LAO PEOPLE'S DEMOCRATIC REPUBLIC
PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY

MINISTRY OF PUBLIC WORKS AND TRANSPORT

DEPARTMENT OF ROADS

The Southeast Asia Regional Economic Corridor and Connectivity Project(P176088)

FEASIBILITY STUDY AND ENVIRONMENT AND SOCIAL ASSESSMENT (ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

Local Road Climate Resilient Improvement and Maintenance in Luang Prabang Province

(Local Road Number 2571, 2652 and 2931-3170)

VOLUME 6A

Environmental and Social Management Plan (ESMP)

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TABLE OF CONTENTS

1. PROJECT DESCRIPTION 1
1.1 Project overview 1
1.2 Detailed description of components 2
1.3 Overview of socio-economic and environmental information 23
1.4 Environmental baseline of local roads 2571, 2652 and 2931-3170 27
1.4.1 Physical Elements 27
1.4.2 Biological Elements 30
1.5 Socio-economic baseline of Local Roads 2571, 2652 and 2931-3170 31
1.5.1 Community and Population 31
1.5.2 Education and Health 31
2. INSTITUTIONAL AND LEGAL FRAMEWORK 33
2.1 Environmental Laws, Regulations, Guidelines, and Standards 33
2.2 Laws, Regulations and Standards on Social, Land and Ethnic Matters 35
2.2.1 Institutional Responsibilities and Legislation 39
2.2.2 Applicable World Bank Environment and Social Standards (ESS) 40
2.2.3 Gaps Analyses of Lao Legal and Relevant WB's ESS 43
3. POTENTIAL E&S RISKS AND IMPACTS and MITIGATION MEASURES 47
3.1 Overall Impacts 47
3.1.1 Cumulative Impacts 86
3.1.2 Cause of Impacts 86
4. GRIEVANCE REDRESS MECHANISM (GRM) 86
4.1 Introduction 86
4.2 Grievance Redress Service (GRS) 90
5. CONSULTATION AND INFORMATION DISCLOSURE 90
6. BUDGET PLAN FOR ESMP IMPLEMENTATION AND CAPACITY BUILDING 93
6.1 Implementation, Monitoring, and Reporting Responsibilities 93
6.2 ESMP Capacity Building and Training 95
6.3 ESMP Implementation Budget 96

LIST OF FIGURES

Figure 1. Location of Local Roads as approved by DOR, MPWT 3
Figure 2. Location of Local Road No. 2571 4
Figure 3. Location of Local Road No. 2652 4
Figure 4. Location of Local Road No. 2931-3170 5
Figure 5. Typical Cross Section of Local Road No. 2571 8
Figure 6. Type of Pavement Proposed by Chainage of Local Road No. 2571 8
Figure 7. Typical Cross Section of Local Road No. 2652 9
Figure 8. Type of Pavement Proposed by Chainage of Local Road No. 2652 10
Figure 9. Typical Cross Section of Local Road No. 2931-3170 10
Figure 10. Type of Pavement Proposed by Chainage of Local Road No. 2931-3170 11
Figure 11. List of Existing Culverts for Local Road No.2571 14
Figure 12. List of Side Drainages for Local Road No.2571 15
Figure 13. List of Existing Culverts for Local Road No.2652 18

Figure 14. List of Side Drainages for Local Road No.2652 19
Figure 15. List of Existing Culverts for Local Road No.2931-3170..... 21
Figure 16. List of Side Drainages for Local Road No.2931-3170 22
Figure 45. GCLS process as part of the GRM 87
Figure 46. Grievance Resolution Flow Chart..... 89

LIST OF TABLES

Table 1. Sensitive Receptors along the COI of Local Roads in Luang Prabang province..... 6
Table 2. Accessibility to Social Infrastructure and Services..... 26
Table 3. Population in the project area..... 31
Table 4. List of key Lao PDR environmental legislations applicable to the project..... 38
Table 5. Relevant ESSs to the local road project implementation 40
Table 6. Summary of Main Gaps of Lao Legal and Relevant WB's ESS 43
Table 7. Generic Environmental and Social Management Plan Local Road No. 2571 at km Km 0 to Km 20+920 of Luang Prabang City and Local Road No. 2652 at Km 0+000 to Km 27+870 of Yord Ou District..... 50
Table 8. Site Specific ESMP, Local Road No. 2571..... 73
Table 9. Site specific ESMP Local Road No.2652 76
Table 10. Site specific ESMP Local Road No 2931-3170 82
Table 11. Instrumental Monitoring for the Construction and Operational Phase 85
Table 12. List of contact persons for submission of grievance at each level..... 88
Table 13. Date and Participants of Public Consultation Meetings in each Village 91
Table 14. ESMP Implementation 93
Table 15. ESMP Implementation Budget..... 96

LIST OF APPENDIXES

Appendix 1. Relevant details related to the project background

Appendix 2. Level of poverty and vulnerability in the project areas

Appendix 3. National Environmental Standard Parameter

Appendix 4. Manager Code of Conduct

Appendix 5. Individual Code of Conduct

Appendix 6. Sample Monitoring check list

Appendix 7. Indicative ToR for C-ESMP

Appendix 8. Guidelines for Worker's Camps

Appendix 9. SEA/SH Action Plan

ABBREVIATIONS AND ACRONYMS

AC	Asphalt Concrete
AHW	Asian Highway
AP	Affected People
AQP	Air Quality Plan
ARAP	Abbreviation Resettlement Action Plan
BOQ	Bill of Quantity
C-ESMP	Contractor Environmental and Social Management Plan
CIQ	Customs, Immigration and Quarantine
CO	Carbon Monoxide
DDIS:	Detailed Design Implementation and Supervision Consultant
CO2	Carbon Dioxide
DOR	Department of Roads
ECC	Environmental Compliance Certificate
EDPD/PTI	Environmental Research and Disaster Prevention Division/ Public Works and Transport Institute
EGEP	Ethnic Group Engagement Plan
EIB	European Investment Bank
ERP	Emergency Response Plan
ESF	Environment and Social Framework
ESMF	Environment and Social Management Framework
ESMP	Environment and Social Management Plan
ESMU	Environment and Social Management Unit
ESS	Environmental and Social Standards
ESS1	Environmental Assessment
ESS2	Labour and Working Conditions
ESS3	Resource Efficiency and Pollution Prevention and Management
ESS4	Community Health and Safety
ESS5	Involuntary Resettlement
ESS6	Biodiversity Conservation and Natural Habitats
ESS7	Indigenous Peoples
ESS8	Physical and Cultural Heritage
ESS9	Financial Intermediaries
ESS10	Stakeholder Engagement and Information Disclosure
GBV	Gender-Based Violence
GCLS	Grievance Complaints and Logging System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HC	Hydrocarbons
HH	Households
IBAs	Important Bird Areas
IDA	International Development Association (World Bank)
IEE	Initial Environmental Examination Report
IUCN	International Union for Conservation of Nature

KBAs	Key Biodiversity Areas
LTEC	Lao Transport Engineering Consultant
MONRE	Ministry of National Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Areas
NES	National Environmental Specialist
NOX	Nitrogen Oxides
NR2	National Road No. 2
NR2E	National Road No. 2 East
NR2W	National Road No. 2 West
OHS	Occupational Health and Safety
OPBRC	Output-and Performance-Based Road Contracts
PAFO	Provincial Agricultural and Forestry Office
PCR	Provincial Cultural Resources
PM	Particulate Matter
PMU	Project Management Unit
PONRE	Provincial of Natural Resources and Environment
PPE	Personal Protection Equipment
ROW	Right of way
SEA	Sexual Exploitation and Abuse
SEARECC	Southeast Asia Regional Economic Corridor and Connectivity Project
SH	Sexual Harassment
SOX	Sulphur Oxides
SSESMP	Site Specific Environment and Social Management Plan
TMP	Traffic Management Plan
TOR	Terms of Reference
UXO	Unexploded Ordnance
WB	World Bank

1. PROJECT DESCRIPTION

1.1 Project overview

1. The GoL has received loan to support its national social economic development by World Bank (WB) and European Investment Bank (EIB), under SEARECC project. The SEARECC project will facilitate the regional and domestic trade and climate resilient transport connectivity along an East-West corridor in Southeast Asia, and to enhance capacity to react on Eligible Crisis or Emergency. Target provinces under the proposed investment include Phongsaly, Oudomxay, Xayabouly, Luang Namtha and Luang Prabang provinces with a total population of about 1,475,000 people. The design of the proposed project builds on a network connectivity approach and in addition where the road alignment passes through dense communities' fence to fence approach also applied in order to improve road accessibility in rural areas, between rural and urban centers, and to the main network. The project provinces were selected considering several criteria including density of rural population of different ethnic groups, agricultural potentials, vulnerability to floods, conditions of the roads, and connectivity of provincial road network to the National Road No 2 that links between China in the east and Thailand in the west.

2. Road works will help to improve climate resilience and safety of road infrastructure. The scope of works will include paving/sealing of the roads with climate adaptation and resilience measures and improving drainage system, bridges, and other road structure to climate-resilient standards. The technical design will ensure that the identified climate-resilient measures reduce transportation costs and flooding risks and achieve the target of creating durable access to the main road network, markets, and services for the rural ethnic population.

3. Roads will be improved along the existing alignment of the carriageway. Engineering designs will aim to avoid, or if not possible, minimize land acquisition. Through local dense community, the design applies fence to fence approach in order to avoid impacts on land acquisition and permanent houses as well as to minimise impacts on the other secondary structures and livelihoods. In cases where there would be no land acquisition, wider alignment could be considered to improve road safety and reduce congestion. Road safety will be improved by sealing shoulders, through better marking and signage, specific traffic calming measures at critical locations, and close consultations with communities living along the road as is described in the project's Stakeholder Engagement Plan (SEP). Full description of the SEARECC, including rationale for the project, can be found in the World Bank's Project Appraisal Document.

4. Along with this ESMP, the ARAP and EGEP have been prepared for all local road projects which will be financed by WB and thus the new Environmental and Social Framework which came into effect in October 2018, is applied for this project.

1.2 Detailed description of components

5. This project divides into five different components as: (1) to support Lao PDR and regional connectivity; (2) to provide logistics services development and border-crossing management; (3) to strengthen institutional capacity and the regulatory framework in agriculture, transport, and investments planning; (4) to assist project management and to provide contingency emergency response. This ESMP will only apply to Component 1 related to Lao PDR and regional connectivity, being implemented by MPWT.

6. Local road project is a part of GoL's aim to integrate for regional connectivity as stated in component 1. In addition, the local road is under sub-component 1.2 for the local road climate resilience improvement and maintenance. The benefits for the local road climate resilience improvement and maintenance are to be able to link with national road as part of the regional connectivity; to access to public services; to access larger market for agriculture products and to gain opportunity for tourism purposes.

7. The local road No. 2571, 2652 and 2931-3170 are three of the proposed local roads in 5 northern provinces of Lao PDR within the corridor of the NR2, which will be implemented under Hybrid Output and Performance Based Road Contract (OPBRC) scheme. This Hybrid OPBRC will perform under process of detailed design period, road improvement period and maintenance period. The Hybrid OPBRC will be in 7 years project, 2 years road improvement period and 5 years maintenance period, excluding detailed design period. The bidding document for the local roads will be prepared in provincial package including the local roads No. 2571, 2652 and 2931-3170.

8. This ESMP covers the environmental and social impacts of the local roads No. 2571, 2652 and 2931-3170 in Luang Prabang City, Chomphet District and XiengNgeun District respectively of Luang Prabang province. The ESMP will be under supervision of PMU (DoR/MPWT), CMUs, EDPD/PTI, and DPWT. The local road No.2571 has the length of 22 Km, the local road No.2652 has the length of 26 Km and the local road No. 2931-3170 has the length of 26 Km, (with total distance of 48 km). The starting and ending villages of these local roads.

   - The local road no. 2571, runs through five villages, starts from Vangngeun Village to Nadonkhoun Village (Distance 16 Km), Luang Prabang City, Luang Prabang Province. Though this local road is located in Luangprabang City but it is about 8 km away from the UNESCO World Heritage Area.
   - The local road no. 2652, runs through nine villages, starts from Nakham Village to Buamlao Village (Distance 22 Km), Chomphet District, Luang Prabang Province. This road is located in Chomphet district across the Mekong River which is not part of the world Heritage area.

The local road no. 2931-3170, runs through three villages, starts from Huayyen Village to Phonsavath Village (Distance 19 Km), Xiengngeun District, Luang Prabang Province. Xiengngeun District about 28 km far away to the south of UNESCO World Heritage site in Luangprabang City.

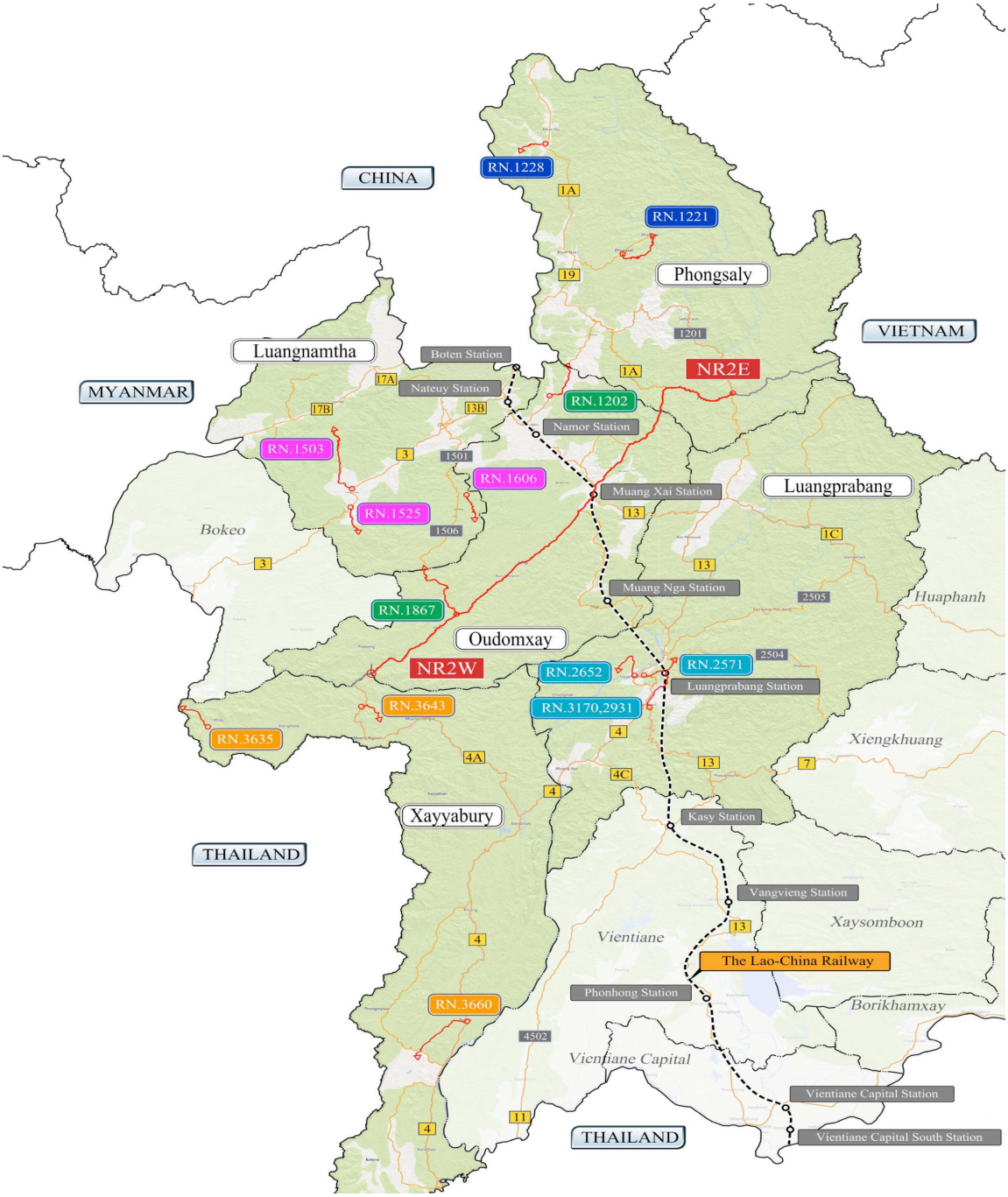


Figure 1. Location of Local Roads as approved by DOR, MPWT

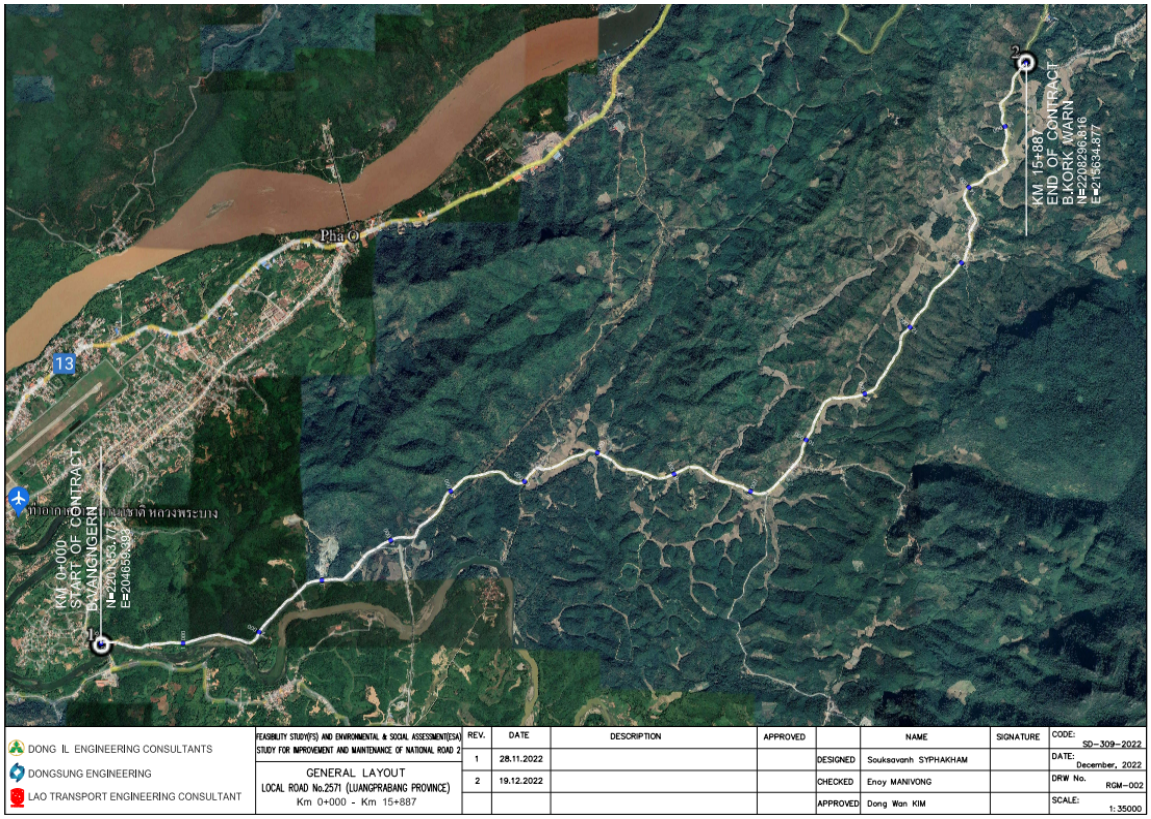


Figure 2. Location of Local Road No. 2571

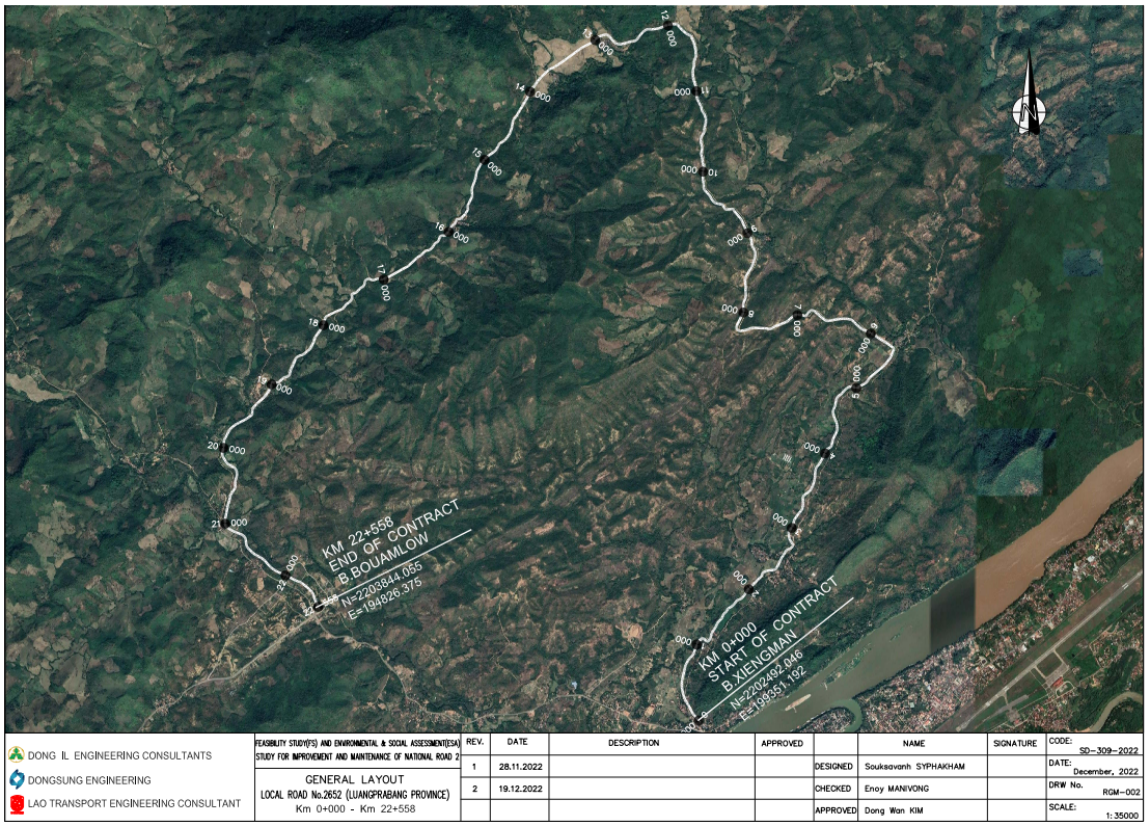


Figure 3. Location of Local Road No. 2652

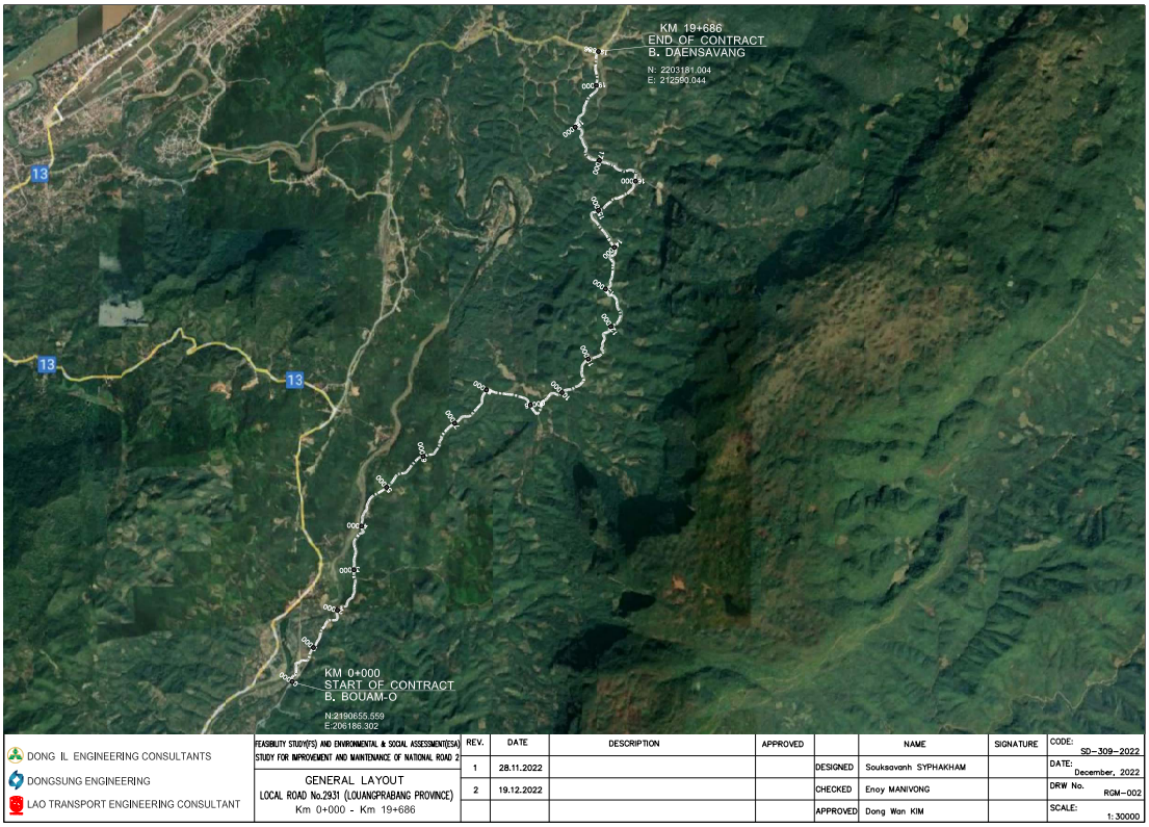


Figure 4. Location of Local Road No. 2931-3170

9. PMU/DOR is responsible for ensuring effective implementation of the ESMP including adequate allocation of budget. The contractor selected to carry out works in roads No. 2571, 2652 and 2931-3170 will be responsible for the implementation of a Contractor's-ESMP.

10. Project activities will mainly be the improvement and rehabilitation of the existing road conditions. Thus, the environmental and social impacts will be minor and temporary during the civil works. Through community area, there will be removal of some secondary structures including wooden fence, porch of house, porch of shops, tea processing hut and etc. In the mountainous or non-community area, natural grown bushes, naturally grown baboo, young fallow, tea plants and etc will be removed. These environmental and social impacts within COI will be handled by concerned local authorities during project construction period prior to Contractor's civil works begin. The areas of influence by COI, the area that will need to be cleared of all secondary structures and trees during and after civil works of the local road No. 2571, 2652 and 2931-3170 are presented in Table 1.

Table 1. Sensitive Receptors along the COI of Local Roads in Luang Prabang province

Local road No	COI (m)	Chainage		Areas of Receptor
		From	To	
I. Local Road No. 2571,				
2571	5-6	Km 0+000	Km 0+950	Vangngern village
2571	5-6	Km 4+300	Km 5+250	Phik-yai village
2571	5-6	Km 6+250R	KM6+300R	Primary school
2571	5-6	Km 6+225L	Km 6+300L	Temple
2571	5-6	Km 9+400	Km 10+500	Daensavang village
2571	5-6	Km 9+450 L	Km 9+500L	Primary school & Secondary school
2571	5-6	Km 13+000	Km 13+850	Natan village
2571	5-6	Km 13+525R	Km 13+550R	Temple
2571	5-6	Km 13+400R	Km 13+450R	Primary school
2571	5-6	Km 14+300	Km 15+500	Nadonkhoun village
2571	5-6	Km 14+580L	Km 14+620L	Temple
II. Local Road No. 2652,				
2652	5.5-5	Km 0+140L	Km 0+175L	Local market
2652	5.5-5	Km 0+165R	Km 0+200R	Nursery school
2652	5.5-5	Km 0+175L	Km 0+250L	Temple
2652	5.5-5	Km 2+150	Km 2+950	Nakham village
2652	5.5-5	Km 2+300L	Km 2+350L	Primary school
2652	5.5-5	Km 2+150	Km 2+950	Naxayjalern village
2652	5.5-5	Km 5+850R	Km 5+900R	Temple
2652	5.5-5	Km 8+300	Km 9+250	Huaytan village
2652	5.5-5	Km 8+800L	Km 8+850L	Primary school
2652	5.5-5	Km 10+975	Km 11+000	Nam Tan1 Bridge
2652	5.5-5	Km 11+800	Km 12+500	Som village
2652	5.5-5	Km 12+500	Km 13+500	Na village
2652	5.5-5	Km 12+750L	Km 12+800L	Health center
2652	5.5-5	Km 13+700	Km 13+730	Nam Tan2 Bridge
2652	5.5-5	Km 15+500	Km 16+500	Xam-Or Village
2652	5.5-5	Km 15+600L	Km 15+650L	Primary school
2652	5.5-5	Km 18+250	Km 19+150	Huay On village
2652	5.5-5	Km 20+700	Km 21+500	Buamlow village
2652	5.5-5	Km 20+950	Km 21+000	Nam Chan bridge
2652	5.5-5	Km 21+100L	Km 21+150L	Primary school
III. Local Road No. 2931-3170				
2931-3170	5.5-5	Km 1+850	Km 2+250	Huayyen village
2931-3170	5.5-5	Km 4+000	Km 4+850	Souandala village
2931-3170	5.5-5	Km 4+250L	Km 4+370L	Temple

Local road No	COI (m)	Chainage		Areas of Receptor
		From	To	
2931-3170	5.5-5	Km 4+500R	Km 4+550R	Primary school
2931-3170	5.5-5	Km 10+675	Km 10+700	Nam Chare Bridge
2931-3170	5.5-5	Km 15+700	Km 16+500	Phonsavath village
2931-3170	5.5-5	Km 15+950L	Km 16+000L	Primary School

Sources: Engineering Field Survey for Conceptual Design, 04 May to 22 June 2022

11. The local road No. 2571 has the distance of 16 Km that passes through 5 villages in highland area where there are 5 villages with density of structures in some sections. The condition of the road is relatively narrow where each village is located around 1-2 km of distance from each other on mountain valley and hills. This local road passes by 3 primary schools, 1 secondary school, and 3 temples. The local road No. 2652 connects 9 villages along the distance of 22 Km, the distance between each village are about 1-2 Km on the mountainous areas. Community assets along this local road include 1 nursery school, 3 primary schools, 1 local market, 1 health center, 2 bridges and 2 temples. The local road No. 2931-3170 has 19 km road length and, passes through 3 villages with some existing structures such as 2 primary schools, 1 bridge and 1 temple.

12. There is no land acquisition and no resettlement of permanent house along the CoI of both local roads No. 2571, 2652 and 2931-3170. However, there will be disruption with the entrance, noise, and air pollution as well as potential accidents associated with the civil works. Mitigation measures are described in Chapter 3 of this ESMP.

13. The scope of works of both local road No. 2571, 2652 and 2931-3170 has been proposed for pavement consisting of double bituminous surface movement and gravel wearing coarse surface. The typical cross section for local road No. 2571, 2652 and 2931-3170 will be similarly designed. There are 4 types of cross-sections such as TC1, TC2, TC3, CT4 and TC5 as shown in Figure 5 for local road No. 2571, Figure 7 is for the local road No. 2652 and figure 9 is for the local road No.2931-3170. The pavement for section that passes through village or community will be double bituminous surface movement and the pavement for mountainous or non-community area will be gravel wearing coarse surface. Detail of pavement chainage is shown in Figure 6; Figure 8 and Figure 10, for the local road No.2571; No.2652 and No 2931-3170 respectively. For the local roads, the cross-section of TC1 which is designed through community section. Drainage will be installed along both sides of local road for TC1. The drainage will connect with natural canal or stream for all discharge. In case that existing drainage is still in a good condition, only simple cleaning and enhancing will be done.

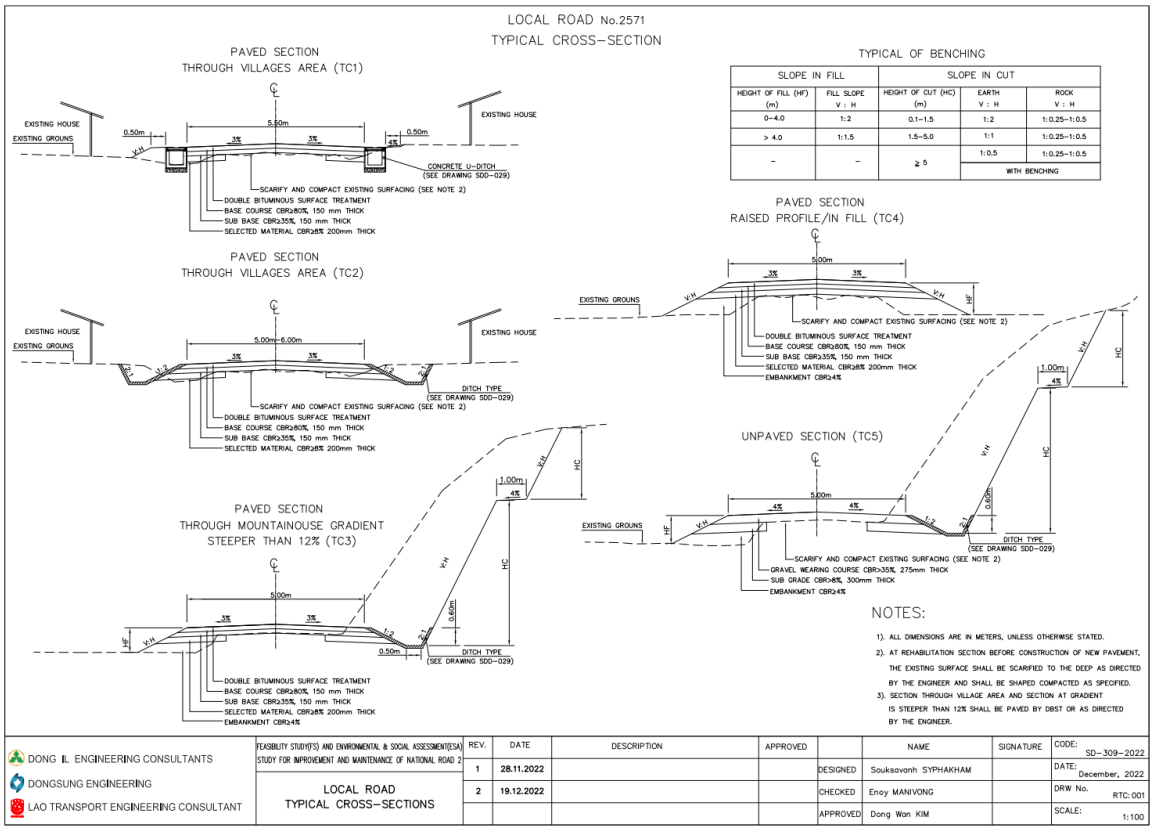
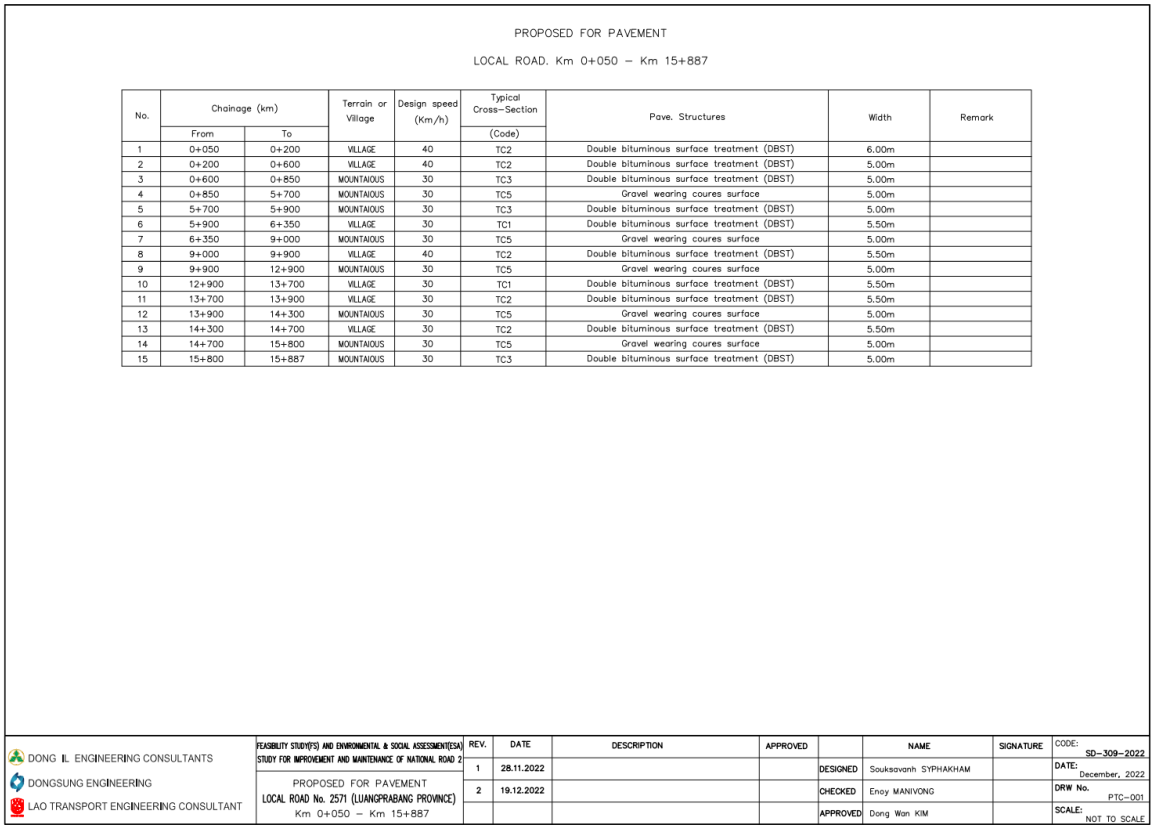


Figure 5. Typical Cross Section of Local Road No. 2571



No.	Chainage (km)		Terrain or Village	Design speed (Km/h)	Typical Cross-Section	Pave. Structures	Width	Remark
	From	To			(Code)			
1	0+050	0+200	VILLAGE	40	TC2	Double bituminous surface treatment (DBST)	6.00m	
2	0+200	0+600	VILLAGE	40	TC2	Double bituminous surface treatment (DBST)	5.00m	
3	0+600	0+850	MOUNTAIOUS	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
4	0+850	5+700	MOUNTAIOUS	30	TC5	Gravel wearing coures surface	5.00m	
5	5+700	5+900	MOUNTAIOUS	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
6	5+900	6+350	VILLAGE	30	TC1	Double bituminous surface treatment (DBST)	5.50m	
7	6+350	9+000	MOUNTAIOUS	30	TC5	Gravel wearing coures surface	5.00m	
8	9+000	9+900	VILLAGE	40	TC2	Double bituminous surface treatment (DBST)	5.50m	
9	9+900	12+900	MOUNTAIOUS	30	TC5	Gravel wearing coures surface	5.00m	
10	12+900	13+700	VILLAGE	30	TC1	Double bituminous surface treatment (DBST)	5.50m	
11	13+700	13+900	VILLAGE	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
12	13+900	14+300	MOUNTAIOUS	30	TC5	Gravel wearing coures surface	5.00m	
13	14+300	14+700	VILLAGE	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
14	14+700	15+800	MOUNTAIOUS	30	TC5	Gravel wearing coures surface	5.00m	
15	15+800	15+887	MOUNTAIOUS	30	TC3	Double bituminous surface treatment (DBST)	5.00m	

Figure 6. Type of Pavement Proposed by Chainage of Local Road No. 2571

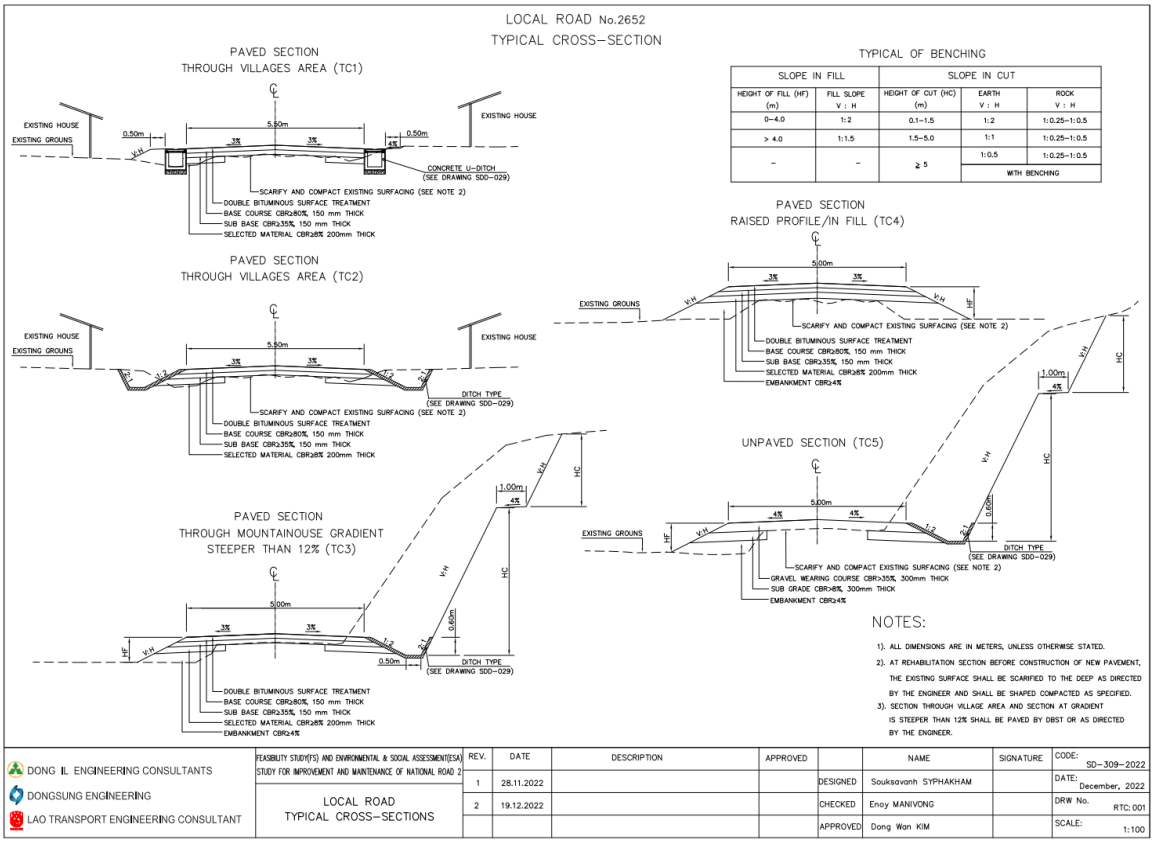


Figure 7. Typical Cross Section of Local Road No. 2652

PROPOSED FOR PAVEMENT

No.	Chainage (km) From	Chainage (km) To	Terrain or Village	Design speed (Km/h)	Typical Cross-Section (Code)	Pave. Structures	Width	Remark
1	0+000	0+050	Village	40	–	Existing Pavemant (Concrete)	Varries	
2	0+050	0+150	Village	40	DBST	Maintenance and resealing	Varries-Existing road	
3	0+150	0+550	Village	40	TC1	Double bituminous surface treatment (DBST)	5.50m	
4	0+550	0+975	Village	40	TC2	Double bituminous surface treatment (DBST)	5.50m	
5	0+975	2+000	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
6	2+000	3+000	Village	40	TC2	Double bituminous surface treatment (DBST)	5.50m	
7	3+000	5+600	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
8	5+600	6+000	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
9	6+000	7+600	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
10	7+600	7+800	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
11	7+800	8+550	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
12	8+550	8+950	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
13	8+950	9+300	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
14	9+300	9+650	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
15	9+650	9+825	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
16	9+825	10+000	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
17	10+000	10+225	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
18	10+225	10+325	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
19	10+325	10+825	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
20	10+825	11+025	Mountaious	30	TC4	Double bituminous surface treatment (DBST)	5.00m	
21	11+025	11+800	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
22	11+800	12+100	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
23	12+100	12+475	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
24	12+475	12+800	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
25	12+800	13+450	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
26	13+450	13+750	Village	40	TC4	Double bituminous surface treatment (DBST)	5.50m	
27	13+750	14+500	Village	40	TC2	Double bituminous surface treatment (DBST)	5.50m	
28	14+500	15+300	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
29	15+300	15+500	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
30	15+500	15+700	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
31	15+700	16+050	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
32	16+050	16+700	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
33	16+700	16+925	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
34	16+925	17+550	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
35	17+550	17+700	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
36	17+700	17+950	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
37	17+950	18+200	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
38	18+200	18+375	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	
39	18+375	18+500	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
40	18+500	18+700	Mountaious	30	TC5	Gravel wearing coures surface	5.00m	

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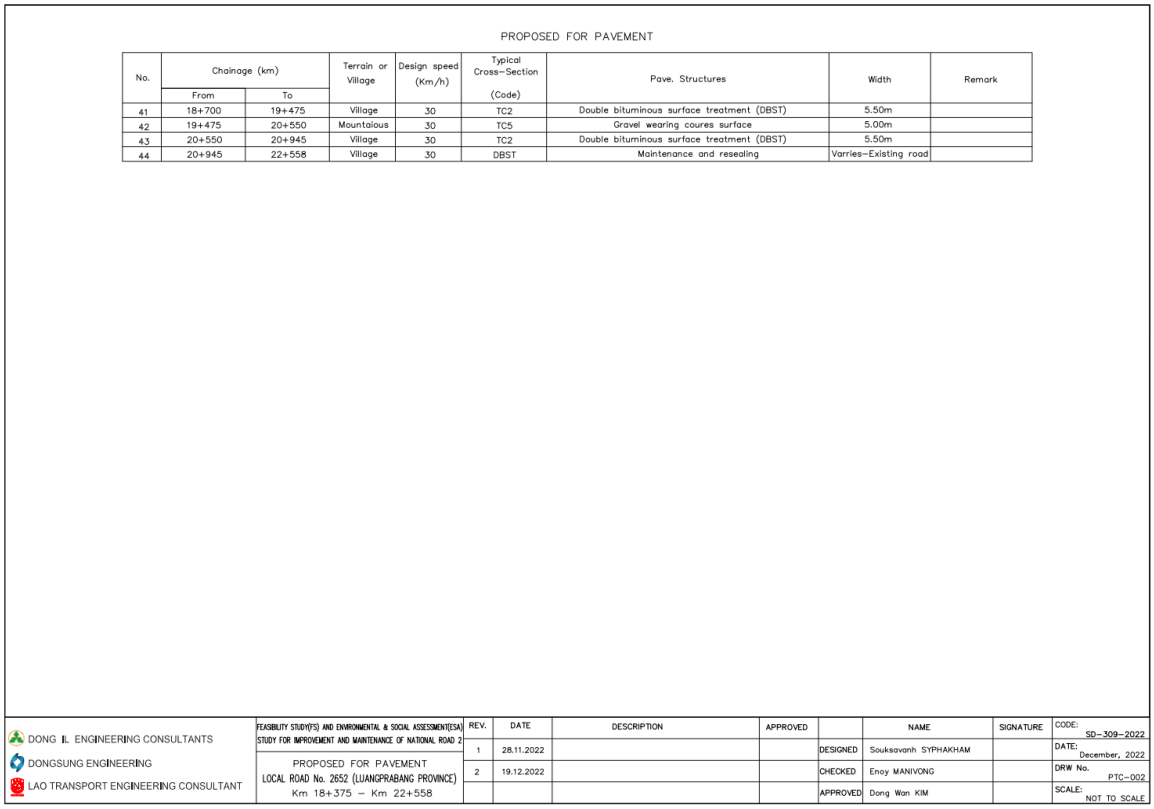
FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

PROPOSED FOR PAVEMENT
LOCAL ROAD No. 2652 (LUANGPRABANG PROVINCE)
Km 0+000 – Km 18+375

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. PTC-001
SCALE: NOT TO SCALE



PROPOSED FOR PAVEMENT

No.	Chainage (km)		Terrain or Village	Design speed (Km/h)	Typical Cross-Section (Code)	Pave. Structures	Width	Remark
	From	To						
41	18+700	19+475	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
42	19+475	20+550	Mountalous	30	TC5	Gravel wearing coures surface	5.00m	
43	20+550	20+945	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
44	20+945	22+558	Village	30	DBST	Maintenance and resealing	Varries-Existing road	

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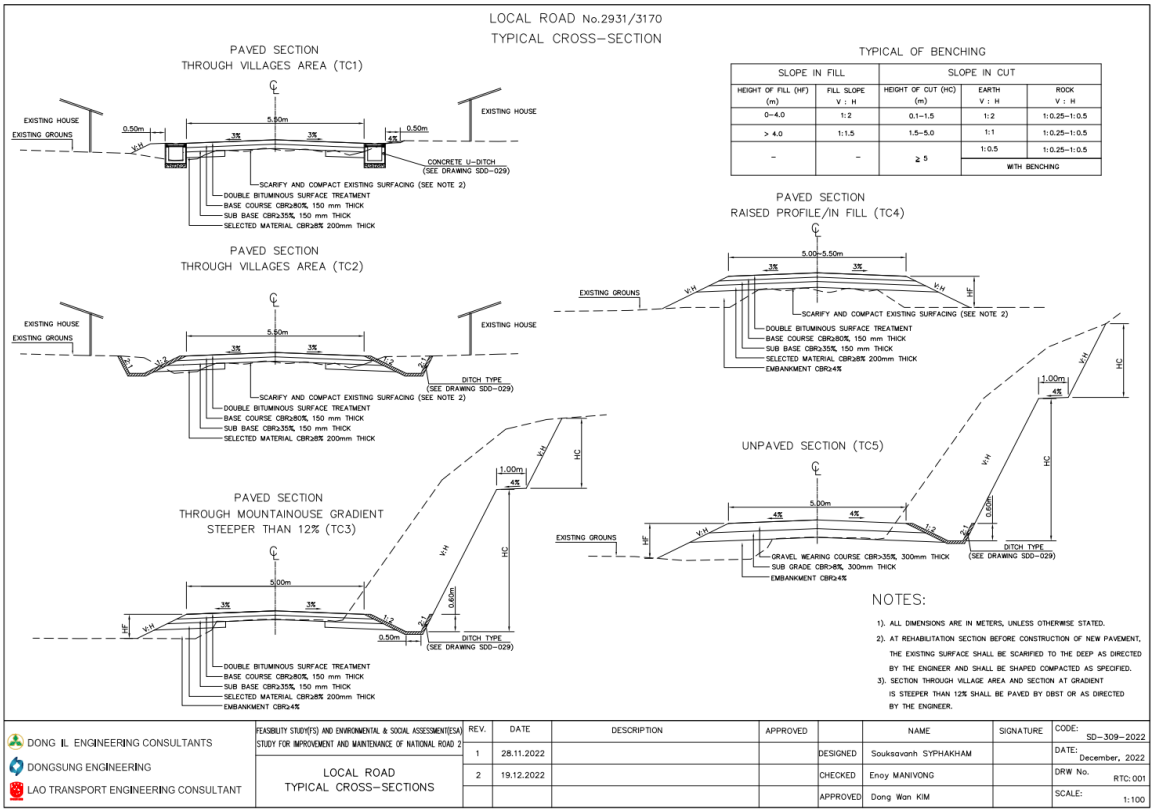
FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

PROPOSED FOR PAVEMENT
LOCAL ROAD No. 2652 (LUANGPRABANG PROVINCE)
Km 18+375 – Km 22+558

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. PTC-002
SCALE: NOT TO SCALE

Figure 8. Type of Pavement Proposed by Chainage of Local Road No. 2652



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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LOCAL ROAD
TYPICAL CROSS-SECTIONS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. RTC: 001
SCALE: 1:100

Figure 9. Typical Cross Section of Local Road No. 2931-3170

PROPOSED FOR PAVEMENT

LOCAL ROAD. Km 0+000 – Km 13+850

No.	Chainage (km)		Terrain or Village	Design speed (Km/h)	Typical Cross-Section (Code)	Pave. Structures	Width	Remark
	From	To						
1	0+000	0+125	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
2	0+125	0+175	Village	30	TC4	Double bituminous surface treatment (DBST)	5.50m	
3	0+175	0+425	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
4	0+425	0+525	Village	30	TC4	Double bituminous surface treatment (DBST)	5.50m	
5	0+525	0+625	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
6	0+625	1+225	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
7	1+225	1+525	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
8	1+525	1+700	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
9	1+700	2+250	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
10	2+250	2+350	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
11	2+350	2+675	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
12	2+675	2+800	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
13	2+800	2+950	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
14	2+950	3+050	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
15	3+050	4+075	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
16	4+075	4+150	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
17	4+150	4+500	Village	30	TC1	Double bituminous surface treatment (DBST)	5.50m	
18	4+500	5+125	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
19	5+125	5+550	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
20	5+550	6+375	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
21	6+375	6+475	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
22	6+475	6+600	Mountaious	30	TC4	Double bituminous surface treatment (DBST)	5.00m	
23	6+600	6+900	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
24	6+900	7+875	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
25	7+875	8+125	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
26	8+125	9+225	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
27	9+225	9+325	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
28	9+325	9+500	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
29	9+500	9+600	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
30	9+600	9+725	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
31	9+725	9+825	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
32	9+825	10+000	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
33	10+000	10+300	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
34	10+300	10+850	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
35	10+850	10+925	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
36	10+925	11+525	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
37	11+525	11+700	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
38	11+700	12+400	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
39	12+400	13+850	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

PROPOSED FOR PAVEMENT
LOCAL ROAD No. 2931 (LUANGPRABANG PROVINCE)
Km 0+000 – Km 13+850

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. PTC-001
SCALE: NOT TO SCALE

PROPOSED FOR PAVEMENT

LOCAL ROAD. Km 13+850 – Km 19+688

No.	Chainage (km)		Terrain or Village	Design speed (Km/h)	Typical Cross-Section (Code)	Pave. Structures	Width	Remark
	From	To						
40	13+850	14+400	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
41	14+400	14+975	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
42	14+975	15+250	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
43	15+250	15+400	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
44	15+400	15+850	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
45	15+850	16+300	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
46	16+300	16+600	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
47	16+600	17+350	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	
48	17+350	17+475	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
49	17+475	17+675	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
50	17+675	18+175	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
51	18+175	18+575	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
52	18+575	18+700	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
53	18+700	18+875	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
54	18+875	18+975	Mountaious	30	TC3	Double bituminous surface treatment (DBST)	5.00m	
55	18+975	19+200	Mountaious	30	TC5	Gravel wearing course surface	5.00m	
56	19+200	19+686	Village	30	TC2	Double bituminous surface treatment (DBST)	5.50m	

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

PROPOSED FOR PAVEMENT
LOCAL ROAD No. 2931 (LUANGPRABANG PROVINCE)
Km 13+850 – Km 19+686

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. PTC-002
SCALE: NOT TO SCALE

Figure 10. Type of Pavement Proposed by Chainage of Local Road No. 2931-3170

14. Since engineering design of local roads No. 2571, 2652 and 2931-3170 is for the mountainous and rural areas thus the design of these local roads is mainly suitable for light vehicles. Driving speed should not over 40 kph in non-community area and the driving speed limited should not over 30 kph for safety reasons.

15. There are many sections that are required to have bridges, pipe culverts and box culverts to protect flood and maintain waterway to discharge onto the natural streams and river. The culvert had been installed along the local roads over the past 20 years. Some of these culverts are still in good condition but many of them need to be repaired, extended, or reconstructed. Among 68 sections with culvert installed along the local road No.2571, only 14 sections can be kept with the existing condition, 11 sections need to be extended, 3 sections where new culverts are needed to be constructed and 40 sections are proposed to be replaced with new culverts. More details are presented in Figure 11. For the side drainage along the local road No.2571, 6 sections will build up. 3 of them are in the form of trapezoidal and remaining 3 are in the form of rectangular. For the right drainage along the local road No.2571, 9 sections will be constructed. 7 of them are in the form of trapezoidal and remaining 2 are in the form of rectangular. More details are available in Table 12.

16. The local road No. 2652 has 119 existing culverts. There are 8 sections that can be kept with the existing condition.62 of them need to be replaced with the new ones, 43 sections need to be extended and 6 additional new culvert need to be installed as shown in Figure 13. With regard to drainage on the left side along the local road No. 2652, 25 sections will build up. 24 of them are in the form of trapezoidal and only one is in rectangular form. For the right side of the local road No.2571, 22 sections will be constructed. 21 of them are in the form of trapezoidal and remaining one is in the form of rectangular. More details are available in Table 14.

17. There are 67 sections of existing culverts along the local road No. 2931-3170. 21 sections are proposed to be extended with new culverts. 30 sections need to be replaced with new culverts. Other 16 sections additional new locations that culverts need to be installed along the local road No. 2931-3170 as presented in Table 15. Drainage will also be installed both sides, there are 18 sections where 17 will build up as in the form of trapezoidal and only one will be in rectangular form on the left side along the local road No. 2931-3170. There are 27 sections on the right side of this local road, 26 of them will be installed in the form of trapezoidal and only one is in rectangular form. More details are available in Table 16.

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT			FLOW DIRECTION	PROPOSED CULVERTS		EXTENSION TO EXISTING			TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
		TYPE AND SIZE	CONDITION	LENGTH (m)		TYPE AND SIZE	LENGTH (m)	LEFT (m)	RIGHT (m)	EXTENSION LENGTH (m)			
1	0+400	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	New structure design
2	0+548	PC,Dia,1.0 m	POOR	11.00	L – R	1PC,Dia,1.0 m	21.00	–	–	–	21.0	WW WW	Replaced by new
3	0+852	PC,Dia,0.8 m	FAIR	11.00	L – R	–	–	2.0	2.0	4.0	15.0	WW –	To be Extended
4	1+230	PC,Dia,1.0 m	FAIR	10.00	L – R	–	–	4.0	2.0	6.0	16.0	WW WW	To be Extended
5	1+523	PC,Dia,1.0 m	FAIR	8.00	L – R	–	–	3.0	2.0	5.0	13.0	WW WW	To be Extended
6	1+687	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	New structure design
7	2+208	PC,Dia,0.6 m	FAIR	9.00	L – R	1PC,Dia,1.0 m	14.00	–	–	–	14.0	WW WW	Replaced by new
8	2+349	PC,Dia,0.6 m	FAIR	9.00	L – R	1PC,Dia,1.0 m	14.00	–	–	–	14.0	WW WW	Replaced by new
9	2+525	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
10	2+805	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
11	2+960	PC,Dia,1.0 m	FAIR	9.00	L – R	–	–	2.0	1.0	3.0	10.0	WW WW	To be Extended
12	2+996	PC,Dia,0.8 m	FAIR	6.00	L – R	–	–	1.0	2.0	3.0	9.0	WW WW	To be Extended
13	3+564	PC,Dia,0.8 m	FAIR	6.00	L – R	–	–	2.0	1.0	3.0	7.0	WW WW	To be Extended
14	3+986	PC,Dia,0.8 m	GOOD	10.00	L – R	–	–	–	–	–	10.0	– –	Remained as Existing
15	4+117	PC,Dia,0.8 m	GOOD	15.00	L – R	–	–	–	–	–	15.0	– –	Remained as Existing
16	4+251	PC,Dia,0.8 m	GOOD	13.00	L – R	–	–	–	–	–	13.0	– –	Remained as Existing
17	4+340	PC,Dia,0.8 m	GOOD	6.00	L – R	–	–	4.0	4.0	8.0	14.0	WW WW	To be Extended
18	4+560	PC,Dia,1.0 m	GOOD	12.00	L – R	–	–	2.0	4.0	6.0	18.0	HW WW	To be Extended
19	4+636	PC,Dia,0.2 m	POOR	6.00	L – R	1PC,~~Dia~~,1.0 m	~~9.00~~	–	–	–	6.0	WW WW	Replaced by new
20	4+706	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	6.0	WW WW	Replaced by new
21	4+775	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	6.0	WW WW	Replaced by new
22	4+892	PC,Dia,0.6 m	FAIR	7.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	7.0	WW WW	Replaced by new
23	5+309	PC,Dia,0.8 m	GOOD	8.00	L – R	–	–	2.0	2.0	4.0	10.0	WW WW	To be Extended
24	5+725	–	GOOD	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	New structure design
25	5+929	PC,Dia,1.0 m	GOOD	10.00	L – R	–	–	–	–	–	10.0	WW WW	Remained as Existing
26	6+048	PC,Dia,0.8 m	FAIR	7.00	L – R	–	–	1.0	1.0	2.0	9.0	WW WW	To be Extended
27	6+446	PC,Dia,1.0 m	FAIR	9.00	L – R	–	–	1.0	1.0	2.0	11.0	WW WW	To be Extended
28	6+843	PC,Dia,0.4 m	GOOD	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	6.0	WW WW	Replaced by new
29	6+888	PC,Dia,0.4 m	GOOD	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	6.0	WW WW	Replaced by new
30	6+946	PC,Dia,1.0 m	POOR	8.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	8.0	WW WW	Replaced by new
31	7+061	2PC,Dia,1.0 m	FAIR	6.00	L – R	–	–	2.0	2.0	4.0	10.0	WW WW	To be Extended
32	7+203	PC,Dia,0.4 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
33	7+411	PC,Dia,0.4 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
34	7+748	PC,Dia,0.4 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
35	7+876	Submersible	GOOD	7.00	L – R	–	–	–	–	–	–	–	Remained as Existing
36	8+200	PC,Dia,0.8 m	FAIR	6.00	R – L	–	–	3.0	1.0	4.0	10.0	WW WW	To be Extended
37	8+597	2PC,Dia,0.6 m	FAIR	6.00	R – L	2PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
38	8+779	PC,Dia,0.4 m	POOR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
39	9+006	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
40	9+071	PC,Dia,0.4 m	VERY POOR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2571 (LUANGPRABANG PROVINCE)
Km 0+400 - Km 9+071

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Bounthanome PHOMPHIPHAK	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. LDD-001
SCALE: NOT TO SCALE

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
41	9+347	PC,Dia,0.2 m	GOOD	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
42	9+894	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
43	10+177	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
44	10+305	PC,Dia,0.6 m	GOOD	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
45	10+361	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
46	10+486	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
47	10+702	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
48	10+847	PC,Dia,0.6 m	POOR	9.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
49	11+232	PC,Dia,0.6 m	VERY POOR	9.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
50	11+742	PC,Dia,0.6 m	VERY POOR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
51	11+829	PC,Dia,0.8 m	FAIR	6.00	R – L	–	–	3.0	2.0	5.0	11.0	WW WW	To be Extended
52	12+185	PC,Dia,1.5 m	FAIR	8.00	R – L	–	–	3.0	1.0	4.0	12.0	WW WW	To be Extended
53	12+430	PC,Dia,0.4 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
54	12+540	PC,Dia,0.6 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
55	12+953	PC,Dia,0.8 m	FAIR	6.00	R – L	–	–	4.0	–	4.0	10.0	WW –	To be Extended
56	13+001	PC,Dia,1.0 m	GOOD	10.00	R – L	–	–	–	–	–	10.0	WW WW	Remained as Existing
57	13+143	2PC,Dia,1.0 m	FAIR	6.00	R – L	–	–	2.0	3.0	5.0	11.0	WW WW	To be Extended
58	13+327	PC,Dia,0.4 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
59	13+550	2PC,Dia,1.2 m	FAIR	6.00	R – L	2BC 3.0x2.5 m	8.00	–	–	–	8.0	WW WW	Replaced by new
60	14+077	PC,Dia,0.4 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
61	14+262	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
62	14+428	PC,Dia,0.6 m	FAIR	6.00	L – R	2PC,Dia,1.5 m	9.00	–	–	–	9.0	WW WW	Replaced by new
63	14+684	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
64	14+895	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
65	15+284	PC,Dia,0.8 m	FAIR	6.00	L – R	2PC,Dis,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
66	15+425	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
67	15+638	PC,Dia,0.8 m	POOR	7.00	L – R	–	–	2.0	3.0	5.0	12.0	WW WW	To be Extended
68	15+865	PC,Dia,0.8 m	GOOD	8.00	L – R	–	–	2.0	2.0	4.0	12.0	WW WW	To be Extended

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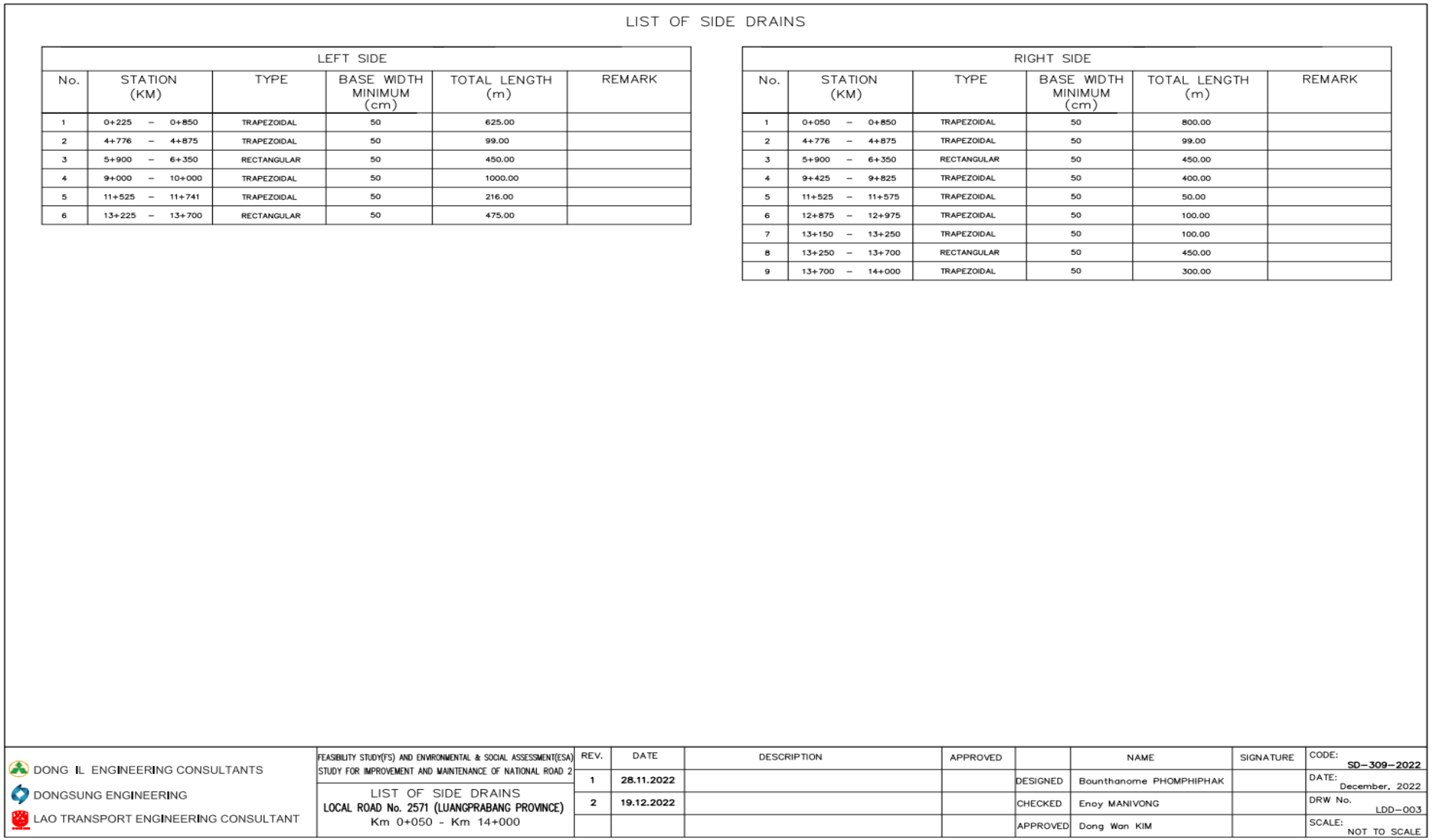
FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2571 (LUANGPRABANG PROVINCE)
Km 9+347 - Km 15+865

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Bounthanome PHOMPHIPHAK	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD–309–2022
DATE: December, 2022
DRW No. LDD–002
SCALE: NOT TO SCALE

Figure 11. List of Existing Culverts for Local Road No.2571



LIST OF SIDE DRAINS

LEFT SIDE

No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+225 – 0+850	TRAPEZOIDAL	50	625.00	
2	4+776 – 4+875	TRAPEZOIDAL	50	99.00	
3	5+900 – 6+350	RECTANGULAR	50	450.00	
4	9+000 – 10+000	TRAPEZOIDAL	50	1000.00	
5	11+525 – 11+741	TRAPEZOIDAL	50	216.00	
6	13+225 – 13+700	RECTANGULAR	50	475.00	

RIGHT SIDE

No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+050 – 0+850	TRAPEZOIDAL	50	800.00	
2	4+776 – 4+875	TRAPEZOIDAL	50	99.00	
3	5+900 – 6+350	RECTANGULAR	50	450.00	
4	9+425 – 9+825	TRAPEZOIDAL	50	400.00	
5	11+525 – 11+575	TRAPEZOIDAL	50	50.00	
6	12+875 – 12+975	TRAPEZOIDAL	50	100.00	
7	13+150 – 13+250	TRAPEZOIDAL	50	100.00	
8	13+250 – 13+700	RECTANGULAR	50	450.00	
9	13+700 – 14+000	TRAPEZOIDAL	50	300.00	

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF SIDE DRAINS
LOCAL ROAD No. 2571 (LUANGPRABANG PROVINCE)
Km 0+050 - Km 14+000

REV.	DATE	DESCRIPTION	APPROVED
1	28.11.2022		
2	19.12.2022		

	NAME	SIGNATURE
DESIGNED	Bounthanome PHOMPHIPHAK	
CHECKED	Enoy MANIVONG	
APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. LDD-003
SCALE: NOT TO SCALE

Figure 12. List of Side Drainages for Local Road No.2571

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
1	0+072	PC,Dia,1.0 m	GOOD	6	L–R	–	–	–	–	–	6.0	DR DR	Remained as Existing
2	0+147	PC,Dia,0.8 m	GOOD	6	L–R	–	–	–	–	–	6.0	DR DR	Remained as Existing
3	0+385	PC,Dia,1.0 m	GOOD	9	R–L	–	–	–	–	–	9.0	WW WW	Remained as Existing
4	0+556	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
5	0+750	PC,Dia,0.6 m	GOOD	6	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
6	1+171	PC,Dia,1.0 m	GOOD	7	R–L	–	–	–	2.00	2.00	9.0	WW HW	To be extended
7	1+332	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
8	1+374	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
9	1+500	PC,Dia,0.6 m	GOOD	8	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
10	1+595	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
11	1+735	PC,Dia,0.6 m	POOR	13	R–L	1PC,Dia,1.0 m	13.00	–	–	–	13.0	WW WW	Replaced by new
12	1+905	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
13	1+992	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
14	2+282	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
15	2+493	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
16	2+614	1BC 1.50 X 1.60 m	GOOD	7	R–L	–	–	4.00	3.00	7.00	14.0	WW WW	To be extended
17	2+826	1BC 3.0 X 2.0 m	GOOD	5.5	R–L	–	–	4.00	3.00	7.00	12.5	WW WW	To be extended
18	3+000	–	–	–	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
19	3+279	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
20	3+487	PC,Dia,0.6 m	POOR	6	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
21	3+576	1BC 1.50 X 1.50 m	FAIR	6	R–L	–	–	2.00	2.00	4.00	10.0	WW WW	To be extended
22	3+688	PC,Dia,1.0 m	GOOD	9	R–L	–	–	1.00	1.00	2.00	11.0	WW WW	To be extended
23	3+877	PC,Dia,0.8 m	FAIR	7	R–L	–	–	2.00	3.00	5.00	12.0	WW WW	To be extended
24	3+977	PC,Dia,0.8 m	GOOD	7	R–L	–	–	2.00	2.00	4.00	11.0	WW WW	To be extended
25	4+036	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
26	4+319	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
27	4+475	PC,Dia,0.8 m	FAIR	7	R–L	–	–	1.00	1.00	2.00	9.0	WW WW	To be extended
28	4+615	PC,Dia,0.6 m	FAIR	8	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
29	4+839	PC,Dia,0.8 m	GOOD	7	R–L	–	–	2.00	2.00	4.00	11.0	WW WW	To be extended
30	5+004	1PC,Dia,0.4 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	HW HW	Replaced by new
31	5+382	PC,Dia,0.6 m	POOR	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
32	5+611	PC,Dia,0.6 m	POOR	6	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
33	5+741	PC,Dia,0.8 m	POOR	8	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
34	5+994	2PC,Dia,1.0 m	GOOD	17	R–L	–	–	2.0	–	2.0	19.0	– WW	To be extended
35	6+245	PC,Dia,0.8 m	POOR	8	R–L	–	–	1.00	1.00	2.00	10.0	WW WW	To be extended
36	6+350	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
37	6+639	1BC 1.50 X 1.50 m	GOOD	6.5	L–R	–	–	2.50	2.00	4.50	11.0	WW WW	To be extended
38	6+902	PC,Dia,0.8 m	GOOD	10	L–R	–	–	–	–	–	–	– –	Remained as Existing
39	6+949	PC,Dia,0.6 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
40	7+048	PC,Dia,0.8 m	FAIR	8	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2652 (LUANGNPHABANG PROVINCE)
Km 0+072 - Km 7+048

REV.	DATE	DESCRIPTION	APPROVED
1	28.11.2022		
2	19.12.2022		

	NAME	SIGNATURE
DESIGNED	Bounthanome PHOMPHIPHAK	
CHECKED	Enoy MANIVONG	
APPROVED	Dong Wan KIM	

CODE: SD–309–2022
DATE: December, 2022
DRW No. LDD–001
SCALE: NOT TO SCALE

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
41	7+243	PC,Dia,0.6 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
42	7+292	PC,Dia,0.8 m	POOR	8	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
43	7+369	PC,Dia,0.6 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
44	7+470	PC,Dia,0.8 m	POOR	9	L–R	–	–	–	1.00	1.00	10.0	WW –	To be extended
45	7+849	–	–	–	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
46	8+117	PC,Dia,1.0 m	POOR	9	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
47	8+260	1BC 1.80 X 1.60m	GOOD	8	L–R	2BC 1.8x1.6 m	8.00	–	–	–	8.0	WW WW	Remained as Existing,add1cell
48	8+640	PC,Dia,0.6 m	POOR	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
49	8+844	PC,Dia,1.0 m	FAIR	10	L–R	–	–	1.00	–	1.00	11.0	WW HW	To be extended
50	9+011	1PC,Dia,0.4 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
51	9+203	PC,Dia,0.6 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
52	9+314	1BC 3.0 X 1.80 m	GOOD	6	L–R	–	–	1.00	1.50	2.50	8.5	WW WW	To be extended
53	9+626	PC,Dia,0.6 m	GOOD	6	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
54	9+785	PC,Dia,1.5 m	FAIR	8	L–R	–	–	2.00	1.00	3.00	11.0	WW WW	To be extended
55	9+826	PC,Dia,0.8 m	GOOD	6	L–R	–	–	2.00	1.00	3.00	9.0	WW WW	To be extended
56	10+223	PC,Dia,1.0 m	GOOD	7	L–R	–	–	4.00	3.00	7.00	14.0	WW WW	To be extended
57	10+384	PC,Dia,0.6 m	FAIR	6	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
58	10+464	PC,Dia,0.6 m	FAIR	6	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
59	10+645	PC,Dia,0.6 m	GOOD	6	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
60	10+816	PC,Dia,1.0 m	FAIR	8	L–R	–	–	1.00	2.00	3.00	11.0	WW WW	To be extended
61	10+937	PC,Dia,0.6 m	GOOD	6	L–R	1PC,Dia,1.0 m	18.00	–	–	–	18.0	WW WW	Replaced by new
62	10+968	–	–	–		1BC 6.0x4.5 m	6.60			–	6.6	WW WW	Addition by new
63	11+043	PC,Dia,0.8 m	FAIR	6	L–R	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
64	11+487	PC,Dia,0.8 m	FAIR	6	L–R	–	–	5.00	5.00	10.00	16.0	WW WW	To be extended
65	11+640	PC,Dia,0.6 m	FAIR	6	L–R	1PC,Dia,1.0 m	11.00	–	–	–	11.0	WW WW	Replaced by new
66	11+783	PC,Dia,0.6 m	FAIR	6	L–R	1PC,Dia,1.0 m	11.00	–	–	–	11.0	WW WW	Replaced by new
67	12+274	–	–	–	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
68	12+483	PC,Dia,0.8 m	FAIR	8	R–L	–	–	5.00	6.00	11.00	19.0	WW WW	To be extended
69	12+696	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	17.00	–	–	–	17.0	WW WW	Replaced by new
70	12+845	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
71	12+993	1BC4.0x3.0	GOOD	6.5	R–L	–	–	1.50	4.00	5.50	12.0	WW WW	To be extended
72	13+080	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
73	13+176	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
74	13+266	PC,Dia,1.0 m	FAIR	7	R–L	–	–	2.00	2.00	4.00	11.0	WW WW	To be extended
75	13+430	PC,Dia,0.8 m	FAIR	7	R–L	–	–	1.00	1.00	2.00	9.0	WW WW	To be extended
76	13+532	1PC,Dia,0.2 m	FAIR	7	R–L	–	–	2.00	1.00	3.00	10.0	WW WW	To be extended
77	13+537	PC,Dia,0.8 m	GOOD	7	R–L	–	–	3.00	3.00	6.00	13.0	WW WW	To be extended
78	13+700	–	–	–	R–L	1BC 6.0x4.0 m	6.60	–	–	–	6.6	WW WW	Addition by new
79	13+758	PC,Dia,0.6 m	GOOD	7	R–L	1PC,Dia,1.0 m	16.00	–	–	–	16.0	WW WW	Replaced by new
80	13+835	PC,Dia,0.6 m	FAIR	6	L–R	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2652 (LUANGNPHABANG PROVINCE)
Km 7+243 - Km 13+835

REV.	DATE	DESCRIPTION	APPROVED
1	28.11.2022		
2	19.12.2022		

	NAME	SIGNATURE
DESIGNED	Bounthanome PHOMPHIPHAK	
CHECKED	Enoy MANIVONG	
APPROVED	Dong Wan KIM	

CODE: SD–309–2022
DATE: December, 2022
DRW No. LDD–002
SCALE: NOT TO SCALE

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
81	13+846	PC,Dia,1.0 m	FAIR	7	R–L	–	–	1.00	2.00	3.00	10.0	WW WW	To be extended
82	13+927	PC,Dia,0.8 m	FAIR	7	R–L	–	–	3.00	1.00	4.00	11.0	WW WW	To be extended
83	14+115	PC,Dia,0.8 m	FAIR	7	R–L	–	–	2.00	2.00	4.00	11.0	WW WW	To be extended
84	14+432	PC,Dia,0.8 m	FAIR	7	R–L	–	–	2.00	2.00	4.00	11.0	WW WW	To be extended
85	14+524	PC,Dia,0.8 m	GOOD	7	R–L	–	–	3.00	2.00	5.00	12.0	WW WW	To be extended
86	14+778	1BC5.0x4.0	GOOD	6.25	R–L	–	–	2.00	2.00	4.00	10.3	WW WW	To be extended
87	15+017	PC,Dia,0.6 m	FAIR	7	L–R	1PC,Dia,1.0 m	10.00	–	–	–	9.0	WW WW	Replaced by new
88	15+442	2PC,Dia,1.0 m	POOR	7	L–R	2PC,Dia,1.0 m	18.00	–	–	–	9.0	WW WW	Replaced by new
89	15+553	PC,Dia,0.8 m	POOR	7	L–R	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
90	15+644	PC,Dia,0.8 m	POOR	7	L–R	1PC,Dia,1.0 m	13.00	–	–	–	13.0	WW WW	Replaced by new
91	15+703	PC,Dia,0.8 m	GOOD	7	L–R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
92	15+848	2PC,Dia,1.0 m	POOR	8	L–R	1BC 3.0x2.0	10.00	–	–	–	10.0	WW WW	Replaced by new
93	15+950	PC,Dia,1.5 m	GOOD	7	L–R	–	–	3.00	1.00	4.00	11.0	WW WW	To be extended
94	16+070	PC,Dia,0.8 m	GOOD	7	L–R	–	–	5.00	3.00	8.00	15.0	WW WW	To be extended
95	16+433	2PC,Dia,1.0 m	FAIR	7	L–R	–	–	8.00	7.00	15.00	22.0	– WW	To be extended
96	16+663	PC,Dia,0.8 m	FAIR	7	L–R	–	–	1.00	4.00	5.00	12.0	WW WW	To be extended
97	16+920	2PC,Dia,1.0 m	FAIR	7	L–R	–	–	3.00	2.00	5.00	12.0	WW WW	To be extended
98	16+980	2PC,Dia,1.5 m	FAIR	8	L–R	1BC 3.0x2.0	11.00				11.0	WW WW	Replaced by new
99	17+161	PC,Dia,1.0 m	GOOD	7	L–R	–	–	3.00	2.00	5.00	12.0	WW WW	To be extended
100	17+494	1BC4x2.3	GOOD	5	R–L	–	–	3.00	4.00	7.00	12.0	WW WW	To be extended
101	17+556	PC,Dia,1.0 m	GOOD	7	L–R	–	–	1.00	2.00	3.00	10.0	WW WW	To be extended
102	17+900	–	–	–	R–L	1PC,Dia,1.0 m	9.00				9.0	WW WW	Addition by new
103	18+383	PC,Dia,1.5 m	FAIR	7	R–L	–	–	5.00	3.00	8.00	15.0	WW WW	To be extended
104	18+694	PC,Dia,0.6 m	POOR	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
105	19+005	PC,Dia,0.8 m	GOOD	8	R–L	–	–	2.00	1.00	3.00	11.0	WW WW	To be extended
106	19+120	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	11.00	–	–	–	11.0	WW WW	Replaced by new
107	19+308	1BC3.8x2.5	FAIR	4.5	R–L	–	–	4.50	5.00	9.50	14.0	WW WW	To be extended
108	19+353	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	11.00	–	–	–	11.0	WW WW	Replaced by new
109	19+447	PC,Dia,0.6 m	FAIR	7	R–L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
110	19+900	1BC 4.0x2.6	FAIR	4.5	R–L	–	–	6.00	6.00	12.00	16.5	WW WW	To be extended
111	19+910	PC,Dia,0.6 m	FAIR	6	R–L	1PC,Dia,1.0 m	12.00	–	–	–	12.0	WW WW	Replaced by new
112	20+194	PC,Dia,0.8 m	POOR	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
113	20+391	PC,Dia,0.8 m	POOR	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
114	20+528	PC,Dia,1.0 m	POOR	7	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
115	20+591	PC,Dia,1.0 m	POOR	7	R–L	1PC,Dia,1.0 m	12.00	–	–	–	12.0	WW WW	Replaced by new
116	21+035	1PC,Dia,0.4 m	GOOD	8	R–L	1PC,Dia,1.0 m	10.00	–	–	–	10.0	WW WW	Replaced by new
117	21+190	PC,Dia,1.0 m	GOOD	10	R–L	–	–	–	–	–	–	– –	Remained as Existing
118	21+457	2PC,Dia,1.0 m	FAIR	11	R–L	–	–	–	–	–	–	– –	Remained as Existing
119	22+140	2PC,Dia,1.0 m	FAIR	10	R–L	–	–	–	–	–	–	– –	Remained as Existing

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2652 (LUANGNPHABANG PROVINCE)
Km 13+846 - Km 22+140

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
1	28.11.2022			DESIGNED	Bounthanome PHOMPHIPHAK		CODE: SD–309–2022
2	19.12.2022			CHECKED	Enoy MANIVONG		DATE: December, 2022
				APPROVED	Dong Wan KIM		DRW No. LDD–003
							SCALE: NOT TO SCALE

Figure 13. List of Existing Culverts for Local Road No.2652

LIST OF SIDE DRAINS

LEFT SIDE					
No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+150 – 0+558	RECTANGULAR	50	408.00	
2	2+325 – 2+475	TRAPEZOIDAL	50	150.00	
3	2+675 – 2+825	TRAPEZOIDAL	50	150.00	
4	5+625 – 6+000	TRAPEZOIDAL	50	375.00	
5	7+600 – 7+850	TRAPEZOIDAL	50	250.00	
6	8+550 – 8+950	TRAPEZOIDAL	50	400.00	
7	9+200 – 9+325	TRAPEZOIDAL	50	125.00	
8	9+425 – 9+500	TRAPEZOIDAL	50	75.00	
9	9+500 – 9+650	TRAPEZOIDAL	50	150.00	
10	9+800 – 9+975	TRAPEZOIDAL	50	175.00	
11	10+225 – 10+500	TRAPEZOIDAL	50	275.00	
12	10+500 – 10+575	TRAPEZOIDAL	50	75.00	
13	11+850 – 12+200	TRAPEZOIDAL	50	350.00	
14	14+225 – 14+500	TRAPEZOIDAL	50	275.00	
15	15+300 – 15+450	TRAPEZOIDAL	50	150.00	
16	15+650 – 15+775	TRAPEZOIDAL	50	125.00	
17	15+975 – 16+050	TRAPEZOIDAL	50	75.00	
18	16+200 – 16+400	TRAPEZOIDAL	50	200.00	
19	16+475 – 16+700	TRAPEZOIDAL	50	225.00	
20	17+575 – 17+800	TRAPEZOIDAL	50	225.00	
21	17+800 – 17+875	TRAPEZOIDAL	50	75.00	
22	17+925 – 18+175	TRAPEZOIDAL	50	250.00	
23	18+425 – 18+575	TRAPEZOIDAL	50	150.00	
24	19+325 – 19+425	TRAPEZOIDAL	50	100.00	
25	20+725 – 20+925	TRAPEZOIDAL	50	200.00	

RIGHT SIDE					
No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+150 – 0+558	RECTANGULAR	50	408.00	
2	0+558 – 0+975	TRAPEZOIDAL	50	417.00	
3	2+000 – 2+450	TRAPEZOIDAL	50	450.00	
4	2+650 – 3+000	TRAPEZOIDAL	50	350.00	
5	5+600 – 5+725	TRAPEZOIDAL	50	125.00	
6	5+850 – 6+000	TRAPEZOIDAL	50	150.00	
7	7+600 – 7+850	TRAPEZOIDAL	50	250.00	
8	8+550 – 8+675	TRAPEZOIDAL	50	125.00	
9	8+825 – 8+950	TRAPEZOIDAL	50	125.00	
10	9+325 – 9+500	TRAPEZOIDAL	50	175.00	
11	9+800 – 10+000	TRAPEZOIDAL	50	200.00	
12	10+225 – 10+500	TRAPEZOIDAL	50	275.00	
13	10+500 – 10+800	TRAPEZOIDAL	50	300.00	
14	11+950 – 12+200	TRAPEZOIDAL	50	250.00	
15	12+475 – 13+050	TRAPEZOIDAL	50	575.00	
16	13+825 – 14+500	TRAPEZOIDAL	50	675.00	
17	15+300 – 15+450	TRAPEZOIDAL	50	150.00	
18	15+650 – 15+825	TRAPEZOIDAL	50	175.00	
19	16+200 – 16+400	TRAPEZOIDAL	50	200.00	
20	16+425 – 16+700	TRAPEZOIDAL	50	275.00	
21	17+800 – 19+275	TRAPEZOIDAL	50	1475.00	
22	20+525 – 20+925	TRAPEZOIDAL	50	400.00	

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF SIDE DRAINS
LOCAL ROAD No. 2652 (LUANGNPHABANG PROVINCE)
Km 0+150 - Km 20+925

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Bounthanome PHOMPHIPHAK	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. LDD-003
SCALE: NOT TO SCALE

Figure 14. List of Side Drainages for Local Road No.2652

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
1	0+137	2PC,Dia,1.2 m	GOOD	8.00	R – L	–	–	8.00	6.00	14.00	22.0	WW WW	To be extended
2	0+441	PC,Dia,0.8 m	GOOD	11.00	R – L	–	–	–	–	–	11.0	– –	Replaced by new
3	0+764	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Addition by new
4	0+917	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
5	1+192	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
6	1+327	PC,Dia,0.6 m	VERY POOR	7.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
7	1+509	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
8	1+621	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
9	1+827	2BC,2.50x2.50 m	GOOD	10.00	R – L	3BC,3.0 x 3.0 m	20.00	–	–	–	20.0	WW WW	Replaced by new
10	2+063	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
11	2+223	PC,Dia,0.6 m	POOR	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
12	2+426	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
13	2+770	PC,Dia,0.8 m	GOOD	8.00	R – L	–	–	2.00	1.00	3.00	11.0	WW WW	To be extended
14	3+368	PC,Dia,1.0 m	GOOD	10.00	R – L	–	–	3.00	–	3.00	13.0	– WW	To be extended
15	3+623	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
16	3+863	1BC,2.0x 2.50 m	GOOD	10.00	R – L	–	–	6.00	4.00	10.00	20.0	WW WW	To be extended
17	4+137	1BC,2.0x 2.0 m	GOOD	10.00	R – L	–	–	5.50	5.00	10.50	20.5	WW WW	To be extended
18	4+698	PC,Dia,1.0 m	GOOD	8.00	R – L	–	–	3.0	5.00	8.00	16.0	WW WW	Replaced by new
19	5+067	PC,Dia,0.8 m	GOOD	8.00	R – L	–	–	–	–	–	8.0	– –	Replaced by new
20	5+132	1PC,Dia,0.6 m	POOR	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
21	5+407	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
22	5+783	PC,Dia,0.6 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
23	6+520	2PC,Dia,1.0 m	GOOD	9.00	R – L	–	–	–	7.00	8.00	17.0	WW –	To be extended
24	6+758	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
25	7+151	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
26	7+545	PC,Dia,0.6 m	GOOD	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
27	7+759	PC,Dia,0.4 m	POOR	7.00	L – R	1PC,Dia,1.0 m	19.00	–	–	–	19.0	WW WW	Replaced by new
28	8+365	PC,Dia,0.6 m	GOOD	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
29	8+946	PC,Dia,0.8 m	GOOD	8.00	R – L	–	–	7.00	5.00	12.00	20.0	WW WW	To be extended
30	9+575	2PC,Dia,1.0 m	GOOD	9.00	R – L	–	–	5.00	5.00	10.00	19.0	WW WW	To be extended
31	9+658	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
32	9+915	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
33	10+090	PC,Dia,1.0 m	POOR	8.00	L – R	–	–	3.00	3.00	6.00	14.0	WW WW	To be extended
34	10+196	PC,Dia,1.0 m	POOR	9.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
35	10+390	PC,Dia,1.0 m	GOOD	9.00	R – L	–	–	1.00	–	1.00	10.0	– WW	To be extended
36	10+400	PC,Dia,0.4 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
37	10+708	PC,Dia,0.8 m	GOOD	8.00	R – L	–	–	3.00	1.00	4.00	12.0	WW WW	To be extended
38	10+861	PC,Dia,1.0 m	GOOD	9.00	R – L	–	–	1.00	1.00	2.00	11.0	WW WW	To be extended
39	11+301	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
40	11+709	–	–	–	R – L	2BC,6.0 x 4.0 m	6.60	–	–	–	6.6	WW WW	Addition by new

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2931 (LUANGPRABANG PROVINCE)
Km 0+137 - Km 11+709

REV.	DATE	DESCRIPTION	APPROVED
1	28.11.2022		
2	19.12.2022		

	NAME	SIGNATURE
DESIGNED	Souksavanh SYPHAKHAM	
CHECKED	Enoy MANIVONG	
APPROVED	Dong Wan KIM	

CODE: SD–309–2022
DATE: December, 2022
DRW No. LDD–001
SCALE: NOT TO SCALE

LIST OF CULVERTS

No.	STATION (KM)	EXISTING CULVERT TYPE AND SIZE	EXISTING CULVERT CONDITION	EXISTING CULVERT LENGTH (m)	FLOW DIRECTION	PROPOSED CULVERTS TYPE AND SIZE	PROPOSED CULVERTS LENGTH (m)	EXTENSION TO EXISTING LEFT (m)	EXTENSION TO EXISTING RIGHT (m)	EXTENSION TO EXISTING EXTENSION LENGTH (m)	TOTAL LENGTH (m)	INLET/OUTLET STRUCTURE TYPE	REMARKS
41	11+965	PC,Dia,0.8 m	GOOD	9.00	L – R	–	–	2.00	3.00	5.00	14.0	WW WW	To be extended
42	12+256	PC,Dia,0.8 m	GOOD	9.00	L – R	–	–	1.00	–	1.00	10.0	WW –	To be extended
43	12+492	PC,Dia,0.8 m	GOOD	8.00	L – R	–	–	2.00	1.00	3.00	11.0	WW WW	To be extended
44	12+812	PC,Dia,0.80m	GOOD	7.00	L – R	–	–	1.00	1.00	2.00	9.0	WW WW	To be extended
45	13+844	PC,Dia,1.0 m	GOOD	8.00	L – R	–	–	2.00	1.00	3.00	11.0	WW WW	To be extended
46	14+041	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
47	14+195	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
48	14+398	PC,Dia,1.0 m	GOOD	9.00	R – L	–	–	3.00	2.00	5.00	14.0	WW WW	To be extended
49	14+578	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
50	14+844	PC,Dia,0.6 m	GOOD	8.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
51	15+177	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
52	15+402	–	–	–	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
53	15+625	PC,Dia,0.8 m	GOOD	8.00	L – R	–	–	3.00	2.00	5.00	13.0	WW WW	To be extended
54	15+769	2PC,Dia,1.0 m	POOR	9.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
55	16+001	PC,Dia,0.60 m	FAIR	7.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
56	16+284	PC,Dia,0.80 m	FAIR	8.00	L – R	–	–	1.00	1.00	2.00	10.0	WW WW	To be extended
57	16+474	PC,Dia,0.4 m	FAIR	6.00	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
58	16+684	2PC,Dia,1.0 m	FAIR	8.00	L – R	–	–	1.00	–	1.00	9.0	WW –	To be extended
59	16+751	PC,Dia,0.4 m	POOR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
60	17+190	PC,Dia,0.4 m	POOR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
61	17+497	PC,Dia,0.6 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
62	17+568	PC,Dia,0.4 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
63	17+953	–	–	–	L – R	1PC,Dia,1.0 m	9.00	–	–	–	9.0	DR WW	Addition by new
64	19+445	PC,Dia,0.8 m	POOR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
65	19+466	PC,Dia,0.4 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
66	19+533	PC,Dia,0.3 m	FAIR	6.00	R – L	1PC,Dia,1.0 m	9.00	–	–	–	9.0	WW WW	Replaced by new
67	19+619	2PC,Dia,0.8,1.0 m	GOOD	7.00	R – L	2PC,Dia,1.5 m	9.00	–	–	–	9.0	WW WW	Replaced by new

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FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF CULVERTS
LOCAL ROAD No. 2931 (LUANGPRABANG PROVINCE)
Km 11+965 - Km 19+619

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
1	28.11.2022			DESIGNED	Souksavanh SYPHAKHAM	
2	19.12.2022			CHECKED	Enoy MANIVONG	
				APPROVED	Dong Wan KIM	

CODE: SD–309–2022
DATE: December, 2022
DRW No. LDD–002
SCALE: NOT TO SCALE

Figure 15. List of Existing Culverts for Local Road No.2931-3170

LIST OF SIDE DRAINS

LEFT SIDE					
No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+200 – 0+400	TRAPEZOIDAL	50	200.00	
2	1+200 – 1+450	TRAPEZOIDAL	50	250.00	
3	4+150 – 4+475	RECTANGULARL	50	325.00	
4	6+225 – 6+475	TRAPEZOIDAL	50	250.00	
5	6+625 – 7+000	TRAPEZOIDAL	50	375.00	
6	7+625 – 7+725	TRAPEZOIDAL	50	100.00	
7	7+850 – 8+025	TRAPEZOIDAL	50	175.00	
8	9+225 – 9+325	TRAPEZOIDAL	50	100.00	
9	9+325 – 9+475	TRAPEZOIDAL	50	150.00	
10	9+975 – 10+088	TRAPEZOIDAL	50	113.00	
11	12+400 – 13+150	TRAPEZOIDAL	50	750.00	
12	13+150 – 13+300	TRAPEZOIDAL	50	150.00	
13	15+200 – 15+750	TRAPEZOIDAL	50	550.00	
14	15+850 – 16+625	TRAPEZOIDAL	50	775.00	
15	17+580 – 18+150	TRAPEZOIDAL	50	570.00	
16	18+800 – 19+300	TRAPEZOIDAL	50	500.00	
17	19+325 – 19+475	TRAPEZOIDAL	50	150.00	
18	19+625 – 19+700	TRAPEZOIDAL	50	75.00	

RIGHT SIDE					
No.	STATION (KM)	TYPE	BASE WIDTH MINIMUM (cm)	TOTAL LENGTH (m)	REMARK
1	0+000 – 0+100	TRAPEZOIDAL	50	100.00	
2	1+200 – 1+750	TRAPEZOIDAL	50	550.00	
3	1+950 – 2+300	TRAPEZOIDAL	50	350.00	
4	2+425 – 2+770	TRAPEZOIDAL	50	345.00	
5	4+175 – 4+500	RECTANGULAR	50	325.00	
6	5+175 – 5+525	TRAPEZOIDAL	50	350.00	
7	6+300 – 6+475	TRAPEZOIDAL	50	175.00	
8	7+625 – 7+675	TRAPEZOIDAL	50	50.00	
9	7+758 – 8+025	TRAPEZOIDAL	50	267.00	
10	9+275 – 9+325	TRAPEZOIDAL	50	50.00	
11	9+675 – 9+850	TRAPEZOIDAL	50	175.00	
12	9+975 – 10+050	TRAPEZOIDAL	50	75.00	
13	12+550 – 12+625	TRAPEZOIDAL	50	75.00	
14	12+750 – 12+825	TRAPEZOIDAL	50	75.00	
15	13+000 – 13+150	TRAPEZOIDAL	50	150.00	
16	13+150 – 13+300	TRAPEZOIDAL	50	150.00	
17	13+500 – 13+900	TRAPEZOIDAL	50	400.00	
18	14+850 – 15+025	TRAPEZOIDAL	50	175.00	
19	15+850 – 16+150	TRAPEZOIDAL	50	300.00	
20	16+550 – 17+300	TRAPEZOIDAL	50	750.00	
21	17+300 – 17+500	TRAPEZOIDAL	50	200.00	
22	17+580 – 17+800	TRAPEZOIDAL	50	220.00	
23	18+150 – 18+300	TRAPEZOIDAL	50	150.00	
24	18+150 – 18+325	TRAPEZOIDAL	50	175.00	
25	18+600 – 18+700	TRAPEZOIDAL	50	100.00	
26	18+800 – 19+300	TRAPEZOIDAL	50	500.00	
27	19+550 – 19+688	TRAPEZOIDAL	50	150.00	

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LAO TRANSPORT ENGINEERING CONSULTANT

FEASIBILITY STUDY(FS) AND ENVIRONMENTAL & SOCIAL ASSESSMENT(ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

LIST OF SIDE DRAINS
LOCAL ROAD No. 2931 (LUANGPRABANG PROVINCE)
Km 0+200 - Km 19+688

REV.	DATE	DESCRIPTION	APPROVED
1	28.11.2022		
2	19.12.2022		

	NAME	SIGNATURE
DESIGNED	Bounthanome PHOMPHIPHAK	
CHECKED	Enoy MANIVONG	
APPROVED	Dong Wan KIM	

CODE: SD-309-2022
DATE: December, 2022
DRW No. LDD-003
SCALE: NOT TO SCALE

Figure 16. List of Side Drainages for Local Road No.2931-3170

Local Road No 2571

18. The Local Road No. 2571 starts from Vangngeun Village, outskirt of Luang Prabang City for about 16 km and end in Nadonekhoun Village. The existing road conditions covers by gravel about 5-5.5 width along the mountainous areas with steep curve and slope in some sections. This road passes through five villages where some culverts need to be reinstalled. The submersible bridge will be rehabilitated for climate change resilience. This road also passes though schools and temples. More details are available in ANNEX 7.

Local Road, No 2652

19. Local Road No. 2652 starts from Nakham Village, in city of Chomphet District for about 22 km and end in Buamlao Village. The existing road conditions covers by asphalt about 2 km and the rest cover by gravel about 5m width along the mountainous areas with steep curve and slope in some sections. This road passes through five villages where some box and pipe culverts need to be reinstalled. This road also passes though schools and temples. More details are available in Appendix 1.

Local Road, No 2931- 3170

20. The Local Road No. 2931, 3170 starts from Huayyen Village, in a rural area of Xiengngeun District for about 19 km and end in Phonesavath Village. The whole existing road conditions covers by gravel about 5m width along the mountainous areas with many steep curve and slope sections. This road passes through three villages where some box and pipe culverts need to be reinstalled. This road also passes though rubber plantation schools and temples. More details are available in Appendix 1.

1.3 Overview of socio-economic and environmental information

21. Luang Prabang Province is located in the northern part of Lao PDR, with an approximately 461,439 people with a density rate of 28/Km[1] people with a total area of 16,875 square kilometres. In general, Luang Prabang province consists of multi-ethnic groups with different linguistics where the Hmong and Khmu are dominant groups of the population that represent about 83 percent in the Project Area. Other ethnic groups that exist in the project area include Yao or Iw-Mien, Taidam, Leu and Lao Loum.

22. Organizations in Luang Prabang province like other provinces of Lao PDR, have both traditional and legal organizations. Other organizations that are related to village governance and management such as village administration, village council, village women and village youth. According to Lao PDR's governing law, the village governing board consists of 3 members, 1 is the village head and the other 2 are deputy members. In addition, there are 3-

[1] Statistics Report 2021

5 members of the national defence unit and national security unit in each village (the youths are members among those units) of the village. The village governing board will be elected from the people in the village after the end of the term of office every two years. In addition to the village administration, the party organization is the highest organization within the village and village group. Guidance and leadership in all areas of the unit is under the leadership of the local party unit, the village party secretary will be the main figure in guiding the political administrating at the village level.

23. According to the Luang Prabang Statistic Center in 2018, there are 756 villages, 114 villages in Luang Prabang City, 69 villages in Chomphet District and 49 villages in XiengNgeun District. In the project area of Luang Prabang province approximately 73.4% of people in live in the rural areas with road access, about 7.9% of people in live in the rural areas with no access road and while the remaining 18.7% live in the urban area. The population growth rate[2] is 0.18%. The sex ratio is 1.6 of men vs women and the fertility rate is about 2.3%.

24. The main economic activity of close to 31.3% of the working age population in Luang Prabang[3] Province is self-employed at own operated service business. While the majority of households in Luang Prabang undertake multiple livelihood activities, but not all activities are carried out at the same time in the year. Examples of activities include paddy rice cultivation, upland rice cultivation, rubber plantation, cassava plantation and other non-rice crops cultivation, riverbank gardening, and processing, fishing, collecting of other aquatic animals and plants, collection of non-timber forest products, hunting, and raising of livestock.

25. Income generating activities in Luang Prabang Province include tourism, services, rice, vegetables, non-timber forest products and other non-agricultural activities such as transport operation, restaurant and guest house operation and trading.

26. Approximately 36.7%[4] land area in Luang Prabang province is allocated for production, protection and conservation forests. Almost all households, about 97.4%[5] have access to land and 98.2% own the land.

27. Most villages in Luang Prabang province are accessible by roads. However, only about 66.8% Bof the villages are accessible during the rainy season. Public services, higher education, health facilities and market opportunities are mainly available in in district towns and provincial capital. Improving access to these administrative centers is of high importance. In rural and remote district, approximately 85.4% have no access to public water supply and 85% of all villages have no permanent access to markets.

28. The Table below shows that about 75% of the villages in Luang Prabang have primary school while very few villages, only 20.7% have secondary school. Luang Prabang has low

[2] Annual Provincial Statistic Report, Luangprabang 2018
[3] Annual Provincial Statistic Report, Luangprabang 2018
[4] Annual Provincial Statistic Report, Luangprabang 2018
[5] Annual Provincial Statistic Report, Luangprabang 2018

percentage of population with access to health services in terms of pharmacy, licensed pharmacy and traditional medicines while the access to medical staff or nurse is almost 46%.

29. Vulnerable households, as defined by Decree 348/GOL, dated 16/11/2017 on the Criteria for Poverty Graduation and Development, Article 4 of this Decree defined criteria for graduation of families from poverty as following:
    1) Have safe and strong housing;
    2) Have assets and equipment necessary for their livelihoods and income generation;
    3) Have labour, stable income or employment;
    4) School age family members receive lower secondary school education;
    5) Have access to clean water and stable sources of energy;
    6) Have access to primary public health services;
30. In order to put this decree into implementation, the government also issued a Guideline number 0830/MAF, dated 06/04/2018 on guideline for implementation the decree on the Criteria for Poverty Graduation and Development. Section 4 of this guideline indicated that families that graduated from poverty are the families that achieved six criteria for graduation of families from poverty defined in the Decree 348/GOL, but still do not have stabilization, and vulnerable to development, risk to fall back to poverty family due to those families are not yet achieved the majority of criteria for developed families such as: political aspects, education, cultural, environmental, and national defense-peace keeping. Importantly, although members of family have occupations, they remain at subsistence income. They do not have saving for families to ensure economic stabilities of their families. Average income per person should not less than 5.6 million kip or USD700 per person per year.
    The vulnerable group in these conditions are as follow:
        1) people with poor income per person less than 5.6 million kip;
        2) people whom as female being head of the family,
        3) people whose only elderly people age over 60 years old in household and
        4) people who having disable person in the household.

31. Information from field survey for village socio-economic data, 04-22, May 2022, report that there are 347 HH out 2,282 HH are considered as vulnerable, account for 15.21% of total HH. The level of poverty showed relatively low 7.58% of total number of HH or about 173 HH. In the community along the local road no. 2571, the highest level of poverty is in Nadonekhoun Village for about 24.39% or 10 HH out of total number of 41 HH. There are low percentage of poverty of villages along Local Road No. 2652, due to the fact that this road is not far away from the city. Local people can access to trade and markets. However, the level of vulnerable shows high percentage of 29.73 % along villages along the local road No. 2931.3170. The highest poverty level was found in Phonesa-ard Village. More retails information is available in Appendix 2.

Table 2. Accessibility to Social Infrastructure and Services.

No.	Description	Number of villages with access	Percentage of villages with access
1.	Road access	479	96.7%
2.	Road access during the dry season	470	96.3%
3.	Road access during the rainy season	268	66.8%
4.	Water supply	110	14.6%
5.	Permanent markets in the village	39	5.2%
6.	Markets nearby	172	22.8%
7.	Electricity	636	84.1%
8.	Primary school	486	69.1%
9.	Secondary school	81	20.7%
10.	Pharmacy	45	19.2%
11.	Licensed pharmacy	25	10.7%
12.	Medical equipment	178	76.1%
13.	Midwife	99	42.3%
14.	Traditional medicines	10	4.3%
15.	Health volunteers	135	57.7%
16.	Health workers/nurses.	142	60.7%

Source: Annual Provincial Statistic Report, Luang Prabang 2018

32. Luang Prabang is located in the Northern part of Laos. It was the capital of the Lan Xang Kingdom during the 13th to 16th centuries. It is nominated as a World Heritage Site for unique architectural, religious, and cultural heritage by UNESCO since 1995. It has been known for a blend of the rural and urban developments over several centuries, including the French colonial influences during the 19th and 20th centuries. As a result, the province is one of the most visited by tourists. Luang Prabang province shares border with Phongsaly Province to the North, Vietnam to the Northeast, Houaphanh Province to the East, Xiangkhouang Province to the Southeast, Vientiane Province to the South, Xayyabuly Province to the Southwest, and Oudomxay Province to the West. Luang Prabang City is main city of the province, it locates on a narrow peninsula that bisects the conjunction of the Mekong River. This section of the Mekong River is flowing South along the West side of the city, and the Nam Khan, a tributary of the Mekong that flows from the East but angles North just before the confluence of the two rivers.

33. Based on the Statistic Yearbook 2021, the total population in Luang Prabang Province has a population of approximately 461,439 people with a density rate of 28/Km2[6]. The province includes a total of 12 districts: Luang Prabang City (92,776 people/46,199 female), Xiengngeun District (35,858 people/17,856 female), Nane District (30,593 people/15,234 female), Pak Ou District (28,286 people/14,085 female), Nam Bak District (71,326/35,517 female), Ngoy District (32,155people/16,012 female), Pak Seng District (24,622

[6] Statistic Yearbook 2021

people/12,261 female), Phonexay District (35,040 people/17,448 female), Chomphet District (32,539 people/16,203 female), Viengkham District (31,020 people/15,446 female), Phoukhoune District (25,674 people/12,784 female) and Phonthong District (21,556 people/10,734 female).

34. Lao PDR has National Biodiversity Conservation Area (NBCA) which covers more than 21% of the country's total area. The NBCA in Luang Prabang province are listed below:

- In Luang Prabang, there is Important Bird Area (IBA) is in the Nam Et-Phou Louey National Biodiversity Conservation Area (NBCA) overs 60,070 hectares Phou Louey Massif. The IBA cover areas of Luang Prabang and Houaphanh Provinces. The the Nam Et-Phou Louey NBCA ranges between an elevation of 700–1,800 metres. The diverse habitat contains mixed deciduous forest, semi-evergreen forest, lower montane evergreen forest, upper montane evergreen forest, and secondary grassland. Notable avifauna include beautiful nuthatch Sitta 27 ercule, Blyth's kingfisher Alcedo 27 ercules, rufous-necked hornbill Aceros nipalensis, and yellow-vented warbler Phylloscopus cantator. This national protected is about 120 km sharing by three districts namely: Viengkham, Phonethong and Phonexay districts. The three local roads of this project are located in Chomphet, Xiengngeun and Luangprabang City. In other words, these roads will not have any impacts on this Nam Et-Phou Louey protected area of the province.

- Phou Loei Protected Reserve has an area of 1,465 square kilometres, shared by Luang Prabang and Houaphanh provinces. This Phou Loei Protected Reserve was announced in 1993. This Phou Loei Protected Reserve has highland elevations for its topography ranging between from 500 to 2,257 metres. The area of Phou Loei Protected Reserve has become main sources of water to enrich Nam Khanh and Nam Xuang streams, which are primarily discharge to the southwest lowland areas. Eighty-seven percent (87%) of the reserve areas includes mixed deciduous and evergreens with an abundance of bamboo and grasslands resulting from swidden farming. The leopard, tiger, and leopard, and large cats are the most important fauna in the Phou Loei Protected Reserve, they are not only in the endemic lists in Lao PDR, but they are also in the endemic lists in Indochina. WWF has been working in Laos for years to protect these endemic species for the sustainable enhancement of biodiversity in the Lao PDR.

1.4 Environmental baseline of local roads 2571, 2652 and 2931-3170

1.4.1 Physical Elements

35. **Geographical Location:** Local roads No. 2571, 2652 and 2931-3170 are located in Luang Prabang, Chomphet District and XiengNgeun Districts respectively of Luang Prabang province. Both local roads are located in the mountainous highland areas about 1,000 meters above the sea level.

36. **Soil** Geology**:** Geological structures represent the joints and fractures of rock and soil formations, which indicate past earthquake activity in the project area. Soil and geology are a study of geological features, soil erosion, earthquakes, landslides in the project area to provide basic information to assess the impact on the environment in terms of geology and earthquakes in case of project development in the area. The local roads project is located in unanimous areas Luang Prabang, Chomphet and XiengNgeun Districts that are vulnerable to earthquake, soil erosion and land slide as well as flash flood.

37. **Climate and Climate Change**: Luang Prabang Province is located on the mountain ranges at an elevation of 700–1,800 metres. In Luang Prabang Province, the climate is divided into Wet and Dry season. The Wet is hot, oppressive, and overcast and the Dry season is warm, humid, and mostly clear. Over the course of the year, the temperature typically varies from 14°C to 34°C and is rarely below 10°C or above 38°C. Based on the tourism score, the best time of year to visit Luang Prabang for warm-weather activities is from early November to mid-March. Due to the altitude, the temperature changes more throughout the year and the dry season is longer and similar to the weather in the central and southern part of Lao PDR.

38. **Hydrology:** In Luang Prabang Province, there are two big streams, the Nam Khanh and Nam Ou that flow through the Mekong River. Luang Prabang Province benefits from these streams which play important roles in land use, agriculture, tourism, traditions and infrastructure management. These streams are tributary of the Mekong River, and they are the longest stream in the northern part of Lao PDR. The location of Local Road No. 2571, 2652 and 2931-3170 are in the areas surrounded by the Nam Khanh and close to Mekong River as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province. The distance from Mekong River will be between 3Km-5Km for the local road No. 2571, over 5Km for the local road No. 2652 00 and 2931-3170. Only the starting point of local roads No. 2652 is close to Nam Khanh about 500 meters.

39. **Mineral Resources:** Luang Prabang Province is rich in mineral resources such as gold, silver, copper, lead and zinc. Small-scale artisanal gold mining[7] began in the mid-1970s, and was a widespread activity by 1980. The small-scale artisanal gold mining is typically carried out at the family level involving men, women and children who are generally lacking in technical skills and sophisticated equipment. Typically, men will operate the equipment, such as shovels and chisels, used for ore / alluvium extraction, while women and children transfer the ore / alluvium to bowls and sluice boards, pan the ore and perform the gold extraction processes (which are usually carried out in the home). Nowadays, these practical processes were prohibited and controlled by the government.

[7] Luang Prabang Artisanal Gold Mining and Sociological Survey, Lao PDR

40. **Natural Disaster:** The Natural Disaster often found in Luang Prabang province are flood and earthquake. The flood in Luang Prabang province regularly happens every year since 2018. The flood was reported as follows: On August 29, 2018, has affected all 12 districts and 58 villages in Luang Prabang province. On July 31, 2019, almost 400 families in eight villages of Nan district, Luang Prabang province, found their homes inundated after torrential rain throughout the night caused flash flooding. On April 28, 2020, floods kill three people and leave four missing in Kiawtaloun village (Luang Prabang province). On August 12, 2022, residents across Laos are battling severe floods as days of heavy rains are compounded by tropical storm Mulan, which has been pummelling the northern parts of Laos. The most recent earthquake was recorded between July 28 and 29, 2021, three earthquakes occurred in Luang Prabang province. No injuries or losses were reported. The first earthquake occurred at 21:59:28 measuring 3.5 Richter. The second earthquake occurred at 01:00:47, measuring 2.3 Richter. The 3rd earthquake occurred at 01:36:32 measuring 1.8 Richter.

41. **Erosion and Sedimentation:** There are floods, landslides and sedimentation occur in the project areas of Local Road No. 2571, 2652 and 2931-3170 in Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province. The Erosion and sedimentation caused by typhoon and storm hit this project area. Floods, landslides, erosion, and sedimentation mainly come from high slopes and discharge to lowland. Therefore, agricultural land, crop farming and livestock, local road, fishpond, and properties were damaged and lost.

42. **Surface and Groundwater Quality:** Local people live along the project areas of the Local Road No. 2571, 2652 and 2931-3170 in Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province,and depend on streams and small rivers for their livelihood. The local people use water from streams for their daily living. In some villages, people partly use water well or bore-well for daily consumption, but people in the main town of local road No. 2571 have access to tap water (clean water). However, gravity water is also used outside the main city where it is close to the high mountains. As a result, this can be implied that the surface and groundwater quality in the project areas are still in good conditions.

43. **Air Quality:** In the project area, there are no factories, major industrial park, and massive land. There are limited sources of causing air pollution. Air pollution may be caused by fumes and smoke from traffic vehicles. In previous years, people practiced swidden farming as slash and burn. Nowadays, this swidden farming is controlled and there is limited land available for this kind of rice farming. In addition, there is no record of air pollution in the project area of the Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province.

44. **Noise and Vibration:** Local people reported that noise pollution and vibration is non-existent. It has been reported at a low level sometimes. Due to the poor condition of the roads in the project areas, there is still limited number vehicles using these roads. Another reason is that due to poor road conditions vehicles are unable to drive above 60km/h currently. Noise

disturbance and vibration is hardly noticed. It can be implied that these Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province, have low level of noise pollution and vibration.

1.4.2 Biological Elements

45. **Terrestrial Ecology/Wildlife**: In the Local Road No. Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province, there is fallow land in the mountainous area which is the slope of the mountain where people have come undertake agricultural production for many years by clearing the forest for farming, planting support crops, economic crops, rubber tree farming along the small creek which is a branch of the Nam Khanh River. Therefore, the forest is characterized by a combination of small hills in the plains and foothills. Animal and plant habitats in the project area are fragmented and many places have been lessening by human activities. Forest in the project area has been almost transformed and most of it has been converted into domestic animal habitat and agricultural land (such as rice fields). In conclusion, the Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province, it is located on existing roads which are far away from terrestrial ecology. Thus, the area of these three local roads are outskirts of the districts where wild animals are hardly found in this project area.

46. **Forestry and Vegetation**: Forest in Luang Prabang is characterized in montane rain forests ecoregion[8] which has different elevations more than 800 meters. The mountainous forest covers in the border between Northern part of Thailand and the North-central Laos, and the mountain range stretches from eastern across the northern and down to the central part of Laos. Due to the increasing populations, the transition in land use for industry, tourism and residency causes decreasing in forest cover. The livelihoods of local people also cause much of the forest cover has been degraded. On the other hand, there are large number of forest areas in Luang Prabang Province, still relatively untouchable. This is national protected area of Nam Et-Phou Louey which is about 120 km from the center of Luang Prabang Province. Nam Et-Phou Louey covers the area of Viengkham, Phonethong and Phonexay districts while the 3 local roads are located in Chomphet, Xiengngeun and Luangprabang City and thus these roads will not have any impacts on this Nam Et-Phou Louey protected area.

47. **Aquatic Resources:** Some local people have reported that they caught various kind of aquatic animals in Mekong River and Nam Khanh Stream along the Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and XiengNgeun District, Luang Prabang Province. There are some large and small fish species such as catfish, eel, domestic shrimp, local crab, and some kind of river snail. These aquatic animals are a source of protein for local people for family consumption and for sale for household income sources.

[8] WWF ID: IM0121. Luangprabang montane rain forests

1.5 Socio-economic baseline of Local Roads 2571, 2652 and 2931-3170

1.5.1 Community and Population

48. From the field collection, the Local Road No. 2571, 2652 and 2931-3170 in Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province in which there are 15 villages with a total of 10,120 people, of which half of the total population is female (4,898 people). In the Local Road No. 2571, there are five villages with 2,789 people and 1,417 females; there are nine villages in Local Road No. 2652 with 5,554 people and 2,566 female and there are three villages in Local Road No. 2931-3170 with 1,777 people and 915 females. Details can be seen in the table 3 below.

Table 3. Population in the project area

No	Village	No. of HH	No. of Family	Total Population	Female
Local Road No. 2571, Luang Prabang City					
1	Vangnguen	450	420	951	509
2	Phikyai	85	85	457	221
3	Densavarng	106	106	634	303
4	Natarn	115	107	542	276
5	Nadonekhoun	41	41	205	108
Sub-total		**797**	**759**	**2,789**	**1,417**
Local Road No. 2652, Chomphet District					
1	Xiengman	339	339	1690	807
2	Nakham	203	200	932	405
3	Naxaijalern	49	55	208	107
4	Huaytarn	69	66	342	159
5	Shom	132	116	588	249
6	Na	94	93	403	201
7	Xumaor	59	53	318	137
8	Huayaorn	128	120	568	264
9	Buamlow	116	98	505	217
Sub-total		**1,189**	**1,140**	**5,554**	**2,566**
Local Road No. 2931-3190 XiengNgeun District					
1	Huayyen	126	112	742	347
2	Suandala	79	77	522	322
3	Phonsa-ard	91	82	513	246
Sub-total		**296**	**271**	**1,777**	**915**
Grand Total		**2,282**	**2,170**	**10,120**	**4,898**

Sources: Field Survey for Village Socio-economic data, 04-22, May 2022

1.5.2 Education and Health

49. As per results from data collection the project area of the Local Road No. 2571, 2652 and 2931-3170 as of Luang Prabang City, Chomphet District and Xiengngeun District, Luang Prabang Province, the access to education and health services of all 17 villages are as follow:

- In the Local Road No. 2571, Luang Prabang City, there are 4 primary schools, averagely 1 school per village. There are 23 classrooms and 21 teachers, 14 of them are female. For secondary/high school, there is one upper secondary school, with four classrooms and nine teachers, all of them are men. For the health services, there is no health center along the project areas.
- Approximately only 1% of the total population in Luang Prabang City, Chomphet District and XiengNgeun District who cannot read and write and amongst them about 79% are women. The reason of having low number of illiterate people is that villages along both local roads no. 2571, 2652 and 2931-3170, are located close to the main towns of Luang Prabang Provinces with better access to primary and secondary schools.
- In the Local Road No. 2931-3190 XiengNgeun District, there are three primary schools, with 16 classrooms and 12 teachers and eight of them are female. There are no secondary and high school services. For the health care services, there is no health center available along this local road.

2. INSTITUTIONAL AND LEGAL FRAMEWORK

2.1 Environmental Laws, Regulations, Guidelines, and Standards

50. ***The EIA decree d in October 2022 (Decree 389/GoL).*** Approval of a new decree on EIA in October 2022 to replace Decree 21/GoL of early 2019 provided a strong legal basis for development projects to conduct social assessment and plan/implement mitigation measures as needed. The new EIA decree describes the EIA/IEE processes and requirements regarding the preparation and submission of an ESIA and IEE reports including the Environment and Social Management Plan (ESMP). This includes the principles, regulations and measures for managing, monitoring, restoring, and protecting the environment to ensure environmental quality including the pollution control and the impact assessment processes. A number of technical guidelines including the Public Involvement Guideline (PI) were launched in 2012 and being applied, however, consideration is being made if it is necessary to update this guideline. The objectives of these Guidelines are to ensure the correct implementation of the public involvement and reflect regulation, principles, transparency, and full coverage particularly the involvement of the project affected people in the above involvement process; and (ii) ensure that the project affected people have fairly received reasonable solutions of impacts resulting from investment project. The Department of Environment (DOE) of Ministry of Natural Resources and Environment (MONRE) is responsible for review of the ESIA report and make recommendation for the issuance of an Environmental Compliance Certificate (ECC) while The Department of Pollution Control and Monitoring (DPCM) is responsible for undertaking compliance monitoring. The Provincial Department of Natural Resources and Environment (PoNRE) is responsible for review, issuance of ECC, and monitoring of project that requires an IEE.

51. ***Decree on Promulgation of National Environmental Standards (2017):*** This National Environmental Standards was first developed in 2009 to minimize impacts to human health, animal life, and the environment from development activities in the country. Revised and updated in 2017, the National Environmental Standards apply to any relevant person, enterprise or organization and provide a common platform for both ambient environmental standards and common pollution control standards. The Standards determine parameters, indicators and levels of pollutant concentrations as scientific reference, in the monitoring of environmental quality and control of pollution emitted to air, or discharges to soil and water including disturbance that may have impact on human and animal life, health and environment. The project developments will be required to obtain the pollution control permit as described in the ministerial regulations which will be established by MoNRE. Article 10 determines the National Surface Water Quality Standards for 5 different classes of waterways. Article 11 determines the groundwater quality standards and Article 14 determines the effluent limit values for different activities. The Department of Pollution Control and Monitoring (DPCM) of MoNRE and the respective unit at the provincial and district levels will be responsible for overseeing the implementation and monitoring of the decree/regulations. PCD is also responsible for management of the ozone depleting substance (per the Montreal Protocol) and be the focal point for the Great Mekong Sub-region program (funded by ADB). This agreement applies to persons, entities, and organizations in the

implementation of pollution control in the environment in Lao PDR. The Annex 1 summaried parameters of the national environmental standards applied for this local road project.

52. ***The Forestry Law (revised 2019)*** defines forests as an invaluable national resource with a unique ecology, comprising biodiversity, water resource, and land with various tree species growing naturally or planted in an area of at least 0.5 hectare and a crown cover of at least 20%. Forest in Lao PDR are classified into three categories for the purpose of management, protection, development, and utilization as follows: protection forests, conservation forests, and production forests. Each forest category consists of areas of dense forest, dry dipterocarp forest, regeneration forest and degraded forest as described in the Forest Management Plan.

- **Protection forests** are forest classified for the function of maintaining water resources, riverbanks and roadsides, for preventing soil erosion and improving soil quality, for protecting strategic areas for national defense and security, safeguarding against natural disasters and providing environmental protection and other functions.
- **Conservation forests (Protected forests)** are forests classified for the purposes of conserving nature, preserving, and propagating plant species, aquatic animals, and wildlife species, protecting forest ecosystems and sites of natural, historical, cultural, touristic, environmental and educational value and for scientific research experiments.
- **Production forests** area forests including natural forests and planted forests designated for the supply of wood and NTFPs as commodities to satisfy the requirements of national socio-economic development and people's livelihoods. The Ministry of Agriculture and Forestry is authorized to develop forestland through coordination with other concerned sectors, local administration authorities and all sectors of society, including Lao citizens, to contribute to forestland development by developing polices, guidelines and measures related to the protection, conservation and rehabilitation of forestland to improve its condition and increase its value in a balanced manner with the forest ecosystem. Forestry Law has defined the scope of protection and development forest and forestland area by the central, provincial, district and village levels.

53. ***The Law on Aquatic and Wildlife (24 December 2007).*** This law determines principles, regulations and measures on wildlife and aquatic life in nature to promote the sustainable regeneration and utilization of wildlife and aquatic life, without any harmful impact on natural resources or habitats and to restrict anthropogenic pressure on decreasing species and the extinction of wildlife and aquatic life. The law outlines guidelines for managing, monitoring, conserving, protecting, developing, and utilizing wildlife and aquatic life in a sustainable manner; to guarantee richness of ecological natural equilibrium systems, and to contribute to upgrading livelihoods for multi-ethnic people, which has the potential to develop and realize national social-economic goals.

54. ***Law on Water and Water Resources (Amended), No. 23/NA, 11 May 2017:*** This Law determines the principles, regulations and measures regarding the management, administration, protection, development and use of water and water resources; prevention from the water harmful effects, and restoration and rehabilitation of adversely affected areas

with the aims to meet the needs of the people for their livelihoods, agricultural and industrial production and services, to ensure the protection of environment, society and nature, green directive development, sustainability and national security, regional and international integration and contribution into the socio-economic protection and development. This Law applies to both domestic and foreign individuals, legal entities and organizations earning their livings and carrying out their activities in Lao PDR. Article 4 defines rights, obligations, and procedures to gain approval for use of water resources. Article stipulates that medium and large scale uses require feasibility studies, EIAs, and mitigation plans, before permission is granted for use of the resource. Article 22 stipulates that water resource development must be consistent with national and sector plans, must ensure preservation of the natural beauty of the resources, and must protect against harmful effects of water.

2.2 Laws, Regulations and Standards on Social, Land and Ethnic Matters

55. ***Land*** acquisition ***and involuntary resettlement:*** Directly applicable to the land acquisition and involuntary resettlement is the Decree on Compensation and Resettlement of People Affected by Development Projects (No. 84/GOL, 5 April 2016). This revised Compensation and Resettlement (C&R) Decree describes the principles, regulations, and standards for mitigating adverse social impacts and compensating for damages resulting from unintentional acquisition or repossession of land and fixed or removal assets, including changes in land use. The decree aims to ensure that the people affected by the project (PAP) are compensated for and assisted in improving or, at least, maintaining their pre-project income and standard of living, and are not made worse off than they would without the project. The decree describes the strict principles of compensation, particularly for those PAPs who do not have legal land title, land use certificate or other acceptable documentation indicating their right to land use. Unlike ESS5, this government Decree does not provide neither any provision related to restriction of access to land and natural resources affecting community livelihood and income nor customary lands. In comparison with the previous Decree (No. 192, 2005), which granted this community of PAP the right to seek compensation not only for their lost assets but also for their lost rights and/or privileges of land use, the revised decree (No 84, 2016) only grants the right to claim for their lost properties, such as homes, trees and/or crops, if found to be located in state lands, and if the land users considered to illegal occupiers.

56. ***The new Law on Resettlement and Occupation (No. 086/NA, dated 16 June 2018):*** This law was developed based on the compensation and resettlement Decree (2016). The law, which applies for both government and private sector development projects, aims to define, regulate, manage and monitor resettlement and livelihood for Lao population of all ethnic groups to ensure that those who are in areas identified for resettlement and provided with stabilized residential and production land and occupation with ultimate goals to address illegal relocation, eliminate poverty, improve livelihood, security and social order, develop small villages into rural small towns contributing to national socio-economic development and national security.

57. ***Law on Cultural, Historical and Natural Heritage (amended 2013):*** addresses several environmental protection issues. It states that socio-economic development shall proceed side by side with protection and conservation of the national heritage. It defines cultural, historical, and natural heritage, noting that natural heritage may have scenic or ecological value. The Law also sets out zoning and measures for protection of heritage sites. Areas of national natural heritage shall be registered, especially those containing heritage of high value, such as biodiversity areas, conservation forests, wetlands, caves, and so on. Although it states that sources of biodiversity which have national natural heritage, e.g. wetlands, ponds and marshes, shall be administered by inspection and registration, as proposed by the concerned sectors. It also sets out regulations for protection of national heritage, such as the need to obtain prior approval for development in any national natural heritage area from the Ministry of Information and Culture (MIC) and other concerned sectors.

58. ***Law on Hygiene, Prevention and Health Promotion (Amended 2011):*** focuses on controlling the elements of the environment which are dangerous or may be dangerous to the body, to mental health and social status of human (Article 2); promoting the investment in hygiene, prevention and health promotion (Article 5); community hygiene to be in place (Article 11); to ensure the building access to hygiene principles (Article 14); the care of working conditions for workers (Article 18); to ensure the cleanness of goods exposed, be far away from dirty sources, cemetery and rearing animal places (Article 22). All facilities to be in place particularly wastewater management, solid waste management systems and anti-fire management system.

59. ***The Law on the Development and Protection of Women and Children (2004):*** guarantees and promotes the roles of women, to define fundamental measures for developing and protecting the legitimate rights and interests of women, and to define the responsibilities of the State, society, and family toward women. It includes various aspects, such as gender equality; eliminating all forms of discrimination against women; and preventing and combating trafficking in women and children, and domestic VAWC. It encompasses domestic and public violence, including in educational institutions, workplaces, and alternative care settings.

60. ***Ethnic Groups:*** The guiding policy document to address ethnic group people's issues in the Lao PDR is the Constitution of the Lao PDR, revised in 2015. Its article 8, states that "The States implements policy on solidarity and equity between ethnic groups. All ethnic groups have the right to protect and promote traditions and culture of their own and the nation. All actions of discrimination are prohibited". The 1992 Party policy on ethnic groups focuses on realizing equality between ethnic groups and gradually improving the lives of different ethnic groups while promoting their ethnic identity and cultural heritage. Lao PDR is a culturally diverse country, comprising of 50 ethnic groups, under 4 ethno-linguistic facilities, namely: the Lao-Tai (62.4 percent), Mon-Khmer (23.7 percent), Hmong-Iu Mien (9.7 percent), and Chine-Tibetan (2.9 percent), which are officially divided into 50 ethnic groups. In 2012, the Lao Front for National Development (LFND) released a National Guideline on Ethnic Group

Consultation in line with the 2012 National Guideline on Public Involvement. It aims to ensure that all ethnic groups which benefit from a development project or are adversely affected by it, regardless of the source of funding, are fully involved in a meaningful consultation process at all stages from preparation to implementation. The guideline also aims to ensure that the potentially affected ethnic groups are fully informed of project objectives, as well as their potential positive and adverse impacts on their livelihood and their environment and provided with opportunities to articulate their concerns. The guidelines provide principles and processes to carry out meaningful consultations with, and obtain free, prior, and informed consent of, all ethnic groups affected by development projects in a culturally sensitive manner. The guidelines consist of: a) objectives and scope of the guidelines, b) consultation processes with ethnic groups at respective stages of development projects, c) consultation approaches and methods for different ethnic groups in a culturally sensitive manner, d) expected outcomes of consultation at each stage, and e) implementation arrangement and responsibility.

61. ***Law on Natural Heritage (amended 2014):*** This law addresses several environmental protection issues. It states that socio-economic development shall proceed side by side with protection and conservation of the national heritage. It defines cultural, historical, and natural heritage, noting that natural heritage may have scenic or ecological value. The Law also sets out zoning and measures for protection of heritage sites. Areas of national natural heritage shall be registered, especially those containing heritage of high value, such as biodiversity areas, conservation forests, wetlands, caves, and so on. Although it states that sources of biodiversity which have national natural heritage, e.g., wetlands, ponds and marshes, shall be administered by inspection and registration, as proposed by the concerned sectors. It also sets out regulations for protection of national heritage, such as the need to obtain prior approval for development in any national natural heritage area from the Ministry of Information and Culture (MIC) and other concerned sectors.

62. ***The Lao Labour Law (2013):*** defines the principles, regulations, and measures on administration and monitoring of labour skills development, recruitment, and labour protection. Article 5 requires that working conditions are safe. Article 59 stipulates prohibits unauthorized forced labour in any form. Article 119 requires employers to maintain a safe workplace and ensure good work conditions for the health of the employees. The employer shall supply information, training, and protection for employees so that they may undertake their work safely; and supply individual safety gear to employees according to international standards. Article 122 requires that the employer must inspect and assess risks to safety and health of the workplace regularly and report the results to the Labour Inspection Agency. Article 125 specifies how to deal with workplace accident or occupational disease that causes major injury or death. This law is detailed by the Decree on Occupational Health and Safety (2019) that requires employers to provide annual health check-ups for its employees and re-enforces that work accidents and occupational diseases need to be recorded and reported to the Labour Management Authorities. An employer or the social security organization is responsible for covering the cost of treatment, allowances, and compensation to victims of work accidents or occupational diseases.

63. ***National Policy and Plan on Gender:*** The activities indicated in the 9th National Socioeconomic Development Plan for 2021-2025 (NSEDP) are focused on the three transformative results aiming to; end maternal mortality, end unmet need for family planning, including among adolescent girls and end Gender-Based Violence (GBV) and harmful practices such as early marriage; ensure youth receive age-appropriate comprehensive sexuality education through school curriculums nationwide and innovative adolescent youth friendly services; implement policies and Gender Equality Law; establish a referral pathway and make dignity kits available in humanitarian emergencies, increase investments for adolescents, especially young women through the "Noi Framework" of 2030. The 2030 Noi Framework provides a platform to address challenges Lao girls (10-19 years old) face in education, sexual and reproductive health, nutrition, employment and gender equality, as well as their opportunities to participate in decisions that matter to them.

64. ***Law on Lao Women Union (No. 31/NA, 2013):*** the government of Lao PDR promotes the development, protection and advancement of women and support their participation, decision-making and equitable benefit-sharing in all development activities according to the Article 4.

65. ***GOL Policy and Procedure to combat COVID-19:*** Since March 2020, considering the outbreak of COVID-19 pandemic in neighboring countries such as China, Thailand, Vietnam, and others, the GOL took strict actions to prevent infection within Lao PDR. Three policy and guideline were issued on 13 March 2020 to control COVID-19 transmission and infection i.e. (a) guideline on prevention of the transmission and infection of COVID-19 at international airport, land border, and transportation stations; (b) guideline on prevention of the transmission and infection of COVID-19 at suspected to be infected area or temporary quarantine center; and (c) guideline on prevention of the transmission and infection of COVID-19 at public place (hotel, guesthouse, offices, schools, and others). On 29 March 2020, the Prime Minister issue an Order on Reinforcement Measures on Containment, prevention and full response to the COVID-19 pandemic (No. 06/PM, Vientiane Capital). This policy orders the restriction of people travelling and allows GOL officers to work from home during 1-19 April 2020.

66. ***Legislation on Gender-Based Violence (GBV):*** These include domestic violence, Sexual Harassment (SH)/Sexual Exploitation and Abuse (SEA), human trafficking. Several laws applied to gender-based violence, including domestic violence, sexual harassment/ exploitation and human trafficking.

Table 4. List of key Lao PDR environmental legislations applicable to the project.

Subjects	Related national policies, strategies, laws, regulations
Road	• Law on Road Traffic, No. 021/NA, dated 08/11/2016; • Law on Public Road, No. 03/NA, dated 08/11/2016; • Law on Land Transport, No. 23/NA, dated, 12/12/2012; • Law on Multi-Transports, No. 28/NA, dated 18/12/2012; • Law on Construction, No. 05/NA, dated 26/11/2009

Natural Environment	• Constitution of the Lao PDR People's Democratic Republic (1991), amended No. 63/NA, 08/12/2015; • Law on Environment Protection, No. 29/NA, dated 18/12/2012; • Law on Forestry, No. 08/NA, dated 13/06/2019; • Law on Disaster Management, No. 15/NA, dated 24/06/2019 Law on Water and Water Resources, No. 23/NA, dated 11/05/2017; • The Law on Aquatic and Wildlife Animals No. 07/NA (2007); • Decree on Environmental Impact Assessment, No. 289/GoL, dated 20/10/2022 • Decree on Protected Forest Management (No.134/Gov, dated 13 May 2015); • Decree on the Promulgation and Enforcement of National Environmental Standards, No. 81/PMO, dated 21 February 2017.
Social	• Law on the Development and Protection of Women, No.08/NA, dated 22/10/2004; • Law on Preventing and Combating Violence against Women and Children, Law No. 56/NA, 23/12/2014; • The revised Land Law (No.70 /NA), endorsed by the National Assembly on 21 June 2019; • Law on Gender Equality, No 32/NA, dated 28/11/2020 • Law on Hygiene, Prevention and Health Promotion (Amended 2011); • Law on Preventing and Combating Violence against Women and Children, Law No. 56/NA, 23/12/2014; • Decree on Occupational Health and Safety, No. 22/GoL, dated 05/02/2019; • Law on Anti-Human Trafficking, No. 022/NA, dated 17 December 2015; • Law on National Heritage, No. 44/NA, dated, 24/12/2013; • The Lao Labour Law (2013); • Law on the Protection of Children Rights and Benefits, No. 05/NA, dated 27/12/2006; • Second National Plan of Action on Preventing and Elimination of Violence against Women and Violence against Children (2021-2025) and the Fourth National Plan of Action on Gender Equity (2021-2025).

2.2.1 Institutional Responsibilities and Legislation

67. From an institutional aspect, the Ministry of Natural Resources and Environment (MONRE) is the lead ***ministry*** responsible for implementation of the Environmental Protection Law and its regulations and/or guidelines. These local roads no. 2571, 2652 and 2931-3170 for Luang

Prabang City, Chomphet District and XiengNgeun District, Luang Prabang Province, are under Local Road Climate Change Resilient Improvement and Maintenance Project. The project covers the improvement and rehabilitation of existing domestic roads. Therefore, the Provincial Department of Natural Resources and Environment (PoNRE) is responsible for review, issuance of ECC, and monitoring of project that requires an IEE as stated in the EIA decree issued in the updated 2022 (Decree 289/GoL).

2.2.2 Applicable World Bank Environment and Social Standards (ESS)

68. At this stage of project preparation, the key WB Environmental and Social Standards (ESS) that are ***deemed*** likely relevant to the project (and that may require specific instruments to be prepared) are:
    - ESS1 – Assessment and Management of Environmental and Social Risks and Impacts;
    - ESS2 – Labour and Working Conditions;
    - ESS3 – Resource Efficiency and Pollution Prevention and Management;
    - ESS4 – Community Health and Safety;
    - ESS5 – Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
    - ESS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources;
    - ESS7 – Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
    - ESS8 – Cultural Heritage; and
    - ESS10 – Stakeholder Engagement and Information Disclosure.

69. The ***following*** ESS is not relevant to the project:
    - ESS9 – Financial Intermediaries.

70. The ***relevance*** of the ESS1 to ESS9 to the project is summarized in the following table:

Table 5. Relevant ESSs to the local road project implementation

ESS	Relevance to the Project
ESS1	• It is the instrument to assess, manage and monitoring environmental and social risks and impacts associated with each stage of this local road project as this project will have negative environmental and social impacts on the communities along the road alignment and thus mitigation measures and tools need to be developed in line with the requirements this ESS1.
ESS2	• ESS2 is the instrument to ensure construction workers' rights to protection and fair treatment and access to safe working environment and grievance mechanisms.
ESS3	• ESS3 is the instrument to help avoiding or minimizing pollution associated with civil works activities for protection of human health and the environment as well as to ensure more efficient and effective resource use, pollution prevention and GHG emission avoidance.

ESS	Relevance to the Project
ESS4	• ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. It is also an instrument to prevent risks of violence, exploitation or harassment to women and children in the workforce, violence to community women or children as well as inappropriate cultural behavior or interaction of construction workers, engineers with local people due to labour influx. In addition, it also provides mitigation measures to avoid accidents and injuries involving workers and the public; introduction of sexually transmitted or other diseases by non-local workers; outbreaks of diseases such as Covid-19, malaria, diarrhoea, etc. in the labour force.
ESS5	• ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition1 or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. Based on the ESS5 the ARAP has been developed for this project.
ESS6	• ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity is defined as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems. ESS6 is the instrument to help mitigating the impacts of the local road project on biodiversity because improper disposal of spoils may cause damage to existing vegetation. Hunting of wildlife and cutting of trees for fuel may be undertaken by construction workers.
ESS7	• ESS7 recognizes that Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities have identities and aspirations that are distinct from mainstream groups in national societies and often are disadvantaged by traditional models of development. In many instances, they are among the most economically marginalized and vulnerable segments of the population. Their economic, social, and legal status frequently limits their capacity to defend their rights to, and interests in, land, territories and natural and cultural resources, and may restrict their ability to participate in and benefit from development projects. lmpacts on the secondary structures such as kitchen, fence, tea processing workshops, rice barns, tea drying workshop and toilet of ethnic people are expected. There is also a risk they could be excluded from project benefits, including job opportunities.
ESS8	• ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present, and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge, and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. If road sections are close to temples, grave sites or other tangible or intangible cultural spaces, these could be impacted by construction.

ESS	Relevance to the Project
ESS10	• ESS10 recognizes the importance of open and transparent engagement between the MPWT that represent Lao Government as borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. If stakeholders are not properly consulted, information is not disclosed and people are not informed about their rights, options for grievance redress or project timelines, there could be project delays, misunderstandings, conflict, or loss of confidence in the community regarding the project. Vulnerable groups can be missed and excluded from the consultation process and may disproportionately suffer negative impacts from the project. They may also be targets for physical or verbal abuse from outsiders.

2.2.3 Gaps Analyses of Lao Legal and Relevant WB's ESS

71. The following table summarizes the main gaps between Lao legal frameworks and relevant WB's ESS to the local roads.

Table 6. Summary of Main Gaps of Lao Legal and Relevant WB's ESS

Main Gaps	Lao Legals	WB's ESS	Measures to Address Differences
ESS2: Labour and Working Conditions In Lao PDR, the Trade Union is managed under the government system which are not a collective association of workers. The WB's ESS2 outlines that the project will not restrict project workers from developing alternative mechanisms to express their grievances and protect their legitimate rights regarding working conditions and terms of employment. The Borrower should not seek to influence, or control discriminate to retaliate against project workers who participate, or seek to participate, in workers' organization and collective bargaining or alternative mechanisms.	The employee rights and working conditions are specified in the Labour Protection Law (2013) which has provisions that are consistent with the Bank's ESS2. In addition, the Prime Minster's Notification on the Minimum Wage of Labour in Lao PDR (2018) also sets out a minimum wage of LAK 1.1 million/month. The Law on Grievance Redress (2016) also outlines conflict resolution procedures.	Terms and Conditions of Employment - Non-Discrimination and Equal Opportunity; - Rights to Organize. - Prevention / restriction of child Labour; - Prevention of forced Labour; - Grievance Mechanism for Labourers; - Identification of potential hazards; - Provision of preventive and protective measures; - Training of workers and maintenance of training records; - Documentation and reporting of occupational accidents, disease, and incidents; - Emergency Preparedness; and Remedies for adverse impacts on workers safety.	The national Labour Law is highly consistent with ESS2. However, to address some of the gaps in the ESS2 includes: - Prevent Child Labour and Forced Labour (PPCLFL). - Project Workers' Grievance Mechanism; - In addition, the LMP sets out requirements for additional measures to comply with ESS2, which will include: • Direct Project Workers' Occupational Health and Safety Strategy; • Terms and Conditions of Employment for Direct Project Workers. • Environmental, Social, Health and Safety Specification (ESHSS) for contracts. • Community Labour Management Procedure; • Provisions in location and site -specific ESMP.

Main Gaps	Lao Legals	WB's ESS	Measures to Address Differences
• There is no specific national guidelines for labour conflict resolution.			
ESS3: Resource Efficiency and Pollution Prevention and Management. There is a lack of national policy for enhancing the resource efficiency of infrastructure particularly the use of construction materials e.g. sand, gravel	Key legislation regarding resource efficiency and pollution prevention includes: • The Decree on Lao PDR National Environmental Standards (2017); • Ministerial Instructions on Hazardous Waste Management (2015); and • the Law on Environmental Protection (2012); • Decision on Pollution Control (2021), • Decree on Energy Saving and Efficiency (2020), • National Policy on Energy Efficiency (2016), • Law on Water and Water Resources (2017).	Resource Efficiency and Pollution Prevention requires project to: • Promote more sustainable use of resources including energy and water and the reduction of project related GHG emissions; and • Avoid or minimise pollution from project activities.	ESS3 will be implemented to apply a precautionary approach that complements the national regulation that ensures the rational and sustainable resource uses, manage, and prevent the pollution.
ESS4: Community Health and Safety. Currently, there is no national law, regulation or guideline specific to community health and safety.	Key legislation for community health, safety, and security in Lao PDR include the Decree on Occupational Health and Safety (2019); Law on Road Traffic (2012), Lao PDR National UXO / Mine Action Standards (2012); and discharge	The Bank's Standard requires for Community Health, Safety and Security and requires projects to: - Avoid or minimise adverse impacts on the health and safety of project affected communities; and - Ensure safeguarding project property and personnel is carried out in accordance with	The Community Health and Safety Plan provides guidelines on how to address the identification and mitigation measures associated with these issues. • Specific guidelines have been provided in terms of Labour Management Procedures in Annex 7 of the ESMF and Code of Conduct (COC) in the appendixes 2 and 3 of this ESMP. • SEA/SH Action Plan in the appendix 7 of this ESMP.

Main Gaps	Lao Legals	WB's ESS	Measures to Address Differences
	/Hazardous waste legislation	relevant human rights principles and in a manner that avoids or minimises risks to project affected communities.	
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Lack of clear reference to siting project on lands already converted. In the hypothesis that no feasible alternative exists as demonstrated by an ESIA, there is no legal obligation to provide for compensation for conversion of non-critical habitats. There is no mention of "critical natural habitats" or prohibition on investing in projects that would degrade or convert them.	EIA process provides for analysis of all potential alternatives. There is no explicit rule providing for use of land already converted and to avoid land located within protected area, water catchment and area containing high forest.	The E&S assessment will consider direct, indirect, and cumulative project-related impacts on habitats and the biodiversity they support. The Borrower will avoid adverse impacts on biodiversity and habitats. Where the project occurs within or has the potential to adversely affect an area that is legally protected, designated for protection, the Borrower will ensure that any activities undertaken are consistent with the area's legal protection status and management objectives.	The construction works include activities that may cause "significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses" in the negative list. Each of project activity will be confined almost exclusively to the existing alignment and Right of Way and will not include construction of new road. Measures and process to avoid and/or mitigate impacts on natural habitats has been included in this ESMP.
ESS8: Cultural Heritage No significant gap. Reference to "chance finds" is formally lacking in applicable laws and regulations.	Key applicable national legislation includes: • The Law on National Heritage (2013), • Agreement of the National Assembly on Ethnicity (2008) and • the Decree of the President of Lao PDR on the Preservation of Cultural, Historical and Natural Heritage (1997).	Aims to protect cultural heritage through consultation procedures, community access and removal of replicable cultural heritage. Provides specific requirements for chance finds, consultation, community access, removal of replicable and non-replicable cultural heritage, as well as critical cultural heritage.	The roads pass by 2 temples and 4 cemeteries but no impacts on the structures have been identified. However, if complaints raised on disturbances Cultural Heritage Framework to be applied in case there is a risk of impacts on heritage, whether tangible or intangible.

Main Gaps	Lao Legals	WB's ESS	Measures to Address Differences
	• Mandatory reporting to authorities (Ministry of Culture and Information and MPWT). • The project owner and contractor must interrupt all construction activities and measures must be adopted to preserve the vestiges uncovered by chance until the classification of those assets or until conclusion of the archaeological research shall be prescribed by the Ministry of Culture and Information. • The area of archaeological patrimony accidentally revealed must be delimited, as suitable and protected under the responsibility of the project owner and contractor.		

3. POTENTIAL E&S RISKS AND IMPACTS and MITIGATION MEASURES

72. The ESMF of SEARECC Project has identified risks and impacts broken down into positive, direct, indirect, downstream, cumulative, and transboundary impacts. The ESMF investigations have identified that the Project has the potential to result in a variety of benefits for local communities and the national economy, however, there will be environmental and social impacts and risks that will need to be effectively managed to ensure that the Project is delivered and operated successfully. This ESMP further assess potential risks and impacts of the local roads no. 2571, 2652 and 2931-3170 in Luang Prabang Province.

3.1 Overall Impacts

73. The overall impacts of the proposed local roads no. 2571, 2652 and 2931-3170 of Luang Prabang province, will be outlined in different stages of project cycles. The project will be positive in improving road accessibility, road safety, landslide/ erosion resilience, and well-being of the local people. Main improvements of critical sections aim to improve the road's climate resilience that include elevating road conditions, paving with gravel. The road section passing through large communities, drainage will be installed and improved slope stabilization. This project will be implemented under OPBRC contract covering both construction works and the environmental and social responsibility.

74. This impact assessment and mitigating measures cover the entire cycle of the Project activities, from design, pre-construction, construction and operation and maintenance. The coverage of the project phases is defined as follows:

- Preparation phase including time for preparation of Project activities and investment including preparation and completion of the ESMP, EGEP, RAP/ARAP, detailed engineering design (DD) and preparation of bidding documents (BD) and contract document (CD) including all WB clearances.
- Pre-Construction Phase is the time before the 'Notice to Proceed' is given to the contractor to commence the construction covering the beginning time for bidding and implementation of ARAP/RAP and EGDP including the time when detailed measurement survey (DMS) and determination of compensation is completed as well as the mobilization of construction supervision consultant.
- Construction Phase is the period from the completion of the Pre-construction activities time until the issuing of the 'Certificate of Completion'. Payment of compensation for project affected people as per ARAP/RAP and GOL issuance of the ECCs and other necessary approval must be completed before construction can begin.
- Operation and Maintenance (O&M) Phase is the time from completion of works (including site clearance) and maintenance activities during the OPBRC period. It

is expected that after the OPBRC, the O&M responsibility will be under the responsibility of the DPWT of Luang Prabang Province.

- Main expected environmental risks and impacts anticipated for these local roads no. 2571, 2652 and 2931-3170 are: Sediment and erosion;
- Water quality;
- Dust, noise, and vibration;
- Disposal of hazardous materials and wastes;
- Domestic solid wastes;
- Potential impacts on flora and fauna;
- UXO risks;
- Climate change.

75. Main social risks and impacts anticipated for these local roads 2571, 2652 and 2931-3170 are:
    - Demolishment of the impacted secondary structures and possible loss of access to properties;
    - The main risks relating to labour and working conditions in the project are: i) unequal payment for the same job for female and male workers; ii) discrimination of women and/or vulnerable groups; iii) payment for unskilled workers below the minimum wage[9] of KIP 1,300,000 as per GOL mandated minimum wage ; iv) inadequate working facilities for workers, in particular lack of sanitation facilities for women; v) risks of child labor; (vi) labour related disputes, (iv) SEA/SH and VAC, and (vii) occupational health and safety or OHS related issues such as inadequate personal protective equipment (PPE).
    - Road safety and increase of traffic during project operation but also related risks during construction;
    - Temporary labour influx of workers, which might increase the risk of substance abuse;
    - Increased risk of SEA/SH from workers (including in training/TA activities) and their proximity to vulnerable groups, as well as opening up of the corridor;
    - Increased risk of human trafficking from improved connectivity;
    - Impacts to ethnic groups such as Khmu and Hmong in the project area;
    - Impacts to 6 templesalong the roads;
    - Risks of communicable diseases such as COVID-19, dengue fever etc.

76. Labor influx can be considered as impact for many big projects due to rapid migration to and settlement of workers and followers in the project area. However, these local road projects, are not big road projects. There are only about 57 km distance in combination of 3 local roads as local road no. 2571 is about 16 km, 2652 is about 22 km and the road local no.2931-3170 is about 19 km. In this 2 years construction project, it is expected to employ

[9] The minimum wage in Lao PDR is a single rate applicable to all employees, and does not differ based on region, skill level, or employer characteristics.

only about 35 skilled workers as outside laborers for civil works contracts for the road constructions. Unskilled labours are also required for less than 50 people to serve general works and manual works at the project site. The unskilled labours shall be available in local community along the project of each local road. For the reason, large numbers of labour influx into the project area can be limited. In brief, there will be no significant labour influx for construction/civil works of local roads in Luang Prabang Province. The risks, impacts and mitigations of manage of labour and worker camp are presented in the Table 7 below.

77. The generic as well as site specific risks and mitigation measures for each of the local road no. 2571, 2652 and 2931-3170 as well as for responsibilities in the implementation and monitoring are summarised in the following tables.

Table 7. Generic Environmental and Social Management Plan Local Road No. 2571 at Km 0 to Km 20+920 of Luang Prabang City, Local Road No. 2652 at Km 0+000 to Km 27+870 of Chomphet District and Local Road No. 2931-3170 at Km 0 to Km 19+700 of Xieng Neun District

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
DETAILED DESIGN/PRE-CONSTRUCTION MOBILZATION STAGE					
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Non-compliant with ESMP provisions	Contractor is required to be oriented with the requirements of ESMP and ESS requirements of WB. This will include: • Obligation under contract to prepare and submit C-ESMP • Regulatory compliance requirements • Grievance redress mechanism • Various plans required under C-ESMP related to occupational health and safety, traffic and road safety, Traffic Management Plan, community health and safety, hazardous and non-hazardous waste, camp site management, emergency response, blasting, borrow area, muck disposal, restoration, SEA/SH risk management (CoC signing) and management of construction induced impact, etc. • Labor management procedures • Community health and safety aspects at workplace • Stakeholder engagement plan, and • Reporting requirements, etc. Contractor shall develop C-ESMP and appoint one environmental and social/community liaison officer and one health and safety officer. Both shall solely be responsible for implementation of all	Environmental and Social Specialist of Supervision Consultant.	PMU, PTI, DPWT/ESM WG[10]

[10] MPWT= Ministry of Public Works and Transport
PTI: Public Works and Transport Institute
DPWTs: Department of Public Works and Transport in the Project Provinces
ESMWG= Environment and Social Monitoring Working Groups the Project Provinces

			ESMP provisions in close coordination and consultation with the Environmental and Social Specialist as well as Environmental Health and Safety Specialist of Supervision Consultant		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention to areas close to sensitive receptors, especially dense communities	Secondary structures impacted	The local roads No. 2571, 2652 and 2931-3170 follow the existing alignment, Therefore, only secondary structures along the roads will be demolished. Given the Fence-to-Fence approach, no relocation of permanent houses, no residential land, farmland and or agricultural land will be affected by this local road project. Only 5 affected households will have minor impacts on the structures. The affected structures are 6 secondary structures (4 porches, 1 erosion protection wall and 1 hut). Compensation of impacted structures will be carried out in accordance with resettlement policy framework applicable to SEARECC and as per ARAP. Compensation of impacts must be completed prior to the commencement of impacts caused.	ARAP Implementation Consultant ESMWG	PTI DPWT ESMWG
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention to areas close to sensitive receptors, especially dense communities, schools, temples, and health centers.	Road safety	Road design should make safety a priority, such as by widening and sealing shoulders, where land is available, through better marking and signage, introducing traffic calming measures at critical locations, and measures to safeguard pedestrians' safety, including for women and children from local communities who use roads to travel to and from schools, markets, temples, health center and cemeteries. The contractors shall prepare the contractor level Traffic Management plan as part of the C-ESMP to prevent accidents during the construction and maintenance stage of the project roads.	Project Manager of the Contractor	Health and Road Safety Consultant, and Resident Engineer of DDIS[11]

[11]DDIS: Detailed Design Implementation and Supervision Consultant

5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All 17 villages along the project road section	Lack of communication with local people	To hold a works orientation meeting at least 2 weeks prior commencement of civil works with people in 17 villages, village authorities and members of ESMWG will also be invited to the meeting.	Environmental and Social Specialist of Supervision Consultant Environmental and Social/ Community Liaison Officer of Contractor	DPWT of Luang Prabang Province
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All 17 villages along the project road section	Lack of mechanism to address social and environmental issues	Establish grievance redress mechanism (GRM) • Create public awareness of GRM. • Ensure that name and contact number of representatives of MPWT and Contractor are place on the notice board outside the construction site and at village offices, markets, or temples, may have in the form of poster; special channel for SEA/SH related complaints should be included. • Ensure Contractor's compliance to ESMP and Annexes is in the contract agreement. • Ensure this ESMP, ARAP and the EGDP, including Grievance Redress Mechanism, is shared, and consulted with local communities.	Environment and Social Specialist of DDIS ESMWG PTI	DPWT of Luang Prabang Province
5 villages, Luang Prabang City, 9 villages, Chomphet District, and	All along the project road section with special attention to areas vulnerable to flooding as	Climate change and flood prevention	During Detailed Engineering Design, climate resilient measures must be taken into consideration to ensure roads can withstand potential climate change impacts, in particular flooding.	Project Manager of the Contractor	Resident Engineer of DDIS Consultant

3 villages, XiengNgeun District	found during Detailed Engineering Design				
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All section where the route passes by residential areas, local market, schools, bridges, temple, and health center.	Additional impacts to structures may occur in the sensitive areas	To carry out the joint field verification to ascertain any possibilities of savings the structures, design modification to minimize impact on structures. The local road No. 2571 has average in distance of 16 Km that passes through 5 villages in highland area where there are 5 villages with density of structures in some sections. The condition of the road is relatively narrow where each village is located around 1-2 km of distance from each other on mountain valley and hills. This local road passes by 3 primary schools, 1 secondary school, and 3 temples. The local road No. 2652 connects 9 villages along the distance of 22 Km, the distance between each village is about 1-2 Km on the mountainous areas. Community assets along this local road include 1 nursery school, 4 primary schools, 1 local market, 1 health center, 3 bridges and 2 temples. The local road No. 2931-3170 has 19 km road length, passes through 3 villages with some existing structures such as 2 primary schools, 1 bridge and 1 temple. Verify the possibilities of construction induced impacts to nearby structures due to the mobility of heavy machinery and construction activities.	Environmental and Social Specialist of DDIS Consultant Environmental and Social/Community Liaison Officer of Contractor	PIU Grievance Committee
5 villages, Luang Prabang City, 9 villages, Chomphet District, and	All along the project road section	Emergency preparedness (Fires, explosions, traffic accident, communicable	Preparation of an Emergency Response Plan (ERP). Including, but not limited to measures to handle traffic accidents, handle construction induced impacts, etc.	Environmental and Social/ Community Liaison Officer, Environmental Health and	Environment Specialist and Resident Engineer of DDIS Consultant

3 villages, XiengNgeun District		diseases (HIV/AIDS, COVID-19, dengue fever etc., earthquakes, etc)		Safety Officer, and Project Manager of the Contractor	
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Impacts of UXO	To consult with the relevant regulatory authorities to confirm that the construction area is clear of any UXO. If this cannot be confirmed the Contractor (through an approved sub-contractor) will be responsible for surveying the construction areas (including ancillary facilities, such as borrow pits and access roads) and confirming that the work sites are free of UXO. The Contractor will provide, in writing, the findings of the survey to the Engineer. If any UXO is found on site the Contractor, through his approved sub-contractor, will be responsible for removing any UXO.	Environmental and Social/ Community Liaison Officer of Contractor and Project Manager of the Contractor	Residence Engineer DDIS Consultant and PMU
CONSTRUCTION STAGE					
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	Worker's camp (if applicable)	Labor influx, OHS in labour camps	There are only about 35 skilled workers outside laborers for civil works contracts for the road constructions of 57 km distance in combination of 3 local road local road no. 2571, 2652, and 2931-3170. It is expected that there are less than 50 unskilled labours are also required to serve general works and manual works at the project site. These unskilled labours shall be available in the local community along the project of each local road in order to limit numbers of labour influx into the project area. It can also create employment opportunities for female and ethnic people. The Contractor preferably will use unskilled labour drawn from local communities to give the maximum benefit to the local community. Contractor to be guided by LMP (Annexes 7 of the ESMF).	Environmental and Social/Community Liaison Officer of Contractor and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant

			The worker registration template will be applied in order to record all necessary information's. The information will be useful for work management. All workers will be provided an orientation session for do/don't before start working in the construction site. As part of the worker orientation program, Contractors' staff shall sign a Code of Conduct relating to his personal behaviour on site. See Appendix 8. Make sure, all workers understand and accept all terms and obligations in Code of Conducts, prior to sign and/or thump stamp. Violations of the code of conduct may lead to dismissals. If setting up a worker's camp, provide adequate housing for all workers at the construction camps and establish clean canteen/ eating and cooking areas. Latrines for male and female, shall be installed and open defecation shall be prohibited. Lavatories should be kept clean. Toilet facilities for women should be accessible from place of work. Compliance with Labor Management Procedures (LMP) in Annex 7 of the ESMF and Codes of Conduct in Appendix 8 of this ESMP.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and	Worker's camp (if applicable)	Various construction activities and operation of workers camps will generate solid wastes.	• The Contractor must carry out appropriate measures for waste collection and treatment. The domestic wastes will be collected in plastic or wooden bins with lids placed in convenient places and in worker canteens. • Generation of these wastes (food wastes and garbage including plastic) will be minimized and/or reused when possible. • Periodically, at appropriate time, transport those bins to the disposal sites (the sites should be approved by local authorities).	Environmental and Social/Community Liaison Officer of Contractor and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant

3 villages, XiengNgeun District		Poor waste management could cause odor and vermin problems, pollution and flow obstruction of nearby watercourses and could negatively impact the landscape	• The Contractor must sign a contract with the Urban Environmental and Construction Company to collect and treat these wastes during construction. • In case the wastes cannot be transported to the dumping site (for example, due to lack of appropriate transport route), wastes must be buried at temporary dumps in the project area in a sanitary way – a waste layer covered by a layer of soil, and when the dump is filled, it is covered by a soil layer about 50 cm thick. • Temporary dump sites must be located at least 500 m away from residential areas, 200 m away from work camps and surface water sources, and not in the prevalent wind direction of the area. • Upon completion of works, cover the entire temporary dumps with soil, ensure land, and landscape restoration for the subproject area. Wastewater effluents from contractors' workshops and equipment washing yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed before wastewater is discharged. Oil and grease residues shall be stored in tightly covered drums. Such wastes shall be disposed consistent with national and local regulations.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All 17 villages along the project road section	Labor rights, gender, child labor, discrimination, vulnerable groups	LMP (Annex7 of the ESMF) should be adhered by all contractors/ sub-contractors which includes protection of all workers engaged to work on and or supply the project related activities in compliance with the Labor Law and WB ESS2, including prohibition on child labor, zero tolerance of GVB and VAC, awareness, and protection of all workers from HIV/AIDS and OHS. Ensure salaries and/or daily rates are in line with guidelines in Labor Law and that at least the minimum wage in Lao PDR is paid for unskilled jobs, and that workers are paid consistent rates (i.e.	Environmental and Social/Community Liaison Officer of Contractor and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant

			the same type of work should be paid the same, whether done by a male or female worker). Encourage the hiring of local labor, in particular for unskilled jobs in construction, as well as for providing services to the worker's camps if applicable (i.e. food preparation or cleaning services). Encourage the hiring of women and make at least 15- 20% of unskilled jobs available to them. When feasible, encourage people living with a disability or other vulnerable people to apply to jobs that may be available. Adopt a minimum working age of 18 and check identities/birth records when hiring. Conduct screening of providers of materials for road construction (and other primary supply workers) to ensure they do not engage in child or indentured labor. All persons hired by the contractor must be paid a fair and adequate salary as per provisions in ESS2 (see LMP Annex 7 of the ESMF). Ensure access to grievance redress mechanism		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and	All along the project road section with special attention around schools and residential areas	Gender-Based Violence (GBV) and Violence against Children (VAC)	Strict Code of Conduct for workers with no tolerance for physical or verbal abuse of women or children. Training to workers on maintaining good community relations, with emphasis on proper conduct around women and children, GBV and VAC. Ensuring workers sites are situated (at least 500m) from schools and/or other areas where children congregate.	Environmental and Social/Community Liaison Officer of Contractor and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant

3 villages, XiengNgeun District			Children prohibited from construction site and worker's camp. Provision of information to local communities about the contractor's policies and responsibilities, including the Contractor's Code of Conduct and minimum working age.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention to areas close to sensitive receptors, especially dense communities, schools, temples, markets, health centers and cemeteries	Road safety in narrow, confined, and sensitive locations in the villages	i. Road engineering design should make safety a priority, such as by widening and sealing shoulders, where land is available, through better marking and signage, introducing traffic calming measures at critical locations, and measures to safeguard pedestrians' safety, including for women and children from local communities who use roads to travel to and from schools, markets, temples, health center and cemeteries. ii. Working hour in schools, markets, temples, health center and cemeteries will be informed and consulted with village authority, village elders, principles and in charge person. This is to avoid potential impacts as noise, vibration, and accidents. iii. Road barrier and demarcation shall be installed along the constructing areas. The barrier and demarcation should be light reflection including ropes and sign to be installed along the constructing areas to minimize potential accident during the night-time.	Project Manager of the Contractor	Health and Road Safety Consultant, and Resident Engineer of DDIS[12]
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention around schools, temple, local market and residential areas	Accessibility	If side drain is constructed, provide temporary/safe access to residential houses, shops, schools, temples, etc. and ensure safety to school kids, shops, temples, cemeteries etc. at the entrance of the facilities as follows: The local road No. 2571 has average in distance of 16 Km that passes through 5 villages in highland area where there are 5 villages with density of structures in some sections. The condition of the road is relatively narrow where each village is located around 1-2 km of distance from each other on mountain valley and	Environmental and Social/Community Liaison Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Resident Engineer of DDIS Consultant

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			hills. This local road passes by 3 primary schools, 1 secondary school, and 3 temples. The local road No. 2652 connects 9 villages along the distance of 22 Km, the distance between each village is about 1-2 Km on the mountainous areas. Community assets along this local road include 1 nursery school, 4 primary schools, 1 local market, 1 health center, 3 bridges and 2 temples. The local road No. 2931-3170 has 19 km road length, passes through 3 villages with some existing structures as 2 primary schools, 1 bridge and 1 temple.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention to areas close to sensitive receptors, especially dense communities, schools, temples, markets and health centers	Access to businesses, households, communities, schools, temples, markets and health centers	(i) Contract term for Contractor to ensure alternative access to houses as soon as possible after the start of the excavation work during the civil works. (ii) The Contractor shall be responsible for compensation for the impacts on PAHs' livelihood and businesses due to his failure to maintain/provide access facilities and the prolonged access lost (beyond the agreed work schedule). A clause on these measures will be specified in the bidding document including the BOQ form and the work contract. Details of compensation policy and implementation are available in ARAP. The Contractor shall state this compensation policy when prepare C-ESMP prior to construction begin. (iii) Contract term for the Contractor to ensure alternative access to the communities, households, schools, temples, markets, health centers and cemeteries as soon as possible after the start of the excavation work during the civil works.	Project Manager of the Contractor	Health and Road Safety Consultant, and Resident Engineer of DDIS[13]
5 villages, Luang Prabang City,	All along the project road section	Occupational Health & Safety	Appoint an Environmental Health and Safety Officer (EHSO) responsible for training, monitoring, and reporting on EHS and implementing health and safety related programs.	Environmental Health and Safety Officer of	Environmental Health and Safety

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9 villages, Chomphet District, and 3 villages, XiengNgeun District			Conduct orientation for construction workers regarding emergency response procedures and equipment in case of accidents; health and safety measures; prevention of HIV/AIDS; GBV, VAC as well as Code of Conduct. Provide fire extinguish equipment and appropriate emergency response equipment. Provide first aid kits at each camp and working sites as applicable. Provide workers with appropriate safety equipment/devices and strictly require them to use these as necessary. Provide training to workers on traffic safety. Ensure work areas have proper signs to alert traffic and that flagmen and speed limits are used, as necessary, to ensure the safety of workers. Light reflection and barrier shall be installed to minimize potential accident during the night-time.	Contractor and Project Manager of the Contractor	Specialist and Resident Engineer of DDIS Consultant
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Damage to private and/or community facilities and/or trees	Immediately repair (not more than 10 days) any damage caused by the Project to community and/or private facilities and/or trees. The contractor to pay adequate compensation to affected parties, as necessary. Access roads damaged during transport of construction materials and other project related activities shall be reinstated within 1 week upon completion of construction works.	Project Manager of the Contractor	Resident Engineer of DDIS Consultant
5 villages, Luang Prabang City,	All along the project road section	Temporary Land Requirement	The Contractor as per the project ARAP, RPF and Laos legislation, will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction	Environmental and Social/Communi	Environment Specialist and Resident

9 villages, Chomphet District, and 3 villages, XiengNgeun District			camp/ borrow areas/Debris Disposal Area etc. The contractor shall identify temporary land for construction camp/ borrow areas/Debris Disposal Area away from Forest Land. PIU will assist contractor in obtaining permission/clearance for any damage to forest land	ty Liaison Officer and Project Manager of the Contractor	Engineer of DDIS Consultant
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Impact to flora and fauna due to vegetation clearance	No chemicals will be used to clear vegetation.	Environmental and Social/Community Liaison Officer and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Sites may be needed to extract gravel and other construction materials, which may cause erosion, pollution and issues with air and water quality. Loss of natural habitats • Land acquisition	• Tree cannot be cut without approval from PAFO. The Contractor will use a quarry of materials according to the regulations and compensate by planting of trees in case of deforestation or tree felling. • Sourcing of quarry and borrow materials from existing licensed sites shall be preferred over establishment of new sites as much as possible. • Quarries and borrow pits shall not be established in national, provincial, district protected forests, productive land, and others ecologically sensitive and protected areas. • In case the Project will involve new quarry/borrow sites/spoil disposal sites, environmental assessment and approvals will be needed. Such sites shall be located over 500 m away from residential, school, hospital, and other sensitive receptors.	Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

			• Prior to extraction, topsoil (about 15 cm) shall be stockpiled, preserved and then and keep away from riverbanks. Extraction of materials shall have prior approval from relevant authorities. • Protect and reinstate riverbanks if unexpected erosion occurs. • Quarry and borrow sites must be selected amongst those offering the highest ratio between extractive capacity (both in terms of quality and quantity) and loss of natural state. • Quarry and borrow sites lying close to the alignment, with a high level of accessibility and with a low hill gradient, are preferred. • Upon completion of extraction activities, recontour borrow/quarry pit wall or fill-up when there are available and suitable materials such as excavation spoils, replace topsoil, and re-vegetate with native species such as grasses and fast-growing shrubs and trees. • Upon completion of extraction activities, borrow pits shall be dewatered and fences shall be installed, as appropriate, to minimize health and safety risks. • In quarries located in mountainous or hilly areas, or wherever slopes are important, terraces shall be cut after extraction, and drainage system and vegetation cover shall be provided for rehabilitation to enhance slope stability. • Implement compensatory planting (at least one to one ratio) if trees will have to be removed at quarry and borrow sites. • Borrow pits will be left in a tidy state with stable side slopes and proper drainage in order to minimize soil erosion, siltation of nearby bodies of water and to avoid creation of water bodies favorable for mosquito breeding. • To avoid or prevent people from drowning when pits become water-filled, measures such as fencing, providing flotation devices such as a buoy tied to a rope, safety signs, etc. shall be implemented.		

			• It is possible that villagers may request borrow pits to be left excavated so that they may be used as water reservoirs or fishponds. If this were to be agreed between the contractors and the villagers, all the full safety measures detailed above must be observed. Such agreements would be formalized in writing between the contractors and the villagers after full discussion with all concerned parties' areas for stockpiles or borrow pits, they must be included in the project resettlement plan and proper agreement and record will be secured. • If access/rescue roads are needed, actions to mitigate all negative impacts described in this ESMP will also be applied. The alignment for each of these roads must be clearly determined with its impacts and mitigation measures. • Quarry Management Plan will be prepared and implemented by contractors.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	During earth works, there could be possible significant erosion and run-off to water bodies. This would be particularly relevant near riverbanks and/or other water bodies.	• On hill slopes and other potentially erodible places along the roadside, appropriate native vegetation that retards erosion should be planted. • As much as possible, construction activities in hilly areas should be undertaken during the dry season only. • Road embankments and slopes should be monitored during construction for signs of erosion, vegetative cover should be provided on slopes by planting native grass and creepers on erosion prone sections. • Long-term material stockpiles should be covered with native species of grass or other suitable materials to prevent wind erosion. • Appropriate erosion control and stabilizing measures should be used such as benching, geotextiles, mats, fiber rolls, soil binders, etc. that are not toxic to the environment, or vegetation measures/temporary landscaping in disturbed areas and on graded slopes.	Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Contractor campsites, bridge works, stockpiling of construction materials and spoils, use of hazardous materials and earthworks if not properly managed are likely to cause deterioration of surface water quality, flooding and flow obstruction of watercourses. Paving / asphalting in weather; road maintenance works conducted without using proper staging techniques to reduce spillage of paving materials.	The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into all rivers and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. Discharge of engine oil and oily waste from dredgers and construction machines to the rivers will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed-off. Key measures are as follows: • Used oil/engine oil: The oil container at the construction site (especially when the site is located less than 10 meters from the waterways) must be of sufficient strength to ensure to prevent leakage. The container must be situated within a secondary containment system (bunded), which will prevent the release of any leaked oil. The Contractor must make provisions to ensure that all hazardous substances including oil drums or containers on site are properly labelled and properly stored and that no oil or other contaminants are allowed to reach water courses or groundwater. • Wastewater from sites: Whenever possible, the Contractor must minimize the amounts of wastewater that need to be discharged and find alternative means of disposal. The Contractor will ensure that any seepage and wastewater arising from the works and camp sites must be collected and discharged via a settlement tank. The standards for wastewater treatment prior to discharge must be agreed in advance with the ESA. Contaminated water or water of an uncertain quality must be discharged into sewers by tankers or other approved means of disposal. • Drainage. Water drainage must be designed to avoid stagnant conditions that could create bad smell and unsanitary condition. The Contractor must agree with the ESA in advance, details of the methodology to be	Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

			employed, prior to commencement of the construction. Particular attention must be given to regular pest control treatment (particularly rats and flies); removal of sludge and other debris after drainage; reducing smell nuisance from sludge and algae by measures including deodorizing, hosing down etc. • Spoils, construction wastes and construction materials stockpile area shall be located away from water bodies and under no circumstances will these materials be dumped into watercourses. • Do not fill up canals and creeks at the construction site. In case filling of local drainage system is necessary, consultation with local authorities shall be undertaken and their permission obtained beforehand. An alternative drainage shall be established before the existing canal is filled-up. • Slope stabilization measures (e.g., planting of fast-growing native species of grass and shrubs, etc.) shall be implemented on exposed surfaces along river embankments to reduce material wash-away. • Construct retaining structures such as gabion baskets, riprap, etc. for riverbank protection. • Obtain required permits indicating water sources and permissible volumes. • Monitoring water quality. • Limit asphalting / concreting works to dry weather / season; use of staging techniques prior to maintenance works (e.g. covering from drain inlets; use of drip pans and absorbent materials on paving machines).		
5 villages, Luang Prabang City,	All along the project road section	Construction plan for material transportation, stockpile, movement, and	• The Contractor should ensure that construction materials are transported in proper types of vehicles, vehicle maintenance and refrain from overloading of materials for avoidance of accidence and injuring pedestrians and other road users.	Environmental Health and Safety Officer of Contractor and	Environmental Health and Safety Specialist and Resident

9 villages, Chomphet District, and 3 villages, XiengNgeun District		parking of construction equipment in narrow and confined areas	• The Contract shall prepare construction plan side by side of the road in order to ensure that traffic movement smoothly managed. • The Contractor needs to have stockpiles that be allowed and approved by landlord and local authority. The stockpile needs to be away from sensitive locations including stream and agriculture farm in order to avoid sediment. The stockpile areas will need to recover and treat relatively the same or better original conditions. • The Contractor shall also ensure parking construction vehicles and equipment should be allowed and approved by landlord and local authority in safety area, flagmen will be in services. • The Contractor shall install speed limited sign and warning sign in these construction stockpile areas, with light reflection and barrier shall be installed to minimize potential accident during the night-time.	Project Manager of the Contractor	Engineer of DDIS Consultant
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Pollutions associated with civil works such as dust, noise, and vibration	• The Contractor must make efforts to control dust, noise, and vibration levels from the site, as far as is reasonably practicable. Portable devices for dust and vibration detect shall be provided at construction site, in order to limit excessive noise/vibration generation activities in accordance with GOL standards. • For critical areas, the Contractor many be required to conduct noise measurement in close consultation with the local residents and establish appropriate measures to control and manage noise level. Measures for reducing dust and other air pollution, noise, and vibration are provided as follows: o Inform the residents: Prior to commencement of work at any site, the Contractor will be required to inform the local authority and residents regarding the construction plan and potential noise and vibration that may occur from the construction activities, including measures to reduce noise and vibration.	Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

			○ The Contractor will ensure that no burning of waste materials on site; adequate water supply is available on site; dry sweeping of large areas is not allowed. ○ Cover all trucks carrying loose or potentially dusty materials (soil, mud, etc.) to and from construction site. ○ Water or sprinkle the construction areas periodically, especially at site located near residential area; avoid overloaded of trucks; routinely clean public roads and access routes. ○ Ensure vehicles working on site have exhausts positioned such that the risk of re-suspension of ground dust is minimized (exhausts should preferably point upwards), were reasonably practicable. ○ Control driving speed on un-surfaced haul routes and work areas. ○ Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. ○ Mix large quantities of cement, grouts, and other similar materials in designated areas. ○ Store materials with the potential to produce dust away from site boundaries where reasonably practicable. ○ Minimize the amount of excavated material held on site. ○ Sheet, seal, or damp down unavoidable stockpiles of excavated material held on site, where required. ○ Seal or re-vegetate completed earthworks as soon as reasonably practicable after completion. ○ Care must be undertaken during the transportation of construction materials to and from the construction site; the spoil must be covered at all times.		

			○ Fly-tipping will not be permitted. Loads must only be deposited at designated sites. ○ The Contractor will be responsible for all the trucks delivering to, or exiting from, a worksite and will clean up all damage that may occur to public road and other public facilities. ○ Care should be taken when loading or unloading vehicles or dismantling scaffolding or moving materials to reduce impact noise. ○ Loading or unloading bays may have to be housed in suitable acoustic enclosures. ○ Noisy plant or equipment including will be sited as far away as is practicable from noise sensitive buildings. The use of barriers, (e.g. soil mounds), site huts, acoustic sheds or partitions to deflect noise away from noise sensitive areas should be employed wherever practicable. ○ The Contractor will be obliged to comply with the vibration levels according to GOL standards. Due attention will be given to minimize human exposure (1 Hz to 80 Hz) and protection of damage to nearby structures.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Preconstruction and construction activities may generate large amount of construction wastes including those generating from resurfacing and excavation of soil, old road surface and/or concrete	• The Contractor will prepare and implement a plan to reduce the generation of these wastes. When possible, these wastes should be properly reused and/or recycle. • Bags and other solid wastes will be collected for recycling while appropriate arrangement will be made if a temporary disposal area will be required. Appropriate final disposal sites must be identified and implemented in discussion with local authorities. • Store fuel and hazardous substances and wastes on bunded paved area with roof and interceptor traps so that accidental spills do not contaminate the environment. If spills or leaks do occur, undertake immediate clean up.	Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

		structure and other surplus materials (oily wastes, miscellaneous woods, steel, etc.). Pollution and safety risks due to use of hazardous materials and disposal of hazardous wastes.	• Develop and implement Emergency spill procedures by contractors. • Train relevant construction personnel in handling of fuels and other hazardous substances as well as spill control and clean-up procedures. • Ensure availability of spill clean-up materials (i.e. absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored. • Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport, and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations. • Store waste oil, lubricant and other hazardous materials and wastes in tightly sealed containers to avoid contamination of soil and water resources. • Ensure all storage containers of hazardous substances and wastes are in good condition with proper labelling. • Regularly check containers for leakage and undertake necessary repair or replacement. • Store hazardous materials above flood level. • Storage areas for fuel, oil, lubricant, bitumen, and other hazardous substance will be located at least 100 m away from any watercourses. • Storage, transport, and disposal of hazardous wastes, including spill wastes, shall be consistent with national and local regulations. • Wherever possible, refuelling will be carried out at a fuel storage area. • Refuelling shall not be permitted within or adjacent to watercourses. • Where significant amount of oily wastewater or spill/leakage of oil and grease may occur (i.e. equipment maintenance areas), drainage leading to an oil- water separator shall be		

			provided for treatment of wastewater. The oil-water separator shall be regularly skimmed of oil and maintained to ensure efficiency. • Vehicle maintenance and refuelling will be confined to designated areas in construction sites designed to contain spilled lubricants and fuel. • Bitumen shall not be allowed to enter either running or dry streambeds and nor will be disposed of in ditches or small waste disposal sites prepared by the contractor. • Bitumen storage and mixing areas as well as storage areas for other petroleum products used in the preparation of the bitumen mixture shall be protected against spills and all contaminated soil must be properly handled according to national and local regulations. As a minimum, these areas must be provided with concrete flooring and surrounded by an embankment to readily contain and clean-up spills. • Adequate precaution will be taken to prevent oil/lubricant/hydrocarbon contamination of channel beds. Spillage if any will be immediately cleared with utmost caution to leave no traces. All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities (i.e. firefighting equipment, sorbent pads, etc.) to combat emergency situations complying with all the applicable statutory stipulation.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Poorly planned and unsupervised dumping of spoils can affect biodiversity and also block water courses, cause stagnant water, impact the water quality of rivers	• Collection of waste, especially oil, not dumped into canal or any water body around construction site. • Excavated soil shall be placed in a designated sites with approval from local authorities and landowner in accordance with site management procedures developed and implemented by contractors. Spoils must not dump in the rice field, river, or any other areas around communities or construction site. • Compensation in case of adverse impacts to land/rice field.	Environmental and Social/Community Liaison Officer and Project Manager of the Contractor	Environment Specialist and Resident Engineer of DDIS Consultant

		and streams, block access to people's homes and businesses, and damage people'sproperty.	• Need visibility into how suppliers are extracting or producing raw materials to ensure they're following sustainability standards. • Train staff on the proper disposal of waste. • Establish a waste management procedure or disposal procedure following international standards and laws and regulations of the government of Lao PDR. • Implement the project's LMP in Annex 7 of the ESMF.		
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section	Repeated non-compliance on key ES impacts	Stipulate more stringent contractual penalties (in case of repeated non-compliance on key ES impacts that could lead to serious or severe E&S incident including road safety, community safety, and delay due to coordination among concerns agencies).	Environment Specialist and Resident Engineer of Supervision Consultant	PMU
OPERATIONAL AND MAINTENANCE STAGE					
5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All road sections but especially those close to residential areas, schools and other sections considered important	Road safety	All vehicles must go through checking regularly. Material load shall be covered and secured during transportation to prevent scattering of soil, sand, materials, or dust. Road Safety plan in place and operational from civil works and throughout operation. If side drain is constructed, provide temporary/safe access to shops, schools, hospitals, etc. and ensure safety to school kids, hospital/clinic personals, etc. at the entrance of the facilities.	Luang Prabang City Public works and Transport Office	Luang Prabang Provincial Public works and Transport Department

5 villages, Luang Prabang City, 9 villages, Chomphet District, and 3 villages, XiengNgeun District	All along the project road section with special attention to areas close to sensitive receptors, especially dense communities, schools, temples, markets, health centers and cemeteries	Access to businesses, households, communities, schools, temples, markets, health centers and cemeteries	(i) Contract term for Contractor to ensure alternative access to houses as soon as possible after the start of the excavation work during the civil works. (ii) The Contractor shall be responsible for compensation for the impacts on PAHs' livelihood and businesses due to his failure to maintain/provide access facilities and the prolonged access lost (beyond the agreed work schedule). A clause on these measures will be specified in the bidding document including the BOQ form and the work contract. Details of compensation policy and implementation are available in ARAP. The Contractor shall state this compensation policy when prepare C-ESMP prior to construction begin. (iii) Contract term for the Contractor to ensure alternative access to the communities, households, schools, temples, markets, health centers and cemeteries especially where crossing drains as soon as possible after the start of the excavation work during the civil works. The access should also cater for disadvantaged people.	Project Manager of the Contractor	Health and Road Safety Consultant, and Resident Engineer of DDIS[14]

[14]DDIS: Detailed Design Implementation and Supervision Consultant

Table 8. Site Specific ESMP, Local Road No. 2571

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
DETAILED DESIGN/PRE-CONSTRUCTION MOBILZATION STAGE (to follow the provisions provided in Table 7 above)					
I. CONSTRUCTION STAGE (to follow the provisions in the Table 7 and the following)					
Km 0+000 to Km 0+950	Route pass through residential area of Vangngern village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 4+300 to Km 5+250	Route pass through residential area of Phik-yai village	Accidents Dust and toxic gases emission and noise disturbance	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety	Environmental and social Specialist and Environmental Health and Safety Specialist and

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
			• Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days.	Officer of Contractor and Project Manager of the Contractor	Resident Engineer of DDIS Consultant
		Waste generation from construction activities	• Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.		
Km 9+400 to Km 10+500	Route pass through residential area of Daensavang village	Accidents	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
		Dust and toxic gases emission and noise disturbance	• Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days.		
		Waste generation from construction activities	• Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.		
Km 13+000 to Km 13+850	Route pass through residential	Accidents	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night.	Environmental and Social/Community	Environmental and social Specialist and

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
	area of Daensavang village	Dust and toxic gases emission and noise disturbance	• Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days.	Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
		Waste generation from construction activities	• Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.		
Km 14+300 to Km 15+500	Route pass through residential area of Nadonkhoun village	Accidents	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
		Dust and toxic gases emission and noise disturbance	• Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days.		
		Waste generation from construction activities	• Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field.		

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
			• Compensation to businesses if affected by civil works disruption.		

Table 9. Site specific ESMP Local Road No.2652

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
DETAILED DESIGN/PRE-CONSTRUCTION MOBILZATION STAGE (to follow the provisions provided in Table 7 above)					
1. CONSTRUCTION STAGE (to follow the provisions in the Table 7 and the following)					
Km 0+140L to Km 0+175L	Local market	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

Km 2+150 to Km 2+950	Route pass through residential area of Nakham village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 5+ 750 to Km 6+750	Route pass through residential area of Naxayjalern village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

			• Compensation to businesses if affected by civil works disruption.		
Km 8+ 300 to Km 9+250	Route pass through residential area of Huaytan village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 10+975 to Km 11+000	Nam Tan1 Bridge	Deterioration of surface water quality, flooding, and flow obstruction of watercourses	• The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into Nam Tan1 and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. • Discharge of engine oil and oily waste from dredgers and construction machines to Nam Lao will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed-off. Key measures are identified in Table 9.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 11+800 to Km 12+500	Route passes through	Accidents	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night.	Environmental and Social/Communit	Environmental and social Specialist and

	residential area of Som village	Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	y Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 12+500 to Km 13+500	Route passes through residential area of Na village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Communit y Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

Km 13+700 to Km 13+730	Nam Tan2 Bridge	Deterioration of surface water quality, flooding, and flow obstruction of watercourses	• The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into Nam Lao and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. • Discharge of engine oil and oily waste from dredgers and construction machines to Nam Lao will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed-off. Key measures are identified in Table 9.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 15+500 to Km 16+500	Route passes through residential area of Xam-Or village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 18+250 to Km 19+150	Route passes through residential area	Accidents Dust and toxic gases emission	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as	Environmental and Social/Community Liaison Officer and Environmental	Environmental and social Specialist and Environmental Health and Safety

	of Huay On village	and noise disturbance Waste generation from construction activities	otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Health and Safety Officer of Contractor and Project Manager of the Contractor	Specialist and Resident Engineer of DDIS Consultant
Km 200+700 to Km 21+500	Route passes through residential area of Buamlow village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 20+950 to Km 21+000	Nam Chan Bridge	Deterioration of surface water quality, flooding, and flow	• The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into Nam Lao and to protect surface and groundwater from pollution and other adverse	Environmental and Social/Community Liaison Officer	Environmental and social Specialist and Environmental

		obstruction of watercourses	impacts including changes to water levels, flows and general water quality. • Discharge of engine oil and oily waste from dredgers and construction machines to Nam Lao will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed-off. Key measures are identified in Table 9.	and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Health and Safety Specialist and Resident Engineer of DDIS Consultant

Table 10. Site specific ESMP Local Road No 2931-3170

Location	Sensitive Area or Activity	Potential Impacts/Concerns	Mitigation Measures	Responsibility	
				Implementation	Monitoring
DETAILED DESIGN/PRE-CONSTRUCTION MOBILZATION STAGE (to follow the provisions provided in Table 18 above)					
2. CONSTRUCTION STAGE (to follow the provisions in the Table 18 and the following)					
Km 1+850 to Km 2+250	Route passes through residential area of Huayyen village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

			• Compensation to businesses if affected by civil works disruption.		
Km 4+000 to Km 4+850	Route pass through residential area of Souandala village	Accidents Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night. • Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 10+675 to Km 10+700	Nam Chan Bridge	Deterioration of surface water quality, flooding, and flow obstruction of watercourses	• The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into Nam Chan and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. • Discharge of engine oil and oily waste from dredgers and construction machines to Nam Lao will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed-off. Key measures are identified in Table 9.	Environmental and Social/Community Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental and social Specialist and Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant
Km 15+ 700 to Km 16+500	Route pass through residential area	Accidents	• Employ flagmen to help navigate the traffic. • Install traffic signs and light reflection at night.	Environmental and Social/Communit	Environmental and social Specialist and

	of Phonsavath village	Dust and toxic gases emission and noise disturbance Waste generation from construction activities	• Apply traffic safety, dust (spray water on road surface to prevent airborne dust, which may be 3-6 times/day or as otherwise needed depending on weather and traffic) and noise restriction. • Construction activities should be limited to working hours only from 8:00 to 17:00. • No construction activity is permitted during holy days. • Collection of waste, especially oil, not dumping into canal and any water body around construction site. • Excavated soil shall be transported away and not dumped in the rice field. • Compensation in case of adverse impacts to land/rice field. • Compensation to businesses if affected by civil works disruption.	y Liaison Officer and Environmental Health and Safety Officer of Contractor and Project Manager of the Contractor	Environmental Health and Safety Specialist and Resident Engineer of DDIS Consultant

Table 11. Instrumental Monitoring for the Construction and Operational Phase

Issue	Survey items	Location	Schedule	Responsibilities	Reporting
Air Quality	Particulate Matter (PM-10, PM-2.5), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2), Carbon Monoxide (CO)	For each road, the engineer selects 2 areas with the most construction	Twice (rainy season and dry season) a year during the construction period	The contractor will employ an accredited laboratory, approved by Supervision Consultant, to perform the monitoring activities.	The laboratory submits the results to the contractor within one week of the monitoring activity, and the contractor immediately reports to the supervising consultant.
Noise	Laeq 1h(dBA), Laeq 24h(dBA)	For each road, the engineer selects two areas of sensitive facilities such as schools, temples, hospitals and houses.	Once a year during the construction period	The contractor will employ an accredited laboratory, approved by Supervision Consultant, to perform the monitoring activities.	The laboratory submits the results to the contractor within one week of the monitoring activity, and the contractor immediately reports to the supervising consultant.
Water Quality	pH, Suspended Solids, BOD5, COD, Coliforms, Nitrate (NO3), Phosphate (PO4)	Upstream and downstream points of the river in the area where construction of bridges in rivers is carried out	Once during construction of bridges in rivers	The contractor will employ an accredited laboratory, approved by Supervision Consultant, to perform the monitoring activities.	The laboratory submits the results to the contractor within one week of the monitoring activity, and the contractor immediately reports to the supervising consultant.

3.1.1 Cumulative Impacts

78. No other existing, proposed and anticipated future road projects have been identified that may result in cumulative impacts to the Project area. In addition, there is no key factor have been identified during the construction and operation of the roads. There is low influence of impacts for the future development of projects that may have significant environmental impacts. The project is a rehabilitation project which intends only to improve conditions of the local road no. 2571, 2652 and 2931-3170 of Luang Prabang and Chomphet and XiengNgeun Districts, Luang Prabang province.

3.1.2 Cause of Impacts

79. The positive effects on the local community will be in different aspects such as: i) economic connectivity within the country, with neighbouring countries and other countries in the regional). Easy access to health services; iii) Eco-tourism and cultural exchange; iv) Opportunities to create service works and upgrade internal services and v) Opportunities to exchange goods, facilitate smooth movement of good.

80. The negative impacts of local roads 2571, 2652 and 2931-3170 will be short term and temporary such as difficult access to houses, schools, temples, and market along the project local roads during construction; ii) Disruption of transport and thus increased transportation time of local products to market and iii) some shops and business may be disrupted.

4. GRIEVANCE REDRESS MECHANISM (GRM)

4.1 Introduction

81. A 'Grievance Redress Mechanism' (GRM) that helps record, assess, and resolve grievances and complaints during the implementation of a project in as efficient, effective, and transparent manner as possible is essential to the success of the project.

82. The GRM is based on key principles that will protect the rights and interest of affected stakeholders, ensure that their concerns are addressed in a prompt and timely manner, and that entitlements are provided in accordance with GOL and WB ESS policies. The GRM will ensure that communities directly affected by the Project have a full understanding of the GRM and ways to access it especially on: (i) the concept of compensation for any involuntary acquisition of land and/or assets; and (ii) ensuring environmental and social mitigation measures in this ESMP's are implemented as planned.

83. The GRM procedures to be followed for all subprojects have been translated into Lao language and it will be prepared in local language as needed so that they are easily accessible to all stakeholders and made available by the PMU. Information on the steps to be followed in handling grievances has been incorporated into the consultation process with local community.

84. The Project will use the 'Grievance and Complaints Logging System' (GCLS) which has been used on multiple WB projects to help ensuring that projects are implemented in accordance with appropriate environmental and social practices. Attachment 9 GRM (Monitoring Record Form). The GCLS will be used to record grievances and complaints on a central database, and then to monitor the progress until eventual resolution. It will provide the necessary data to meet the 'grievance redress' indicators. Specifically, it reports on:
    - Grievances registered related to delivery of project benefits that are addressed (%);
    - Grievances responded and/or resolved within the stipulated service standards (%);
    - Project-supported organization(s) publishing periodic reports on GRM and how issues were resolved (including resolution rates) (Yes/No); and
    - The figure below shows the business flow process for the GCLS as part of the GRM.

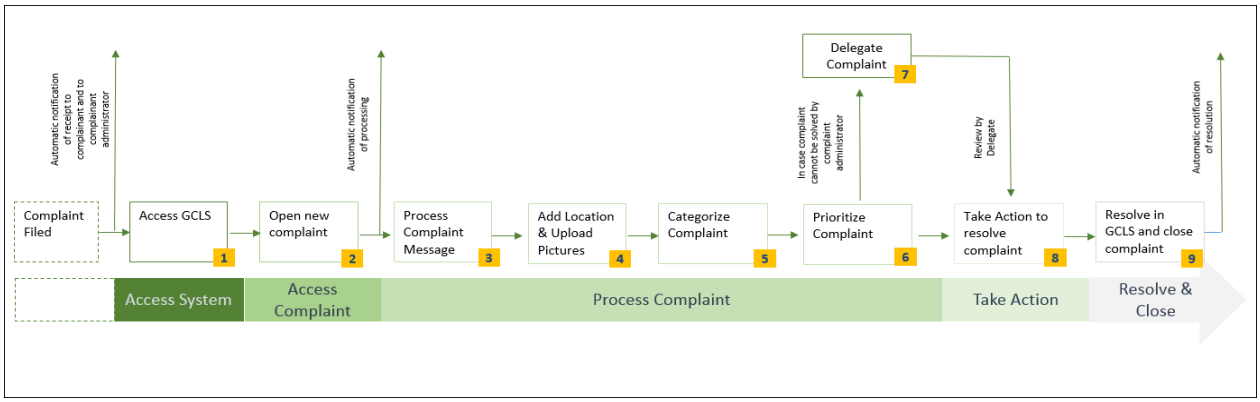


Figure 17. GCLS process as part of the GRM

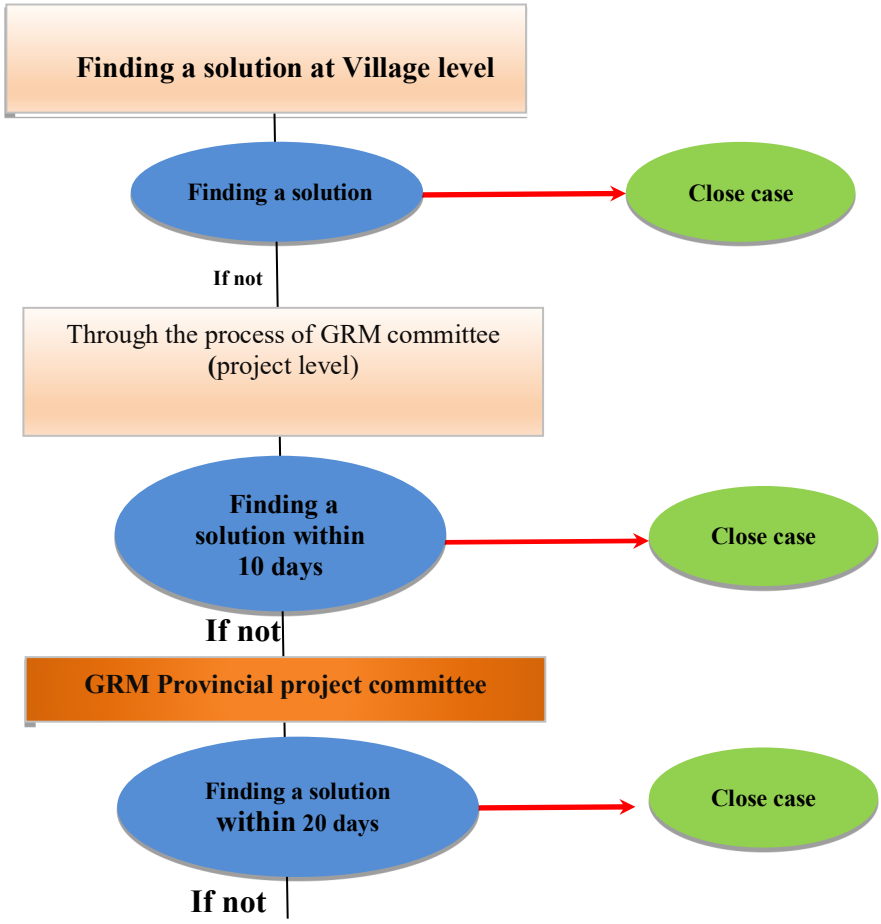
85. The GRM process will operate as follows:
    - The EDPD/PTI at the MPWT in Vientiane will host the GCLS.
    - In each Project Province, the Environment and Social Unit (ESU) under the DPWT—who are responsible for monitoring contractors—will assemble records of all complaints and supply them to the EDPD/PTI either directly, or by entering into the GCLS.
    - For each province, a 'Grievance Redress Committee' (GRC) will be established. The GRC will nominate a secretary who is responsible to monitor and facilitate resolution of complaints.
    - The affected peoples (AP) (or his/her representative) may submit his/her complaint in a number of ways e.g. by written letter, phone, WhatsApp, SMS messages and email to the GRC or, alternatively, raise his/her voice in a public or individual meeting with PMU staff as well as ISWS consultants.
    - Grievances will be addressed at the village, district, province, and national level. A complainant also retains the right to bypass this procedure and can address a grievance directly to the EDPD/PTI Office or the National and Provincial Assembly, as provided for by law in Lao PDR. At each level grievance details, discussions, and outcomes will be recorded in a grievance logbook, and the data provided to the GRC for recording in the GCLS. The status of grievances

submitted, and grievance redress will be reported to DPWT management through the monthly reporting as generated by the GCLS.

86. The GRC will meet to try and resolve the matter at community level and make a recommendation within 7-10 working days from receipt of complaint. If there is no decision after 10 days, the AP can refer the complaint to the Director of DPWT in the province who will then address the complaint and respond to the complainant within 20 days. Coordination for submission of complaints at the project and provincial levels will be facilitated by the focal person of the village grievance committee. In addition, the complainant can also contact the focal persons at the district, provincial and district levels for grievance redress. At this stage the focal person for grievance redress at these levels have not been nominated yet but at this stage the names and contact number of focal persons for local roads in Luang Prabang are summarized in the table below.

Table 12. List of contact persons for submission of grievance at each level

No	Name of contact person	Position	Office	Contact number
I.	**Luang Prabang City**			
1	Mr. Bounchong Vang	Technical Officer	DPWT	02097677795
II	**Chomphet District**			
1	Mr. Bounsom Chanthafone	Technical Officer	DPWT	02095426661
III	**XiengNgeun Dsitrict**			
1	Mr. Vannasone Siriphanya	Technical Officer	DPWT	02058500626
IV	**Luang Prabang Province**			
1	Mr. Thavisouk Khithivong	Technical Officer	DPWT	02077779993
V	**Public Works and Transport Institute**			
1	Mr. Souksamay Manhmanyvong	Technical staff	PTI	020 22224746
VI	**Department of Road**			
1	MPhouvixay Vongxay	Technical staff	DoR	02056112244



If the complaints have not been resolved, the affected person (AP) may choose to use the right under Lao PDR law to refer the matter to the Court of Justice at free will.

Figure 18. Grievance Resolution Flow Chart

87. All submitted complaints and grievances will be entered into the GCLS within two working days of being received by the PMU and ESU/DPWT. Each complaint and grievance will be ranked, analysed and monitored according to type, accessibility and degree of priority. The status of grievances submitted, and grievance redress will be reported by ESU/DPWT in collaboration with PMU. The GCLS web site will display data on resolution rates which will enable the communities to be kept informed of progress of resolution of grievances. Individuals will be notified within 5 working days of the status of their grievance once it has been addressed by the appropriate parties.

88. If not satisfied with the resolution, the APs may elevate the compliant directly to the EDPD/PTI at the MPWT in Vientiane or via the Provincial Assembly.

89. The project will also establish user friendly and easily accessible means of communication such the hotline phone call, social media, WhatsApp or Facebook, if and where technologically feasible to facilitate efficient GRM process. GRM procedures and contact detail of responsible staff will be provided in a Project Information Leaflet (PIL) to be prepared and distributed to all project affected villages during the GRM training for village mediation communities for their references.

4.2 Grievance Redress Service (GRS)

90. Communities and individuals who believe that they are adversely affected by a WB supported projects may submit complaints to this project-level grievance redress mechanism or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaints to the WB's independent Inspection Panel which determines whether harms occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the WB's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit www.worldbank.org/grs. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

5. CONSULTATION AND INFORMATION DISCLOSURE

91. This consultation meeting has been done in pre-construction stage of the project. In order to understand the opinions and concerns of the ethnic groups in response to the proposed project, the consultations in the Local Road No. 2571, 2652 and 2931-3170 of Luang Prabang City, Chomphet District and XiengNgeun District, Luang Prabang Province were organized.

92. In Luang Prabang province, the project road was carried out in two districts namely Luang Prabang City, Chomphet District and XiengNgeun District. The main objectives of the consultation were to: i) consult on the draft of EGEP; ii) know the perception of local authority on the implementation of the project; iii) understand worries and concerns over the local road project; and (iv) to establish and seek for community support for the project implementation.

93. In this initial consultation and information disclosure of the project activities have been explained and presented to the local people with all ethnic groups' participation. The participants included representative from different villages, concerned local authorities, LFND and LWU. There is no languages barrier during the consultation and communication with ethnic group those participated in the meeting as there are technical officers from DPWT of Luang Prabang and village headman who can communicate Hmong and Khmu. All participants support the development of this project for many positive reasons such as the new road will be a significant for local product trading, middleman for tea buyer can collect more times and more convenient, having drainage installment in community can protect road condition and dirtiness. At the end of the meeting, all participants had an opportunity to express in a final vote whether they agree with or whether they have any objections to the project. All the participants supported the project implementation and agreed that it will greatly benefit them.

Table 13. Date and Participants of Public Consultation Meetings in each Village

No	Village	Date	No# of participant	No# of female	Ethnic group
Local Road No. 2571, Luang Prabang City					
1	Vang Ngeun	05/06/2023	7	0	Lao Loum and Khmu
2	Phikyai	03/06/2023	41	22	Lao Loum
3	Densavarng	03/06/2023	25	11	Lao Lum, Khmu and Hmong
4	Natarn	03/06/2023	28	8	Lao Loum and Khmu
5	Nadonekhoun	03/06/2023	29	11	Lao Loum and Khmu
Sub-total			**130**	**52**	
Local Road No. 2652, Chomphet District					
1	Xiengman	07/06/2023	19	8	Lao Lum, Khmu and Hmong
2	Nakham	06/06/2023	75	36	Lao Loum
3	Naxaychaleun	06/06/2023	37	17	Lao Loum and Khmu
4	Natan	06/06/2023	17	8	Lao Loum and Khmu
5	Some	06/06/2023	41	21	Lao Loum and Khmu
6	Na	06/06/2023	49	23	Lao Loum and Khmu
7	Xam Or	07/06/2023	47	26	Lao Loum and Khmu
8	Houay Orn	07/06/2023	43	25	Lao Loum
9	Bouamlow	06/06/2023	23	9	Lao Loum
Sub-total			**351**	**173**	
Local Road No. 3170-2931, XiengNgeun District					
1	Huayyen	02/06/2023	79	47	Lao Lum, Khmu and Hmong
2	Suandala	02/06/2023	21	4	Lao Lum, Khmu and Hmong
3	PhonsaAt	02/06/2023	45	31	Lao Loum
Sub-total			**145**	**82**	
Grand total			**626**	**307**	

Sources: Field Survey for Village Socio-economic data, 04-22, May 2022

94. Participants in the consultation and information disclosure consisted of village headman, village elders, women union, youth union, village security and defence. At first the dissemination of information has been announced the project goals, by the team leader by DPWT of Luang Prabang. More details of the project areas were informed, the plan for rehabilitation and improvement quality of road for climate change resilience was introduced. After the dissemination of information had been finished, the representative from DPWT of

Luang Prabang had opened floor for discussion and questions and answers. Then, the consultation was carried out with groups discussion by y male and female attendance separately to seek and open opportunity for all of them to speak out. Group of ethnic people were recorded during consultation as representation of their understanding and concern over the project activities After acknowledgement of the construction work of the activities of project has been determined, some of people had discussed about their properties if it will be affected. Some people had raised a question "what is going to happen if the property were to be lost". Some of participants asked if the project to have a compensation policy, in case is is affected. Some of others had been asked what they can do during the construction work if their property were damaged, and loss occurred. At the end of the meeting, the representation of DPWT of Luang Prabang and data collection leader explained the design, plan, and procedure of the project.

95. The second Focus Group Discussion (FGD) and in-depth discussion at village level was conducted from 6 to 11 May 2022 in four ethnic group villages with 626 ethnic participants (307 female). Participants are ethnic group households (men, women), village authorities, and representatives from the project team (Table 13) from villages along the Local Road No. 2571, 2652 and 2931-3170 of Luang Prabang City, Chomphet District and XiengNgeun District, Luang Prabang Province.

96. Focus group discussion at the village level: the consultation with ethnic group was held alongside with the focus group discussions. After the presentations and open group discussion at the Public /Village Consultation Meeting. The ethnic group participants were divided into two groups (male and female groups) to have in-depth focus groups discussion with male and female groups to ensure that women ethnic group could express their idea freely without intervention of males.

97. The objective of FGD with male and female was to engage with the key ethnic group informants who are potentially affected by the project. The focus group discussion was organized separately between men and women where applicable. The guiding questions for the FGD was prepared and shared with participants. The project team gave an introduction about the process and explain the questions to participants. After that allow ethnic group participants ask for clarifications. The facilitators were assigned to facilitate the discussion and help to documents what they discussed. During the focus group discussion with the ethnic group (male and female groups), they raised their concerns related to assets and properties as building structures, road safety, information sharing about the project activities, policy and objectives, environment issues (noise, dust, waste), access road condition, demarcation, etc.

98. The in-depth interview with village authority, the FDGs and Village Consultation Meeting were conducted on the same date in each village but with separately divided groups. The guiding questions were used to guide the discussions. From the discussion, it was confirmed that the sub-ethnic groups in their villages to be affected by the project include:Khmu and Hmong. However, only few households will have a direct impact as they have some temporally property along the right of way.

6. BUDGET PLAN FOR ESMP IMPLEMENTATION AND CAPACITY BUILDING

6.1 Implementation, Monitoring, and Reporting Responsibilities

99. PMU/DOR is responsible for ensuring effective implementation of the ESMP including adequate allocation of budget. PMU/DOR will also ensure that the Construction Supervision Consultant (CSC) and/or Field Engineers responsible for supervision and monitoring of works contracts will also be responsible for approval of the C-ESMP and day-to-day supervision and monitoring of contractor compliance with the C-ESMP. EDPD/PTI is responsible for providing technical guidance on the ESS requirements and periodical monitoring of the ESS compliance. EDPD/PTI will conduct monitoring of ESS compliance and submit a report to WB. EDPD/PTI will also ensure that the Project is also in compliance with GOL requirements regarding ESS.

100. At provincial level, DPWTs of Luang Prabang Province will assign specific staff and/or engineer to be responsible (as the ESU/DPWT) for ensuring full compliance with the ESS requirements on the ground and prepare ESS implementation monthly or quarterly monitoring report as agreed with EDPD/PTI. The ESU/DPWT is considered part of the Project team responsible for ensuring compliance with the ESMP.

101. The DPWT will also be required to establish a Monitoring Working Groups (MWG) comprising ESU/DPWT, PONRE, LWU, and other related local authorities to be responsible for undertaking periodic monitoring of the ESMP, ARAP, and EGEP implementation including GRM tracking and Contractor performance of the approved C-ESMP. A Village Grievance Committee (VGC) will also be established to be responsible for overseeing the GRM implementation using the existing structures with a village mediation committee and fiduciary agencies (District and Provincial Office of Justice, Provincial Assembly, PWTOs and District Governor Office). EDPD/PTI will also be required to (a) review/adjust the current monitoring and reporting forms to enhance effectiveness of the monitoring and reporting process and (c) ensure that adequate budget can be transferred to the ESU/DPWT and the MWG and timely submission of the ESS monitoring report.

102. Table 15 summarizes key institutional responsibilities for the implementation of the ESMP at various stages.

Table 14. ESMP Implementation

Project Stage	Responsible Institution	Key Responsibilities
Preparation		
Ethnic Group Engagement Plan	EDPD/PTI	• Secure WB clearance of the EGEP prior to the commencement of civil work.

Project Stage	Responsible Institution	Key Responsibilities
(EGEP) to be prepared after the detailed design of road works available and cleared by WB prior to civil work		• Implement/Monitor/report the implementation progress of the EGEP
ESMP for WB clearance	EDPD/PTI	• Ensure ESMP is cleared by WB before bidding
IEE for PONRE	EDPD/PTI assisted by the ESA consultant	• Ensure approval by PONRE of Luang Prabang Province before construction begins
Detailed Design and preparation of Bidding (BD) and Contract Documents (CD)	PMU/DOR and EDPD//PTI with the Detailed Design Consultant and its ESS Team (LTEC).	• Incorporate ESMP mitigation measures into detailed engineering design.
	EDPD/PTI	• Ensure ESMP is incorporated into the BD/CD.
		• Review Contractors proposals to ensure that they are aware of the ESMP requirements and that line items for environmental management as per the ESMP are included in the BOQ.
Site Clearance and Construction	Contractor	• Prepare C-ESMP in line with the SS-ESMP • Obtain all necessary environmental and social related permits for construction.
	PMU/DOR, CSC/Field Engineer	• Review and approve C-ESMP and send a copy of the approved C-ESMP to EDPD/PTI
	Contractor	• Attend periodical meetings on site management and monitoring with CSC/Fiend Engineer
Construction and O&M phases during the OPBRC services	Contractor	• Daily monitoring of environmental and social issues by the contractor ESSM team. • Preparation of weekly environmental and social checklists. • Preparation of Monthly environmental and social reports.

Project Stage	Responsible Institution	Key Responsibilities
		• Preparing Corrective action plans as needed.
	PMU/DOR and EDPD/PTI	• Periodic site visits (6-months) to monitor Contractors environmental and social performance.
	CSC/Field Engineer	• Weekly monitoring of the Contractors compliance with ESMP / C-ESMP. • Issuing the Contractor with Non-compliance Notices. • Monthly reporting to PMU/PTI of Contractors performance based on the review of Contractors weekly checklists and weekly site visits. • Quarterly Environmental and Social Reports prepared by the ESS1 and submitted to PMU/PTI and World Bank.
3-month monitoring	ESU/PMU and the Monitoring Working Group	• Monitor compliance and adequacy of the C-ESMP and ECC to be issued by PONRE Luang Prabang Province.

6.2 ESMP Capacity Building and Training

103. Specific budget has been allocated for (a) ensuring effective monitoring, reporting, and training to ensure full compliance including consultation and implementation of EGEP and (b) technical assistance and capacity building and/or priority action research activities on ESS. Extensive training and capacity building on environmental, social, and occupational health and safety (ESOHS) will be necessary to enhance performance on the ground. Improving effective site management, effective application of Personal Protection Equipment (PPE), active participation of local communities, and effective application of GRM record will be necessary with proper tracking records.

104. DPWT will also be required to establish a Monitoring Working Groups (MWG) comprising ESU/DPWT, PONRE, LWU, and other related local authorities to be responsible for undertaking periodic monitoring of the ESMP, ARAP, and EGEP implementation including GRM tracking and Contractor performance of the approved C-ESMP. EDPD/PTI will also provide review the current monitoring and reporting forms to enhance effectiveness of the monitoring and reporting process. EDPD/PTI will ensure that adequate budget can be transferred to the ESU/DPWT and the MWG and timely submission of the ESS monitoring report.

6.3 ESMP Implementation Budget

105. The ESMP implementation cost will be part of the Project costs. It comprises (a) cost for preparation and implementation of the mitigation measures during road rehabilitation and maintenance (C-ESMP) which will be part of the Project construction costs; (b) cost of land acquisition and/or compensation of assets or relocations (if any); (c) cost of UXO clearance (if required); (d) cost for monitoring, reporting, and training; and (e) cost for consultation with ethnic group and implementation of EGEP (if needed). The following table provides the travel costs for monitoring and training of the Contractor and provincial project staff of PPWT as well as DPWT in the implementation of this ESMP.

Table 15. ESMP Implementation Budget

No	Description	Construction Period	Maintenance Period
Lumpsum of travel costs for monitoring, training on ESMP		**2 Years**	**5 Years**
1	Budget for Consultants/Concerned Parties in E&S for monitoring of ESMP, EGEP and ARAP.	USD 7,000	
2	Training for the Concerned parties, DPWT, CMU, Contractors, provincial departments as for: - Implementing the ESMP; - Monitoring E&S compliance, including reporting; - Gender-Based Violence, - Violence Against Children, - HIV/AIDS awareness; - Occupational Health & Safety; - Labor Management Procedures, - Grievance Redress; - Road Safety.	USD 7,000	
3	Budget for conduct travel to villages to conduct monitoring, training activities, etc.	USD 3,500	
4	Miscellaneous	USD 3,500	
Total Budget Local road No. 2571, 2652 and 2931-3170		**USD 21,000**	