



**ASIAN INFRASTRUCTURE
INVESTMENT BANK**

PD000373-LAO
October 15, 2020

**Project Document
of the Asian Infrastructure Investment Bank**

Sovereign-backed Financings

**Lao People's Democratic Republic
Climate Resilience Improvement of National Road 13 South Project (Section 3)**

Currency Equivalents
(As at September 21, 2020)

Currency Unit	–	Laos Kip (LAK)
LAK 1.00	=	USD 0.00011
USD1.00	=	LAK 9,126

Fiscal Year

January 1-December 31

Abbreviations

AADT	Annual Average Daily Traffic
AIIB	Asian Infrastructure Investment Bank
ASEAN	Association of South East Asian Nations
AWPB	Annual Work Plan and Budget
CBA	Cost Benefit Analysis
COI	Corridor of Impact
DBMOT	Design, Build, Maintain, Operate and Transfer Methodology
DoF	Department of Finance, MPWT
DoR	Department of Roads, MPWT
DPWT	Provincial Department of Public Works and Transport
EGEP	Ethnic Groups Engagement Plan
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
ESEL	Environmental and Social Exclusion List
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard
FM	financial management
GAP	Gender Action Plan
GDP	gross domestic product
GHG	greenhouse gas
GRM	Grievance Redress Mechanism
IAM	Independent Accountability Mechanism
IDA	International Development Association
IFIs	international financial institutions
IRAP	International Road Assessment Program
MDB	multilateral development bank
MPWT	Ministry of Public Works and Transport
NPV	Net Present Value
NR13	National Road 13
NR13S	National Road 13 South

O&M	Operation and Maintenance
ODA	Official Development Assistance
OHS	Occupation Health and Safety
OPBRC	Output and Performance-based Road Contract
OPWT	District Office of Public Works and Transport
PDR	People's Democratic Republic
PMU	Project Management Unit
POM	Project Operations Manual
PPM	Project-affected People's Mechanism
PUR	Public Utility Relocation
RC	Resettlement Committee
RP	Resettlement Plan
RF	Road Fund
TD	Tender Documents
WB	World Bank

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1. Summary Sheet
Lao People's Democratic Republic
Climate Resilience Improvement of National Road 13 South Project (Section 3)

Project No.	000373
Borrower	Lao People's Democratic Republic (Lao PDR)
Project Implementation Entity	Ministry of Public Works and Transport (MPWT)
Sector / Subsector	Transport / Roads (non-urban)
Project Objective	To improve the road condition, safety, and climate resilience of the south section of the National Road 13 (Section 3).
Project Description	<p>The Project comprises the construction/rehabilitation of a 78-km section of the existing two-lane NS13S highway from Km 190 to Km 268 and implemented through a 10-year Output and Performance-Based Road Contract (OPBRC) under the Design, Build, Maintain, Operate and Transfer (DBMOT) methodology. AIIB will finance civil works for construction/rehabilitation and the Government of Lao PDR will finance O&M under the OPBRC.</p> <p>The proposed Project is part of a larger government program of rehabilitation and maintenance of the 275 km long National Road 13 south (NR13S), comprising a two-lane section, from Km 71 in Bolikhamxai Province to km 346 in Khammouane Province. The program consists of four sections of the NR13S. A separate World Bank (WB)-supported project will cover Section 1, and a European Investment Bank (EIB)-supported project will cover Sections 2 and 4, including the construction supervision of all four sections. The Government of Lao PDR will finance the operation and maintenance of all sections.</p>
Implementation Period	Start Date: April 30, 2021 End Date: April 30, 2024
Expected Loan Closing Date	December 31, 2024
Cost and Financing Plan	Project Cost: USD40.0 Million Financing Plan: AIIB = USD30.0 million Government of Lao PDR = USD10.0 million
Size and Terms of AIIB Loan	USD30.0 million Term: Final maturity of 35 years, including a grace period of 4 years, with level repayments at the Bank's standard interest rate for sovereign backed loans.
Environmental	B

and Social Category	
Risk (Low/Medium/High)	High
Conditions for Effectiveness	<ul style="list-style-type: none"> • A formal letter regarding the counterpart funding, and a Road Fund (RF) financial analysis report will be provided to AIIB by MPWT. • Project Operations Manual accepted by the Bank. • All staff and consultants listed in the updated staffing plan are on board. • The right to make withdrawals under EIB Financing Framework Loan Agreement has been fulfilled. • MPWT has completed 70 percent of resettlement work in accordance with the resettlement plan, including the compensation and Public Utility Relocation.
Key Covenants	<ul style="list-style-type: none"> • Furnish to AIIB, no later than Nov. 30 of each year, an annual work plan and budget for the Project for the following Fiscal Year and implement the activities under the Project during the relevant Fiscal Year in accordance with such plan and budget for the duration of AIIB loan. • Adopt, not later than twelve (12) months prior to the Closing Date, a sustainability plan, specifying actions and budget designed to ensure the continued and effective implementation of the OPBRC in the period after the Closing Date, including, inter alia, financial, institutional sustainability and monitoring and supervision measures to be put in place by the Ministry of Public Works and Transport (MPWT) for the full period of the operation and maintenance phase of the OPBRC.
Retroactive Financing (Loan % and dates)	None
Policy Waivers Requested	None
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the Bank is in compliance with the policies applicable to the project.

President	Jin Liqun
Vice President, Region 1	D.J. Pandian
Director General, Region 1 Technical	Rajat Misra (acting)
Manager, Region 1 Technical	Rajat Misra
Team Leader	Wenyu Gu, Senior Investment Operations Specialist
Team Members	Anne Ong Lopez, Young Professional Chang Tian, Project Assistant Giacomo Ottolini, Principal Procurement Specialist Liu Yang, Counsel—Investment Operations

	<p>Omar Khalid, Senior Safeguard Consultant Shonell Robinson, Financial Management Specialist Soon Sik Lee, Principal Investment Operations Specialist Susrutha Goonasekera, Senior Social Development Specialist Zhixi Zhu, Environmental Specialist</p>
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2. Project Description

A. Rationale

1. **Country Priority.** The Lao People's Democratic Republic (Lao PDR) is landlocked and bordered by China, Vietnam, Cambodia, Thailand, and Myanmar. Given its location, the country has strong potential to serve as a transit link for the transportation of goods among Greater Mekong Sub-region (GMS) countries such as Cambodia, China, Myanmar, Thailand, and Vietnam. Regional connectivity is a key part of the government's strategy. The Government of Lao PDR has a vision to transform the country from landlocked to land-linked. The government has been investing in highway network expansion along the regional economic corridors, airport expansion, upgradation of inland waterway transport and new railways development. The Government of Lao PDR's Eighth Five-Year National Socio-Economic Development Plan (2016-2020) highlights the upgrading of transport infrastructure to ASEAN standards, coupled with the associated development of the logistics industry, to be among its national strategic investment priorities in order to achieve economic integration with neighboring countries.

2. Lao PDR is highly vulnerable to climate and disaster risks. Historical data indicate that annual losses from adverse climatic events range between three and four percent of GDP, with the associated average annual fiscal costs being close to two percent of government expenditures. Three of the five costliest natural disasters have taken place since 2009, including two floods in 2013. In particular, severe flooding in 2018 had a significant impact on the country's physical infrastructure, causing damage to one-fifth of the road network, including sections of the National Road 13 South (NR13S). These events are likely to intensify in the future due to climate change. Climate change projections indicate further increases in temperature as well as in the intensity and frequency of extreme events, including increased rainfall and flooding risks. These conditions can severely impact economic activity, most importantly, hydropower, transport, and agricultural production. Vulnerability and losses may be compounded if infrastructure planning does not take into consideration climate disaster risk and mitigation measures.

3. National Road 13 (NR13), a north-south corridor of 1,426 kilometers (km), is a backbone road in Lao PDR that connects Lao PDR with China in the north and with Cambodia in the south, and links 10 of the 17 Lao PDR provinces, playing a vital role in international and regional connectivity. The main sections of the road were completed in 1997 and have not been rehabilitated since, receiving only periodic and emergency maintenance. The Asian Infrastructure Investment Bank (AIIB or the Bank) approved the Lao PDR National Road 13 Improvement and Maintenance Project (NR13, L0066A) in 2019, the first AIIB-financed project in Lao PDR, which is under implementation. During the 2018 floods, sections of NR13S were cut off for a week, causing losses to the economy as well as social disruptions. With no alternative routes in the network, NR13S is vital for traffic and economic flows, and is also the backbone road connecting the Vientiane Capital (the country's economic hub) to central and southern parts the country. Therefore, for the government of Lao PDR, it is unaffordable to have NR13 cut off due to the deterioration of the Road exacerbated by higher rainfall from events such as typhoons, which cause massive flooding and trigger landslides. Additionally,

by improving the climate-resilience and safety of the Road, the Project will spur economic development and facilitate inclusion and shared prosperity.

4. The Project is aligned with the government’s National Transport Sector Plan to 2020 and Strategy to 2025, in which sustaining the condition of existing infrastructure is a high priority.

5. **Institutional Context.** The road sector is financed through the government budget, Official Development Assistance (ODA) and the Road Fund (RF).¹ With a limited national budget, the Government of Lao PDR set up the RF in 2002 to ensure predictable and sustainable allocations for road maintenance. According to its legal mandate,² the RF supports the routine, periodic and emergency maintenance as well as rehabilitation and upgrading of existing roads. The budget allocated for the road sector and expenses for the past three years can be found in Table 1. Due to growing maintenance requirements and other competing needs (e.g., emergency, road safety), domestic resources are not adequate to finance capital investments. New investments for large-scale projects largely rely on external sources of funds.

Table 1: Road Fund Financial Statement, 2017-2019 (USD million, rounded)

Fiscal Year	2017	2018	2019
Accumulated Balance	35	6	6
Revenue collected	76	73	72
Expenses	105	73	73
Balance	6	6	5

Source: Department of Finance, MPWT

6. Maintenance remains the key issue in road sector management as the life cycle of roads is shortened by the quality of construction, overloading, and natural disasters (mainly floods and landslides). The government faces the challenge of controlling the quality of construction and managing the contractors as the sector saw some newly constructed roads prematurely deteriorating. Overloaded domestic and international freight traffic is increasing and having an impact on the rate of deterioration of the network. Road network damage is exacerbated by higher rainfall from events such as typhoons which cause massive flooding and trigger landslides. These events call for better construction quality control as well as more resources for road maintenance and rehabilitation.

7. The road sector is under the overall jurisdiction of the Ministry of Public Works and Transport (MPWT). MPWT is responsible for policymaking, strategic planning, financing, oversight, and overall management of the sector, including not only road, but also railway, aviation, inland waterway transport, etc. While it has progressively delegated maintenance and operations for local roads to the provincial level, MPWT retains the responsibility for the maintenance and operation of the national road network. MPWT has some experience in working with international financial institutions (IFIs), specifically the World Bank’s guidelines and procedures for both fiduciary (procurement and financial management) and safeguards (environmental and social) policies.

¹ The RF was formerly called the Road Fund or RMF.

² Decree of the Prime Minister on Road Fund (No.09/PM), issued on January 15, 2001 and replaced by RF Decree No. 130/PM issued by the Prime Minister on June 1, 2016, and Decision Number 1870 of the Minister of MPWT dated November 25, 2011.

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8. **Strategic Fit for AIIB.** The Project is aligned with AIIB's transport sector strategy as follows:
 - a. **Cross-border Connectivity.** NR13 is a north-south corridor (1,500 km) that connects Lao PDR with China in the North and with Cambodia in the South. It comprises of NR13 North from the Vientiane Capital to Boten on the Chinese border (671 kilometers) and NR13 South from the Vientiane Capital to the Cambodian border (829 kilometers).
 - b. **Trunk Linkages.** The Project links 10 of the 17 Lao PDR provinces, and is the backbone network of the country, linking the northernmost province of Luang Namtha through the capital city of Vientiane and all the way to the southernmost province of Champasak;
 - c. **Upgrading of Existing Infrastructure:** The Project will make the road climate-resilient, reduce vehicle operating costs and travel time, increase the accessibility of enterprises, reduce road fatality rates, and lower fuel consumption by improving road condition.
9. **Value Addition by AIIB.**
 - a. The Bank will bridge the financing gap of the Government of Lao PDR's program to improve NR13S.
 - b. The Bank will provide experience and technical contributions in the road contracting through the application of the OPBRC/DBMOT concept.
10. **Value Addition to AIIB.**
 - a. The Project will contribute to the Bank's thematic priority of cross-border connectivity.
 - b. Blending the Bank resources with the concessional funding for the Government of Lao PDR's overall program to strengthen NR13S (e.g., IDA credit for Section NR13S, Section 1) makes AIIB's involvement in low-income countries possible.
 - c. The Project will also strengthen the continuity and the long-term partnership with the client in the transport sector.
11. **Lessons learned from previous projects.** The Team has relied on lessons learned from the previous road projects, in particular the Lao PDR National Road 13 Improvement and Maintenance Project financed by AIIB (NR13 North, L0066A) under implementation, in terms of the implementation of Resettlement Plan (RP) and Public Utility Relocation (PUR), OPBRC implementation and streamlining payment procedures. Further details regarding lessons learned are presented in Annex 2.
 - a. **RP and PUR.** NR13N has experienced delay in implementation of both RP and PUR, especially for RP, where double works and additional costs for its preparation and implementation have been experienced. The root cause is that there was no clear identification of corridor of impact (COI) before the preparation and

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implementation of the RP. Therefore, the Team reiterates that the COI of NR13S needs to be clearly defined by DOR in writing and marked before the RP preparation.

- b. The nature of OPBRC/DBMOT is the equitable transfer of project risks to the party best fit to mitigate that risk. For instance, damages to bridges and pavement before and after construction period should be the responsibility of the contractor as the contractor is supposed to conduct their own assessment of existing structures and develop detailed designs accordingly. Therefore, PMU is required to prepare a detailed risks allocation and mitigation matrix and incorporate it into the Tender Documents (TD) to avoid potential claims from contractor during the implementation stage.
- c. Given the payment delay of around four months that is happening with the NR13N project, it was agreed that a payment procedures guideline will be prepared and incorporated in the Project Operations Manual, and which will be one of the conditions for loan effectiveness.

B. Project Objective and Expected Results

12. **Project Objective.** The Project objective is to improve the road condition, safety, and climate resilience of the south section of the National Road 13 (Section 3).
13. **Expected Results.** The Results Framework presented in Annex 1 will be used to monitor and evaluate the implementation of the proposed Project Objectives, namely:
 - a. Road condition: Improved road condition to reduce vehicle operating cost on the Project road (Percentage);
 - b. Road safety: Improved road safety to increase the average International Road Assessment Program (IRAP) star rating of the Project road (Number);
 - c. Climate resilience: Project road upgraded and improved with climate resilience measures (Yes/No).

Intermediate Results Indicators, including:

- a. Reduction in average International Roughness Index (IRI) for finished sections.
- b. Road constructed or rehabilitated.
- c. Kilometers of roads ready for O&M phase under OPBRC/DBMOT modality.

14. **Expected Beneficiaries.** The direct beneficiaries of the Project include approximately 103,000 people living in 151 villages³ in the districts along the Project corridor. The NR13 is the only corridor linking the north and south parts of the country. The Project will support better domestic and international connectivity, and access to public services and markets, and will

³ This is the total population of the Pakkading district in Bolikhamsai province and Hinboun district in Khammouane Province.

directly benefit road users on the country’s main north-south trunk road in Bolikhamxai, Khammouan, and the Vientiane Capital through improving the climate resilience of the road. Improved access to markets, jobs, and services will benefit a significant share of the population and contribute to inclusive growth. The Project will also benefit freight traffic. MPWT will benefit through improved capacity in the use of output and performance-based contract modalities which can help extend the road lifecycle and pave the way for increased private sector participation in the road sector.

C. Description of the Project Component

15. The Project comprises rehabilitation and maintenance on a 78-km road section of the NR13S, from Km 190 to Km 268. Land acquisition and resettlement will be financed by the Government of Lao PDR.

D. Cost and Financing Plan

16. The total project cost is USD40.0 million, of which USD30.0 million will be financed by the Bank. The project cost and financing plan is shown in Table 2.

Table 2: Project Cost and Financing Plan (USD million)

Item	Project Cost	Financing	
		AIIB	GoL*
Rehabilitation and Maintenance of a 78-km road section of the NR13S, from Km 190 to Km 268	39.0	30.0	9.0
Land Acquisition and resettlement	1.0	-	1.0
Total Cost**	40.0	30.0 (75%)	10.0 (25%)

Note: *Counterpart fund will come from Road Fund.

**10% Contingencies are already embedded in project costs. Any additional contingencies will be covered by the Government of Lao PDR.

17. **Related Projects under the Government of Lao PDR’s NR13S Program.** The Government of Lao PDR initially requested the WB to finance under the IDA Crisis Response Window (CRW)⁴ the construction/rehabilitation of vulnerable sections of NR13S under the government’s program to mitigate the effects of the severe floods of 2018. EIB and AIIB were subsequently requested by the Government of Lao PDR to finance different sections of the program.

18. Because of the WB’s earlier involvement in the program, its procurement and environmental and social safeguard policies were initially applied during preparation of the overall program. Subsequently and since the program is divided into three separate projects, each financier will apply its own policies to the project it supports. Section 1 of NR13S is financed by the WB with an IDA credit of USD25 million to cover civil works, which became effective on March 20, 2020. Sections 2 and 4 of NR13S are financed by EIB with approximately EUR60 million out of EUR100 million framework loan approved on Dec. 20,

⁴ A technical briefing for the World Bank Board of Directors was held on March 11, 2019 to request the use of the IDA Crisis Response Window resources of USD50 million for Lao PDR to support disaster recovery following the 2018 extensive floods. USD25 million is proposed as Additional Financing to Lao Road Sector Project 2 to support the climate resilient improvement of vulnerable sections of NR13S in the provinces of Bolikhamxai to Khammouan.

2019. The EIB loan will finance the civil works for sections 2 and 4, as well as the supervision consultant services for all four sections. AIIB will finance civil works for Section 3. The Government of Lao PDR will cover the cost of land acquisition and operation and maintenance of OPBRC for all three projects, estimated at USD 27.5 million.

19. Given three projects comprise the NR13S program and are managed by the same PMU. WB, EIB, and the Bank are working closely during the preparation stage and will also coordinate with each financier during the implementation stage, for instance, conducting joint implementation supporting missions.

20. The total Program cost and financing are shown in Table 3.

Table 3: NR13S Program Financing Plan (USD million)

Section	Chainage (Km 71–Km 346)	Length (km)	Project Estimated Cost	Financing	
				IFI	GoL
1 (WB)	71-111	40	28.5	25	3.5
2 (EIB*)	111-190	79	42	35	7
3 (AIIB)	190-268	78	40	30	10
4 (EIB*)	268-346	78	42	35	7
Total Cost			152.5	125	27.5

AIIB = Asian Infrastructure Investment Bank, EIB = European Investment Bank, GOL = Government of Lao PDR, IFI = international financial institution, km = kilometers, WB = World Bank

Note: * EIB loan amount is indicative.

21. **Financing Terms.** Final maturity of 35 years, including a grace period of 4 years, with level repayments at the Bank’s standard interest rate for sovereign backed loans.

E. Implementation Arrangements

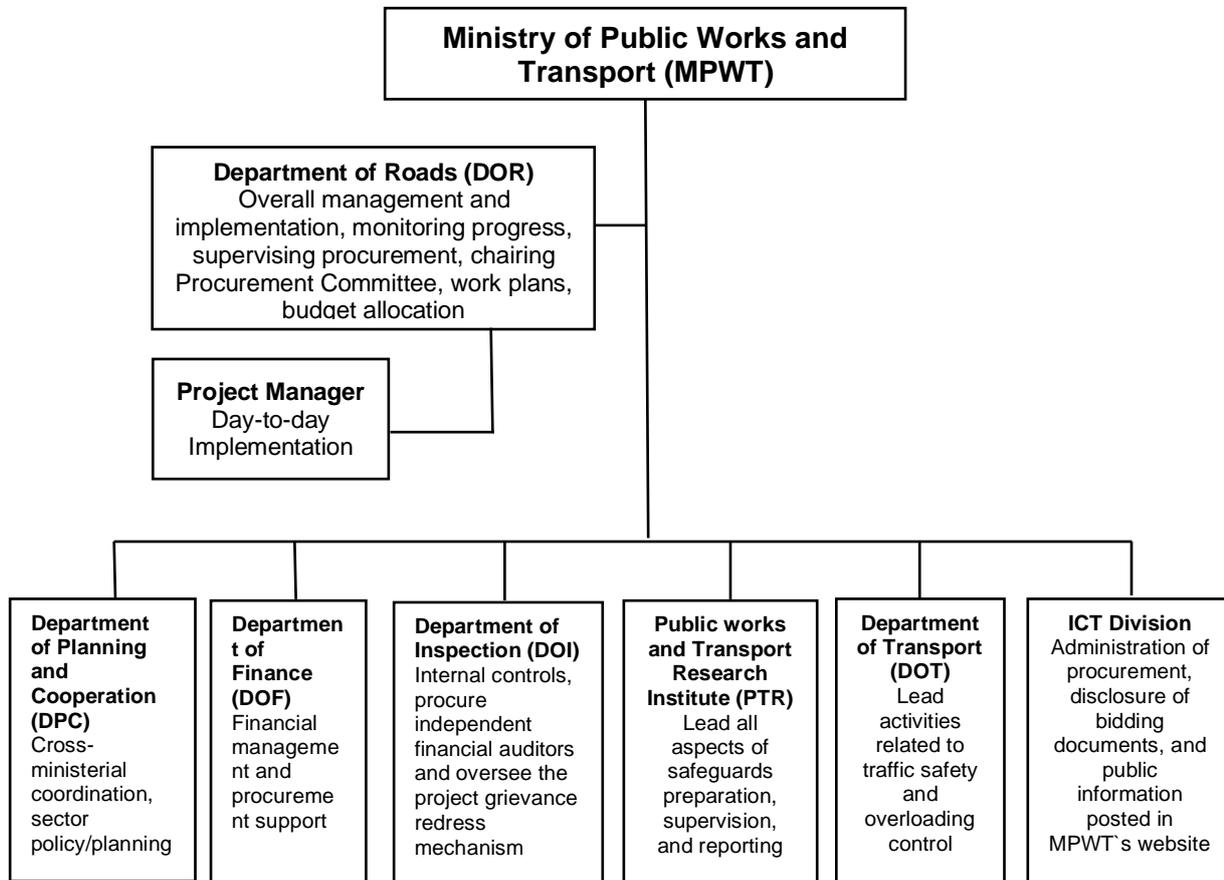
22. **Implementation Period.** The Project will have a 3-year implementation period to avoid any potential delays, from April 2021 to April 2024. AIIB will finance the construction phase in the first three years, while the Government of Lao PDR will continue to finance and manage the remaining seven-year O&M period of the OPBRC/DBMOT contract.

23. **Implementation Management.** The Project will be implemented through the existing government structures. The Project will receive overall policy and strategic guidance from the Project Steering Committee chaired by the Minister or Vice Minister of MPWT and include the Vice Governors of Bolikhamxay and Khammuane provinces, representatives from other ministries involved in the implementation of the Project, and the MPWT’s department directors directly involved in the implementation of the Project. The Project Steering Committee will be supported by a Secretariat led by the Director General of MPWT’s Department of Roads (DoR) and comprising representatives of related departments.

24. MPWT is the Project Implementing Agency. MPWT’s DoR is responsible for the overall management and implementation of the Project. This includes monitoring progress, supervising the procurement processes, chairing the Procurement Evaluation Committee, reviewing work plans, and allocating funds for road improvement and O&M works during the post-construction period. DoR has established a Project Management Unit (PMU) led by a Project Manager responsible for the management of day-to-day implementation. Other

departments and divisions in MPWT will be responsible for Project implementation as per their official mandates as further described in the figure below.

Figure 1: Implementation Arrangements



25. The PMU is familiar with working with multilateral development banks (MDBs) and their policies. The PMU will be supported by an OPBRC/DBMOT monitoring supervision consultant during construction and initial Operation and Maintenance (O&M) period.

26. **Procurement Committee.** A Procurement Committee has been established. DoR is the Chair of the Committee, which comprises representatives from the Department of Finance (DoF), Department of Transport (DoT), Department of Planning and Cooperation (DPC), Provincial Department of Public Works and Transport (DPWT), and the Project Manager.

27. **Resettlement Committees (RCs).** A Provincial Resettlement Committee (PRC) has been established in each of the two Project provinces (Bolikhamxay and Khammuane) with the Vice Governor of the province as the chairperson of each PRC. Similarly, at the district level, two District Resettlement Committees (DRCs) have been established, one for each project district (Pakkading and Hinboun). The DRCs are headed by the Vice Chairperson of the district. The Resettlement Committees comprise representatives from DPWT, Department of Natural Resource and Environment (DONRE), Department of Forest and Agriculture (DOFA), district Lao National Front for Construction, district Lao Women's Union, and others.

28. **Project Operations Manual.** A Project Operations Manual (POM) was prepared for the NR13 North project, which contains detailed information on the project implementation

arrangements and processes, including procurement. MPWT will update the POM with lessons learned, including but not limited to identifying the Corridor of Impact (COI), implementing the Resettlement Plan (RP) and Public Utility Relocation (PUR), streamlining the payment procedures, etc. The acceptance by AIIB of the updated POM will be a condition for loan effectiveness.

29. **Project Monitoring Supervision Consultant.** EIB will finance a monitoring supervision consulting firm to provide high quality technical, environmental and social and project management services to the PMU for all four sections of the NR13S Program. The consulting firm will also supervise the initial post-construction maintenance and operation. The Request for Expressions of Interest (REOI) has been released on March 26, 2020; the shortlist of seven firms has been submitted to EIB for No Objection and a supervision consulting firm is expected to be on board by February 2020. To ensure that a supervision consulting firm is on board on time, EIB loan effectiveness will be one of the conditions for AIIB loan effectiveness.

30. **Monitoring and Evaluation.** The overall responsibility for monitoring Project results will be with MPWT, supported by the monitoring supervision consulting firm mentioned above. Project progress and performance will be monitored based on the result indicators, which is presented in Annex 1.

31. **AIIB's Implementation Support.** AIIB will supervise the Project and administer the loan. AIIB staff will carry out implementation support missions and site visits to the Project sites, as frequently as needed, to monitor progress and outputs. However, given the challenge induced by the COVID-19, the Project team may consider mobilizing local consultants to conduct the site visits if necessary. In addition, the Technical Audit/Review consultant engaged by the WB, which will conduct the technical audit yearly, will also provide audits/review annually covering all four sections.

32. **Procurement.** Procurement will be conducted in accordance with the provisions of the AIIB Procurement Policy, January 2016, and associated Interim Operational Directive: Procurement Instructions for Recipients, June 2016. MPWT is the Project implementing agency. A Project Delivery Strategy (PDS) has been prepared, including a procurement and contract management plan by MPWT and following a review it is found acceptable by the Bank. The procurement activities under the Project are well identified, and the approach is deemed fit for purpose with the Project needs.

33. **Financial Management.** The Department of Finance (DoF) of MPWT will have the overall responsibility for the financial management of the project. DoF has been involved in managing donor-funded projects, and currently is managing the AIIB and WB-jointly financed National Road 13 improvement and Maintenance Project that is under implementation. DoF has adequate internal controls in place to ensure that funds are used solely for the purposes intended. The Department utilizes an automated accounting system "Accpac" which allows for the proper accounting and reporting of project transactions by sources of finances, project components, categories and activities. The processes, procedures and controls as documented in MPWT's Financial Management Manual (FMM) will also apply to this project.

34. DoF is staffed with experienced professionals; however, with the increase in the number of projects being managed, one additional financial management (FM) consultant will be hired to assist with the timely preparation of accounting records and financial reports, and the processing of payments. While the payments process is very robust, the lead time for

processing payments and withdrawal applications is quite lengthy. Therefore, the process is being revisited to reduce the lead time and simultaneously maintain adequate internal controls.

35. The project will be audited by an Independent External Auditor financed by the WB deemed to be acceptable to both AIIB and WB. The auditor is already onboard and will execute the audit in accordance with an audit ToR approved by the WB.

36. **Annual Work Plan and Budget.** MPWT will prepare an Annual Work Plan and Budget (AWPB) covering all sources of project financing to the Bank, no later than November 30 of each year. The AWPB will clearly indicate the sources of financing for the activities under each component. AIIB will review and provide no objection to the AWPB prior to implementation.

3. Project Assessment

A. Technical

37. **Project Design.** From the technical aspect, the Project road is a simple rural type of an arterial/highway road, two-lane rehabilitation (Km 190 to Km 268) with a total width of nine meters, located in a flat topography, involving appropriate horizontal/vertical alignments. The rehabilitated/improved road will follow the existing alignment.

38. **Technical design.** MPWT has mobilized a local consulting firm to prepare the design for the Project road, taking into consideration ASEAN standards, structural strength, traffic characteristics and volume, road safety, and climate and disaster risks. This design will be used as a minimum technical requirement in the Bidding Documents for OPBRC/DBMOT together with other parameters required for the OPBRC contracting model and DBMOT methodology. Key design parameters are specified in Annex 2.

39. **OPBRC/DBMOT.** The proposed OPBRC contract format involves application of DBMOT methodology for the Project design and implementation. This concept enables greater participation of the private sector and efficient allocation of risks between the government and the private sector to achieve better quality results and services. Under the OPBRC/DBMOT concept, the contractor is paid by the government through lump-sum payments for completed milestones for rehabilitation and improvement works and maintenance & operation, provided that all performance requirements are met. The role of MPWT (the Employer) will be to enforce the contract by verifying compliance with the specified service levels and all applicable national legislation and regulations. The OPBRC/DBMOT approach is expected to improve efficiency in road investment and maintenance by transferring design, construction, operations, and maintenance risks to the contractor. Payments based on meeting performance indicators will provide incentives for the contractors to better manage the transferred risks and deliver agreed service levels. This will result in a lower lifecycle cost to the government and higher quality road services.

40. **Main Features of the OPBRC/DBMOT Contract.** The main elements of the OPBRC/DBMOT contract structure and financing are summarized below:

- (i) The Project OPBRC/DBMOT contract will have a 10-year implementation period, including three years of road improvement and seven years of O&M phases.
- (ii) The implementation period of the proposed Project financed by AIIB is an initial 3-year period. Hence, the O&M phase of the Project will continue after the closure of the

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Project, which will be financed by the Government of Lao PDR. This will support the sustainability of the Project investment beyond the Project period by providing continuous coverage of maintenance requirements.

- (iii) The payments to the contractors for road improvement works will be based on completed construction milestones according to defined performance criteria. During the O&M phase, the contractors will receive quarterly payments, including deferred amount of payments for the construction of civil works based on the achievement of service level performance requirements. The performance milestones for road rehabilitation/construction and service level requirements for O&M will be specified in the tender documents.
- (iv) Bidders will be assessed on their technical and financial proposals. The bidding documents will include a conceptual design for road improvement works, and the contractor, through the contractor's associated qualified consultant, will be required to prepare the detailed design.
- (v) Service levels include performance indicators related to road roughness, skid resistance, vegetation control, visibility of road signs and markings, response times to rectify safety-related defects, attendance to road accidents, clearance of drainage sedimentation, and pavement strength, etc.

41. **Market Sounding.** The NR13 Improvement and Maintenance project approved by the Bank last year was the first project in Lao PDR that applied OPBRC/DBMOT. Under that project, there were positive responses from the market to bid for OPBRC and supervision, with a large number of contractors (31 bidders) and consulting firms (28 firms) participating in the bidding process.

42. Despite the impact of COVID-19, there are still positive responses from the market for Sections 1 and 2, for which the TD have been issued. For Section 1, the TD was issued on April 24, 2020; 65 interested contractors in total bought the TD, out of which 39 are international contractors. For Section 2, the TD was issued on June 1, 2020; 28 interested contractors bought the TD, out of which 15 are international contractors. The international contractors are mainly from neighboring countries with either ongoing projects or local offices in Lao PDR.

43. **Climate Resilience.** Specific climate risks identified in the Project area and the required mitigation measures have been discussed and reviewed in detail during the virtual appraisal mission. Based on the provided designs and the draft climate conditions report, the identified risks mainly include floods, embankment/slope erosion, overloading of drainage systems, etc. While the standard works specifications already include several measures for the proper design of a road in specific climate and soils conditions, there is a need to increase the safety factors related to potential flood levels and intensity, which involves enhanced drainage systems; construction of additional culverts; and the appropriate inlet-outlet design of culverts, drains and ditches to ensure that water can discharge fast and minimize the impact to the road structure and adjacent surroundings. Riverbank protection and erosion protection will be provided at piers and abutments of the existing bridges. The bridges were found sufficiently designed for the expected future flood levels, including the increase of 15 percent compared to the historic floods.

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44. Since the detailed designs will be provided by contractor in this DBMOT/OPBRC project, the contractor will be required to translate/summarize the findings of the climate adaptation report in a tabular form, clearly indicating the potential climate risks, the engineering and bio-engineering measures to be taken, their potential locations and cost estimates for each of these measures.

45. To ensure that the Project will be passable all year, the following design criteria will be applied:

- Bridges: flood return frequency of 100 years;
- Box culverts and short bridges ≤ 10 m span: flood return frequency of 50 years;
- Road and pipe culvert less than 2 m in diameter: flood frequency of 25 years;
- Side drains and ditches: flood frequency of 10 years.

46. The measures outlined in the Road Design Manual of MPWT (2018) are applied for dealing with the issue of climate change for road drainage design:

- Use new calculated Intensity-Duration-Frequency Curve, constructed based on the series of rainfall measurements from 1989 to 2018.
- Adding a 15 percent increase to the calculated 10, 25, 50 or 100-year return storm events in order to react to increases in short duration rainfall intensities.

47. **Road safety.** A road safety auditor, financed by WB under Section 1, will conduct a road safety audit (RSA) of the NR13S Program at the conceptual design stage, the detailed design stage and during the rehabilitation and the O&M period. The findings of RSA at the conceptual design stage were submitted to DOR in April 2020. Road safety measures include road furniture, reflectors, and improvements in driving vision, sidewalks, traffic calming options and street lighting in populated areas. Traffic safety aspects will be further strengthened through education and awareness campaigns targeting motorists, public transport and the public, and through road safety enforcement. The assessment of the traffic safety condition following the rehabilitation and during the O&M period will be based on the IRAP Star Rating methodology.

48. **Operation and Maintenance.** The OPBRC/DBMOT contract will have a 10-year implementation period, including a 7-year O&M phase. The monitoring supervision consulting firm will provide training and hands-on capacity building measures to ensure that MPWT is fully equipped with the necessary tools and knowledge to carry out supervision and monitoring of the O&M work following project closure. MPWT will also gain experience from the ongoing NR13 N project, which uses the same OPBRC/DBMOT methodology.

B. Economic and Financial Analysis

49. **Traffic Forecast.** A traffic survey was carried out in October-November 2019 which included six traffic count locations along the 275 kms comprising the NR13S Program. Based on traffic data, Annual Average Daily Traffic (AADT) for the 275-km was 6,329 vehicles per day. For Section 3, it was 4,616 vehicles per day, comprising 1,905 cars/day (41 percent of total traffic), 1,614 motorcycles/day (35 percent of total traffic), and 1,097 heavy vehicles (buses and trucks)/day (24 percent of total traffic). A similar proportion can be observed for the whole NR13S. AADT for each NR13S Sections are provided in Table 4, disaggregated by vehicle type.

Table 4: Annual Average Daily Traffic (vehicles/day), 2019

	Motorcycle	Car	Bus	Truck	Total
Section 1	2,460	2,432	814	702	6,408
Section 2	2,435	3,376	850	885	7,546
Section 3	1,614	1,905	544	554	4,616
Section 4	2,983	2,305	615	866	6,768
NR13S	2,361	2,518	691	759	6,329

Source: Climate Resilience Improvement of NR13S Program, Traffic Survey Data, April 2020.

50. Forecasted traffic figures were based on real GDP growth rates, registered vehicles and historical traffic trends in NR13S. Real GDP grew at around 6.5 percent in Lao PDR on average between 2015 and 2019, albeit projected to grow at a slower rate of 3.6 percent for 2020 due to COVID-19. Real GDP growth is forecasted to rebound and increase to 5.8 percent in 2021 and 5.3 percent in 2022.⁵ More information on traffic is provided in Annex 3.

51. **Economic Analysis.** The economic analysis applied cost-benefit analysis (CBA) as a standard methodology for appraisal of road works. The economic benefits quantified are a reduction in vehicle operating costs (VOCs) due to improved road conditions, savings in travel time for passengers and freight carriers due to improved speed, emergency maintenance costs avoided, and reduction in road accidents. The Project costs comprise capital and O&M costs. The financial costs are converted to economic costs at a standard conversion factor of 0.92 and 0.87 for construction and O&M costs, respectively.

52. Based on available data and assumptions adopted in the base case, Section 3 of NR13S has an Economic Internal Rate of Return (EIRR) of 24.7 percent and Net Present Value (NPV) of USD51.16 million at a 9 percent discount rate. The EIRR is well above the opportunity cost of 9 percent and the Project is considered economically viable.

53. The sensitivity of the EIRR was also tested against different cost and traffic scenarios, which has confirmed the robustness of economic returns. The results of the cost-benefit and sensitivity analyses are illustrated in Table 5. Details of the economic analysis are provided in Annex 3.

Table 5: Sensitivity Analysis

Scenarios	Section 3	
	EIRR	NPV
(1) Maintenance cost increases by 20%	24.7%	51.15
(2) Construction cost increases by 20%	21.5%	46.01
(3) Both construction and maintenance costs increase by 20%	21.5%	46.00
(4) Traffic moves to railway and/or expressway by 20% starting 2023 (traffic decrease)	21.7%	38.69
(5) No generated traffic in 2021	24.7%	51.16
(6) Combination of (3) (4) and (5)	18.8%	33.53

⁵ World Bank. 2020. East Asia and Pacific Economic Update. (April).

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EIRR = Economic Internal Rate of Return, NPV = net present value

54. **Financial Analysis.** As the Project road will not be tolled and will be wholly financed by the public sector during construction and O&M, a financial analysis is not conducted.

C. Fiduciary and Governance

55. **Procurement.** A procurement assessment was conducted by the Project team. Through the implementation of similar projects in terms of scope and complexity financed by other MDBs, such as the World Bank and Asian Development Bank (ADB), MPWT has demonstrated that they are capable of handling this Project. Qualified staff have been assigned for the Project preparation and will be responsible for procurement during Project implementation; they are also supported by an external procurement consultant funded by WB under Section 1. The Team conducted further fiduciary due diligence during Project appraisal and the current support by the procurement consultant is deemed a sufficient mitigation measure.

56. The Bank's prior review for works contracts procured following International Open Competitive Tendering method will be required, while the supervision of works is funded by EIB in parallel and will be selected following international open competitive selection method. WB's standard Tender document for OPBRC format under DBMOT will be used with the required proper changes to be acceptable to AIIB.

57. The Client intends to proceed with advance procurement. A draft of the tender documents is being reviewed by the Bank and tenders could be invited in August 2020.

58. **Financial Management.** A Financial Management (FM) assessment was conducted, and the conclusion was that the proposed FM arrangements are satisfactory to the Bank and can provide accurate and timely information on the status of the funds. The main risk factors noted are the lengthy delay in contractual payments, increased workload which will overstretch the current staff capacity, and accounting for a complex multi-financed project. These risk factors will be mitigated through the preparation and implementation of a payment procedure guidance note, the hiring of an additional FM Consultant, and the use of automated accounting software that is designed to account for the separate projects on NR13S supported by AIIB, EIB, and the WB.

59. DoF will be charged with the overall financial management responsibilities of the Project, and will coordinate with PMU, DoR and the Ministry of Finance (MoF) to obtain relevant approvals and process payments. An annual budget and work plan (ABWP) for the Project will be prepared, which will be reviewed and approved by AIIB. The accounting software "Accpac" will be used to capture transactions by sources of finance, components, and sub-components. The internal controls governing the Project are guided by DoF's FM manual as well as the Project Operations Manual, which will include the payment procedure guidance note. DoF will be required to provide both consolidated unaudited interim financial reports and consolidated annual project audit reports to the Bank. The unaudited financial report, which will cover a semi-annual period (Jan-June and Jul-Dec), should be submitted to AIIB within 45 days of the end of the reporting period. The audit report will comprise the audited financial statement and management letter, which becomes due within six months after the financial year ending in December.

60. **Disbursement.** The Project will adopt the advance and direct payment methods. Under the advance method, AIIB will transfer funds to a segregated designated account, established at the Bank of Lao PDR and maintained by the National Treasury within MoF. Withdrawal applications will be submitted based on a consolidated expenditure and cash forecast statement on a six-month basis approved by AIIB. The disbursement arrangements including the minimum value for the direct payment will be guided by the AIIB disbursement letter for the loan.

61. **Governance and Anti-corruption.** AIIB is committed to preventing fraud and corruption in the projects it finances. It places the highest priority on ensuring that projects it finances are implemented free of Prohibited Practices (as defined in the Bank's Policy on Prohibited Practices) (2016). Implementation will be monitored regularly by AIIB staff. The Bank will reserve the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, coercive or obstructive practices, and misuse of resources and theft or coercive practices relating to the Project and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate. Detailed requirements and reference to the Prohibited Practices will be specified in the Loan Agreement and the Project tender documents. AIIB will monitor the work related to tender preparation and evaluation under Bank financing.

62. **Institutional Capacity.** DoR has established a PMU, which is fully dedicated to the project management of the overall NR13 program, including this Project. DoR has been involved in managing ODA projects as well as Road Maintenance Projects since 1998. MPWT has a well-established organizational structure and has experience in implementing government funded as well as ODA-funded projects.

63. A comprehensive staffing plan has been prepared during the appraisal mission, including both full-time officials from MPWT and individual consultants funded by the WB under Section 1, as presented in Annex 2. All staff are expected to be mobilized by the end of 2020, and this is one of AIIB's loan effectiveness conditions.

D. Environmental and Social

64. **Environmental and Social Policy and Categorization.** AIIB's Environmental and Social Policy (ESP), including the Environmental and Social Standards (ESS), and Environmental and Social Exclusion List (ESEL), is applicable to the Project. ESS 1 (Environmental and Social Assessment and Management), ESS 2 (Involuntary Resettlement) and ESS 3 (Indigenous Peoples) apply to the Project. The Project has been identified as Category B on the basis that the anticipated Project environmental and social (ES) risks and impacts will be localized and temporary and can be mitigated through effective ES management.

65. **Instruments.** For the WB-financed project for Section 1 of NR13S, the client prepared in 2019 an Environmental and Social Management Framework, a Resettlement Policy Framework, and an Ethnic Groups Engagement Framework in accordance with the WB's safeguard policies. These frameworks provide guidelines for environmental and social assessments and plans for the four sections of NR13S. The frameworks provide the basis for supplemental field-based review of ES risks and impacts of this Project (section 3) undertaken by the client with the guidance of AIIB.

66. For the Project, the client has conducted an ES assessment on the basis of the conceptual design of the proposed Project and prepared an Environmental and Social Management Plan (ESMP) to address the potentially adverse ES impacts of the Project. Similarly, to address any economic displacement and resettlement impacts of the Project, the client has prepared a Resettlement Plan (RP). In addition, an Ethnic Groups Engagement Plan (EGEP) has also been prepared for this Project since ethnic minorities exist in the area. A Gender Action Plan (GAP) will also be prepared, in coordination with WB and EIB, covering the entire corridor. The Bank's team has conducted due diligence of these ES documents and confirmed their compliance with AIIB's ESP. Given the attributes of this OPBRC Project, the ES risks and impacts might vary due to the detailed design. Hence, the ESMP, RP and EGEP will need to be reviewed and updated as part of preparation of the detailed design.

67. **Environmental Aspects.** The Project is expected to create positive impacts on the environment by reducing emissions of air pollutants from traffic per kilometer traveled. The adverse environmental impacts of the Project are expected to be limited since the existing alignment will be used for the road improvement under the proposed Project. Adverse environmental impacts during the construction phase are likely to include noise, dust and air emissions, disposal of solid and hazardous wastes, water contamination, siltation of water bodies, blockage of drainage, soil erosion and contamination, and removal of vegetation, caused by various construction activities, batching and asphalt plants, construction camps, heavy machinery use, and site management issues related to the influx of workers (e.g., hygiene and sanitation, community health and safety), traffic disruption and traffic safety during construction, and occupational health and safety (OHS) risks for the construction workers. Similarly, air and noise emissions due to increased traffic flows, waste generation from road users, traffic safety, and OHS risks for workers are the potential environmental impacts during the O&M phase. Pollution may also be induced by road incidents or accidents during both construction and O&M phases as the Project is located in the catchment area of the Mekong River and several of its first order tributaries. These impacts are likely to be site-specific and limited to the Project areas and surroundings.

68. The existing NR13S is located in rural areas of Bolikhamxay and Khammouane provinces. The Project area is dominated by people-modified habitats. The Bank's due diligence has confirmed that the Project's construction and O&M activities will not have any significant impact on the natural habitat since the existing alignment will be used for road improvement.

69. The above-described impacts have been addressed in the ESMP, which includes mitigation measures for the identified risks and adverse impacts. In addition, the ESMP includes a monitoring plan, environmental code of practices, reporting mechanism and roles and responsibilities of the key institutions for its implementation. The ESMP will be included in construction contracts. Site-specific ESMPs will be prepared by the contractor prior to the construction.

70. **Climate Change Risks and Opportunities.** The major climate risks in the Project region include flooding and torrential rains. The Project is expected to create positive impact by improving the climate resilience of the road. including elevating flood-prone road sections, paving road sections with steep gradients and sections passing through large communities, slope improvement/stabilization, drainage improvement, e.g., construction of additional and larger culverts with appropriate inlets and outlets, side ditches and canals to drain run-off water.

The Project design and improvements will enable stormwater to be discharged to natural receiving watercourses, minimizing the impact to the road and adjacent surroundings.

71. **Social Aspects.** The proposed Project is expected to generate largely positive social benefits for the local population, including improved travel conditions and road safety, reduced transportation costs, and travel time, in addition to improved health outcomes due to long-term reduction in noise and dust. Productivity gains for agricultural businesses, increased competitiveness and contribution to the growth of the local economies are also expected, together with increased access to markets and social services—particularly with respect to education. Other benefits include improved connectivity between rural and urban centers, and between the southern provinces and Vientiane capital area.

72. The involuntary resettlement impacts of the Project as determined on the basis of the conceptual design include 11.4 m² of affected residential land; two affected houses with an affected area of 13 m² (one entire house shall be relocated); 16 affected shops with an affected area of 331 m²; 20 house porches with an affected area of 267 m²; 56 shop porches with an affected area of 761 m²; four huts with an affected area of 137 m²; 8 m long concrete fences; shop signs and advertisement signs with a total surface area of 48 m²; concrete slab floor with a total area of 1,633 m²; and four electricity poles.

73. Additional adverse social risks and impacts during the construction phase include temporary business disruption due to land closure or restricted access, temporary restriction of access to houses, shops, temples and graves, temporary disruption of the water and electricity supplies, impacts on schools and healthcare facilities, in terms of noise and vibration, safety and access, potential labor influx and the conduct of road workers during construction, and health and safety issues for the communities along the road. The adverse social impacts and risks during the operation and maintenance phase are mostly associated with noise and road accidents. As mentioned earlier, the ESMP includes measures to address the above impacts, including a chance finds procedure for archaeological, historical and sacred sites. In addition, to address any impacts on the ethnic minorities that exist in the area, the EGEP includes appropriate mitigation measures to be implemented during the construction as well as O&M phases.

74. **Gender.** Women and children in the Project area will be benefited by the improved transport facilities. A gender assessment has been conducted as part of the environmental and social assessment of the Project. In consultation with relevant stakeholders, including communities along the proposed corridor, measures have been identified to prevent potential adverse impacts caused by the influx of migrant workers in the community and the risk of gender-based violence, and included in the ESMP. A Gender Action Plan for the Project will be prepared in coordination with the WB and EIB.

75. **Occupational Health and Safety, Labor and Employment Conditions.** The ESMP has identified occupational health and safety (OHS) risks during both construction, and O&M phases. The OHS requirements will also be included in the contractor's site-specific ESMP. Similarly, issues related to influx of labor and code of conduct have been addressed in the ESMP. The client will require that bidding documents include clauses on those requirements. The client will also require that contractors comply with all applicable labor laws and regulations and adopt and enforce codes of conduct for all workers, following the same principles that have been adopted in the NR13N project.

76. **Stakeholder Consultation and Information Disclosure.** The consultations on the draft frameworks were conducted in 2019. Further consultations have been carried out during the development of the EGEP and update of the ESMP and RP in May-June 2020. Two consultation meetings on draft ES documents were carried out on Aug 19-20 with affected communities and local authorities. During construction, the Client is required to regularly conduct consultations with the local community and report on these consultations on a monthly basis. In addition, the client will conduct Free, Prior, and Informed Consultations (FPICon) with the affected ethnic minorities in accordance with the Government of Lao PDR’s regulations and ESS 3 provisions. The ES documentation and their executive summaries in Lao language have been disclosed, both online and made available in hard copy in the Project area. The documents in English have been posted on the client’s⁶ and Bank’s websites⁷ on July 9 and July 13, 2020, respectively. The executive summaries in Lao language have also been disclosed on the same websites.

77. **Project Level Grievance Redress Mechanism.** A multi-tier grievance redress mechanism (GRM) has been proposed at the village, district, province, and national levels for all four sections of NR13S, described in ESMP, RP and EGEP and will be implemented by the client. Communities and individuals who believe that they are adversely affected by the Project may submit complaints to the project-level GRM.

78. **AiIB Independent Accountability Mechanism.** The Project-affected People’s Mechanism (PPM) has been established by the Bank to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AiIB’s failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the processes of the Bank’s Management. Information about PPM is available at: <https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html>

E. Risks and Mitigation Measures

79. The Bank has assigned an overall “High” risk rating to the Project based on AiIB’s risk assessment and the implementation experience from the NR13N project.

Table 6: Summary of Risks and Mitigating Measures

Risk Description	Assessment Ratings (High, Medium, Low)	Mitigation Measures
<p>Timely availability of counterpart fund. The macroeconomic situation is challenging with natural disasters, in particular, with the globally evolving COVID-19 situation that put pressure on</p>	<p>High</p>	<p>Risks are partly mitigated by fiscal consolidation plans expected to be driven by stronger revenue collection and continued controls on overspending. However, considering the economic slowdown due to COVID-19 pandemic, the situation is still difficult. Ongoing</p>

⁶ <http://www.mpwt.gov.la/en/projects-en/nr1s-project-menu-en/lrsp2-af-nr13s-km-111-km-190-menu-en/09621-nr13s-menu-en>

⁷ <https://www.aiib.org/en/projects/details/2020/proposed/Lao-PDR-Climate-Resilience-Improvement-of-National-Road-13-South-Project.html>

<p>the fiscal position of the country, high fiscal and current account deficits, as well as public debt levels. Limited fiscal space reduces the ability of the Government of Lao PDR to fund maintenance of public assets, including infrastructure.</p>		<p>reforms to strengthen the Procurement and Financial Management systems and the recent approval of the public debt management law will help strengthen MoF's role and capacity to improve public finance and debt management.</p> <p>Related to the Project, the counterpart financing will be used only for the remaining period of 7 years through RF. By that time, estimated to be around mid-2023, the impact of COVID-19 presumably will be overcome, the economic activity will resume and potentially increase and, therefore, the RF contribution will be sufficient for the project financing, as planned.</p> <p>Moreover, the strong political commitment to the Project further mitigates risks. During a meeting with the Minister of Public Works and Transport, the Minister highlighted the strategic importance of NR13 and the priority of the Project among other transport projects planned in Lao PDR.</p>
<p>Institutional Capacity for Implementation and Sustainability Risks are Substantial.</p> <p>MPWT has experience in implementing MDB projects and is familiar with Bank procedures. However, the internal approval process within MPWT for the procurement of works and consultant contracts is lengthy, which could delay project implementation and disbursement. In addition, although MPWT has experience in the preparation of OPBRC contract under the Lao NR13 Improvement and Maintenance Project, knowledge and experience in managing OPBRC contracts remain limited. Moreover, the</p>	<p>High</p>	<p>Training and hands-on capacity building measures financed by the WB will ensure that MPWT is fully equipped with the necessary tools and knowledge to carry out supervision and monitoring of the operation and maintenance (O&M) work following project closure. WB funds have been allocated to (i) the operating, fiduciary, and human resource systems of MPWT and provincial and district road authorities; and (ii) the capacity of MPWT and other relevant government agencies to manage the technical, environmental and social aspects of OPBRC contract implementation.</p> <p>During the Appraisal mission, a comprehensive staffing plan has been discussed and agreed, which will mitigate the risk. All staff and consultants listed in the updated staffing plan on board will be one of the loan effectiveness conditions.</p>

<p>Project is also overloading the implementation agency which has limited resources and capacity.</p>		
<p>Climate and Disaster Risk. There is also little capacity within MPWT to incorporate disaster and climate risks into road designs, construction and maintenance.</p>	<p>High</p>	<p>Specific climate risks identified in the Project area and the required mitigation measures have been discussed and reviewed in detail during the appraisal mission. A draft climate adaptation report has been submitted and the Project team has provided comments to further improve the report. Since the detailed designs will be provided by contractor in this OPBRC/DBMOT project, for clarity of demand from the contractor, it is required to translate/summarize the findings of the report into tabular form, clearly indicating the potential climate risks, the engineering measures to be taken and the bio-engineering measures to be taken, their potential locations and provide cost estimates for each of them.</p>
<p>Financial Management. There is limited capacity within DoF, to ensure that the FM responsibilities are timely and properly executed. The lengthy payment process will impact the honoring of contractual agreements, project implementation, and ultimately overall disbursements.</p>	<p>High</p>	<p>Experienced FM Consultants will be hired. In addition, training and hands-on support will be provided to the FM team. It was agreed to prepare a payment procedures guideline to be incorporated in the Project Operations Manual, which will be one of the Loan effectiveness conditions. The guidance note will detail the procedure for processing payments starting from when invoices are received by the PMU all the way through to MoF. The payment procedures guideline will be submitted to the Bank for review and clearance by September 30, 2020.</p>
<p>Environmental and Social. PMU has limited capacity and resources as identified to implement the RP and Public Utility Relocation during the implementation of the ongoing NR13 Project.</p>	<p>High</p>	<p>Capacity building in terms of increasing the number of ES personnel within the PMU, as well as enhancing their skills, will be carried out. For this purpose, to supplement permanent staff, the PMU will engage consultants and conduct regular training for said staff and consultants. ES staff from the Bank will also undertake field-based monitoring missions on a</p>

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		regular basis to support the PMU in the implementation of the Project.
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Annex 1: Results Framework and Monitoring

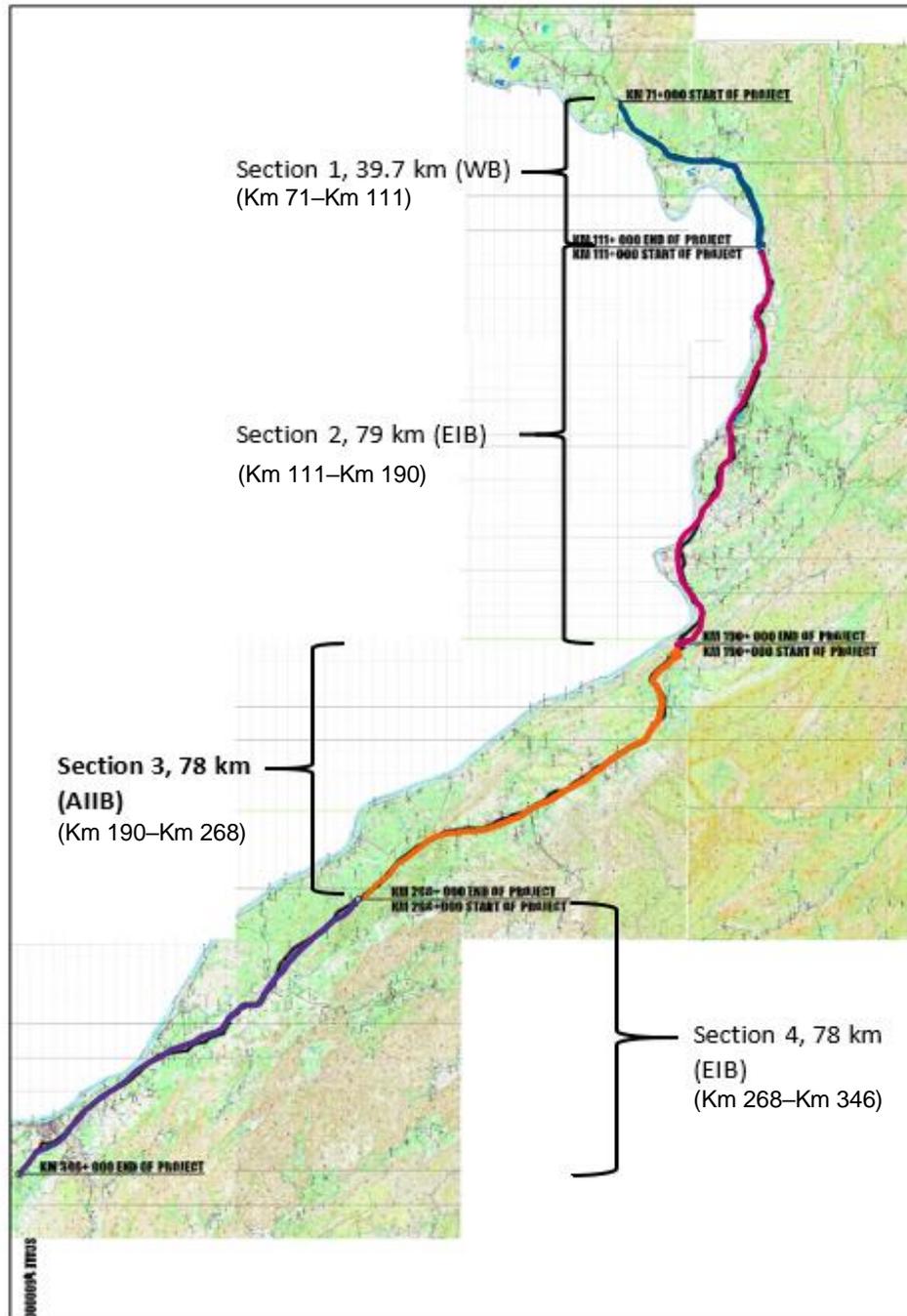
Project Objective:	To improve the road condition, safety, and climate resilience of the south section of National Road 13 (Section 3) in Lao PDR							
Indicator Name	Unit of measure	Base-line Data Year	Cumulative Target Values			End Target	Frequency	Responsibility
			Y1	Y2	Y3			
Project Objectives Indicators								
1. Reduction in vehicle operating costs on the Project road	Percentage	0	0	0	100	100	First-year of operation	MPWT
2. Increase in average IRAP star rating of the Project road	Number	1	1	1	3	3	First-year of operation	MPWT
3. Project road upgraded and improved with climate resilience measures	Yes/No	No	No	No	Yes	Yes	First-year of operation	MPWT
Intermediate Results Indicators								
1. Reduction in average International Roughness Index (IRI) for finished sections	Number	7	3	3	3	3	Annual	MPWT
2. Road constructed or rehabilitated	km	0	25	50	78	78	Annual	MPWT
3. Kilometers of roads ready for the O&M phase under OPBRC/DBMOT modality	km	0	0	0	78	78	Annual	MPWT

Note: The Project implementation period for AIIB will be 3 years and will correspond with the above results framework as follows: Year 1 (April 2021 – April 2022), Year 2 (April 2022 – April 2023), and Year 3 (April 2023 – April 2024).

Annex 2: Detailed Project Description

A. Map of the Project

Figure 1: NR13S Program



B. Key Design Parameters

- Two-lane rehabilitation (Km 190 to Km 268): total width of nine meters (m), out of which the road width varies for the sections through the community and non-community areas:
 - In the community area: Roadway width of 12 m, traffic lanes 3.5x2, slow lanes 2.50x2, sidewalks 1.50x2
 - In the non-community area: Roadway width of 9 m, traffic lanes 3.5x2, shoulders 1.00x2
- Hot Mix Asphalt (flexible pavement) will be used for this project.
- Design speed: 80 km/h
- Number of traffic lanes: 2
- Traffic lane width: 3.5 m
- Pavement layer consists of:
 - 300 millimeter (mm) sub-grade (depending on traffic and California Bearing Ratio (CBR) values of the sub-grade)
 - 200-250 mm sub-base.
 - 200 mm base course.
 - 50 mm binder course.
 - 50 mm surface course.
- The road pavement structure will be designed depending on the quality of both the existing material and the sub-grade, and traffic volumes.
- The road horizontal alignment mainly follows the existing road alignment, the improvement will affect at below minimum hazardous horizontal curves by increasing the curve radius and with road widening at the curves to allow for the required site clearance and visibility.
- The vertical curves and the existing drainage system will be rectified and/or re-designed to improve the climate resilience of the road based on the hydraulic report.
- The slope protection including the inlet and outlet of culverts will be designed to enable safe water flow without erosion.
- In village areas, the type of side ditch has been designed as rectangular reinforced concrete canal covered by slabs, for pedestrian safety.
- At community areas, pedestrian crossings have been designed with warning signs, speed limit control and flashing amber signal lights.

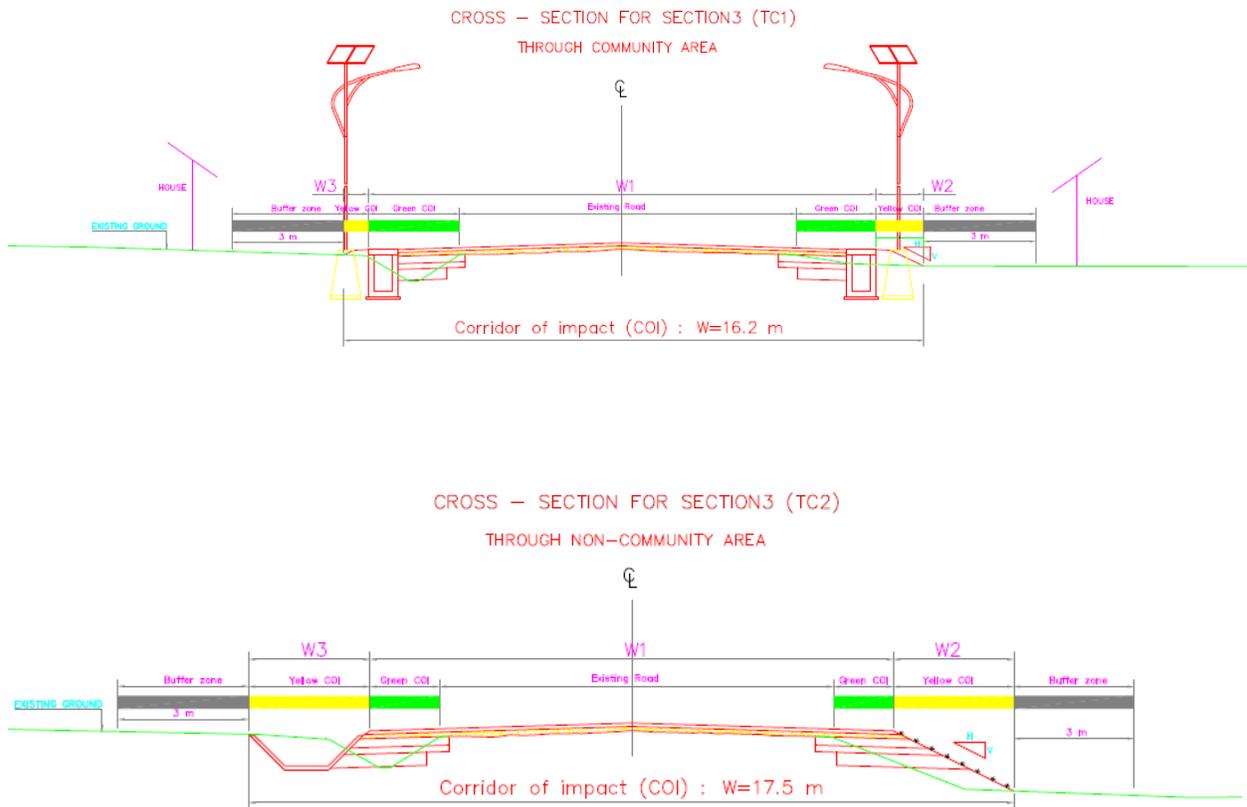
C. Lessons Learned. The Team highlighted the lessons learned from the previous road projects, in particular, the earlier Lao NR13 (North) project, jointly financed by the World Bank (WB) and the Asian Infrastructure Investment Bank (AIIB), that is currently under implementation.

- **Resettlement Plan and Public Utility Relocation.** NR13N has experienced a delay of implementation of both the Resettlement Plan (RP) and Public Utility Relocation (PUR), especially for RP, where double works and additional costs for its preparation and

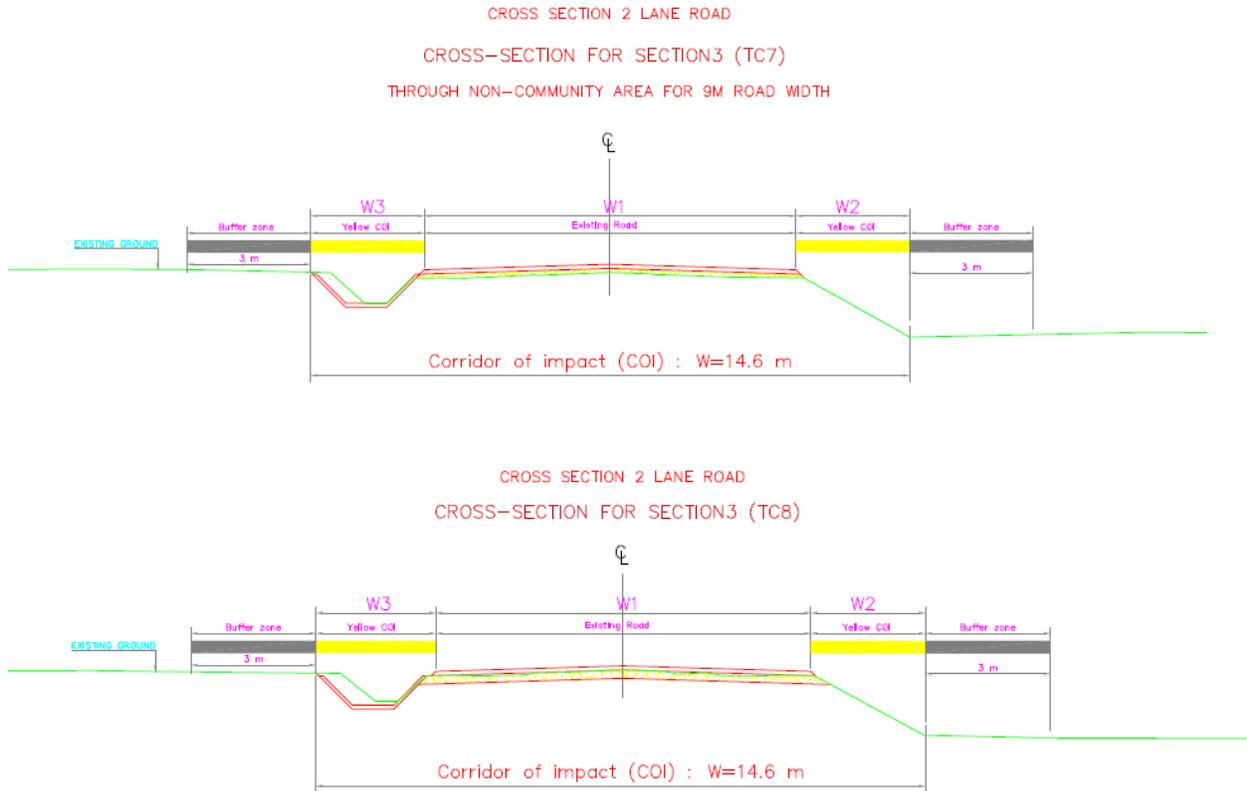
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implementation have been experienced. The root cause is that there was no clear identification of the corridor of impact (COI) before the preparation and implementation of the RP. Therefore, the Team reiterates that the COI of NR13S needs to be clearly defined by the Department of Roads (DOR) in writing and marked before RP preparation. Moreover, the detailed design to be developed by the contractor needs to be developed within the COI. All related data and requirement should be incorporated into the RP, Tender Documents, as well as the final Project Document of AIIB. DoR is required to prepare four typical cross-sections of Section 3, with clear identification of the COI marked on the cross profiles. The typical cross-sections should clearly indicate where the high-water levels are that will potentially affect the road design, as shown in Figure 2.

Figure 2: Typical Four Cross-sections in Section 3 of NR13S



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Source: DOR

- In addition, to avoid a potential delay caused by the implementation of the RP and/or PUR, it is agreed that the implementation of RP and PUR will be carried out by the Project Management Unit (PMU) through engaging a third party agent as necessary, and 70 percent of RP and PUR need to be completed before the commencement of works. This will be one of AIIB's conditions for possible loan effectiveness.
- Project Risk Allocation Matrix. The nature of an Output and Performance-Based Road Contract (OPBRC) under Design, Build, Maintain, Operate and Transfer (DBMOT) is the equitable transfer of project risks to the party best fit to mitigate that risk. All construction and other risks during the Operation and Maintenance (O&M) phase will be transferred to contractor while the number of potential risks can be shared or allocated to the owner of the project. For instance, damages to bridges and pavement before and after construction period should be the responsibility of the contractor as the contractor is supposed to conduct their own assessment of existing structures and develop detailed designs accordingly. Therefore, PMU is required to prepare a detailed risks allocation and mitigation matrix and incorporate it into the Tender Documents (TD) to avoid potential claims from contractor during the implementation stage.
- For instance, damages to bridges and pavement before and after construction period should be the responsibility of the contractor as the contractor is supposed to conduct their own assessment of existing structures and develop detailed designs accordingly. Therefore, PMU is required to prepare a detailed risks allocation and mitigation matrix and

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incorporate it into the Tender Documents (TD) to avoid potential claims from contractor during the implementation stage.

- Given the payment delay of around four months that is happening with the NR13N project, it was agreed that a **payment procedures guideline** will be prepared and incorporated in the Project Operations Manual, and which will be one of the conditions for loan effectiveness. The payment procedures guideline will be submitted to the Bank for review and clearance. The guidance note should detail the procedure for processing payments starting from when invoices are received by the PMU all the way through to the MoF. The procedure should reflect:
 - a. A checklist or template for contractors and consulting firms, enabling contractors to have a clear understanding of the supporting documents required for the processing of payments. Similarly, a checklist should also be prepared reflecting the supporting information or approvals required by the PMU, DoR, and MoF. Such checklist is expected to be attached to each payment document to ensure consistency and reduce the possibility of inaccuracies.
 - b. The specific procedures and approvals required by the PMU, DoR, DoF and MoF.
 - c. Time frame in which each department is expected to execute the required checks and approvals enabling payment.
 - d. List of common errors or inaccuracies to be cautious of.
- **Staffing Plan.** The Team expressed serious concerns on the understaffing of PMU, more specifically, the lack of qualified senior staff in PMU and DoF. The Project poses a significant increase in the workload that will impose a challenge to PMU, which will subsequently affect the timely and orderly preparation and implementation of the Project if no additional staff or consultant are hired to support PMU. In that light, it was agreed that one senior technical engineer will be allocated to PMU and one additional financial management (FM) specialist or consultant will be engaged for DOF for NR13S. The updated staffing plan is shown in Table 1.

Table 1: Project Management Unit Staffing Table

Staff				
No.	Status	Roles	Department	Remarks
1	On board	Project Manager	DoR	Full-time
2	On board	Deputy Project Manager	DPWT in Bolikhamxay Province	Full-time, coordinating in Bolikhamxay province
3	On board	Deputy Project Manager	DPWT in Khammouan Province	Full-time, coordinating in Khammouan Province
4	On board	Coordinator	OPWT in Thaphabath District	Full-time, coordinating in Thaphabath District
5	On board	Coordinator	OPWT in Pakkading District	Full-time, coordinating in Pakkading District
6	On board	Resettlement Committee (RC)	OPWT in Hinboun District	Full-time, coordinating in Hinboun District

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7	On board	ES coordinator	PTRI/Deputy Head of Division	Full-time
8	On board	ES assistant	PTRI	Full-time
9	To be assigned	Project Assistant	DoR	Full-time

Consultants

No.	Status	Roles	Period	Remarks
10	On board	Procurement consultant	Intermittent. Oct. 1, 2018 – Sep. 30, 2020, can be extended if necessary	Already onboard
11	On board	ES consultant	Intermittent 2020-2021 recently proposed to extend till 2022	Already onboard
12	1 to be engaged	PMU technical consultant for both NR13 N&S in the overall project management	Intermittent 24 months from Oct. 2020 to Oct. 2022	Under procurement process
13	1 to be engaged	National Financial Management Consultant	Full-time 24 months 2 years till 2023	Preparing TOR and Request to WB for approval
14	1 to be engaged	National Senior Social Safeguard Consultation (NSSC) to support the implementation of RP and EGEP of NR13S (all 4 sections)	Full time 8 months Part time 4 months Aug. 2020-2022	Under procurement process
15	1 to be engaged	National Environmental and Social Management Consultant (NESMC) to support Senior consultant during RP and EGEP implementation from July 2020 to March 2021 after that will follow up both LRSP2 and NR13S	Full-time 12 months Part-time 12 months 2 years till 2023	Under procurement process
16	4 to be engaged	ESS supporting staffs (junior/ new graduated) to assist in implementation of RP, EGEP and ESMP of LRSP2 + AF(NR13S)	Full time 2-3 years (will be on board in Aug. 2020)	Under procurement process. After completion of RP implementation, 2 staff will be mobilized to LRSP2 projects and 2 staffs will remain for NR13S for monitoring

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				of project implementation
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AF=Additional Financing, LRSP2=Lao Road Sector Project 2

Note: 1.8 staff from MPWT and 2 consultants are already onboard, 1 more staff will be assigned to assist PMU, 5 more consultants will be on board by December 2020, in total 19 in PMU. 2. All consultants are and will be financed by WB.

Annex 3: Economic Analysis

A. Introduction

1. A Cost-Benefit Analysis (CBA) was conducted to calculate the Economic Internal Rate of Return (EIRR) and Net Present Value (NPV) of road improvement based on a standard methodology for the appraisal of road investments. The scope of the Project involves 78 kilometers (km) of road rehabilitation which will use Hot Mix Asphalt (flexible pavement). The investment comprises a two-lane section from Km 190 to Km 268 and is part of a government program to improve the 275-km long National Road 13 south (NR13S) from Km 71 (Thapabath district) to Km 346 (Khammouane Province). A separate World Bank (WB)-supported project covers Km 71 to Km 111 (Section 1) of the NR13S, and a European Investment Bank (EIB)-supported project covers Km 111 to Km 190 (Section 2) and Km 268 to Km 346 (Section 4) of NR13S. The proposed AIIB Project covers Section 3 of the NR13S. The road improvement project is expected to improve road safety, increase road capacity to serve growing demand, and enhance the climate resiliency of roads.

B. Methodology and Key Assumptions

2. The economic evaluation covers the 20-year life cycle period for asphalt concrete roads. Road improvement will occur over the first three years and it is assumed that road operations and maintenance will continue for 17 years. The economic analysis is based on comparisons of costs and benefits under the without-project and with-project scenarios. The without-project scenario assumes that no major rehabilitation of the project road section will take place. Costs and benefits are valued based on economic prices. Specifically, the standard conversion factor of 0.92 for construction and 0.87 for maintenance were used to convert financial costs to economic costs. The construction cost and annual operation and maintenance cost estimated by the design consultant was included in the assessment. The social discount rate used is 9 percent. The analysis is expressed in terms of EIRR and NPV and is made for the whole NR13S and specifically for Section 3, which is the section that AIIB is funding.

C. Estimating Economic Benefits

3. **Traffic Forecast.** The economic analysis starts with analyzing current traffic demand and making traffic forecast during the project life. The Annual Average Daily Traffic (AADT) was estimated based on traffic surveys carried out in October-November 2019 which included six traffic count locations along the 275-km NR13S.

4. Based on traffic data, AADT for 2019 on Section 3 of the NR13S was 4,616 vehicles per day. AADT for the 275-km NR13S was 6,329 vehicles per day. For Section 3, this comprises of 1,905 cars/day (41 percent of total traffic), 1,614 motorcycles/day (35 percent of total traffic), and 1,097 heavy vehicles (buses and trucks)/day (24 percent of total traffic). A similar proportion can be observed for the whole NR13S. AADT for each NR13S Sections are provided in Table 1, disaggregated by vehicle type.

Table 1: Annual Average Daily Traffic (AADT) (vehicles/day), 2019

	Motorcycle	Car	Bus	Truck	Total
Section 1	2,460	2,432	814	702	6,408
Section 2	2,435	3,376	850	885	7,546
Section 3	1,614	1,905	544	554	4,616
Section 4	2,983	2,305	615	866	6,768
<i>Weighted average of NR13S</i>	<i>2,361</i>	<i>2,518</i>	<i>691</i>	<i>759</i>	<i>6,329</i>

Source: Lao PDR Transport Engineering Consultant, Traffic Survey Data, April 2020.

5. Forecasted future traffic were based on real GDP growth rates, registered vehicles and historical traffic trends in NR13S. Real GDP grew at around 6.5 percent in Lao PDR on average between 2015 and 2019, albeit projected to grow at a slower rate of 3.6 percent for 2020 due to COVID-19. Real GDP growth is forecasted to rebound and increase to 5.8 percent in 2021 and 5.3 percent in 2022.¹ Vehicle registrations from 2013-2018 in the country saw significant increases: 9.8 percent for motorcycles, 17.8 percent for cars, 8.1 percent for buses and 12.4 percent for trucks. Traffic growth rates adopted for the 275-km NR13S, including Section 3, are shown in Table 2.² Considering the ongoing COVID-19 pandemic and possible implications on connectivity with neighboring countries, it is expected that traffic volume in NR13S will not be much affected. NR13S is expected to primarily serve domestic needs, while also contributing to Lao PDR's integration into the regional/global economy.

Table 2: Forecasted Annual Traffic Growth Rates (%), 2015-2040

Period	Motorcycle	Car	Truck/Bus
2020-2025	6.0%	6.0%	6.0%
2025-2030	5.5%	5.5%	5.5%
2030-2035	5.0%	5.0%	5.0%
2035 and beyond	4.0%	4.0%	4.0%

Source: World Bank

6. The major economic benefits of the proposed investment arise from (i) vehicle operating cost (VOC) savings (due to improved road condition), (ii)-(iii) travel time savings to passengers and freight, (iv) emergency road maintenance costs avoided, and (v) avoided costs related to road accidents.

7. **Vehicle Operating Cost (VOC) Savings.** The project is expected to reduce VOC due to improved road conditions [i.e., from international roughness index (IRI) of 5 (fair) under the without-project scenario to 3 (good) under the with-project scenario], which will result in increased traffic speed from approximately 40 km per hour to 70 km per hour. VOC savings per vehicle-km for each type of vehicle in the with- and without-project scenario is approximated based on Highway Design and Management (HDM-4) modelling as shown in Table 3 below. VOC savings

¹ World Bank. 2020. East Asia and Pacific Economic Update. (April).

² These were also the growth rates used by World Bank as part of its Economic Analysis for Section 1 of NR13S.

were calculated based on total vehicle-km forecasted, average VOC savings and length of the road sections.

Table 3: Vehicle Operating Cost (USD per Vehicle-KM)

	Without Project	With Project	VOC Savings
Motorcycle	0.0902	0.0901	0.0001
Car	0.2110	0.2052	0.0058
Bus	0.5893	0.5525	0.0368
Truck	0.6394	0.6059	0.0335
Average	0.3449	0.3298	0.0151

Km = kilometer

Source: World Bank.

8. **Passenger Travel Time Savings.** With improved speed (i.e., from 40 km per hour to 70 km per hour), the journey time of the project road is estimated to be reduced by approximately 0.0107 hour per vehicle-km. The average passenger load factor assumed is 1.5 passengers per vehicle. The value of time for passengers is estimated using the proxy of average wage rate of the project road users which is estimated at USD0.81 per hour.³ This is a weighted average of the wage rates of three passenger groups (i.e., USD0.60 per hour for motorcycle passenger, USD1.05 per hour for car passenger and USD0.78 per hour for heavy vehicles).

9. **Freight Travel Time Savings.** To estimate the commercial value of time savings for freight, the economic analysis adopted the Value of Delays (VOD) which is the value of time to commercial vehicles due to highway congestion. Since a VOD estimate is not available for Lao PDR, VOD based on a study conducted in the US was used as proxy to estimate VOD in the context of Lao PDR. VOD in the US was estimated to range between USD49.90 and USD58.11 per vehicle per hour in 2014, depending on location.⁴ The lower estimate of USD50 was chosen and then adjusted to 2019 prices and also adjusted to the context of Lao PDR based on the difference in the national per capita income between the US and Lao PDR. VOD for this project was estimated at USD 4.85 per vehicle per hour.

10. **Emergency Road Maintenance Cost Avoided.** Another benefit quantified is avoided cost for emergency road maintenance. The Project road has been periodically affected by seasonal flooding with various degrees of severity during the monsoon season. Thus, without the project, Ministry of Public Works and Transport (MPWT) will need to spend more budget to carry out emergency maintenance to repair such damages. By making the Project road more climate resilient, the project will result in avoided budget MPWT needs for emergency maintenance compared to the without-project scenario; the budget saved could be spent elsewhere to maintain the road network. The avoided cost of emergency maintenance is estimated from the average emergency maintenance budget which is currently being spent by MPWT at USD70,000 per km.⁵

³ Leigh Fischer. 2015. PPP Project Traffic Study.

⁴ See: Qing Miao, Bruce X. Wang, and Teresa M. Adams. 2014. Assessing the Value of Delay to Short-Haul Carriers; and Florida Department of Transportation. 2014. The Impact of Freight Delay to Economic Productivity.

⁵ World Bank, Lao Road Sector Project 2.

As flooding events are periodic and their occurrence cannot be predicted with certainty, the economic analysis assumed that the probability of disaster is once every three years and expected to affect 20 percent of the road sections. The average emergency maintenance cost is then annualized accordingly.

11. **Avoided Costs of Accidents.** Another key benefit of the project is to improve road safety for both pedestrians and road users which will result in avoided fatalities on the Project road and other injury-related costs. To quantify this benefit, the economic analysis first derived the baseline accidents rate which was based on road accident statistics for the Bolikhamxay and Khammouane provinces, where sections of NR13S are located. In 2018, there were 263 accidents in Bolikhamxay, of which 53 resulted in fatalities. There were 262 accidents in Khammouane, of which 29 resulted in fatalities. It was estimated that 10 fatalities and 83 injuries occurred on NR13S annually. The project is assumed to reduce traffic accidents both in terms of fatalities and injuries by 10 percent each year compared to the without-project scenario. The value of a fatality and an injury is then estimated based on the Value of Statistical Life (VSL) using willingness-to-pay approach according to a formula published by IRAP. IRAP recommends the ratio of VSL to GDP per capita at 70. The reasonable value of serious injury is recommended at 25 percent of the value of fatality.⁶

D. Estimating Economic Costs

12. The project's economic costs include: (i) construction costs, including civil works for upgrading the road to Hot Mix Asphalt and excluding land acquisition and contingencies; (ii) annual operations and maintenance (O&M) costs; and (iii) periodic maintenance costs. Construction and annual O&M cost estimates come from the April 2020 conceptual design report and bill of quantities (BOQ). Periodic maintenance cost is assumed for every eight years after the first 10 years. The financial cost of construction is USD37.2 million for Section 3 and USD148.7 million for the whole NR13S. The financial cost of annual O&M is around USD466,000 for Section 3 and USD1.6 million for the whole NR13S. These financial costs are converted into economic costs at the conversion factor of 0.92 for construction costs and 0.87 for maintenance costs.

E. Results of Economic Analysis and Sensitivity Analysis

13. Based on available data and assumptions adopted in the base case, Section 3 of NR13S has an EIRR of 24.7 percent and NPV of USD51.16 million at a 9 percent discount rate. For the 275-km NR13S, EIRR is calculated at 25.9 percent while NPV is estimated at USD234.37 million. The EIRR is well above the opportunity cost of 9 percent and the project is considered economically viable. The results of economic analysis are shown in Table 4.

Table 4: CBA Results for Base Case

	TOTAL	Section 1	Section 2	Section 3	Section 4
EIRR	25.9%	21.8%	29.3%	24.7%	26.0%

⁶ IRAP. 2007. The True Cost of Road Crashes: Valuing Life and the Cost of a Serious Injury.

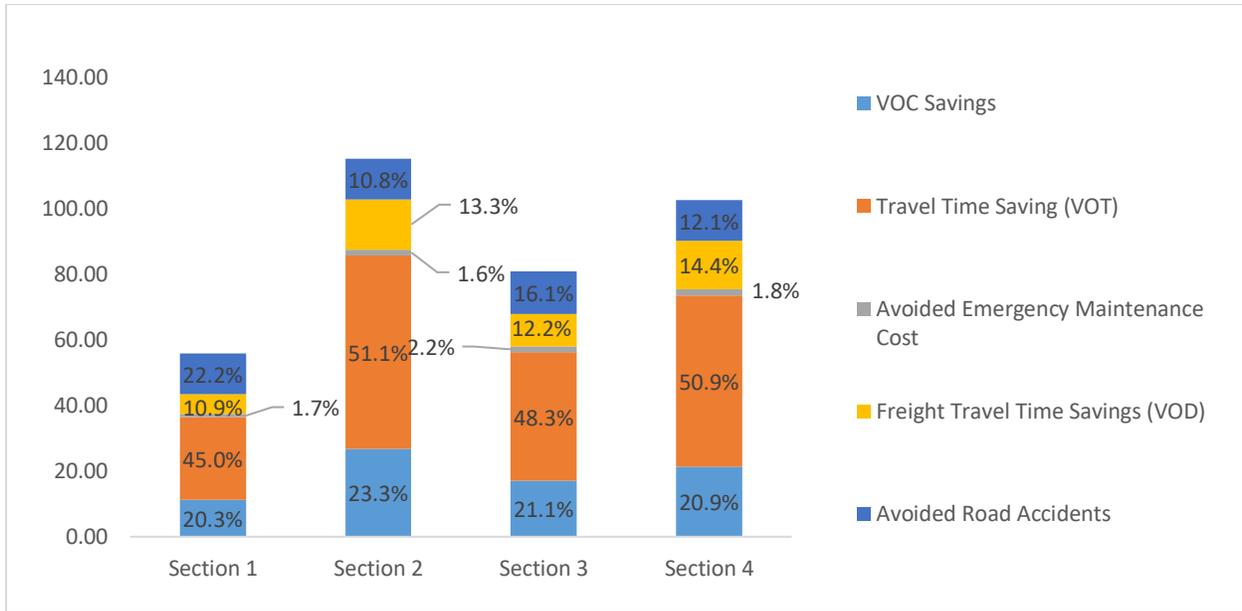
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NPV (USD million)	234.37	32.68	82.35	51.16	68.18
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CBA = cost benefit analysis, EIRR = Economic Internal Rate of Return, NPV = net present value

14. The composition of NPV benefits in the various NR13S sections is shown in Table 5. Across NR13S sections, it can be seen that travel time savings to passengers constitute the largest share of the economic benefits, at around 50%. This is followed by VOC savings, with a share at over 20 percent.

Table 5: Composition of Net Present Value Benefits



NPV = net present value, VOC = vehicle operating cost, VOD = value of delays, VOT = value of time

15. Sensitivity analysis was conducted to test the robustness of the Project's economic viability based on project-specific and market risks, including cost overruns and reductions in forecasted demand. Sensitivity tests were carried out for six scenarios including: (1) 20 percent increase in maintenance costs; (2) 20 percent increase in construction costs; (3) 20 percent increase in both maintenance and construction costs; (4) 20 percent of the traffic moves to railway (i.e., the Vientiane-Khunming High Speed Rail is currently under construction) and/or expressway (the Vientiane-Vangvieng Expressway is being proposed) starting 2023; (5) no generated traffic; and (6) a combination of Scenarios 3, 4 and 5. The results of the sensitivity analysis are shown in Table 6. In all scenarios, the EIRR is well above the hurdle rate of 9 percent. This shows that the Project investment is robust and can withstand variations in both cost and demand shocks.

Table 6: Sensitivity Analysis

Scenarios	Section 1		Section 2		Section 3		Section 4	
	EIRR	NPV	EIRR	NPV	EIRR	NPV	EIRR	NPV
(1) Maintenance cost increases by 20%	21.8%	32.68	29.3%	82.34	24.7%	51.15	26.0%	68.17
(2) Construction cost increases by 20%	18.9%	28.46	25.8%	76.59	21.5%	46.01	22.7%	62.11
(3) Both construction and maintenance costs increase by 20%	18.9%	28.45	25.8%	76.58	21.5%	46.00	22.7%	62.11
(4) Traffic moves to railway and/or expressway by 20% starting 2023	18.5%	22.33	25.8%	63.30	21.7%	38.69	22.8%	51.52
(5) No generated traffic in 2021	21.8%	32.68	29.3%	82.35	24.7%	51.16	26.0%	68.18
(6) Combination of (3) (4) and (5)	15.8%	18.10	22.5%	57.53	18.8%	33.53	19.8%	45.45

EIRR = Economic Internal Rate of Return, NPV = net present value

F. Greenhouse Gas Emissions Analysis

16. A greenhouse gas (GHG) emissions analysis based on fuel (diesel and gasoline) consumption rates at different speeds under with-project and without-project scenarios was conducted. Under the without-project scenario, existing road conditions limit the speed of vehicles and increases fuel consumption per vehicle-km compared to the with-project scenario. Under the with-project scenario, improved road conditions improve vehicle speed, thereby reducing fuel consumption. Reduction in fuel consumption will lead to a reduction in carbon emissions. Table 7 showcases the gross GHG emissions under the with-project scenario, total net GHG emissions (after taking the difference between GHG emission under with- and without-project scenario), and annual average net GHG emission over the 20-year project period. The social benefits from GHG reduction from each NR13S section are calculated using the shadow prices of carbon (e.g., USD44 per ton in 2024, USD63 per ton in 2040).⁷ Results show that for Section 3, carbon emission is estimated to decrease by 245,975 tons. The social benefit of emission reduction amounts to USD13.44 million.

Table 7: Greenhouse Gas Analysis

	TOTAL	Section 1	Section 2	Section 3	Section 4
Gross GHG emission under with-project scenario (tCO₂e)	5,668,842	862,674	1,987,824	1,271,216	1,547,126
Total net GHG emission (tCO₂e)	-1,108,710	-171,314	-390,048	-245,975	-301,373

⁷ This is based on the World Bank's Guidance Note on the shadow price of carbon in economic analysis (Nov. 12, 2017). The figures for the social benefits of emission reduction are conservative estimates since the lower price estimate was used.

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Annual average net GHG emission (tCO₂e)	-55,435	-8,566	-19,502	-12,299	-15,069
Social benefit of emission reduction (USD million)	59.37	9.12	20.74	13.44	16.06

GHG = greenhouse gas, NPV = net present value

Annex 4: Sovereign Credit Fact Sheet**A. Recent Economic Development**

1. Lao People's Democratic Republic (Lao PDR) is a lower-middle income economy with a GDP per capita of USD2,670 in 2019 and a population of 7.2 million. Gross domestic product (GDP) growth averaged 7.8 percent over the last decade, with the use of the country's natural resources—mostly water, minerals and forests—contributing around one-third of this growth. Real GDP growth was slightly moderate from 6.8 percent in 2017 to 6.3 percent in 2018 and was an estimated 6.4 percent in 2019 due to lower industrial and agricultural production (as a result of natural disasters), fewer tourist arrivals, tighter credit condition and stagnation in exports and electricity generation. 2020 economic growth is dimmed by the ongoing COVID-19 pandemic. Negative spillovers are expected to affect key sectors such as tourism, construction and manufacturing.
2. Inflation averaged 2.0 percent in 2018 but is projected to have increased to 3.3 percent in 2019, reflecting an increase in food prices. Current account deficit remained structurally high, at about 12 percent of GDP, even though imports contracted faster than exports in 2019. Gross international reserves are very low at around one month of prospective imports (way below the adequate reserve level of four to six months of imports).
3. Fiscal deficit decreased from 5.5 percent in 2017 to a projected 4.9 percent in 2019, thanks to efforts to improve revenue administration (e.g., rollout of electronic tax payment systems) and optimize spending (e.g., reduce civil service recruitment and re-prioritize capital spending for post-disaster repair needs). Meanwhile, public debt remained high at 57 percent of GDP in 2018 and almost 60 percent in 2019. External debts were projected to slightly decrease to 90 of GDP in 2019 but remain relatively high. Much of it are related to productive infrastructure projects, though. The currency has continued to gradually weaken since 2015.

B. Economic Indicators**Table:** Selected Macroeconomic Economic Indicators (2015-2020)

Economic Indicators	2015	2016	2017	2018	2019*	2020*
Real GDP Growth	7.3	7.0	6.9	6.3	4.8	3.6
CPI (% change, average)	1.3	1.8	0.8	2.0	3.3	4.8
Current account balance (% of GDP)	-22.4	-11.0	-12.1	-11.5	-11.3	-13.4
Central government overall balance (% of GDP)	-5.6	-5.1	-5.5	-4.7	-4.9	-6.0
Public sector debt (% of GDP)	53.1	54.2	55.8	57.2	59.9	63.5
Public gross financing needs (% of GDP)	7.8	10.0	9.3	9.2*	7.6	8.6
External debt (% of GDP)	94.2	89.0	92.6	92.9	90.0	N/A
Gross external financing need (USD billion)	1.7	1.6	1.0	1.8*	2.1	N/A
Gross official reserves (months of imports)	1.7	1.3	1.5	1.2	1.3	1.0
Foreign direct investment (% of GDP)	7.5	6.8	9.9	7.8	7.6	N/A
Broad money (M2, % annual change)	14.7	10.9	12.2	8.4	16.7	N/A

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Exchange rate (Kip/USD, EOP) **	8,148	8,151	8,293	8,530	8,677	N/A
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Note: * denotes projected figures. ** FX data from Business Insider, 2020 FX rate as of 2020/03/31.

Source: IMF World Economic Outlook, October 2019; IMF, August 2019. Country Report No. 19/267, 2019 Article IV Consultation; World Bank 2020 East Asia and Pacific Economic Outlook (figures in italics).

C. Economic Outlook and Risks

4. In the near term, for 2020, economic growth is expected to slow to about 3.6 percent (or less depending on the scenario), due to the ongoing COVID-19 pandemic that is affecting demand and capacity utilization of its tourism, construction and manufacturing sectors. However, in the long-term, the International Monetary Fund (IMF)⁸ expects favorable growth supported by private investment, electricity exports, and completion of a key infrastructure project. Apart from COVID-19-related risks and uncertainties, downside risks stem from high public debt and deficits, a vulnerable external position with low international reserves, and a slowdown in key trade and investment partners' economies (e.g., China, Thailand and Vietnam), potentially affecting exports and capital flows. High debt levels and low international reserves (coupled with high dollarization and balance sheet vulnerabilities) weaken Lao PDR's capacity to address external shocks and increase debt sustainability risks. Other risks include slow implementation of structural reforms in the fiscal sector, weather-related shocks, and financial risks related to an increase in nonperforming loans and low liquidity in the banking sector. On the upside, structural weaknesses are being addressed through fiscal consolidation, reforms that strengthen economic governance, and policies that support credit recovery (e.g., lifting of interest rate caps and resolution of non-performing loans pertaining to past infrastructure projects).
5. On debt outlook, IMF assesses Lao PDR as having a high risk of debt distress. Public debt is about 60 percent of GDP, of which public and publicly guaranteed (PPG) external debt comprises the bulk of debt stock (about 50 percent of GDP). Between 2015 and 2019, debt increased by about 7 percentage points due to increasing sovereign bond issuances in the Thai capital market and higher borrowing from China (currently its single largest creditor at 43 percent of PPG debt). Contingent liabilities associated with public-private partnerships, recapitalization needs of the banking sector and unknown costs related to mitigation and prevention of COVID-19 likewise increase balance sheet vulnerabilities. On the upside, strong electricity exports markets (with earnings secured under long-term power purchase agreements), reprioritization of investment projects and planned cuts in civil service employment should help ease debt accumulation. Debt-related priorities highlighted by IMF include boosting the fiscal space, implementing clear guidelines for sovereign debt issuance and guarantees, improving debt management and evaluating contingent liability vulnerabilities. To reduce the debt burden, IMF suggests external borrowing to finance infrastructure projects should be contracted on concessional terms as much as possible to advance debt sustainability.

⁸ IMF. 2019. Country Report No. 19/267, 2019 Article IV Consultation. (August).