT will be responsible for the project's financial management (FM) including, but not limited to, maintaining the project's financial records; ensuring budget execution and monitoring; preparing FM reports; and making payments to contractors, suppliers, and service providers. The World Bank has assessed the DPF's capacity to carry out FM work and the overall FM risk for the project and concluded that with the implementation of the proposed mitigation measures detailed in Annex 1, the project's FM arrangements will meet the World Bank's minimum requirements under the World Bank Policy/Directive for Investment Project Financing (IPF) Operations.
- 70. The Residual FM Risk is Substantial. Though the DPF has extensive experiences with the Bank financed projects, the followings are noted: (1) the current staffing of the DPF now are overloaded with the donor funded projects and the domestic projects and (2) the Implementation and the FM arrangements of the project have not yet been officially regulated at this stage. The mitigation measures proposed are: (1) the DPF to clearly identify the staffing demand for the entire portfolio managed and propose the staffing plan for the project to ensure the project FM will be adequately staffed, and (2) the FM manual of the DPF will be updated to reflect the implementation arrangements of the project.



(ii) Procurement

71. An assessment of the implementing agency's procurement capacity was carried out by the World Bank procurement team in July 2023 and decided that the overall procurement risk under the project is classified as Substantial. The Procurement Regulations for Investment Project Finance borrowers dated September 2023 will apply to this operation. Request for Bids (RFB-international market approach) and selection of consultants involving international competition under the project will use the World Bank's standard procurement documents. Rated criteria will be used for RFBs (international market approach) for goods and works packages. For procurement of goods and works through RFB (national market approach) and Request for Quotations, the harmonized standard open bidding documents and requests for quotations dated July 2021 revised for World Bank-financed projects, will be used. The DPF and the Department of Roads (DOR) will be responsible for the procurement of the Project. DPF submitted the Project Procurement Strategy for Development (PPSD) for the World Bank review on February 13, 2024; the World Bank reviewed it and provided its comments on April 19, 2024. DPF submitted the revised PPSD and the draft first 18-month procurement plan to the World Bank on June 29, 2024, and they are under review by the World Bank. Detailed information on the risk mitigation measures, oversight and procurement arrangements are included in Annex 1.

C. Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

D. Environmental and Social

- 72. Overall Environmental and Social (E&S) risks is considered Moderate. Nine out of ten Environmental and Social Standards (ESSs) of the World Bank are relevant under the project. These are ESS1: Assessment and Management of Environmental and Social Risks and Impacts, ESS2: Labor and Working Conditions, ESS3: Resource Efficiency and Pollution Prevention and Management, ESS4: Community Health and Safety, ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement, ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources, ESS7: Indigenous People, ESS8: Cultural Heritage, and ESS10: Stakeholder Engagement and Information Disclosure.
- 73. Environmental risk is considered Moderate. The project will not finance road sections within Protected Areas (PAs) with international or nationally significant biodiversity value that may cover Conservation Forests and Protection Forests so as to ensure avoidance of adverse impacts on key biodiversity, critical and natural habitats, and ecological functions. Potential direct environmental impacts associated with the rural road improvement may include sourcing of material for earthworks, noise, dust, sedimentation, erosion, wastes generated from civil works, management of storm water, worker camps, forests/land clearing beyond road corridors, potential impacts on flora and fauna in nearby Protected Areas, encounter of unexploded ordnance (UXO), and intentional or accidental introduction of non-native flora species for stabilization of embarkment. Based the scale and nature of proposed project activities, the environmental risks and impacts associated with rural road improvement activities



are considered moderate and will be mostly site specific, temporary, and manageable if relevant mitigation measures are properly conducted. Potential indirect impacts include additional encroachment of agricultural farms and infrastructure to the road-side forests, induced by the improved road condition. Road upgrade and the increased connectivity of road network may amplify illegal trades of timber and wildlife products from nearby Conservation Forests/Protected Areas and Protection Forests.

- 74. Social risk is considered Moderate. Social risks and impacts are expected to be site specific and manageable since the project aims to finance improvement works for existing District Roads and Rural Roads mainly within the preidentified road alignments. Expected impacts are related to: a) temporary economic displacement, small-scale land acquisition and relocation of minor structures and/or access restrictions during the construction period. Land acquisition and resettlement are expected to be manageable as all main house structures and assets are located outside the road alignments. To minimize such impacts, one of the agreed criteria included in the negative list of project investment is that road sub-projects that may cause resettlement of more than 200 people, and/or cause more than 40 households to be severely affected - with 10 percent or more of productive assets including land owned by individual household lost – will not be financed under the Project in all three target provinces; b) risks of Occupational Health and Safety (OHS) for workers including unsafe working conditions and discrimination faced by women and/or ethnic employees; c) risks of Community Health and Safety (CHS) due to the construction activities, including risks of traffic accidents and of communicable diseases transmission, and low risk of Sexual Exploitation and Abuse and Sexual Harassments (SEA/SH); d) exclusion of vulnerable and ethnic groups, from consultations and benefit sharing through employment opportunities that would cause them to be unable to access project benefits; and e) during operations, road safety risks due to the improved road conditions and potential unsafe driving behavior, and broader risks of human trafficking due to improved road connectivity.
- 75. Project's risk management instruments are prepared to be applied to manage the above discussed E&S risks under the project in accordance with the relevant ESSs. These include an Environmental and Social Commitment Plan (ESCP), and an Environmental and Social Management Framework (ESMF) which includes, among others, (i) screening procedures; (ii) template for a Biodiversity Management Plan; (iii) Labour Management Procedures (LMP); (iv) CHS measures including traffic management plan; (v) ESMP Outline; (vi) UXO Protocal, and (vii) Chance Find Procedures. A Resettlement Policy Framework (RPF) is prepared to guide land acquisition and resettlement impacts. A standalone Stakeholder Engagement Plan (SEP), which incorporates elements of an Ethnic Group Development Framework (EGDF), including a Grievance Redress Mechanism (GRM), is also prepared to guide the stakeholder engagement and to ensure meaningful consultation and engagement of the vulnerable and ethnic groups in project design and implementation. All these environmental and social instruments were consulted on October 3 and 27, 2023, and disclosed in-country on May 21, 2024.

V. GRIEVANCE REDRESS SERVICES

76. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any



time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), visit <u>http://www.worldbank.org/GRS</u>. For information on how to submit complaints to the Bank's Accountability Mechanism, visit <u>https://accountability.worldbank.org</u>.

VI. KEY RISKS

- 77. The overall risk rated 'Substantial' based on the political and governance, macroeconomic, sector strategies and policies, technical deign, institutional capacity for implementation and sustainability, fiduciary, environment and social, and stakeholder risks involved. The key risks are described in the following paragraphs.
- 78. **Political and Governance risk Substantial.** Lao PDR has made some progress in strengthening governance; however, weaknesses remain related to accountability, control of corruption, and regulatory quality. These pose substantial risks to the proposed project activities which will be undertaken in three provinces and involve several personnel from the institutions. An Anti-Corruption Law was passed in 2012, including the National Anti-Corruption Action Plan to 2020. In addition, the State Inspection Authority has been empowered to prevent and counter corruption. Nonetheless, the impacts have been limited, and governance mechanisms remain weak, and therefore political and governance risks remain substantial to the project. The proposed project will have audits for technical, environmental, social, and financial management to help manage the political and governance risks.
- 79. **Macroeconomic risk High**. Lao PDR's public and publicly guaranteed debt has risen to unsustainable levels⁵⁰. Limited fiscal space reduces the ability of the Government to fund the maintenance of public assets, including infrastructure, and thus becomes a risk to the long-term impact of the project. Macroeconomic instability has affected the implementation of ongoing projects by disrupting procurement, creating fuel shortages, leading contractors to ask for price revisions, and requiring the revision of compensation for project-affected people. The World Bank is supporting public financial management improvements and provide advice on debt management in the context of the recently approved public debt management law. A key mitigating factor is the existence of a Road Fund financed from fuel levies rather than general revenues. The project will undertake a study on climate resilient road planning and prioritization and build capacity of MPWT and DPWTs. These activities will help the MPWT in better management of limited fiscal space through prioritization of workplan and efficient use of limited budget for road sector development. To mitigate the risk of inadequate availability of government funding, the project considered counterpart funding for only land acquisition, resettlement, and rehabilitation.
- 80. Sector Strategies and Policies risk Substantial. Sector strategies and policies have been developed but their implementation remains a challenge. The focus of the government is on construction and rehabilitation of National Roads, and after allocation of funding for these activities, the funding is grossly inadequate for (i) maintenance of the whole of the road network, and (ii) rehabilitation of the rest of the network other than the National Roads. Also, the information and data systems are out of date and hence do not provide accurate planning scenarios. The proposed project through the investment and institutional strengthening activities, including climate resilient road network planning and prioritization study and a road sector financing strategy, in the tertiary road network will help manage these risks.
- 81. Institutional Capacity for Implementation and Sustainability risk Substantial. The MPWT, which is the implementing agency, has experience in implementing IDA-financed projects and is familiar with World Bank procedures. However, since the proposed project roads are spread in three provinces and several offices at the

⁵⁰ Lao People's Democratic Republic Joint World Bank-IMF Debt Sustainability Analysis, 2023.

provincial and district level will be involved in project preparation and implementation activities, there may be delays and non-familiarity issues due to diverse capacity of different agencies. The proposed project's activities include training of MPWT and DPWT staff to manage this risk. To address the sustainability risks, the proposed project activities include maintenance of the project roads during project period and OPBRC contracts. The proposed project activities also include a study on climate resilient road network planning and prioritization, and preparation of a road sector financing strategy. These together with the ongoing Bank-funded study on 'Lao Road Sector Financing Review' will help both augmentation and efficient use of the resources for maintenance. Further, the proposed project activities include capacity building measures for both MPWT and DPWT staff, and involvement of these staff in all project activities to help institutionalize maintenance at including central, provincial, and district levels.

82. Fiduciary Risk – Substantial. The Department of Roads (DOR) and the Department of Planning and Finance (DPF) of the MPWT will be responsible for the project procurement and the majority of the Project Financial Management (FM). The procurement team under DOR seems to have limited procurement experience, and a weak capacity for contract management. This might result in a delay in the implementation of works contracts under the project. To mitigate this risk, DOR and DPF will assign dedicated staff to implement the project procurements with the assistance of the full-time national procurement consultants hired under other current World Bank projects working with DPF.



VII. RESULTS FRAMEWORK AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Closing Period		
Improve climate resilient road access in targeted provinces			
Access disruption along the project roads due to climate hazards (number of days multi	Access disruption along the project roads due to climate hazards (number of days multiplied by section length per year) (Number)		
May/2024	Aug/2030		
54,000	1,200		
Millions of people that benefit from improved access to sustainable transport infrastructure and services (Number)			
Jun/2024	Aug/2030		
0	0.11		
≻Female (Number)			
Jun/2024	Aug/2030		
0	0.06		
Enhance capacity to manage the road network			
Percentage of new road projects designed/prepared by the MPWT that include climate resilient designs (Percentage)			
Jun/2024	Aug/2030		
0	50		

Intermediate Indicators by Components

Baseline Period 1 Closing Period					
	Climate Resilient Road Access				
Project roads rehabilitated incorporating climate resilience designs (Kilometers)					
May/2024 Aug/2030					
0 300					
Project Management					
Annual Financial audit completed for project roads (Yes/No)					



Lao PDR Climate Resilient Road Connectivity Improvement Project(P179284)

Jun/2024		Aug/2030		
No		Yes		
Technical audit completed for the project road improvement	ent works (Yes/No)			
Jun/2024		Aug/2030		
No		Yes		
Road safety audit carried out for the project road designs	(Kilometers)			
May/2024		Aug/2030		
0		300		
Road user satisfaction and feedback (Text)				
Sep/2024	Oct/2027	Aug/2030		
Baseline survey results published	Mid-term survey results, baseline survey follow up	Final survey results, mid-term survey follow up actions, and		
	actions, and implementation enhancements published	implementation enhancements published		
	Institutional Development			
Capacity building of local contractors carried out in the ar	eas of Output and Performance-based Road Contracts, clima	ate resilience, road safety, and environmental and social risk		
management (Text)				
May/2024	May/2025	Aug/2030		
Nil	staff from 10 local firms trained	staff from 20 local firms trained		
Study carried out on climate resilient road network planning and prioritization (Yes/No)				
May/2024		Aug/2030		
No		Yes		
Road sector financing strategy prepared (Yes/No)				
May/2024		Aug/2030		
No		Yes		
Training of MPWT and DPWT staff conducted on cross-cutting issues including road maintenance, road safety, gender, citizen engagement, and climate disaster risk (Number)				
May/2024		Aug/2030		
0		100		
Number of female last-year university students and graduates recruited for the 6-month paid internship program at MPWT in the areas of engineering/similar male-dominated fields (Number)				
Jun/2024		Aug/2030		
0		50		
Share of local women employed by road construction companies of project works in mid-skilled transport roles (Percentage)				
Jun/2024		Aug/2030		
0		15		



Recommendations of the climate resilient road network planning and prioritization, and road sector financing strategy applied in planning and budgeting of maintenance					
resources (Yes/No)	resources (Yes/No)				
May/2024		Aug/2030			
No		Yes			
Adoption and implementation of a sustainable financing n	nodel for the road sector based on the study on 'Lao Road S	ector Financing Review' (Yes/No)			
Jun/2024 Aug/2030					
No Yes					
Share of local women employed by road construction companies of project works in engineering and other similarly male-dominated high-skilled technical roles (Percentage)					
Jun/2024	Jun/2024 Aug/2030				
0		20			
Contingent Emergency Response					
Contingent Emergency Response Manual prepared (Yes/No)					
May/2024		Feb/2025			
No		Yes			



Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

Improve climate resilient	t road access in targeted provinces
Access disruption along	the project roads due to climate hazards (number of days multiplied by section length per year) (Number)
Description	The indicator will measure Access disruption along the project roads due to climate hazards (km-days)
Frequency	Annual
Data source	M&E Reports
Methodology for Data Collection	Number of days per year the road section is not operational multiplied by the road section length that is not operational, aggregated for project roads Value = $\sum (t, i * L, i) [km-days]$, calculated before and after project completion.
Responsibility for Data Collection	DoR
People that benefit from	improved access to sustainable transport infrastructure and services (Number)
Description	The indicator will measure people that benefit from improved access to sustainable transport infrastructure and services
Frequency	Annual
Data source	Census data, MPWT data, M&E Reports
Methodology for Data Collection	Number of people counted in area of influence (2 km) from project roads, calculated before and after project completion.
Responsibility for Data Collection	DoR
Enhance capacity to mar	nage the road network
New road projects desig	ned/prepared by the MPWT that include climate resilient designs (Percentage)
Description	The indicator will measure capacity enhancement of MPWT in implementing climate resilient designs in road projects
Frequency	Annual
Data source	M&E Reports
Methodology for Data	No of new projects implemented by MPWT that include climate resilienet designs, counted before and after project
Collection	completion.
Responsibility for Data Collection	DoR

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

Climate Resilient Road Access				
Project roads rehabilitate	Project roads rehabilitated incorporating climate resilience designs (Kilometers)			
Description	The indicator will measure length of project roads rehabilitated incorporating climate resilience designs			
Frequency	Annual			
Data source	M&E Reports			
Methodology for Data	Progress Paparts of construction supervision consultants			
Collection	Progress Reports of construction supervision consultants			
Responsibility for Data	Dor			
Collection	DOIX			
Project Management				
Annual Financial audit completed for project roads (Yes/No)				
Description	The indicator will measure whether a Financial Audit is carried out for the project			
Frequency	Annual			
Data source	Audit Reports			
Methodology for Data	Audit Reports			



Collection			
Responsibility for Data			
Collection			
Technical audit complete	ed for the project road improvement works (Yes/No)		
Description	The indicator will measure whether a technical audit is carried out for the project road works		
Frequency	Annual		
Data source	M&E Reports		
Methodology for Data	M&E Paparts		
Collection			
Responsibility for Data	DoB		
Collection			
Road safety audit carried	d out for the project road designs (Kilometers)		
Description	The indicator will measure Road safety audit carried out for the project road designs		
Frequency	Annual		
Data source	M&E Reports		
Methodology for Data	Study delivered and approved		
Collection			
Responsibility for Data	DoR		
Collection			
Road user satisfaction ar	nd feedback (Text)		
Description	The indicator will measure Road user satisfaction at the start of implementation, at mid-term, and at the close of the		
	project; whether follow up actions undertaken, and implementation enhancements published		
Frequency	Annual		
Data source	M&E Reports		
Collection	Data collected by surveys, including Baseline, Mid-Term, Final Survey		
Posponsibility for Data			
Collection	DoR		
Institutional Developme	nt		
Capacity building of loca	I contractors carried out in the areas of Output and Performance-based Road Contracts, climate resilience, road safety,		
and environmental and s	social risk management (Text)		
	The indicator will measure local contractors trained in the areas of Output and Performance-based Road Contracts,		
Description	climate resilience, road safety, and environmental and social risk management		
Frequency	Annual		
Data source	M&E Reports		
Methodology for Data	Training attendance record		
Collection			
Responsibility for Data	DoB		
Collection			
Study carried out on clim	nate resilient road network planning and prioritization (Yes/No)		
Description	The indicator will measure whether a study is carried out on climate resilient road network planning and prioritization		
Frequency	Annual		
Data source	M&E Reports		
Methodology for Data Collection	M&E Reports		
Responsibility for Data Collection	DoR		
Road sector financing strategy prepared (Yes/No)			
Description	The indicator will measure whether a road sector financing strategy is prepared		
Frequency	Annual		



Methoology for Data Collection Strategy delivered and approved Responsibility for Data Collection DoR Training of MPWT and DPWT staff conducted on cross-cutting issues including road maintenance, road safety, gender, citizen engagement, and climate disaster risk (Number) The indicator will measure key stakeholders trained (MPWT, DPWT) in cross-cutting issues including road maintenance, road safety, gender, citizen engagement, and climate disaster risk Frequency Annual M&E Reports Methodology for Data Collection Training attendance record Training attendance record Collection Training attendance record Training attendance record Collection DoR DoR Number of female last-year university students and graduates recruited for the 6-month paid internship program at MPWT in the areas of engineering/similar male-dominated fields (Number) Description The indicator will measure the number of female last-year university students and graduates recruited for the 6-month paid internship program at MPWT in the areas of engineering/similar male-dominated fields Data source M&E Reports Methodology for Data Collection M&E Reports Share of local women employed by road construction companies of project works in mid-skilled transport roles (Percentage) Description The indicator will measure the share of local women employed by road cons	Data source	M&E Reports		
Responsibility for Data Collection DoR Training of MPWT and DPWT staff conducted on cross-cutting issues including road maintenance, road safety, gender, citizen engagement, and climate disaster risk (Number) Description The indicator will measure key stakeholders trained (MPWT, DPWT) in cross-cutting issues including road maintenance, road safety, gender, citizen engagement, and climate disaster risk. Frequency Annual Data source M&E Reports Methodology for Data Collection Training attendance record Responsibility for Data Collection DoR Number of female last-year university students and graduates recruited for the 6-month paid internship program at MPWT in the areas of engineering/similar male-dominated fields (Number) Description The indicator will measure the number of female last-year university students and graduates recruited for the 6-month paid internship program at MPWT in the areas of engineering/similar male-dominated fields Pata source M&E Reports Methodology for Data Collection DoR Share of local women employed by road construction companies of project works in mid-skilled transport roles (Percentage) Data source M&E Reports Methodology for Data Collection DoR Share of local women employed by road construction companies of project works in mid-skilled transport roles (Percentage)	Methodology for Data Collection	Strategy delivered and approved		
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Responsibility for Data Collection DoR Recommendations of the climate resilient road network planning and prioritization, and road sector financing strategy applied in planning and budgeting of maintenance resources (Yes/No) Description The indicator will measure wheather study recommendations were applied in planning process Frequency Annual Data source M&E Reports Methodology for Data M48.5 percente	Methodology for Data Collection	M&E Reports		
Recommendations of the climate resilient road network planning and prioritization, and road sector financing strategy applied in planning and budgeting of maintenance resources (Yes/No) Description The indicator will measure wheather study recommendations were applied in planning process Frequency Annual Data source M&E Reports Methodology for Data M455 Dependent	Responsibility for Data Collection	DoR		
budgeting of maintenance resources (Yes/No) Description The indicator will measure wheather study recommendations were applied in planning process Frequency Annual Data source M&E Reports Methodology for Data M45 Excepts	Recommendations of the	e climate resilient road network planning and prioritization, and road sector financing strategy applied in planning and		
Description The indicator will measure wheather study recommendations were applied in planning process Frequency Annual Data source M&E Reports Methodology for Data M45 Excepts	budgeting of maintenand	ce resources (Yes/No)		
Frequency Annual Data source M&E Reports Methodology for Data M&E Reports	Description	The indicator will measure wheather study recommendations were applied in planning process		
Data source M&E Reports Methodology for Data M85 Parasta	Frequency	Annual		
Methodology for Data	Data source	M&E Reports		
Collection M&E Reports	Methodology for Data Collection	M&E Reports		
Responsibility for Data Collection DoR	Responsibility for Data Collection	DoR		
Adoption and implementation of a sustainable financing model for the road sector based on the study on 'Lao Road Sector Financing Review' (Yes/No)	Adoption and implement (Yes/No)	tation of a sustainable financing model for the road sector based on the study on 'Lao Road Sector Financing Review'		
Description The indicator will measure wheather study recommendations were adopted and implemented	Description	The indicator will measure wheather study recommendations were adopted and implemented		
Frequency Annual	Frequency	Annual		
Data source M&E Reports	Data source	M&E Reports		
Methodology for Data Collection M&E Reports	Methodology for Data Collection	M&E Reports		



Responsibility for Data Collection	DoR
Share of local women en	nployed by road construction companies of project works in engineering and other similarly male-dominated high-skilled
technical roles (Percenta	ge)
Description	The indicator will measure the share of local women employed by road construction companies of project works in engineering and other similarly male-dominated high-skilled technical roles
Frequency	Annual
Data source	M&E Reports
Methodology for Data Collection	M&E Reports
Responsibility for Data Collection	DoR
Contingent Emergency R	esponse Component
Contingent Emergency R	esponse Manual prepared (Yes/No)
Description	The indicator will measure if a Contingent Emergency Response Manual was prepared
Frequency	Once
Data source	M&E Reports
Methodology for Data Collection	Manual delivered and approved
Responsibility for Data Collection	DoR



ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Lao People's Democratic Republic Lao PDR Climate Resilient Road Connectivity Improvement Project

Project Institutional and Implementation Arrangements

- The Ministry of Public Works and Transport (MPWT) is the Project Implementing Agency and will be responsible for the overall supervision, execution, and management of the project. The project will be implemented through the existing MPWT organizational structure and its institutional arrangements, in which its concerned departments at central level are responsible for formulating policy and strategy, setting standards, allocating resources, monitoring, providing technical support including training to provincial authorities, overseeing quality assurance systems and technical auditing, and carrying out impact evaluations.
- 2. MPWT plays a role as Secretariat to Government in managing, at the macro level, land transportation, waterway transportation, air transportation, train transportation, housing, town planning and water supply nationwide (Prime Minister Decree No. 373/PM of 22 October 2007). MPWT has a mandate to implement the National Social Economic Development Plan (NSEDP) aspects for transport and urban infrastructure through sector strategic, medium-term, and annual plans, programs, and detailed projects.
- 3. At provincial level, the Governor's office is responsible for securing adequate and agreed funds for the provincial contribution to routine and periodic maintenance, for the operational costs, as well as for disbursement of project funds to the contractors through its provincial treasury.
- 4. Provincial Assemblies have been established as the legislative mechanism at sub-national level through the Second Amendment to the Constitution of December 2015 and confirmed by the National Assembly on March 2016. The assemblies have the mandate to review, approve, and oversee implementation of provincial socio-economic development plan and provincial budget.
- 5. The provincial Departments of Public Works and Transport (DPWT) are responsible for the preparation of strategic plans for local road network development, including annual work plans, three-year rolling plans, and medium-term plans. The DPWT has the mandate for local roads (including Provincial, District, and Rural roads), including for local road maintenance. DPWT's mandate includes local road planning, budgeting, procurement, contract management, accounting, site supervision and quality control, and reporting.
- 6. The District Office of Public Works and Transport (OPWT) report to the DPWT for road works. As per government policy the district is the planning unit in the administrative organization of Lao PDR. The district offices are responsible for road condition surveys and data collection, administer the routine maintenance works, and conduct routine inspections.
- **7.** As per government policy, the Village is the implementation level in the administrative organization and reports to the district. Villages have been involved in routine maintenance of some local roads, but there is no standardized system and various approaches are used.

Project Oversight and Management

- 8. The MPWT is the Project Implementing Agency. The project will be implemented through Government structures. The project will receive overall policy and strategic guidance from a Project Coordination Committee chaired by a Vice Minister of MPWT and comprising MPWT's Department Directors directly involved in project implementation and Director of Provincial DPWT involved in the implementation of the project. The Committee will be supported by a secretariat led by the Deputy Director General of MPWT's Department of Planning and Finance and comprising representatives of related departments.
- 9. **Project Coordination.** MPWT's Department of Planning and Finance (DPF), serving as the PCC 's secretariat, will be responsible to oversee the overall project coordination and management. Consultant support will be required and hired to work under DPF. The DPF will have the specific following roles and responsibilities:
- Prepare the Project Operational Manual (POM) and ensure that it is followed;
- Review and update implementation schedule for all project activities and disbursement plan;
- Prepare annual workplan and budget with inputs from other implementing agencies and submit it to the World Bank for review and no objection;
- Consolidate quarterly and yearly progress reports from all MPWTs implementing agencies; and report on project progress to MPWT Minister of Public Works and Transport and the Bank
- Ensure that Audits (technical and financial) are carried out;
- Review and clear training plans prior to implementation; and
- Identify and resolve issues related to implementation constraints or delays.

Project Management Supporting Functions

- 10. Department of Planning and Finance will have overall responsibility for financial management of the project. DPF staff is responsible for accounting and disbursement of project funds, and overall procurement support to MPWT departments implementing the project activities, ensuring that the Government and the World Bank's procurement guidelines are followed, and the correct procurement documents are used. Consultant support will be required, and FM and procurement consultants will be hired to work under DPF. At the provincial level, the division of planning and budget of DPWT will be responsible for financial management at provincial level. DPF will be responsible for preparation of an unaudited Interim Financial Report (IFR) and roll out of the financial system to provincial level.
- 11. **Department of Inspection (Dol)** will have overall responsibility for quality assurance of the project implementation including procuring independent technical and financial auditors. The department will also be responsible for monitoring and reporting on the grievance mechanism implementation in coordination with the ICT division of the Cabinet Office, and work with the provincial Division of Inspection at DPWT. The Inspection function has a double line of reporting, to MPWT as well as State Inspection Authority, under the Prime Minister's Office. Consultants will support Dol on internal control audits.
- 12. Environmental and Disaster Prevention Division of Public Works and Transport Institute (EPD/PTI) will be responsible for (i) overseeing full compliance with project E&S instruments and monitoring of E&S implementation in coordination with DoR and Provincial Offices for Natural Resources and Environment (PONRE); (ii) ensuring DoR includes the E&S requirements into the bidding documents; (iii) monitoring the supervision of the implementation of these requirements; (iv) verifying E&S mitigation measures are applied; (v) liaising with the Department of Environment and Social Impact Assessment of the Ministry of Natural Resources and Environment (MONRE), including E&S capacity development of DPWT and OPWT; (vi) integrating the gender dimension into E&S

documents, and consultation processes and overseeing the implementation of DPWT's gender action plans. EPD/PTI will provide an annual report on the environmental and social impacts of the works carried out under the program and ensure all road works are at all times carried out in conformity with the ESMF and national regulations in a manner which ensures that any adverse environmental impact is effectively mitigated in a timely and satisfactory manner.

- 13. **The ICT Division at Permanent Secretariat Office of MPWT** will be responsible for public disclosure of project information and the administration of the MPWT website which includes information disclosure on project grievances.
- 14. **Project Implementation:** MPWT's Department of Roads (DoR) will be responsible for overseeing the implementation of Component 1 on climate resilient road maintenance including monitoring progress, leading the procurement process, chairing of the Procurement Evaluation Committee, providing prior review, reviewing work plans, and allocating funds to routine and periodic maintenance activities. DoR will supervise data collection and conduct data analysis. DoR will ensure that the Environmental and social management plan is integrated into civil work bidding package and contracts. As the project will mainstream gender in the implementation of works, DoR in coordination with PTI, will be responsible for monitoring the implementation gender aspects in road contracts.
- 15. In line with the decentralization policy, the role of the DPWT in each of the three selected provinces will be to carry out PROMMS prioritization, preparation of the provincial three-year rolling maintenance plan and provincial road sector budget, participate in the procurement process led by DoR, carry out day to day contract management with support from supervision consultants under supervision of DoR, maintenance works site supervision, quality control, and reporting. DPWTs will ensure that safeguard specific requirements stated in relevant ESMP as part of road contracts are implemented. DPWTs will implement and report on the gender action plans related to DPWT. Under the supervision of DoR, DPWT, together with OPWT will conduct field data collection of local roads. OPWT will also involve in site supervision of road work contracts.
- 16. A consultant firm will be contracted to provide implementation support and work supervision (ISWS) for road works, which will be managed by DoR, the consultant will support DoR and DPWT in capacity building.
- 17. Under Component on institutional strengthening, various MPWT's Departments will implement project activities as per their official mandates with the overall coordination of DPF:
- 18. The Department of Planning and Finance (DPF) will work with DoR to implement all activities related to sector strategic planning, financing, and policy framework development. DPF will implement this sub-component through technical assistance. A Policy Advisor Consultant will be procured to provide high-level policy and planning support to the MPWT.
- 19. The Department of Roads (DoR), with support from a consultant firm, is responsible preparation of climate resilient investment plan for the Lao road network. DoR will collect the data needed to evaluate National Roads, including inventory surveys, periodic road condition surveys, traffic surveys, road database, and pavement management system. DPWT will collect data for Local Roads and submit to DoR for verification. The Department of Inspection (DoI) will implement the activities related to strengthening MPWT and DPWT's internal control systems. The Department of Personnel (DOP) will oversee the implementation of capacity development activities including internship program. The Environment and Disaster Prevention Division of the Public Works and Transport Institute (EPD/PTI) will lead safeguard supervision, monitoring, and safeguard training, including implementation of safeguards related activities for all project activities. The Department of Transport (DOT) will be responsible for the implementation of traffic safety activities under the project.



- 20. **Memorandum of Understanding.** In order to ensure clear assignment of roles and responsibilities, and accountability for project results, the Minister of MPWT and the Governor of each one of the three participating provinces have discussed and agreed to sign a Memorandum of Understanding prior to the commencement of project implementation.
- 21. **Project Operational Manual.** The project will be implemented using a Project Operational Manual (POM). The POM includes the MPWT updated Financial Management Manual (FMM) that details the division of responsibilities for the fiduciary function between MPWT and DPWTs at provincial level.
- 22. **Role of Partners.** GoL has established an Infrastructure Sector Working Group, led by the Minister of MPWT, as a mechanism to facilitate overall coordination among development partners. The project will strengthen this mechanism for sector dialogue and coordination. The project will collaborate with partners currently engaged in road maintenance activities including ADB, EIB, EU, NDF, AIIB, NIDA, JICA, KOICA, KfW, etc.

Financier	Institutional Strengthening	Physical Works
ADB	 Road Maintenance and Governance (2016-2021) Regulations on axle load control Review Technical Specification 	 Periodic road maintenance in Southern provinces: Saravan, Xekong, Attapeu (2016-2021)
	 e-procurement Contractor's training Quality assurance PBC for paved road maintenance 	 Improvement NR 6B (Houaphan)
JICA	 Software update RMS/PROMMS PBC for paved roads Technical manuals for road maintenance 	 Sekong Bridge construction Improvement of NR 9 (Savannakhet) Reconstruction bridges along NR 9
KfW	 Local road maintenance procedures Local road maintenance techniques 	 Rural roads improvement and maintenance in Sekong, Saravan, Bokeo, Louangnamtha, Oudomxay, Khammouane provinces.
People's Republic of China		 Improvement NR 1A (Phongsaly)
Thailand		 Improvement of NR 11 (Vientiane) Improvement of Vientiane urban road

Table A3.1: Current Activities financed by Development Partners in the Lao Road Sector

Financial Management, Disbursements and Procurement

Financial Management

- 23. **Budgeting.** An annual budget and work plan (ABWP) will be prepared in accordance with annual work plans, covering all project financing. Steps and timeline for preparation of ABWP will follow the budgeting processes and timeline as detailed in the Financial Management Manual (FMM). It is expected that ABWP will clearly indicate sources of financing (IDA or GoL) for activities under each component and subcomponents.
- 24. Accounting and Financial Reporting. ACCPAC Accounting Application which has been used in World Bank financed projects implemented by MPWT will continue to be used. Interim Financial Reports will be prepared by DPF on a

semi-annual basis and submitted to the Bank within 45 days of the end of the reporting period. The template of the report will be provided in the FMM.

- 25. Internal Controls. The internal controls are regulated in the current manuals of the DPF. However, procedures on cash management, authorization processes including the segregation of duties and delegation of tasks between DOR, provincial DPWT and DPF, and contract management should be enhanced and reflected in the project FMM.
- 26. **Disbursement.** A segregated designated account (DA) in USD will be opened at the Bank of Lao PDR, managed by the National Treasury, MOF. Funds advanced from the IDA Credit will be transferred to the Segregated Account. The ceiling for the DA will be variable and will be based on six months planned expenditure and related cash flow forecast. Reporting of expenditure will be based on IFRs. The IFR will be prepared semi-annually and submitted to IDA no later than 45 days after the quarter end. Applicable disbursement methods are advance, direct payment and reimbursement. The individual minimum application size for Reimbursements and Direct Payments will be equivalent to US\$250,000.
- 27. Auditing. The Project Financial Statements will be audited annually by an independent auditing firm acceptable to the Bank, in accordance with the Terms of Reference acceptable to the Bank. The audited financial statements should be submitted to the Bank within 6 months of the period end and should be published publicly.
- 28. Internal Audit. In addition to annual independent financial audit, the Internal Audit will be done by the DOI in accordance with the procedures provided in the FMM.

FM Risk	Action	Responsible Party	Completion Date
Overloaded FM of DPF may lead to the inefficiency and effectiveness of project FM	Identify the staffing demand for the entire portfolio managed and propose the staffing plan for the project to ensure the project FM will be adequately staffed. Recruit additional FM consultant.	DPF	August 30, 2024, for staffing plan.
The Implementation and the FM arrangements of the project have not yet been officially regulated at this stage.	Update the FM manual to reflect the implementation arrangements of the project.	DPF	Negotiations.

29. FM action Plan

Procurement

30. A total of US\$ 47.81 million, which is 84 percent of the total project budget will be used for the Improvement of climate resilience and safety of ten selected local roads in 3 project provinces (Khammouan, Savannakhet, and Saravan), using hybrid PBC/OPBBC approach. It is a combination of the conventional road improvement works contract (in phase 1) and performance-based maintenance (in phase 2), including road improvement during the first two years, for which the payment is based on inputs or quantities (unit price BoQ) followed by a 3-year maintenance period, for which payment is made based on fixed lump-sum amounts subject to meeting the services levels specified in the contracts. Procurement under the Project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers for Goods, Works, Non-consulting Services and Consulting Services, Fifth Edition September 2023. Request for Bids (RFB-international market approach) and selection of consultants involving international competition under the project will use the World Bank's standard procurement documents. Rated criteria will be used for RFBs (international market approach) for goods and works packages. For procurement of goods and works through RFB (national market approach) and Request for



Quotations, the harmonized standard open bidding documents and requests for quotations dated July 2021 revised for World Bank-financed projects, will be used.

31. The DPF will manage, coordinate, and monitor all procurement activities and communicate with the Bank with regards to procurement activities. The DoR will act as Chair of the Procurement Committee and will oversee and provide technical support to DPWTs in supervision of the works contracts, The World Bank carried out the procurement capacity and risk assessment of MPWT in accordance with the guidelines on "Revised Instruction for carrying out assessment of agency's capacity assessment to implement procurement, setting of procurement supervision plan" in July 2023. The assessment was done for MPWT at the national, and included an assessment of contractor capacity to carry out works at provincial level. Various MPWT departments will provide inputs to technical assistance activities within their mandates. The responsibilities and flow of procurement activities implemented at the national for goods, non-consulting services and consulting services, and works under the project are summarized in the following diagrams.

Work Flow for Procurement of Goods, Consultant and Non-Consultant Services



Procurement Flow for Procurement of Goods, Consultant and Non-Consultant Services





- 32. The MPWT has over 30 years of experience implementing Bank financed projects. Since 1991, MPWT has implemented nine (9) World Bank financed projects. Overall MPWT has adequate capacity to manage procurement activities under the project. Within MPWT, DPF will be responsible for the management of procurement activities. While at the institutional level the procurement capacities are appropriate, the assessment found that most of the experienced staff have moved on as result of promotion or restructuring, and the available staff is not completely familiar with World Bank procurement procedures. For this project, the limited exposure to World Bank procurement procedures among new staff and delays in providing technical inputs could result in delays in procurement processing and contract delivery.
- 33. The overall procurement risk is rated as Substantial. The major risks and mitigation measures are summarized as follows:

No	Risk/problem Proposed risk mitigation measure Responsibility	Responsibility	Deadline	
1.	Delays in procurement process	 (i) Careful procurement planning and scheduling, procurement advanced as much as possible, (ii) Procurement monitoring using Systematic Tracking of Exchanges in Procurement (STEP), (iii) setting a Service level Agreement (SLA) stating timelines for approvals, and auto approval if the same is not received within that SLA. 	DPF	During Project implementation

Table A3.4: Procurement risk mitigation measures



		(iv)	Closer coordination between DoF		
		. ,	Implementing Departments and IDA,		
			and supervisions and follow up by		
			IDA.		
2.	Procurement staffing	(i)	The DPF procurement staff to be	DoR, DoF	During Project
	and coordination		involved in assisting with		implementation
			procurement implementation.		
		(ii)	The DPF and DoR have to agree on a		
			procurement responsibility matrix to		
			be followed in procurement		
			implementation, to ensure that		
			documents have been reviewed by		
			the National Procurement Consultant		
			currently hired under LRSP 2 and		
			SEARECC.		
3	Governance risks	(i)	Enhanced disclosure of procurement	MPWT, DPF, DPR	During Project
	associated with conflict		information, including publication of		implementation
	of interest, fraud and		the annual procurement plan and a		
	corruption		quarterly summary of the contract		
			award information for all		
			procurement packages on MPWT's		
			website and in newspapers.		
		(ii)	Require staff involved in procurement		
		()	to declare their interest and sign a		
			declaration form.		
4	lengthy internal	(i)	Prepare and adopt a project	MPW/T: DPE: DoB	During Project
-	procurement	(1)	operation manual (POM) including a		preparation and
	reviewing and		chapter on procurement comprising		implementation
			of clear rules, step by step procedures		implementation
	updar MDWT that		and responsibilities, timeline		
			requirements for procurement		
	may cause the		activities, actions and decisions,		
	project		sample documents and evaluation		
	implementation		report for small procurements;		
	delays	(ii)	Detailed information shall be		
			stated in the procurement flow i.e.,		
			timeline for each procurement		
			stage for both specified in STEP		
			and expected actual time uses.		

- 34. The overall procurement risk is rated as Substantial.
- 35. **Procurement oversight:** In addition to prior review, field procurement supervision will be conducted as part of the regular implementation support missions, which will be conducted at least twice a year. The Bank will periodically undertake the ex-post review by a procurement specialist once a year if there are sufficient contracts for review.
- 36. **Procurement plan:** The MPWT will prepare a common detailed Procurement Plan for the first 18 months of the project which will provide the basis for the selected procurement procedures. The Plan will be updated with the Bank's prior concurrence, annually or as required, to reflect changes in implementation needs and improvements in institutional capacity. The procurement plan is summarized as follows:



Goods and Works and non-consulting services.

37. **Prior Review Threshold**: Procurement Decisions subject to Prior Review by the WBG as stated in Appendix 1 to the Procurement Regulations:

	Procurement N	Method Thresholds	Prior Rev	iew Thresholds
Category	Applicable thresholds (US\$)	Remarks	Applicable thresholds (US\$)	Remarks
<u>WORKS</u>				
RFB through Open International market approach	≥ 5.0 million	-	≥ 5 million	
RFB through Open National market approach	≥ 200,000 - < 5.0 million	-	None	-
Request for Quotations	< 200,000	-	None	-
Direct Selection	None	No threshold; meet requirements of regulations 7.13-7.15	Same as for competitive selection	This has not been foreseen at the project preparation stage.
GOODS AND NON-CONSU	JLTING SERVICES			
RFB through Open International market approach	≥ 1.0 million	-	≥ 1 million	This has not been foreseen at the project preparation stage.
RFB through Open National market approach	≥ 100,000 - < 1.0 million	-	None	Risk-based approach
Request for Quotations	< 100,000	-	None	
Direct Selection	None	No threshold; meet requirements of regulations 7.13-7.15	Same as for competitive selection	This has not been foreseen at the project preparation stage.

Table A3.5: Method and Prior Review Threshold

38. **Prequalification**. Not expected for the works/goods packages.

Selection of Consultants

39. **Prior Review Threshold**: Selection decisions subject to Prior Review by Bank as stated in Appendix 1 to the Procurement Regulations:

Table 4: Prior Review Threshold



No.	Selection Method	Contract	Prior Review Threshold	Comments
		Value	(US\$)	
		Threshold		
		(US\$)		
1	QCBS, QBS, FBS, LCS (Using the	≥ 300,000	Shortlist of only National	\geq 2.0 million
	most appropriate market		Consultants (Firms) for	
	approach)		contract agreed in the	
			PP	
2	CQS (Open or limited	< 300,000	QCBS, QBS, FBS, LCS can	None
	competition through national or		be applied for contracts	
	international market approach,		with value under	
	specified in the PP and agreed		\$300,000	
	with the Bank.			
3	Direct Selection of firms	None	No threshold; meet	Same as for
			requirements of	competitive
			regulations 7.13-7.15	selection
4	Individual	N/A	Essential individual	≥ 400,000 and for
	Consultants	depending	assignments will be	the positions as
		on nature of	defined in the	specified in the PP
		services	Procurement Plan	agreed with the
			agreed with the Bank	Bank
			and in line with	
			regulations 7.34-7.39	
			using the most	
			appropriate market	
			approach	

- 40. Short list comprising entirely national consultants: A short list of consultants for services, estimated to cost less than US\$300,000 equivalent per contract, may comprise entirely national consultants in accordance with the provisions of paragraph 2.7 of the Procurement Regulations.
- 41. The Project Operation Manual (POM) will provide guidance to project implementing agencies.

42. Procurement Plan

Procurement packages for Goods (prior and post reviews) with method and Time Schedule.

Ref. No.	Contract (Description)	Estimate d Cost (US\$)	Procure- ment Method	Review by Bank	Expected Bids Opening Time	Market approach	Remarks
Works							
CRRCIP-	Improvement and	4.00	RFB	Post	Mar.	Open-	IDA &
W-01	maintenance of Road number				2025	National	Gov



	5669 in Khammouan, using HPBC							
CRRCIP-	Improvement and	5.00	RFB	Post	Mar.	Open-	IDA &	
W-02	maintenance of Road number				2025	National	Gov	
	5682 and 5683 (section 2) in							
	Khammouan, using HPBC							
CRRCIP-	Improvement and	5.00	RFB	Post	Mar.	Open-	IDA &	
W-03	maintenance of Road number				2025	National	Gov	
	5683 (section 1) in							
	Khammouan, using HPBC							
CRRCIP-	Improvement and	5.00	RFB	Post	Apr. 2025	Open-	IDA &	
W-04	maintenance of Road number					National	Gov	
	6507 in Savannakhet, using							
	НРВС							
CRRCIP-	Improvement and	4.70	RFB	Post	Apr. 2025	Open-	IDA &	
W-05	maintenance of Road number					National	Gov	
	6323 and 6576 in Savannakhet,							
	using HPBC			_				
CRRCIP-	Improvement and	4.91	RFB	Post	Apr. 2025	Open-	IDA &	
W-06	maintenance of Road number					National	Gov	
	6586 and 6594 in Savannakhet,							
CRRCIP-	Improvement and	4.90	RFB	Post	Jun. 2025	Open-	IDA &	
W-07	maintenance of Road number					National	Gov	
	6861 in Savannakhet, using							
CDDCID	НРВС	5.00	050	Deat	1 . 2025	0		
CRRCIP-	Improvement and	5.00	KFR	Post	Jun. 2025	Open-	IDA &	
VV-08	maintenance of Road number					National	GOV	
CDDCID	6909 III Salavann, using HPBC	4 20	ргр	Dect	Jun 2025	Onon		
W 00	maintenance of Road number	4.30	КГВ	POSL	Jun. 2025	Open-		
VV-09	6022 in Salayanh, using HPBC					National	GOV	
	Improvement and	5.00	REB	Post	Jul 2025	Open-	1DA &	
W_10	maintenance of Road number	5.00	NI D	rost	Jul. 2025	National	Gov	
VV 10	6913 and 7271 in Salavanh					National	000	
	using HPBC							
Goods				L				
CRRCIP-	Office Equipment (Notebooks,	0.45	RFB	Post	Feb. 2025	Open-	IDA	
G-01	Desktop, Photocopiers,					National		
	Printers, Scanners)							
CRRCIP-G-	13 Motorbikes to support	0.04	RFQ	Post	Jan. 2025	Open-	IDA	
02	CRRCIP					National		
Total Wor	ks and Goods	48.3						



Consultancy Assignments with Selection Methods and Time Schedule

Ref.	Description of Assignment	Estimated	Selection	Review by	Expected	Market	Donors
No.		Cost (USS	Method	Bank	Proposals Submission	approach	
		minon			Time		
Firms			1	<u> </u>			
CRRCIP-	Audit Firm	0.15	QCBS	Post	Mar. 2025	Limited-	IDA,
CQS-01						National	
CRRCIP-	Implementation Support	2.90	QCBS	Prior	Mar. 2024	Open-	IDA,
QCBS-01	and Supervision Consultant					International	
Individual	5			,			
CRRCIP-	National Project	0.20	IC	Post	Jan. 2025	Open-	IDA
IC-01	Coordinator to support DOR					National	
CRRCIP-	National Project Assistant	0.04	IC	Post	Jan. 2025	Open-	IDA
IC-02	to support DOR					National	
CRRCIP-	National Project	0.20	IC	Post	Jan. 2025	Open-	IDA
IC-03	Coordinator to support DPF					National	
CRRCIP-	National FM Consultant to	0.18	IC	Post	Jan. 2025	Open-	IDA
IC-04	support DPF					National	
CRRCIP-	National Procurement	0.07	IC	Post	Jan. 2025	Open-	IDA
IC-05	Consultant to support DPF					National	
CRRCIP-	National Procurement	0.02	IC	Post	Jan. 2025	Open-	IDA
IC-06	Assistance to support DPF	0.00	10	.		National	15.4
CRRCIP-	National Technical Auditor	0.20	IC	Post	Jun. 2025	Open-	IDA
	to support DOI-IMPW I	0.10		Dect	lan 2025	National	
	soctor financing stratogy	0.10	IC.	POSL	Jan. 2025	Open-	IDA
10-08	Consultant					International	
CRRCIP-	Part time International	0.15	IC	Post	Mar. 2025	Open-	IDA
IC-09	SESC to support PTI					National	
CRRCIP-	National ESC to support	0.09	IC	Post	Mar. 2025	Open-	IDA
IC-10	PTI					National	
Total cons	ulting services	4.40					
Total Wor	ks, Goods and Consulting	52.70					
Services							

Monitoring & Evaluation

43. At Project level, the DPF of MPWT responsible for the overall management of the Project will also be responsible for ensuring that the implementation report of the Project includes a section on safeguards implementation.

EPD/PTI is responsible for six month and annual monitoring, including preparation of the six month and annual safeguard monitoring report, while DoR is responsible for ensuring that safeguard measures are incorporated into the designs and bidding/contract documents. At subproject level, DPWTs are responsible for implementation of safeguard activities including undertaking day-to-day monitoring of safeguard measures to be carried out by contractors. The Environmental and Social Unit (ESU) of DPWT will be responsible for carrying out monthly monitoring of contractors and implementation of other safeguard measures including preparation of safeguard monthly monitoring reports to be submitted to EPD/PTI. The EPD/PTI, and ESU/DPWTs will be responsible for keeping proper documentation for review by the WB. The EPD/PTI will also be responsible for providing overall safeguards supervision and monitoring, ensuring effective mainstreaming of safeguard requirements into the road development project cycle.

44. The EPD/PTI (in consultation with World Bank safeguard specialists) will conduct safeguard training to concerned staff of DoR and DPWT of the Project provinces at least one time per year. Effort will be made to engage the local authorities (PONRE/DONRE), local mass organizations, and/or local communities to assist in monitoring performance of the contractors, especially in areas that are sensitive and likely to be affected by the subproject activities and workers. A qualified national and/or regional consultant will be hired to establish and implement the training of trainers' program.

Mid-Term Review

45. A midterm review will be carried out within 30 months after project effectiveness to assess the status of project implementation as measured against the performance indicators. Such a review would include an assessment of the (i) overall implementation progress of the Project; (ii) results of Monitoring and Evaluation of various activities and performance indicators; (iii) progress on procurement, disbursement and financial management; (iv) progress on the implementation of the safeguards instruments and measures; (v) implementation arrangements; and (vi) need for any project restructuring or reallocation of funds among project components to achieve the Project Development Objective by the closing date and/or improve performance. At least one-month prior to the Bank's mid-term review mission, the Project Director, will provide the Bank with a Mid-Term Review report assessing project implementation status with updated results indicators, project cost estimates, and plans for completion.



Annex 2: Geospatial Analysis for Road prioritization.

- 1. Summary: The objective of the proposed Lao PDR Climate Resilient Road Connectivity Improvement Project (CRRCIP) is to improve climate resilient road access in the targeted provinces of Savanakhet, Saravan and Khammouan. Further, in these three provinces, 10 districts⁵¹ with very high poverty head counts were identified for the proposed investments (improvement of local roads) under the proposed project. The local road network of about 3,600 km is a lifeline for the predominantly rural population in these districts, providing critical access to human development facilities such as hospitals, markets, and schools. The road network is subjected to a geospatial analysis to prioritize/select about 300 km of Candidate Roads for investments under the proposed project. A data-driven approach was undertaken, utilizing existing data from the Ministry of Public Works and Transport (MPWT), Ministry of Planning and Investment (MPI), and the Food and Agriculture Organization. The analysis included calculation of travel times, for understanding how the accessibility in the 'dry season; and 'wet season' under the scenarios of 'with project' and 'without project', between 718 villages in the districts to 109 Health Centers, 159 Secondary Schools, 10 District/Provincial Hospitals and 10 District Markets. The analysis reveals that when traveling by car⁵², during the wet season under the 'without project scenario', 47 percent of the road users of the Candidate Roads experience over 100 minutes to travel to the nearest District Hospital, 41 percent to the nearest District Market, 18 percent to the nearest Health Center and 2 percent to the nearest Secondary School. Improving the Candidate Roads⁵³, prioritized in 8 of the 10 districts analyzed, is expected to result in about 63 percent reduction in the number of road users experiencing over 100 minutes to travel to the nearest District Hospital, 80 percent reduction in the number of road users experiencing over 100 minutes to the nearest District Market, 27 percent reduction in number of road users experiencing over 100 minutes to the nearest Health Center and 100 percent reduction in number of road users experiencing over 100 minutes to the nearest Secondary School. Furthermore, with project scenario during the wet season, the Candidate Road users, on an average are expected to experience time savings of about 52.66 percent when travelling to the nearest District Hospital, about 25.28 percent nearest Health Center, about 57 percent to the District Market and about 60.81 percent to the nearest Secondary School. Lastly, upon project intervention, during the wet season there will be a 100 percent reduction in agricultural land within 2 km of the candidate roads experiencing over 100 minutes to the District Markets. The improvement in accessibility to the district markets will allow 3,190 hectares accessible within 30 minutes, and an additional 17,007 hectares of agricultural land connected to these markets within 30-60 minutes.
- 2. Introduction: The homogeneity in the Provincial Road Operating Maintenance Management System (PROMMS) data when measuring accessibility to human development facilities to prioritize 300 km Local Roads from 3600 km necessitated a geospatial analysis for the prioritization process. To measure the potential impact of the roads proposed in the project, the Geospatial Analysis framework provides insight on the Local Road network by identifying accessibility constraints to human development facilities. The network analysis54 which links the GIS

⁵¹ Target districts: Buapapha, Xebangfai, Sepone, Champone, Songkhone, Toomlarne, Lao Ngarm, Saravane, Thakhek and Nakai.

⁵² Speed assumptions based on the Road design Manual for paved roads, for unpaved roads speed assumptions based on consultation with MPWT and World Bank.

⁵³ The Candidate Roads are only from 8 of the 10 districts analyzed. The MPWT did not select any Candidate Roads in Thakhek and Nakai Districts.

⁵⁴ Network Analysis: Shortest path batch point to point. Topology tolerance 20m.



data to the PROMMS data furthers the analysis through identification of climate vulnerable roads in the local network which can be used on the creation of wet and dry season scenarios of this analysis.

- 3. Methodology and Data Inputs: The following inputs were used in this methodology
- Shapefiles of points of interest
 - Villages (2012), Health Facilities (2022), Schools (2022): Ministry of Planning and Investment
 - o Markets (2023): Department of Public Works and Transport
- Shapefile of the road network (2022): Ministry of Public Works and Transport
- Crop Cover (2019): Department of Agricultural Land Management, Strengthening Agro climatic Monitoring and Information System (SAMIS)
- Speed Data
 - Paved road speed acquired from the Road Design manual
 - Unpaved road speed based on discussions with transport specialist at MPWT.
- 4. The data inputs were combined and a shortest path network analysis was conducted to the points of interest from the villages in the project area on the existing road network. The integration of PROMMS data with the network analysis on GIS to identify Local Roads critical to access to human development facilities was done through the following formula.

 X_i =Contribution of the i^{th} road segment

RN_i=Road Number of the ith road segment

P_i=Road users of the ith road segment

T_i= Travel Time of the ith road segment

 R_i = Road Class of the i^{th} road segment

 C_i = Road condition of the ith road segment

 $S_i\text{=}$ Surface type (Paved/unpaved) of the i^{th} road segment

D= Season (Dry/Wet)

V(R_i,C_i,S_i,D_i,RN_i)= Speed from the table based on RCSD

L_i= Distance of the ith road segment

 $\mathsf{T} = \frac{L_i}{V(R_i, C_i, S_i, D_i, RN_i)}$

Total Travel Time= $\sum_{i=1}^{n} T_i$

n= Total Number of Road Segments T_i = Travel time for the ith road segment

5. The project area consists of districts with the high poverty headcount in the target provinces of Savanakhet, Khammouan and Saravan, therefore to prioritize climate vulnerable Local Roads (Class 3 and 5) which impact accessibility to human development facilities, the output of the following function used.

 $X_{i} = P_{i}T_{i} \begin{cases} P_{i} \times T_{i} \text{ if } S_{i} \text{ is unpaved and } D_{i} \text{ is Wet and } R_{i} \in \{3,5\} \\ 0 \text{ otherwise} \end{cases}$





Where the roads were ranked in descending order of the output of this function to District Hospitals, Health Centers, District Markets and Secondary Schools.

Figure 1 Total contribution to all points of interest during wet season segregated by road class

Figure 1 indicates that during the Wet Season, the unpaved Local Roads represent 75 percent of the contribution to travel time to points of interests whereas the unpaved National Roads represent only 25 percent. This highlights the need for investment in climate resilient infrastructure towards the Local Road network.

6. Candidate Roads-Overview: The results of the Geospatial analysis were shared with MPWT and DPWT and the following candidate roads were identified in the districts.

No.	District	Road Class	District Hospital Rank [District level]	Health Center Rank [District level]	Market Rank [District level]	Secondary Schools Rank [District level]	Total Ra [District level]
1	Bualapha	3	3	3	3	2	3
2	Xebangfai	5	1	6	1	2	1
		_	_	_	_		_

Table 1 Candidate Roads ranked on contribution to travel time during wet season.

			District	Health Center	Market Rank	Secondary	Total Rank
		Road	Hospital Rank	Rank [District	[District	Schools Rank	[District
Road No.	District	Class	[District level]	level]	level]	[District level]	level]
5669.1	Bualapha	3	3	3	3	2	3
5683.2	Xebangfai	5	1	6	1	2	1
5682.1	Xebangfai	5	3	2	3	1	3
5683.1	Xebangfai	5	19	15	25	21	21
6861.1	Sepone	5	14	12	11	9	11
6594.1	Songkhone	5	4	10	4	10	5
6586.1	Champone	5	1	13	1	11	1
6323.1	Champone	3	3	3	3	1	3
6576.1	Champone	5	9	10	8	6	8
6507.2	Champone	3	10	8	10	7	10
6933.1	Saravane	5	16	13	18	3	13
6933.2	Saravane	5	24	14	19	20	19
7271.1	Toomlarne	5	1	2	1	1	1



6909.1	Lao Ngarm	3	1	2	1	1	1
6913.1	Lao Ngarm	3	2	1	4	2	2
6913.2	Lao Ngarm	3	15	10	16	15	16

The candidate roads in Table 1 are ranked based on the contribution to travel time to human development facilities during the wet season. The ranking determines where the road stands in providing access to these facilities within the district they are located in.

		District Ho	ospital	Health Ce	nter	Distict Ma	rkets	Secondary Schools		
		Weighed	Ву	Weighed	Ву	Weighed	Ву	Weighed	Ву	
Candidata		Population	n	Population	Population		n	Population		
Roads	Road	Reduction	in travel	Reduction	in travel	Reduction	in travel	Reduction in travel		
Rudus	Length	time		time		time		time		
	(km)	Dry	Wet	Dry Wet		Dry	Wet	Dry	Wet	
		Season	Season	Season	Season	Season	Season	Season	Season	
5669	20.00	43.57%	54.21%	35.74%	35.74%	46.44%	57.76%	50.15%	50.15%	
5682	17.56	8.07%	10.96%	15.85%	15.85%	10.36%	14.23%	25.50%	25.63%	
5683	49.00	36.01%	61.56%	1.68%	1.68%	39.51%	68.35%	11.94%	12.00%	
6323	14.00	11.14%	21.84%	4.06%	4.14%	5.56%	11.26%	5.39%	5.58%	
6576	8.60	2.85%	5.59%	5.72%	5.84%	1.43%	2.90%	5.68%	5.88%	
6586	8.30	13.04%	25.57%	1.99%	2.03%	13.62%	27.57%	1.63%	1.69%	
6594	20.00	28.73%	54.54%	15.91%	16.23%	39.13%	72.48%	15.97%	16.27%	
6861	30.00	16.84%	66.02%	NA ⁵⁵	NA	15.89%	64.54%	6.10%	8.20%	
6507 ⁵⁶	43.00	1.85%	3.62%	3.70%	3.77%	0.92%	1.86%	2.61%	2.70%	
6933	21.88	5.06%	15.34%	11.95%	14.61%	5.40%	14.98%	23.80%	31.22%	
6909	32.41	36.23% 47.12%		17.35%	17.45%	29.51%	38.36%	27.58%	27.71%	
6913	16.51	10.98%	14.36%	39.22%	39.44%	13.89% 18.16%		24.64% 24.75%		
7271	12.70	28.80%	51.78%	11.98%	11.98%	31.65% 56.35%		21.91% 21.94%		

Table 2 Travel time impact on Road users using the candidate roads to access human development facilities.

7. **Geospatial Analysis:** A Geospatial analysis was conducted to reveal the current accessibility constraints to human development facilities for direct beneficiary villages of the proposed roads without the project intervention and the impact the project intervention will have during the dry and wet season. The results of the Geospatial Analysis indicate that by transforming the Candidate Roads into climate resilient roads, the project will have a significant positive impact on the road users, particularly the most marginalized segments of the community. Improving the Candidate Roads, prioritized in 8 of the 10 districts analyzed, is expected to result in about 63 percent reduction in the number of road users experiencing over 100 minutes to travel to the nearest District Hospital, 80 percent reduction in the number of road users to the nearest District Market, 27 percent reduction in number of road users experiencing over 100 minutes to the nearest District Secondary School. Furthermore, with project scenario during the wet season, the Candidate Road users, on an average are expected to experience time savings of about 52.66

⁵⁵ The nearest health facility for the road users on road 6861 is a District Hospital.

⁵⁶ 2 sections of this road fall outside Champone district. Direct beneficiary villages outside of the target district are not included in the analysis.



percent when travelling to the nearest District Hospital, about 25.28 percent Health Center, about 57 percent to the District Market and about 60.81 percent to the nearest Secondary School. Lastly, upon project intervention, during the wet season there will be a 100 percent reduction in agricultural land within 2km of the candidate roads experiencing over 100 minutes to the District Markets. The improvement in accessibility to the district markets will allow 3,190 hectares accessible within 30 minutes, and an additional 17,007 hectares of agricultural land connected to these markets within 30-60 minutes.

					Dry Seaso	n							
			I	Baselin	e- Without	Projec	t						
Travel Time	Secondary Schools	%	Health Centers	%	District Hospitals	%	Markets	%	Agriculture	%			
0-30 minutes	65431	98%	42698	82%	46386	45%	42466	51%	3190	10%			
30-60 minutes	1497	2%	3984	8%	36473	35%	27563	33%	24363	77%			
60-100	0	0%	4058	8%	16708	16%	11745	14%	3918	12%			
100+	0	0%	1082	2%	4141	4%	831	1%	0	0%			
					Dry Seaso	n							
				Impa	act- With Pr	oject							
Secondary Health District Markets Agriculture %													
0-30 minutes	66708	100%	45004	87%	65496	63%	62983	76%	27553	88%			
30-60 minutes	220	0%	2206	4%	32979	32%	16715	20%	3918	12%			
60-100	0	0%	4202	8%	5233	5%	2907	4%	0	0%			
100+ 0 0% 410		410	1%	0	0%	0	0%	0	0%				
				١	Wet Seasc	n							
				Baselin	e- Without	Projec	t						
	Secondary		Health		District								
Travel Time	Schools	%	Centers	%	Hospitals	%	Markets	%	Agriculture	%			
0-30 minutes	51237	77%	19915	38%	9561	9%	3564	4%	3190	10%			
30-60 minutes	12808	19%	11342	22%	12253	12%	11961	14%	0	0%			
60-100	1386	2%	11441	22%	33239	32%	33114	40%	15305.4	49%			
100+	1497	2%	9124	18%	48655	47%	33966	41%	12975.6	41%			
				١	Wet Seaso	n							
				Impa	act- With Pr	oject							
	Secondary		Health		District								
Travel Time Schools % Centers %				%	Hospitals	%	Markets	%	Agriculture	%			
0-30 minutes	62931	94%	27206	52%	39805	38%	36052	44%	6538	21%			
30-60 minutes	220	0%	15775	30%	18155	18%	25412	31%	22559	72%			
60-100 951 1% 2023 4%		28167	27%	14423	17%	2374	8%						
100+	0	0%	6818	13%	17581	17%	6718	8%	0	0%			

Table	3	Geospatial	analysis	results:	Project	Level
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8. Geospatial analysis District Level: These results provide an insight on the district level accessibility constraints and the impact the Candidate Roads will have on the district level. The district wide geospatial analysis which includes the entire network of the 8 districts where the Candidate roads are located identify the most marginalized and how the proposed investments will impact their accessibility to these Human Development Facilities. Notable increase in accessibility can be observed in the wet season scenario where the number of individuals across the 8



districts requiring over 100 minutes to the District Hospitals have reduced by 21.9 percent, to the nearest Health Centers by 9.6 percent, to the nearest Secondary School by 12 percent and to District Markets by 21.8 percent.

			Dry S	eason							•	Wet S	eason				
		Base	line- Wit	hout Pi	oject				Baseline-								
	Secondary		Health		District					Secondary		Health		District			
Travel Time	Schools	%	Centers	%	Hospitals		Markets	%	Travel Time	Schools	%	Centers	%	Hospitals		Markets	%
0-30 minutes	376454	95.4%	266187	91.3%	248814	59.6%	260559	62.5%	0-30 minutes	315033	79.9%	186837	64.1%	148083	35.5%	153639	36.9%
30-60 minutes	15907	4.0%	19456	6.7%	103383	24.8%	98999	23.8%	30-60 minutes	49811	12.6%	55815	19.2%	64846	15.5%	75343	18.1%
60-100	615	0.2%	3852	1.3%	38602	9.2%	40171	9.6%	60-100	17172	4.4%	26932	9.2%	88053	21.1%	77527	18.6%
100+	1507	0.4%	1944	0.7%	26819	6.4%	16910	4.1%	100+	12467	3.2%	21855	7.5%	116636	27.9%	110130	26.4%
			Dry S	eason					Wet Season								
		Im	pact- W	ith Proj	ect				Impact-								
	Secondary		Health		District					Secondary		Health		District			
Travel Time	Schools	%	Centers	%	Hospitals	%	Markets	%	Travel Time	Schools		Centers		Hospitals		Markets	%
0-30 minutes	377731	95.8%	268285	92.1%	266062	63.7%	277337	66.6%	0-30 minutes	324879	82.4%	192323	66.0%	177011	42.4%	183851	44.1%
30-60 minutes	D-60 minutes 14630 3.7% 17886 6.1% 96239 23.0% 90911 21							21.8%	30-60 minutes	14630	3.7%	58193	20.0%	67704	16.2%	81744	19.6%
60-100 615 0.2% 3660 1.3% 31378 7.5% 31999 ¹						7.7%	60-100	16737	4.2%	21166	7.3%	81794	19.6%	64901	15.6%		
100+	100 615 0.2% 3660 1.3% 31378 7.5% 31999 7. \+ 1507 0.4% 1608 0.6% 23939 5.7% 16392 3.								100+	10970	2.8%	19757	6.8%	91109	21.8%	86143	20.7%

9. Data Limitations:

10. GIS data: The road alignment data has several topological and geometry errors as well as disconnected endpoints. Sections of the road network were drawn in different base maps projections. The shapefile detailing the attributes of road network exhibit multiple disconnections. To rectify, the vector files were adjusted to ensure connectivity when conducing shortest path analysis in QGIS at a topology tolerance of 20 m.



The figures above represent the road network of the target provinces of Savanakhet, Khammuan and Saravane. The red points on the right represent errors in the shapefile for the local roads provided by the MPWT.

11. Non-alignment between GIS and PROMMS data: The PROMMS data represents road condition of individual links, while the GIS data is segmented into sections. To align the PROMMS data with the GIS data, the mean road condition of the links within a section was taken. Additionally, the mode of surface type was used to assign a definitive surface type to the section. This was done for all the roads and a data dictionary which describes the road condition and surface type of the road in sections was created.



12. Linking PROMMS data to GIS: To transfer the attributes from the MPWT provided shapefile, points across the road network with 25m interval were created. Upon completion of this layer, an additional layer was made with a buffer of 12.5 m on the interpolation points along the road network. The pink circles represent the buffer layer along the interpolation points created at every 25m. Intersection between this layer and the shortest path between the village and the point of interest, produces the following raster.

FID	Village ID	Village Name	Road Class	Road Number
2	1208021	B. Gnang-Gnai	4	5763.1
2	1208021	B. Gnang-Gnai	4	5763.1
2	1208021	B. Gnang-Gnai	4	5763.1
2	1208021	B. Gnang-Gnai	4	5763.1
2	1208021	B. Gnang-Gnai	4	5764.1
2	1208021	B. Gnang-Gnai	4	5766.1
2	1208021	B. Gnang-Gnai	1	13SO
2	1208021	B. Gnang-Gnai	1	13SO
2	1208021	B. Gnang-Gnai	1	13SO
2	1208021	B. Gnang-Gnai	1	13SO

13. The data illustrates the distance between B. Gnang-Gnai village and the district hospital, broken down by segments of roads. The 'Count' column shows the number of 25-meter increments on each particular road number. Therefore, the data suggests, the network between B. Gnang-Gnai and the District hospital consists of 11,825 meters of road 13SO, 2175 meters of road 5506.1, 275 meters of road 5512.2, 4625 meters of road 5685.1 and 2075 meters of road 5763.1 thus the total distance of 20,975 meters.

FID	Village ID	Village name	Road Class	Road number	Count
2	1208021	B. Gnang-Gnai	1	13SO	473
2	1208021	B. Gnang-Gnai	3	5506.1	87
2	1208021	B. Gnang-Gnai	3	5512.2	11
2	1208021	B. Gnang-Gnai	5	5686.1	185



2	1208021	B. Gnang-Gnai	4	5763.1	83
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- 14. Coverage: Villages which do not have accessibility based on the alignment data provided are not considered in the analysis. The crop cover for the candidate roads in the districts of Songkhone and Champone was drawn manually. The crop cover for the other districts was extracted from SAMIS. After diligent error correction, the analysis was able to incorporate 90 percent of the villages in the project area. Improvement in the shapefiles of the local roads and village points will further this analysis to incorporate more villages and ensure digital inclusion.
- 15. Speed assumptions:

Travel Speed Assumptions												
Dry season												
Paved road						Unpaved road						
						6 - Privately						6 - Privately
Road/ Surface	1 - National	2 - Provincial	3 - District	4 - Urban		constructed		2 - Provincial	3 - District	4 - Urban	5 - Rural	constructed
Condition	Road	Road	Road	Road	5 - Rural Road	road	1 - National Road	Road	Road	Road	Road	road
Excellent/ Very good	80	60	60	60	40	50	50	50	50	35	35	40
Good	60	50	50	50	30	45	45	45	40	30	30	30
Fair	50	40	40	40	30	30	30	30	40	25	25	30
Poor	30	30	30	30	20	20	20	20	20	15	15	20
Bad	20	20	20	20	10	10	10	10	10	5	5	10
					Wet	season						
						6 - Privately						6 - Privately
Road/ Surface	1 - National	2 - Provincial	3 - District	4 - Urban		constructed		2 - Provincial	3 - District	4 - Urban	5 - Rural	constructed
Condition	Road	Road	Road	Road	5 - Rural Road	road	1 - National Road	Road	Road	Road	Road	road
Excellent/ Very good	80	60	60	60	40	50	40	40	40	35	25	35
Good	60	50	50	50	30	45	35	35	30	30	20	30
Fair	40	30	30	30	20	20	20	9	12	25	10	25
Poor	20	20	20	20	10	10	10	6	6	15	5	15
Bad	10	10	10	10	10	10	5	3	3	5	5	5

Table 5 Speed assumption based on Road class, condition, and surface type of the road network in PROMMS.

Surface Type					
1	Earth	UNPAVED			
2	Gravel	UNPAVED			
3	Surface treatement	PAVED			
4	Cement concrete	PAVED			
5	Asphalt	PAVED			

Table 6 Classification of surface types in PROMMS data