Technical Assistance Consultant's Report

Volume 3: Annexes R, S
(Chapter 5)

Project Number: 47085
September 2015

Lao People's Democratic Republic: Road Sector Governance and Maintenance Project
(Financed by the Asian Development Bank)

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For Ministry of Public Works and Transport
Department of Roads

Asian Development Bank

Lao Peoples Democratic Republic (Lao PDR)

Ministry of Public Works and Transport

ADB TA-8492 LAO:

ROAD SECTOR GOVERNANCE AND MAINTENANCE PROJECT (47085-001)

Final Report

Volume 3: Annexes R, S [Chapter 5]

September, 2015

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Annex R – Rapid Environmental Assessment Checklists [6 Roads]

Rapid Environmental Assessment (REA) Checklist: NR 20, Salavan Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, referrals to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples;(b)povertyreductionhandbook;(c)staffguidetoconsultationand participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		X	
▪ Protected Area		X	
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; Disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ Encroachment on precious ecology (e.g. sensitive or Protected area)?		X	

▪ Alteration of surface water hydrology of waterways Crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		X	
▪ Deterioration of surface water quality due to silt runoff And sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ Increased local air pollution due to rock crushing, Cutting and filling works, and chemicals from asphalt processing?		X	
▪ Risks and vulnerabilities related to occupational health And safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ Noise and vibration due to blasting and other civil works?		X	
▪ Dislocation or involuntary resettlement of people?		X	
▪ Dislocation and compulsory resettlement of people Living in right-of-way?		X	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ Other social concerns relating to inconveniences in Living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ Hazardous driving conditions where construction Interferes with pre-existing roads?		X	
▪ Poor sanitation and solid waste disposal in Construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for this road maintenance project will ensure proper solid waste disposal and sanitation at construction camps and worksites.
▪ Creation of temporary breeding habitats for diseases Such as those transmitted by mosquitoes and rodents?		X	
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		X	
▪ Increased noise and air pollution resulting from traffic volume?	X		The EMP will also require the contractor to follow the allowable noise, vibration and air quality standards
▪ Increased risk of water pollution from oil, grease and Fuel spills, and other materials from vehicles using the road?		X	

▪ Social conflicts if workers from other regions or Countries are hired?		X	
▪ Large population influx during project construction and Operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ Community safety risks due to both accidental and Natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

A Checklist for Preliminary Climate Risk Screening, NR 20

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)

Sector: Roads and Highways
Subsector:
Department:
Division:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely To be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	
Materials and Maintenance	Would weather, current and likely future climate conditions (e. g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs(e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments:_____

_____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such show climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

Rapid Environmental Assessment (REA) Checklist: NR 16, Xekong Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	
▪ Protected Area		√	
▪ Wetland		√	
▪ Mangrove		√	
▪ Estuarine		√	
▪ Buffer zone of protected area		√	
▪ Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; Disfiguration no land scape by road embankments, cuts, fills, and quarries?		√	
▪ Encroachment on precious ecology(e.g. Sensitive or Protected areas)?		√	

▪ Alteration of surface water hydrology of waterways Crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	
▪ Deterioration of surface water quality due to silt runoff And sanitary wastes from worker-based camps and chemicals used in construction?		√	
▪ Increased local air pollution due to rock crushing, Cutting and filling works, and chemicals from asphalt processing?		√	
▪ Risks and vulnerabilities related to occupational health And safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		√	
▪ Noise and vibration due to blasting and other civil works?		√	
▪ Dislocation or involuntary resettlement of people?		√	
▪ Dislocation and compulsory resettlement of people Living in right-of-way?		√	
▪ Disproportionate impacts on the poor ,women and Children, Indigenous Peoples or other vulnerable groups?		√	
▪ Other social concerns relating to inconveniences in Living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		√	
▪ Hazardous driving conditions where construction Interferes with pre-existing roads?		√	
▪ Poor sanitation and solid waste disposal in Construction camps and worksites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?		√	
▪ Creation of temporary breeding habitats for diseases Such as those transmitted by mosquitoes and rodents?		√	
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		√	
▪ Increased noise and air pollution resulting from traffic volume?		√	
▪ Increased risk of water pollution from oil, grease and Fuel spills, and other materials from vehicles using the road?		√	

▪ Social conflicts if workers from other regions or Countries are hired?		√	
▪ Large population influx during project construction and Operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	
▪ Community safety risks due to both accidental and Natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		√	

A Checklist for Preliminary Climate Risk Screening, NR 16

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)

Sector: Roads and Highways
Subsector:
Division/Department:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely To be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e. g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of Project outputs	Would weather/climate conditions, and related extreme events Likely affect the performance (e.g. annual power production) of project output (s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low

Other Comments:_____

_____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

According to the EIA system of MONRE, if a proposed project is construction of a new road route, MONRE will require MPWT/Contractor to carry out Environment Impact Assessment (EIA) and submit to MONRE for review, approval and issuance of Environmental Compliance Certificate (ECC). However, as the proposed project is maintenance works of an existing road, only an IEE will be required and the Department of Natural Resource and Environment of the province is the authority to approve and issue the corresponding ECC and conduct monitoring activities the Project's maintenance works and related activities. There are two Forest Reserve Zones in Xekong province, however none of them are situated or located near NR 16 road alignment.

Rapid Environmental Assessment (REA) Checklist: NR 18B, Attapeu Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		X	
▪ Protected Area	X		Forest Section under the Department of Natural Resource and Environment of the province. They shall be officially notified about the implementation schedules of the maintenance works
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity	X		Forest Section under the Department of Natural Resource and Environment of the province. They shall be officially notified about the implementation schedules of the maintenance works
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; Disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ Encroachment on precious ecology (e.g. sensitive or Protected areas)?		X	

▪ Alteration of surface water hydrology of waterways Crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		X	
▪ Deterioration of surface water quality due to silt runoff And sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ Increased local air pollution due to rock crushing, Cutting and filling works, and chemicals from asphalt processing?		X	
▪ Risks and vulnerabilities related to occupational health And safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ Noise and vibration due to blasting and other civil works?		X	
▪ Dislocation or involuntary resettlement of people?		X	
▪ Dislocation and compulsory resettlement of people Living in right-of-way?		X	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ Other social concerns relating to inconveniences in Living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ Hazardous driving conditions where construction Interferes with pre-existing roads?		X	
▪ Poor sanitation and solid waste disposal in Construction camps and worksites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for this road maintenance project will ensure proper solid waste disposal and sanitation at construction camps and worksites.
▪ Creation of temporary breeding habitats for diseases Such as those transmitted by mosquitoes and rodents?		X	
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		X	
▪ Increased noise and air pollution resulting from traffic volume?	X		The EMP will also require the contractor to follow the allowable noise, vibration and air quality standards
▪ Increased risk of water pollution from oil, grease and Fuel spills, and other materials from vehicles using the road?		X	

▪ Social conflicts if workers from other regions or Countries are hired?		X	
▪ Large population influx during project construction and Operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ Community safety risks due to both accidental and Natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

Checklist for Preliminary Climate Risk Screening, NR 18B

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)
Sector: Roads and Highways
Subsector:
Department:
Division:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely To be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	
	Would the project design (e.g. the clearance for bridges) need To consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e. g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e. g. hydro-power generation facilities) throughout their design life time?	0	

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments:_____

_____

[1]If possible, provide details on the sensitivity of project components to climate conditions, such show climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

NR.18B passes through the Dong Amphan National Biodiversity Conservation Area from KM. 48 to KM. 100, and there are two villages along the road at KM.53-54 and KM.100-102. The Construction of the road was carried out between 2001 and 2006, and the road is strategic development road for West East Economic Corridor connecting to Danang and Hyu Gen port in Vietnam through Phu Keau international border. Before construction, EIA had been done and approved.

The maintenance works along NR 18B only require an IEE Report as mentioned above, regarding workers camp they will specify the area for the camp, the staff from the Department of Natural Resource and Environment will regularly monitor the maintenance works and related activities.

The authority in charge of NRA is the Forest Section under the Department of Natural Resource and Environment of the province. They shall be officially notified about the implementation schedules of the maintenance works along NR 18B.

Rapid Environmental Assessment (REA) Checklist: PR 6901, Salavan Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) check lists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		X	
▪ Protected Area		X	
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; Disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ Encroachment on precious ecology (e.g. sensitive or Protected areas)?		X	

▪ Alteration of surface water hydrology of waterways Crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		X	
▪ Deterioration of surface water quality due to silt runoff And sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ Increased local air pollution due to rock crushing, Cutting and filling works, and chemicals from asphalt processing?		X	
▪ Risks and vulnerabilities related to occupational health And safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ Noise and vibration due to blasting and other civil works?		X	
▪ Dislocation or involuntary resettlement of people?		X	
▪ Dislocation and compulsory resettlement of people Living in right-of-way?		X	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ Other social concerns relating to inconveniences in Living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ Hazardous driving conditions where construction Interferes with pre-existing roads?		X	
▪ Poor sanitation and solid waste disposal in Construction camps and worksites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for this road maintenance project will ensure proper solid waste disposal and sanitation at construction camps and worksites.
▪ Creation of temporary breeding habitats for diseases Such as those transmitted by mosquitoes and rodents?		X	
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		X	
▪ Increased noise and air pollution resulting from traffic volume?	X		The EMP will also require the contractor to follow the allowable noise, vibration and air quality standards.
▪ Increased risk of water pollution from oil, grease and Fuel spills, and other materials from vehicles using the road?		X	

▪ Social conflicts if workers from other regions or Countries are hired?		X	
▪ Large population influx during project construction and Operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ Community safety risks due to both accidental and Natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

Checklist for Preliminary Climate Risk Screening PR 6901

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)
Sector: Roads and Highways
Subsector:
Department:
Division:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely To be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e. g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output (s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low

Other Comments:_____
_____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such show climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

Rapid Environmental Assessment (REA) Checklist: PR 7615, Xekong Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) check lists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		X	
▪ Protected Area		X	
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas; Disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ Encroachment on precious ecology (e.g. sensitive or Protected areas)?		X	

▪ Alteration of surface water hydrology of waterways Crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	X		The EMP will provide the needed measures to control soil erosion and sedimentation of streams
▪ Deterioration of surface water quality due to silt runoff And sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ Increased local air pollution due to rock crushing, Cutting and filling works, and chemicals from asphalt processing?		X	
▪ Risks and vulnerabilities related to occupational health And safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ Noise and vibration due to blasting and other civil works?		X	
▪ Dislocation or involuntary resettlement of people?		X	
▪ Dislocation and compulsory resettlement of people Living in right-of-way?		X	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ Other social concerns relating to inconveniences in Living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ Hazardous driving conditions where construction Interferes with pre-existing roads?		X	
▪ Poor sanitation and solid waste disposal in Construction camps and worksites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for this road maintenance project will ensure proper solid waste disposal and sanitation at construction camps and worksites.
▪ Creation of temporary breeding habitats for diseases Such as those transmitted by mosquitoes and rodents?		X	
▪ Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		X	
▪ Increased noise and air pollution resulting from traffic volume?	X		The EMP will also require the contractor to follow the allowable noise, vibration and air quality standards
▪ Increased risk of water pollution from oil, grease and Fuel spills, and other materials from vehicles using the road?		X	

▪ Social conflicts if workers from other regions or Countries are hired?		X	
▪ Large population influx during project construction and Operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ Community safety risks due to both accidental and Natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

Checklist for Preliminary Climate Risk Screening, PR 7615

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)
Sector: Roads and Highways
Subsector:
Department:
Division:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely To be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e. g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output (s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low

Other Comments:_____

_____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such show climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

Rapid Environmental Assessment (REA) Checklist: PR 9001, Attapue Province

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (ESD), for endorsement by Director, ESD and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project

Sector Division: Roads and Highways

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		X	
▪ Protected Area		X	
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		X	

▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		X	
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		X	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		X	
▪ noise and vibration due to blasting and other civil works?		X	
▪ dislocation or involuntary resettlement of people?		X	
▪ dislocation and compulsory resettlement of people living in right-of-way?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		X	
▪ hazardous driving conditions where construction interferes with pre-existing roads?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	X		The EMP for this road project shall address workers' camp sanitation and solid waste disposal and management
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?	X		The EMP for this road project shall address the possible breeding habitats for mosquitoes and rodents
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		X	
▪ increased noise and air pollution resulting from traffic volume?		X	
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		X	

▪ social conflicts if workers from other regions or countries are hired?		X	
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		X	

A Checklist for Preliminary Climate Risk Screening, PR 9001

Country/Project Title: ADB TA-8492 Lao: Road Sector Governance and Maintenance Project (47085-001)

Sector : Roads and Highways
Subsector:
Division/Department:

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea- level, peak river flow, reliable water level, peak wind speed etc.)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments:_____
_____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Prepared by: Marcelo R. Caleda

The PR 9001 road alignment starts at the junction of NR 18B, Km 14, and ends at Sanxay Village with a total distance of 76.00 kilometers in a mountainous area with slope gradients up to 15% and 18%. About 16 kilometers of the road was paved in 2009. Approximately 40 to 50 percent of the road alignment is located on steep slopes. Some of the steepest slopes have been paved with concrete. Occurrence of landslides during the rainy months are evident on the steeper slopes.

Annex S – Initial Environmental Examinations, IEEs, [6 Roads]

Initial Environmental Examination

National Road 20, Salavan Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
CBM	Community-based Maintenance
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
IBA	Important Bird Area
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People's Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
PPTA	Project Preparation Technical Assistance
PBC	Performance-Based Maintenance Contract
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
SPS	Safeguards Policy Statement
sq. mi.	square miles
UXOs	Unexploded Ordnances

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EXECUTIVE SUMMARY

1. An environmental assessment was conducted for National Road (NR) 20 under the Lao Road Sector Governance and Maintenance Project funded as part of a Project Preparation Technical Assistance (PPTA) funded by the Asian Development Bank (ADB). The purpose of the PPTA is to define maintenance needs and the likely scope of design requirements for the future „Project" which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and institutional capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the corresponding provincial Departments of Public Works and Transport (DPWTs) in Salavan, Xekong and Attapeu Provinces. The Project is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 20 in Salavan Province is classified under Category „B" and therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and monitoring plan is required. Similarly, under the Lao PDR EIA system, the project is classified as a Category „1" project, i.e. projects that are small or create few impacts on the environment and society and that are consequently required to be subject only to an IEE procedure complete with management procedures defined for dealing with anticipated impacts and again, a monitoring plan.

3. *Project Description*. The maintenance works of NR 20 will be implemented in a section starting from the urban area of Salavan and continuing through to the Salavan/Champasak Border over a total distance of 56.0 km. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and associated community-based contracted efforts. The routine maintenance will be implemented with minor rehabilitation/Improvement works during the first few months of the contract until the road has been "restored" to a condition suitable for a PBC contract approach. The regular routine maintenance will be continued until the end of the 3 year period.

4. *Environmental and Socio-economic Conditions*. The population of the Province as per the 2005 census was 300,000 distributed over eight districts. There are nine villages located within the subject section of the NR 20 road corridor. The land use alongside the road is dominated by agricultural land devoted to rice cultivation. Vacant areas of land are predominantly covered with shrubby vegetation and native grass species, with some trees dispersed along the road alignment. Rice is the staple food for the local population and is generally grown during the monsoon months. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible. In addition to rice cultivation, vegetables and commercial crops are also grown, among them cash crops such as coffee, mung-beans, soybeans, peanuts. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and the incidence of unusual and extreme flood events escalating.

6. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for this section of NR 20. For the pre-maintenance phase, two potential impacts were identified related to missed/incomplete aspects of road and bridge design, and

to social conflicts between the local villagers and non-residents in the area due to employment opportunities. An initial climate risk screening showed that NR 20 is in a „medium" risk category, and that therefore the future detailed design should consider hydro-meteorological data and parameters relating to water level, to include the peak flows of streams and river tributaries to ensure appropriate design and protection of the bridge, river/stream banks and beds.

7. During maintenance works, potential environmental impacts are: (i) air and noise pollution; (ii) water pollution; (iii) improper waste management and disposal; (iv) soil erosion and deposition of excess materials (v) water ponding and flooding; (vi) traffic congestion; (vii) public safety along the road; and (viii) workers" health and sanitation at workers" camps. These impacts would be temporary and mitigation measures have been developed for inclusion in the Technical Specifications of the Works Contracts to ensure their implementation.

8. During the operations phase, potential environmental impacts include: (i) an increase in road and vehicular accident rates; (ii) an increase in noise levels along the road corridor; and (iii) an increase in air pollution from increased vehicular traffic movements. Nonetheless, maintenance works for NR 20 should also bring positive impacts to the communities, in that it will provide better access to markets, schools, medical facilities etc. and will create economic opportunities for them to sell their products.

9. An EMP for NR 20 has been developed to effectively manage the environmental issues during the pre-design/maintenance, maintenance and operational stages. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP"s institutional arrangements define the requirements and responsibilities during the project's pre-maintenance, maintenance and operations phases. The project's executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection and with the Provincial DoNRE for compliance monitoring of the project.

10. *Consultation and Participation*. A public consultation for NR 20 was conducted on 12 January 2015, chaired and moderated by the Director of the DPWT in Salavan Province, and attended by various stakeholders including representatives from the Districts and the Provincial DPWT, the District Governor, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the project corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system, control of erosion, landslide and deposition along the road, reduction of dust levels and installation of traffic safety measures. Overall, they gave their support to the project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

11. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization

can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies

12. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for NR 20, the ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, the NR 20 is classified as Category "B" project and will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable way and will generate both direct and indirect benefits for many people and as the project continues, bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

I. INTRODUCTION

1. The purpose of this Project Preparation Technical Assistance (PPTA) is to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and institutional capacity in the planning, financial management and implementation of routine and periodic road maintenance activities by the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) in Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and

- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each Province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. National Road (NR) 20 is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included the Lao PDR"s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, was also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of current institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its officers to verify and confirm the procedural steps and new requirements for the approvals application process of the project's IEE Report and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and the Protected Area Management section were also visited to gather available secondary data including forest cover maps and details of protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location of the road alignments as well as physical, ecological, presence of protected species and/or endangered species of wildlife along the project roads was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife (by Tracks on the ground, roosting areas, faecal droppings of animals. The presence of endangered species was also confirmed through interviews with local villagers", economic and socio-cultural features, present conditions of the roads, photo documentation of the vegetation cover as input to the determination of the environmental classification of NR 20 for maintenance interventions under the future Project. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. The no sightings and encounters with wildlife species may be due to the absence of appropriate habitat requirements for the rare, threatened and protected species of wildlife along the road corridor.

7. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 20 in Salavan Province is classified under Category B and therefore will not be subject to a full EIA procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and associated monitoring plan is required. The REA Checklist for NR 20 in Salavan Province is in a separate **Annex R - Rapid Environmental Assessment Checklist [6 Roads]**.

8. Similarly, under the Lao PDR EIA system, the project is classified as a Category "1" project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject only to an IEE approach complete with definition of impact management procedures and a corresponding monitoring plan.

9. The IEE Report presents the findings of the environmental examination conducted for NR 20 located in the province of Salavan. It is meant to ensure the environmental soundness and sustainability of the future Project and to integrate environmental considerations into the Project Design and the EMP. The IEE was conducted in adherence to the ADB‟s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009) and the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

10. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the Environmental Protection Law (EPL) which was approved by the President on April 3, 1999. It mandates a unified environmental management approach with the aim of preserving the environment and making rational and sustainable use of natural resources.

11. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to safeguard the public, natural resources and biodiversity and to ensure the sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of the EPL.

12. Under the EIA Decree no. 112/PM02/2010, the timeframe for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after formal submission.

13. While other Ministries issue guidelines for implementing provisions of the IEE and EIA and for environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, is the agency that reviews and issues the ECC.

14. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental conditions for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional versions are in place and corresponding environmental standards used by international organizations and advanced countries have been adopted as reference documents.

15. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

16. The part of NR 20 to be included in the Road Maintenance Project extends southwards from the urban area of Salavan to the Salavan/Champasak Border over a total distance of 56.0 km. For study purposes this has been considered to be comprised of two separate components – Section A of length 26.0 km contains the urban and semi-urban stretch between Salavan and the junction with National Road 1E at Ban Beng and a Section B of length 30.0 km covering the mostly rural length from Ban Beng southwards to the Provincial border. The road traverses a flat to rolling terrain and the surface condition is relatively good - in part due to the recent maintenance interventions carried out by the MPWT. Figure 3.1 shows the location of NR 20 in Salavan Province.

17. There is a total of 4 steel, „Bailey‟ type bridges in Section A plus two concrete bridges recently installed to replace old steel structures. In Section B a further 4 steel bridges exist in various states of deterioration. All but one of the steel bridges have posted 20-tonne carrying capacity – one in Section B, being subject to a 15-tonne limit.

B. Maintenance Works and Implementation

18. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based road maintenance contract (PBC) approach. This will include all maintenance activities concerning the road surface and main drainage features - community-based contracts (CBC) will cover all roadside maintenance needs.

19. The PBC contract will be implemented with the Initial Rehabilitation/ Improvement works during the first few months of the contract until the road has been "restored" to a condition suitable for a regular PBC contract approach. The Routine Maintenance will be subsequently continue to the end of the 3 year period.

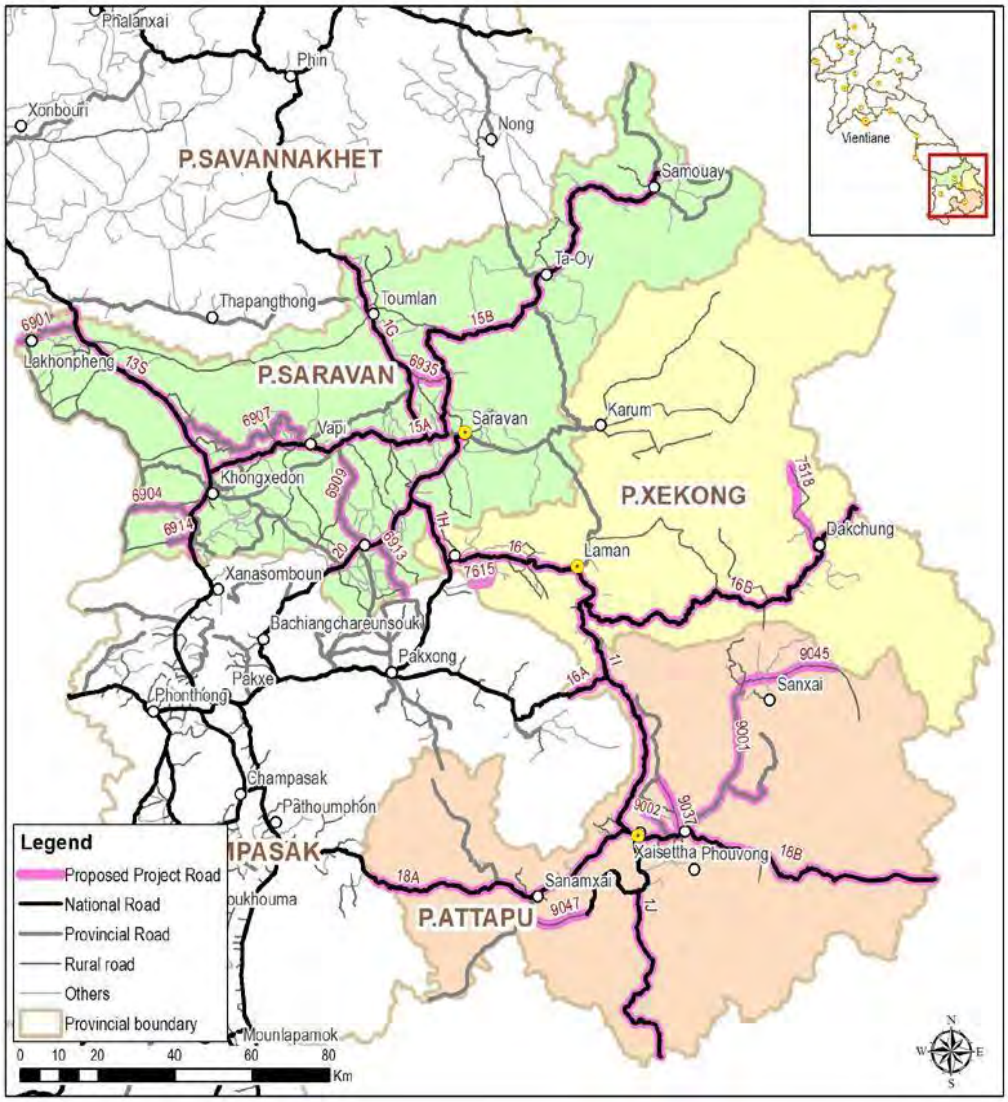


Figure 3.1: Location map of NR 20 in Salavan Province.

20. The roadside routine maintenance will include culvert and ditch cleaning, clearing under bridges and within box-culverts as part of the CBC Maintenance Works and will also be implemented over the same 3 year period. Table 3:1 presents the various maintenance works and activities identified for the NR 20 contracts.

Table 3.1: Maintenance Works and Activities

ROUTINE MAINTENANCEWORKS	MINOR REHABILITATION/ IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Filling of potholes with base material	Excavating unsuitable material in patch areas	Scarifying of existing road
Patching of potholes in DBST surfaces	Repair of base course, incl. new material	Reshaping the road (incl. ditches)
	Repair of Sub-base, including new material	
Crack sealing - minor areas		
Light grading		
Spot filling		
Clearing of ditches by hand		
Clearing of pipe culverts	Excavating unsuitable materials	
Repair of ditch lining	Pipe culverts with headwalls	
Cleaning of concrete bridge decks Clearing river channels of debris Repair of steel decking* Repair/replacement of timber decks & running strips*	Excavation of new ditches	Replacement of steel bridges with box culverts [4 in Section A]
Grass and bush cutting	Construction of scour checks	
	Erosion protection - gabions	
	Riprap protection of channel	
	Erosion protection - vegetation	
Proposed Schedule for Maintenance Works Implementation:		2018-2021

IV. DESCRIPTION OF THE ENVIRONMENT

21. Salavan Province is one of the southernmost provinces of Lao PDR, about 550 km from the capital city Vientiane. It occupies a total area of 16,389 square kilometers (6,328 sq. mi) and has a total population of 300,000 as of 2005. It is composed of 8 districts namely: Saravane, Ta Oy, Toomlam, Lakhonpheng, Vapy, Khongsedone, Lao Ngarm, and Samoui. It is bounded in the north by Savannakhet Province, in the west by Thailand, in the south by Champasak Province and in the east by Vietnam.

22. A brief description of the existing environmental and socioeconomic conditions of the NR 20 influence area is presented in the following subsections:

A. Physical Resources

23. *Topography*. The origin of Salavan Province is volcanic with mountains and wide valleys. The central part is located in the Bolaven Plateau, with the Mekong River bordering the western part and the Lao-Vietnamese border in the east. 44% of the land area is flat rising 140-300 meters above sea level, and contains the Districts of Saravane, Khongsedone, Lakhonpheng, Vapy and Toomlam districts. 19% of the land area is located on the plateau rising 300-700 meters above sea level and contains Lao Ngam and parts of Salavan, Khongsedone and Vapy Districts. 37% of the province is mountainous, rising 700-1,200 metres above sea level and is occupied by Ta Oy and Samoui Districts. NR 20 traverses a flat to rolling terrain.

24. *Climate, Rainfall and Temperature*. Salavan has a relatively temperate climate compared to other parts of the country. It features monsoons with pronounced wet and dry seasons. Most rain falls during May to September when the prevailing winds blow from the southwest. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. The dry season from October to April, is characterized by

winds that blow from the north-east. Mean temperatures range from about 10 0C in January to 38 0C in July, cooler in the north, warmer in the south. The lowland areas are tropical while the highest elevations and the mountains of the extreme north are sub-tropical. Table 4.1 shows the meteorological data of Salavan Province from 2011-2013.

25. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

26. *Soils.* The soils in the southern part of Lao are generally good and are acid hydromorphic and contain low organic matter and nutrients, which are moderately-well suited to rice production. More fertile soils with high organic matter and good physical properties are found in the southern portion of the Lao PDR and the agricultural land of Salavan Province is fertile and supports the food demand from Xekong and Attapeu Provinces.

27. *Water Resources*. Salavan Province is rich in water resources. There are more than 30 rivers which flow through the province and serve as sources of water for drinking, domestic and irrigation use. The most important of them is the Xedon River which crosses the region and joins Mekong River at Pakse. Saravane, the province's capital, is located at a bend in this river which originates from Nang Bua Lake located 15 kilometres (9.3 mi) from the city itself. The Xedon River flows about 192 km through the province and supports many people living along its banks. Other key rivers are the Mekong, Se Banguan, Sepone and Seset rivers. The water resources in Salavan Province are also used for hydropower generation, as storage reservoirs, for fishing, transportation and tourism.

28. *Water Quality.* Several streams and a number of drainage channels flow into the Xedon within the study area. Grey water from households, markets, restaurants and other establishments in the urban area is mostly discharged directly to these water courses. Sewage is also finding its way into the drainage system and thereby discharged untreated into the Xedon. All outfalls are upstream of the intake for the Salavan water supply giving rise to much local concern over the quality of raw water being delivered. However, it is understood that the intake, which is currently close to the riverbank, will be moved to the center of the river utilizing a provision incorporated into the design of the Xedon Bridge.

29. *Air Quality.* Air quality monitoring is still not a routine practice in Lao PDR and there is no information on the concentration of air pollutants though in general terms the air quality appears to be good. Due to a lack of equipment and technical expertise there has been no historic collection of data on air quality and reports on pollution levels remain anecdotal.

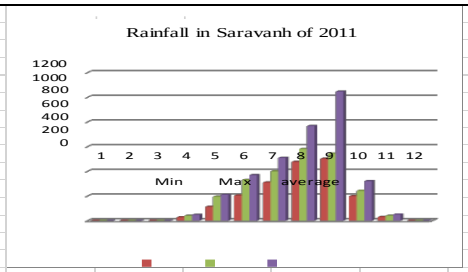
30. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localized air pollution does occur and the incidences are likely to increase with increased urbanisation unless action is taken to prevent or mitigate them. Sources include:

- Uncontrolled incineration of garbage;
- Decaying deposits of uncollected garbage;
- Wind-blown dust and debris resulting from solid waste transportation;
- Dust caused by traffic along unsealed roads; and
- Exhaust from vehicles and motorcycles – exacerbated by poor traffic management.

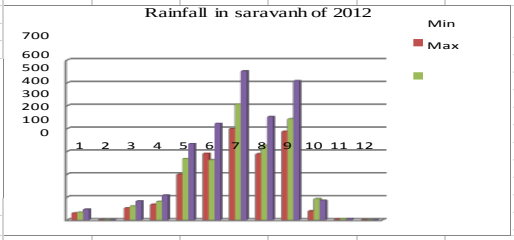
Table 4.1: Meteorological data of Salavan Province, 2011-2013.

METEOROLOGICAL DATA OF SARAVAN PROVINCE

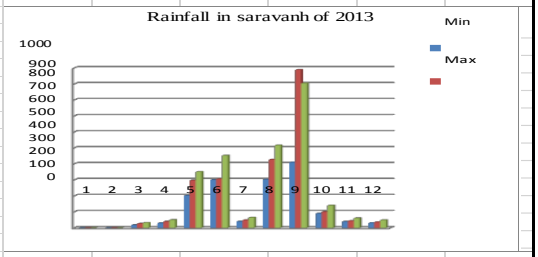
Month	Min	Max	average
1	0	0	0
2	0	0	0
3	0	0	0
4	27.3	39.5	47.05
5	112.3	195	209.8
6	203.7	330.5	368.95
7	309.2	399.7	509.05
8	476.5	580.6	766.8
9	502.3	543.6	1045.9
10	198.9	242.3	320.05
11	29.8	39.7	49.65
12	0	0	0



Month	Min	Max	Average
1	29.7	33.3	46.35
2	0	0	0
3	52.1	60.2	82.2
4	67.8	80.2	107.9
5	199.2	267.8	333.1
6	291	262	422.05
7	399	506	652.1
8	289	326	451.85
9	388	442	608.75
10	38.9	92.1	84.95
11	2.8	5.3	5.45
12	0	0	0

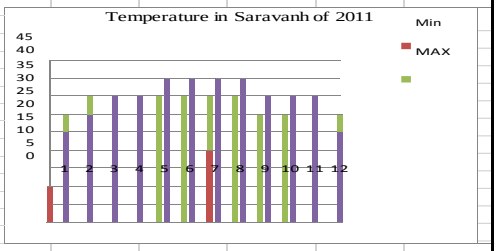


Min	Max	average
0	0	0
0	0	0
17.9	26.6	31.2
29.7	39.9	49.65
202	297	350.3
300	305	452.4
39.8	48.1	63.85
303	427	516.2
410	989	904.1
89.8	100	139.9
38.9	43.6	60.7
30.3	35.8	48.2

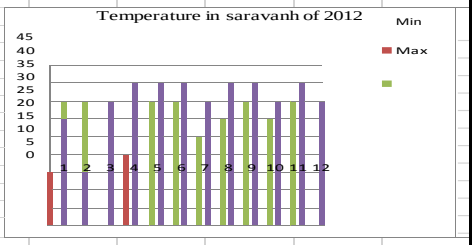


Temperature in Saravanh

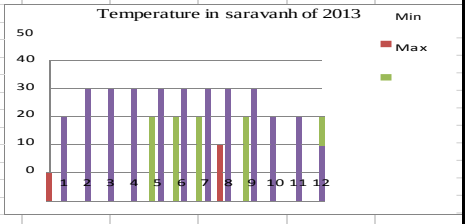
Month	Min	MAX	Average
1	13.5	30	28.5
2	13	36	31
3	18	37.7	36.9
4	19.4	38	38.4
5	23.6	37.3	42.3
6	24	35	41.5
7	22.2	34.5	39.5
8	23	34.5	40.3
9	22	31.6	37.8
10	21.1	33	37.6
11	18.7	32.6	35
12	12.1	31.5	27.9



Month	Min	Max	Average
1	15	34	32
2	16.6	36.4	18.3
3	18.5	37.4	37.2
4	22.4	37.7	41.3
5	22.8	37.6	41.6
6	23.4	34	40.4
7	24.4	27.2	38
8	23.3	33	39.8
9	23	34.5	40.3
10	22.6	32.5	38.9
11	22.7	33.8	39.6
12	19.9	33.1	36.5



Month	Min	Max	average
1	14	34.5	31.25
2	19	38	38
3	18.6	39.5	38.35
4	22	40	42
5	22.2	36.5	40.45
6	23	35	40.5
7	23	34	40
8	24.5	30.1	39.6
9	22.3	33.5	39.1
10	22	30.4	37.2
11	16.3	33.5	33.1
12	11	31.6	26.8



B. Ecological Resources

31. *Flora and Fauna*. The forests and other natural areas in Salavan Province host diverse biological resources that support the lives and livelihoods of local peoples. Non-timber forest products and wildlife are collected for food and for income-generation. Wildlife surveys are limited but studies indicate that some wildlife is to be found in Xe Bang-Nouan, Xe Sap and Phou Xiang Thoung National Biodiversity Conservation Areas which are partially located within Salavan. The native species include those identified by the International Union for the Conservation of Nature (IUCN) as of global conservation concern such as pangolin, pig-tailed and long tailed macaques, large loris, etc.

32. Biodiversity is also high in the Important Bird Areas (IBAs) of Xe Sap IBA, "Mekong Channel from Phou Xiang Thong to Siphandon" IBA, Phou Xiang Thong IBA, and the Xe Bang Nouan Protected Area.

33. Among those observed are: two species of gymnosperm (*Fokine hodginsii* and *Pinus dalatensis*), avifauna (Blyth's Kingfisher *Alcedo hercules*, Yellow-billed Nuthatch *Sitta solangiae*, and Crested Argus *Rheinardia ocellata*, Little Terns *Sternula albifrons*; there are also Small Pratincoles *Glareola lactea*, River Lapwings *Vanellus duvaucelii*, Wire-tailed Swallows *Hirundo smithii*, and River Terns *Sterna aurantia*, Siamese Fireback *Lophura diardi*, Red-collared Woodpecker *Picus rabieri*, Green Peafowl *Pavo muticus*, and Grey-faced Tit Babbler *Macronous kelleyi*), several types of mammals, two types of primates, and one turtle species.

34. *Protected Areas.* The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993. The NPA system covers about 14% of the land area of Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country (see Fig. 4.1). The NPA system was created as part of the Government's commitment to biodiversity conservation.

35. There are some IBAs which straddle two provinces, one of which is Salavan Province: the Xe Sap IBA situated within the Xe Xap National Biodiversity Conservation Area (NBCA); the "Mekong Channel from Phou Xiang Thong to Siphandon" IBA, part of which is overlaps with the Phou Xiengthong NBCA; the Phou Xiang Thong IBA (36,650 hectare) situated within the Phou Xiengthong NBCA (120,000 hectare); and the Xe Bang Nouan Protected Area.

C. Economic Development

36. *Economy*. The economy of the province is one of the worst in the country. The region was heavily bombed during the last Indo-China war and the remains of bombs are still found along the former Ho Chi Minh trail. There are only small and medium scale industrial activities. The industries comprise small scale furniture factories, sawmills, drinking water factories [including Saksith], rice mills, ice making, meat processing, print shops, television/radio repair shops, watch repair shops, and motor garages.

37. Lao PDR is an agricultural economy and this sector is contributing more than 60% to the National Gross Domestic Product (GDP). Rice is the staple food for the local population and it is predominantly grown during the monsoon months. The traditional varieties of rice are grown in all irrigated areas. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible.

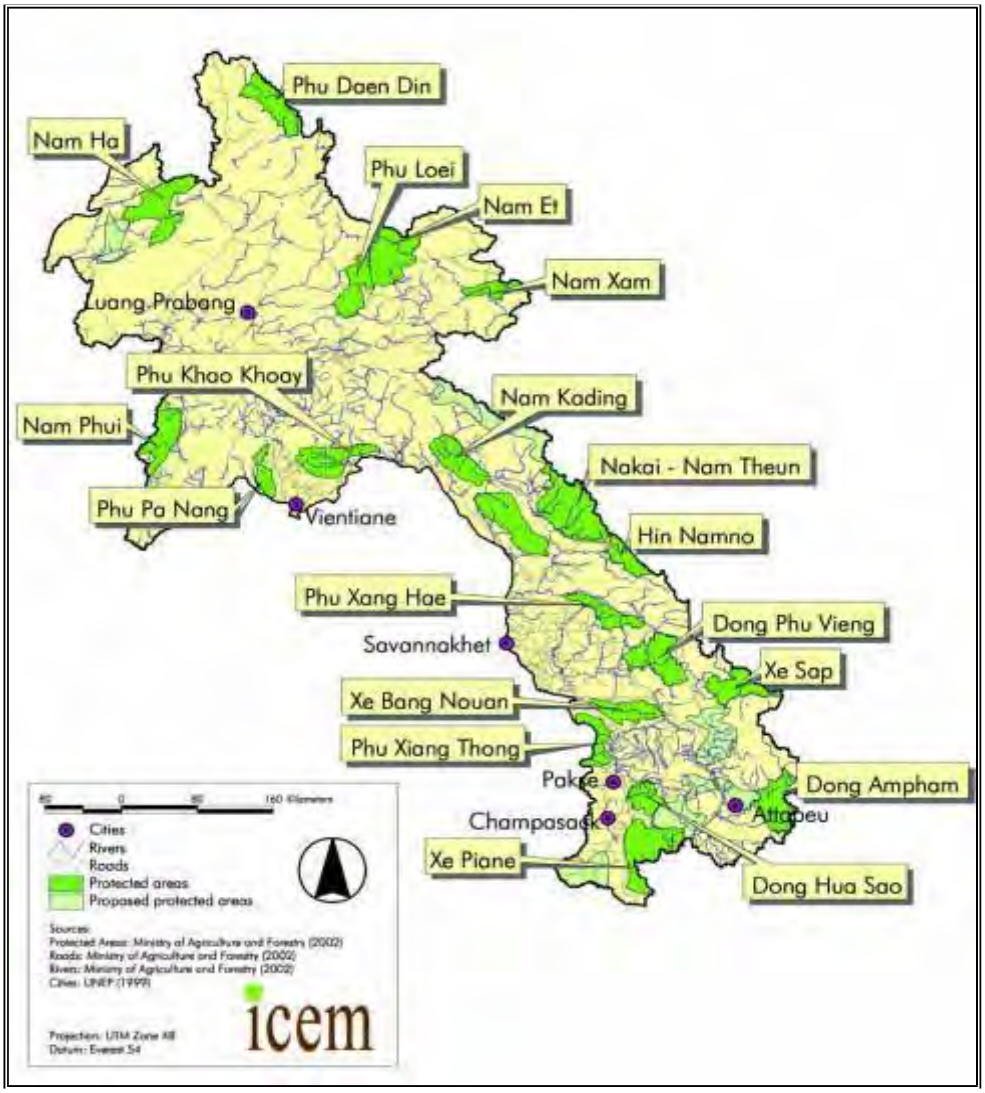


Figure 4.1: National Protected Areas in Lao PDR.

38. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products often produced as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Laos's agricultural sector are timber, lumber, plywood and coffee. Most of the commercial crops are grown for export to Thailand.

39. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People grow vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

40. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks and turkeys and develop fish ponds. Buffalos are used to plough the agricultural land. Households maintain 1-2 buffaloes which are used as draft animals in the rice paddy lands. Livestock is also sold in the villages and at district markets to provide additional income for the local population.

41. *Transportation, Communication, Power and Water.* The project corridor serves as the main land route connecting several regions of the southern part of Lao PDR with the surrounding areas and enables the transport of agricultural produce. The major transport modes are pickups and medium-sized, 2-axle trucks. Other transportation modes include tuk-tuks, trishaws (lot-sam-lor) and jumbos (small tuk- tuks).

42. Salavan Province has a fairly developed communications infrastructure with domestic and international telephone services provided by companies such as Laotel, Enterprise of Communications Lao (ETL), and Unitel. Mobile telephone network services are present throughout most of the province. A 100-watt radio network is available in Khongsedone, Ta Oy and Samoui districts.

43. Salavan Province also hosts a number of hydropower projects which supplies much of its electricity, namely Xeset 1 and 2 and Xenalong 2.

44. There is a partial piped water supply system in Lakhonpheng village but the rest of the requirement is met from available surface and ground water sources and it is extracted by villagers from wells, rivers and streams in areas where there are no piped water systems.

D. Socio-cultural Resources

45. *Population and Communities***.** The population of the province is 300,000, based on the 2005 census and is distributed over eight Districts. The ethnic groups in the province comprise the Tahoy, Pako, Katang, Kado, Suay and Laven where the majority of the people still practice traditional livelihoods, including some shifting cultivation.

46. *Land Uses*. There are nine villages located within the subject part of the NR 20 road corridor. The land use alongside the road is dominated by agricultural land devoted to rice cultivation. Vacant areas of land are predominantly covered with shrubby vegetation and native grass species, with some trees dispersed along the road alignment. A summary of the present use of land adjacent to the roadway is contained in Table 4.2.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Other
NR 20 Section A	26.0	Km 0+000 to km 7+000 Km 8+000 to km 10+000 Km 11+000 to km 11+500 Km 12+000 to km 13+000 Km 13+500 to km 14+800 Km 16+300 to km 16+600 Km 17+500 to km 18+400 Km 20+000 to km 24+000 Km 22+400 to km 24+000 Km 25+500 to km 26+000	km 7+000 to km 8+000 km 10+000 to km 1+000 km 11+500 to km 2+000 km 13+000 to km 3+500 km 14+600 to km 7+500 km 18+400 to km 0+000 km 22+000 to km 2+400 km 24+000 to km 5+500	km0 to km 0	
NR 20 Section B	30.0	Km 26+500 to km 28+500 km 30+000 to km 31+000	Km 28+500 to km 30+700	Km 0 to km 0	

47. Salavan Province hosts several cultural, historical and natural sites. These include the Katang Village in Toomlam District known for its silk weaving, the Katu and Alak Buffalo Sacrifice or Lapup Festival where buffaloes are sacrificed. Tourists can visit the ethnic villages of Suay and Taoy or Katou weavers in Ban Houay Houn, the Ho Chi Minh trail (where UXOs are found and are a threat to the people), the Tad Lo Waterfall or boat rides on the Xe Lanong River.

48. Another important cultural area is Tahoy which is inhabited by about 300,000 ethnic people whose practice includes shamanistic rituals combined with animism. World-class Arabica coffee beans and hand woven fabrics can also be bought from villagers.

49. The approximate distances of the above attractions from the centre of the subject length of NR 20 are shown in Table 4.3 below:

Table 4.3: Distances from Roadway

Location	Attraction	Approx. Distance from Mid-point [km]
Katang Village	Silk Weaving	17
Katu Site	Buffalo Festival	21
Suay Village	Ethic Weaving	15
Taoy Village	Ethic Weaving	18
Katou Village	Ethic Weaving	22
Xe Lanong River	Boat Rides	25
Tahoy Area	Ethic Peoples	23

50. *Public Health*. The healthcare system in Salavan Province is relatively developed and covers the rural areas as well. There are more women now giving birth in hospitals or receiving assistance from trained volunteers or nurses than before. Women's health clinics have been built in villages and the number of community health stations has increased. Measurement of health indicators reveals a decrease in the death rate from tuberculosis and malaria due in part, to improved access to clean water.

51. *Education*. The education system in Salavan Province has improved with 612 schools as of 2010, 570 of which are primary and 42 secondary. There are also 47 kindergarten schools. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and the bigger villages. The major problem encountered in the school system is the inadequate level of training of the teaching staff and the distance needed to travel often affected by the bad condition of the access roads.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

52. Since the Project is considered to fit into Category B, significant negative environmental impacts are not anticipated. The identification of the potential environmental impacts were based on the observed maintenance needs and on the nature of the maintenance interventions required to address them and therefore to be included in the work for the NR 20 corridor. These included assessment of the presence of environmental sensitivities (e.g. the topography, soils, and water Resources, natural hazards - including forests as well as protected areas and habitats of protected species of wildlife) within the immediate area of the future Project.

53. The identification and assessment of impacts associated with the NR 20 project cycle include the design/pre-implementation phase, the physical implementation of the required maintenance works and the post-intervention / operational phase. Where impacts were identified that might exceed the acceptable the relevant standards, mitigation measures have been proposed to reduce them to acceptable levels. The assessments were completed in compliance with the ADB‟s SPS 2009 and relevant GoL standards. In the absence of a precise GoL standard or guideline, standards given in World Bank's Environmental Health and Safety Guidelines were adopted.

54. During the design/pre-implementation and implementation phases, the cost of the required environmental mitigation measures will be borne by the Contractors and will be considered as part of their contractual obligations - as must be specified in the works contract documents. During the operational phase, the cost of monitoring of conditions and the implementation of any additional mitigation measures needed will be of the operation and maintenance costs to be borne by the MPWT / DPWT.

A. Design/Pre-Implementation Stage

55. There are two potential impacts identified that will need attention during the pre-implementation phase of the maintenance works as endorsed by the participants in the public consultation session for the NR 20 held on 12th January 2015. The potential impacts are as follows:

- Missed/incomplete aspects of road and bridges design; and
- Social conflicts between the local villagers and non-residents in the area due to employment opportunities.

56. *Road and Bridge Works*. For the purpose of this PPTA study, the subject part of NR 20 has been divided into 2 lengths, namely a Section A between Salavan and the main road junction in Ban Beng and Section B to the south between Ban Beng and the provincial border with Champasak province. A total of 10 bridges in different conditions are located in the two Sections many of which will be the subject of maintenance and/or rehabilitation and replacement works.

57. Section A contains a total of 6 bridges including 2 new concrete bridges that have already been constructed by the Ministry due to the poor condition of the original steel structures. The remaining 4 bridges are all single-span, steel [Bailey type] bridges that operate under single lane conditions and have restricted [20 tonne maximum load] carrying capacities. Full replacement but with new concrete box culverts has been assumed during the Study – this to be subject to confirmation during the future detailed design stages of the Project. The cost of this replacement work has been included in the overall cost estimate for this road and the economic viability checks performed thereon.

58. Section B contains a further 4 steel [Bailey] bridges which operate under similar conditions as for Section A [except that one has a 15 tonne load restriction]. Two of these are of long length, multiple span configurations while the others are shorter and might be able to be replaced with box culverts. Due to the high replacement cost implications and the observation that similar crossings will still exist further south [beyond the Champasak border that is excluded from this Project but will mean that Section B will continue to be unavailable to heavy vehicles], the cost of routine maintenance work only [e.g. minor deck repairs] has been included at this time.

59. *Climate risk screening*. The result of the initial screening for climate risk showed that NR 20 is considered as being at „medium" risk. As mentioned earlier, the lack of long-term climate data to support projections of future climate trends has limited the assessment and analysis of potential climate change impacts.

60. *Mitigation*. There is increasing anecdotal evidence of unusual and extreme flood events escalating and due allowance must be made during the future detailed design stages. The future design of the replacement bridges will have to consider hydro-meteorological data and parameters relating to predicted water levels [under peak flow conditions] examined to ensure the provision of adequate waterway opening sizes, anti-erosion needs for the protection of river banks and beds.

61. *Social Conflicts between Local Villagers and Non-residents*. The potential social conflict between the local villagers and non-residents in the area was identified both during the conduct of field assessments of the road conditions and during the public consultation for NR 20.

62. *Mitigation*. To prevent such conflict, the Contractor should be required to prioritize the hiring of local community members rather than non- residents. This could be achieved by including appropriate provisions in the works Contract documents.

B. Maintenance Work Stage

63. Based on the maintenance works and activities likely to be implemented for NR 20, the potential impacts identified during the Study include the following: increase of dust and noise levels, pollution of surface water from wastewater discharges and from works during the bridge replacement and maintenance works. Also, effects of traffic management methods adopted and provisions made for the safeguarding of socio-economic activities for local people.

64. *Air and noise pollution*. There could be an increase in dust/air and noise pollution levels during transport, loading and unloading of materials for the road maintenance works. Activities of concern include; clearing, grubbing and excavation activities; and from the hauling and transport of materials and equipment.

65. Emissions from trucks and other transport vehicles and noise from the operation of equipment can have a considerable impact on the villagers whose houses are often located immediately alongside the road.

66. *Mitigation*. Dust/air and noise pollution can be controlled and mitigated by: (i) regular watering of exposed surfaces; (ii) covering all trucks carrying materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained; (iv) limiting maintenance works to day times only in order to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works.

67. Emissions of air pollutants including nitrous oxide, carbon monoxide and hydrocarbons are considered as being „mild to moderate" because the number of machines used is likely to be small and the construction area large.

68. Smoke and foul odors may emanate from burning fuel wood for heating bitumen. However, impacts from air and noise pollution will likely be low since there are only nine villages – each with a low population density - throughout the 56 km length of NR 20. Concentration levels of dust and air quality will be maintained to the allowable environmental standards (based on Ambient Air Quality Standards of the National Environmental Standards VN02734 /PMO MoNRE).

69. *Water pollution*. The bridge maintenance and replacement works including excavation and backfilling activities will increase water turbidity affecting water quality and any water users downstream.

70. *Mitigation*. Water turbidity impacts are considered minimal and temporary in nature and likely to be able to be mitigated with measures such as settling ponds, filter fabrics and temporary drainage ditches for runoff; and training water flow and directions.

71. *Waste management and disposal*. Without waste management and proper waste

disposal will cause contamination of soils and surface water. Indiscriminate dumping and disposal of waste including maintenance works debris and hazardous chemicals can cause serious detrimental effect to the environment and local population.

72. *Mitigation*. There should be a regular collection and disposal of solid and hazardous wastes. The debris produced during maintenance operations and other waste deposits should be closely monitored [to avoid dumping in nearby water bodies would have a detrimental effect on aquatic flora and fauna] and avoided. Temporary toilet facilities with adequate water supply and strict enforcement of sanitation controls should be imposed.

73. *Soil erosion and deposition of excess materials* (from road grading and excavation activities, removal of topsoil, and run-off from stockpiles, may find their way to waterways and farmlands.

74. *Mitigation*. These cascading impacts will be prevented by close supervision of the maintenance works to ensure the of proper storage locations for excess materials from the maintenance works intended for future use or permanent disposal of unsuitable materials. The mitigating measures to prevent these impacts are likely to have to include the stockpiling of such materials in flat areas far from drainage routes; the use of settling ponds and temporary drainage ditches for runoff water; and the provision of protective covers for exposed soils particularly during rainfall events.

75. *Water ponding and flooding.* Due to improper execution of maintenance works and activities these impacts could become a regular occurrence if the natural drainage systems become blocked by waste materials or if pipe culverts are broken.

76. *Mitigation*. A close supervision and monitoring of maintenance works Some measures to mitigate and prevent these impacts would again include the stockpiling of materials in flat areas away drainage routes; the use of settling ponds and other measures to control; and provision of protective covers for exposed soils particularly during rainfall events.

77. *Traffic Congestion*. A closure of a road segment during maintenance works can create traffic congestion and stall vehicles along the road.

78. *Mitigation*. A traffic management plan including temporary re-routing schemes to reduce congestion along the road the contractor shall be required to prepare a traffic management plan (TMP) - prior to the implementation of the maintenance works. The traffic management plan [TMP] must be submitted to the concerned authority for approval. Subsequently, the Contractor will be required to maintain coordination with the traffic management authority by giving advance notice and providing on a weekly schedule, details of the road maintenance works planned and the traffic management measures to be used.

79. *Public Safety along the Road*. Public safety will be an important responsibility of the Contractor during the implementation of the maintenance works to ensure the prevention of vehicular accidents and loss of life.

80. *Mitigation*. With strict enforcement of traffic rules and regulations, installation of traffic signs and speed limits on critical routes at least during peak flow hours, coordination with the approved traffic management plan and with local traffic management authority and community representatives, vehicular road accidents and loss of human life can be prevented or mitigated.

81. *Workers' Health and Sanitation at Workers' Camp* is a responsibility of the contractor. Improperly managed silt runoff and sanitary wastes from these camps may

reach nearby areas and will affect water quality of streams and aquatic biota. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for vermin and other disease vectors to easily multiply and infect the workers. This may lead to the transmission of diseases from the workers camp to other areas. These conditions will increase public health risk.

82. *Mitigation*. contractor will be required to: (i) install proper sanitary facilities to prevent the indiscriminate discharge of sanitary wastes at the camps' surroundings, (ii) implement proper solid waste management, and (iii) prevent surface runoffs from flowing into the workers camps to avoid carrying away any contaminants. The contractor will be required to use temporary diversion drains, catch drains, and silt-traps at the workers' camps.

C. Operational Stage

82. The potential environmental impacts may occur during the operational phase:

a. Increases in road and vehicular accidents due to increases in speed;
b. Increases in noise and vibration levels due to increased traffic volume;
c. Air pollution due to increased traffic flows.

83. *Mitigation Measures.* The implementation of the environmental mitigating measures will be the responsibility of the Contractor as must be stated in the Works Contract This will include mandatory compliance with the relevant environmental standards of the GoL - such as the permissible noise and vibration levels, ambient air and water quality standards.

84. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures applicable to each impact are meant to reduce if not to eliminate entirely, the impact to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted effects of Project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

85. *Public Consultation***.** Public consultation meetings were held for the six shortlisted priority Road Maintenance Projects in Salavan, Xekong and Attapeu provinces from 12 to 26 January 2014.

86. The public consultation for NR 20 in Salavan Province was conducted on 12th January 2015 and was chaired by Mr. Sengdarith Kattignasack, Director DPWT Salavan Province assisted by the International Environment Specialist.

87. The attendees of the public consultation were composed of representatives from the Districts and Provincial DPWT, the District Governor, concerned local government agencies from the Province, mass organizations, village leaders and representatives of potentially affected households along the corridor. The participants were also given the Project Information Handout translated into the Lao language.

88. The Director of DPWT initiated the public consultation and welcomed the participants to the consultation process. The objective was stated as to introduce the road maintenance project by providing the project's background and description, the maintenance works planned and an implementation schedule. The background information and description of the maintenance works on NR 20 together the potential

impacts and benefits to be gained, were presented by the DPWT Director Mr. Kattignasack.

89. The participants were also informed of the required compliance of the project with the environmental and safeguards policy of the ADB as well as to the EIA procedures and requirements of the GoL. The process of application for the approval of the Project IEE Report and the subsequent issuance of the required ECC by the DoNRE was also outlined. Other topics mentioned and clarified during the consultation included:

a) grievance redress mechanism;
b) roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities; and
c) community participation during implementation of the project. The participants were also informed that future public consultations will be held for the detailed design and prior to the implementation of the project.

90. The main activities of the public consultation were:

a) disseminating information with project information handouts;
b) presenting the project's objectives, locations, designs and cost estimates, tentative implementation schedules, the potential environmental impacts caused by each project and proposed mitigation measures, and the EMP and Environmental Monitoring Program;
c) discussing the opinions, perceptions and suggestions of the project- affected villagers;
d) clarifying issues relating to any loss of land for sub-project implementation;
e) identifying issues related to project environmental impacts on the community;
f) inclusion of the participants‟ opinions into design alternatives;
g) identifying levels and scope of community participation in project implementation; and
h) understanding of the overall goals and accrued benefits of the project.

91. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments received from the participants are provided below.

92. *Concerned Local Government Agencies.* The representative of the Provincial Assembly Office, Salavan Province proposed the following for consideration:

a) Widen the existing road to improve road and traffic safety;
b) Install inlet and outlet pipe culverts to sure smooth water flow;
c) Remove/replace old road structure with new or construct as needed; and
d) Ensure proper design and installation of drainage system on each section of the road to eliminate flooding and stagnant water in some villages along the project road corridor during rainy season at it a breeding area for malaria mosquito.

93. The representative from the DoNRE expressed strong support to improve NR. He reported that several locations along NR 20 are accident-prone such as in Lao Ngam district and in Xeset village area. He recommended carrying out an environmental and social impact assessment during the pre-construction phase. Impact assessment should include: Identification of impacts, public announcement about project activities, and public consultation with villagers to clarify any impact to land use and households. Some officials also noted that there might be impacts on agricultural lands and on the households adjacent to the corridor, and hence recommended that mitigation measures be implemented during project implementation. Furthermore, safety should be considered during road maintenance as all kinds of vehicles move along the road.

94. The representative from the Tourism and Culture Department said that better transport connectivity will bring more tourists to the districts. At present the level of tourism is low due to poor connectivity. The present road will not affect any monument or historical places. Minimum traffic safety requirements such as speed limit in risk areas and/or sensitive communities, schools, temples and residential areas should also be considered as NR 20 has been used more than 20 years ago, and many sections of this road are accident-prone.

95. The representative from the Agriculture and Forest Department mentioned that the project should:

- Closely cooperate, during the design phase, with the DPWT and Department of Agriculture and Forest on the technical aspects of drainage installation, including location of pipe culverts along the road project to ensure proper installation and to avoid negative effects on paddy fields;
- Estimate quantity of water outflow and inflow to paddy fields and other agricultural land; and
- Prevent erosion and install retaining walls or Gabion in risk areas.

96. The representative of the Rural Development Office of Salavan recommended the following:

- Ensure proper CBR test for each road section;
- Identify locations of damaged area and take quick action to respond in consultation with contractor or consultant;
- Survey all road sections to ensure that the whole road project use proper construction management and materials for construction; and
- Carry out testing procedures and proper design for road maintenance.

97. *Mass Organizations*. The representative of the Lao Women's Union commented that the project will benefit the local people by facilitating easy access and transport of products to the market. Women will benefit from this project through commercial trade of their vegetable products and other income generation activities. Construction of a bus stop for the community was also suggested.

98. The representative of the Lao Youth Union commented that the project can bring benefits to the local community for production exchange and commercial development. He suggested that the project should also carry out an awareness program for all villages living along the project corridor.

99. *Village Chiefs and Villagers.* Overall, the chiefs of the villages and the villagers along the road project did not pose any objection to the proposed road maintenance works. They expressed their strong interest and support to the project and are willing to be hired as laborers for the road maintenance works. Some are hoping for an early start of the project. The road improvement will increase economic activities and income

generation opportunities, access to market, medical services/facilities and schools brought about by better road condition.

100. The road improvement would also bring with it other benefits such as improved electricity and water supply, irrigation and other improvement in the general quality of life. A number of communities were also interested in potential income generation from increased tourism, as a result of improved road network. Other reactions are given below:

- Rehabilitate village roads as part of the project. If necessary, villagers are willing to move from their residential houses if the GoL will include rehabilitation of their village roads;
- Take immediate action to restore and rehabilitate borrow pits to prevent accidents in those areas;
- Install traffic safety measures such as signboards along high population density areas like public markets and schools;
- Construct proper drainage system and replace damaged pipe culverts replaced to prevent flooding and accidents during the rainy season;
- Reduce dust levels by regular watering; and,
- Minimize tree cutting.

101. Overall, the villagers expect local economic conditions to improve, traffic load to increase, transport costs to decrease, and property values along the road to increase due to improved road condition. They also expect more trade not only with Thailand but also Vietnam and Cambodia

102. The following suggestions/recommendations raised during the public consultation were considered and added into the proposed mitigations and monitoring plan of NR 20, such as: a) Improve drainage system to prevent water ponding and flooding; b) Control land slide, erosion and deposition along the road; c) Reduce dust levels; and d) Install traffic safety measures.

103. *Information Disclosure*. In line with ADB‟s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its website:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and

- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation upon receipt.

VII. GRIEVANCE REDRESS MECHANISM

104. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance work zones, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor's relevant contact persons.

105. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance activities.

106. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps:

Table 7.1: Steps for resolution of issues under the GRM.

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

107. This section addresses the need for mitigation and management measures for NR 20. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

108. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices. The budgetary requirements of the EMP will be taken as part of project preparation costs. The Contractor's office operations and maintenance costs will be built in to the applicable Pay Items in the bid documents. The Ministry's capacity building cost will be part of the construction supervision contract.

A. Environmental Mitigation

109. *Mitigation Measures*. The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 contains the summary matrix of the environmental mitigation measures.

B. Environmental Monitoring

110. The environmental monitoring plan for the EMP is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

111. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial DPWTs with support provided by the project/construction supervision consultant.

112. The Provincial Advisory Committee with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Design/Pre-implementation					
Inappropriate/ incomplete Road & bridge design	Review & finalize Road & bridge Design improvement	Road and bridges design	Road design Consultant	MPWT & DPWT	MPWT, DPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Include in the Contractor's contract a provision to prioritize hiring of workers	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance Works Implementation					
Loss of vegetation Protection & Soil erosion	Replanting of vegetation	Grading and road side maintenance Works	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Noise and vibration	Contractors Shall follow the noise and vibration standards of GoL	Minor improvement/rehabilitation works	Contractor	MONRE, DPWT Environmental Officer; village representative	Contractor-included in contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression By water; Contractor must ensure trucks used for maintenance works are not smoke belchers	Transport/hauling of road maintenance materials along the road alignment	Contractor	MONRE, DPWT Environmental officer & Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Erosion & deposition	Proper storing and	Grading, excavation of	Contractor	DPWT	Contractor-included in contractor's

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Of maintenance Materials and excess soils materials from grading, borrow pits, cut and fill	covering of soil materials to protect against wind and during rainfall	new ditches and unsuitable materials		Environmental Officer; Village representative	contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Siltation & blockage Of water flow	Proper supervision of bridge works	Bridge maintenance works: Replacement of steel bridges with box culverts	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Water ponding and flooding	Proper grading and backfilling of borrow materials, installation of pipe culverts and cleaning of water channels	Maintenance works	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties and cultivated land	Proper supervision during road grading and backfilling	During maintenance works	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Traffic congestion due to limited road access road blockade	Implement Traffic management plan and observe maintenance works schedule	Filling and patching of potholes, repair of sub-base materials, scarifying and reshaping of the road	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of road lanes and pedestrian lanes	Bridge maintenance works: Repair of steel decking* Repair/replacement of timber decks & running strips*	Contractor	DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Workers‟ protection, health and sanitation	Contractor to provide workers with protective	All maintenance works area, storage, field office and workers‟ camps	Contractor	DPWT Environmental Officer;	Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	gears, proper location of workers‟ camps and supply of potable water			Village representative	allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	All maintenance works area, storage, field office and workers‟ camps	Contractor	DONRE, DPWT Environmental Officer; Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE‟s budget allocation; Contractor-included in contractor's contract; DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management and vehicular accidents	Maintain traffic signs, speed limits, guard and protection rails at high population density areas, strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	DPWT and members of the local villages	DPWT-included in DPWT‟s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Design/Pre- Implementation						
Incomplete/inappropriate road & bridge design	Updated road & bridge design	Office of the consultant	Determine Changes in road & bridge designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget
Social conflict	Employed workers	Maintenance work area, workers‟ camp & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Implementation of Maintenance Works and Activities						
Excessive dust & Air pollution	Dry road surface, and watering Of the road to Suppress Dust, trucks/transport vehicle maintenance service records	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, PTI, DPWT & Village representative	MONRE-included in MONRE‟s budget. PTI-DPWT-included in PTI-DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Sound/noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, PTI, DPWT & Village representative	MONRE-included in MONRE‟s budget. PTI-DPWT-included in PTI-DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Water quality	pH, BOD,	At bridge	Laboratory	1x before bride	MONRE, PTI,	Contractor-included in the

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
	coliforms	work site & 30 meters downstream	Water analysis	works; 1x per month During bridge Works; 1x after Bridge works	DPWT & Village representative	contractor's contract MONRE-included in MONRE"s budget. PTI-DPWT-included in PTI-DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Erosion & deposition Of construction Materials and soil	Exposed & unprotected Construction Materials and soils	All work sites	Ocular/visual inspection	1x per week	PTI, DPWT Environmental officer & Village representative	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks, decaying garbage materials & soils	At bridge works, cleaning of ditches,, pipe culverts, excavation of new ditches	Ocular/visual inspection	1x per week	PTI, DPWT Environmental officer & Village representative	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Water ponding and flooding	Incorrect location & installation of pipe culverts, excavation of ditches	Road grading and reshaping of road; water channels	Ocular/visual inspection	During and after rainfall	PTI, DPWT Environmental officer & Village representative	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling, filing of excavated materials	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	PTI, DPWT Environmental officer & Village representative	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	PTI, DPWT Environmental officer & Village Representative in coordination with the local	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
					management authority	
Public safety/ Road accidents	Installed traffic signs, detour routes, guard posts, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	PTI, DPWT Environmental officer & Village Representative	PTI-DPWT-included in PTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Workers" protection, health and sanitation	Provision of appropriate workers" camp, protective gears and water supply by the contractor	At workers" camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	PTI, DPWT Environmental officer & Village Representative	PTI-DPWT Environmental officer & Village Representative-included in their CBC and PBC
Solid waste mgt. and Disposal	Contractors" waste collection management plan and disposal sites	At workers" camp and work sites and approved disposal sites by the local authority	Visual/ocular	1x a week	MONRE, PTI, DPWT Environmental officer & Village representative	MONRE-included in MONRE"s budget. PTI-DPWT-included in PTI-DPWT"s budget appropriation Budget. Villager-included in the CBC and PBC budgets
Operation						
Road safety & traffic management	Repair and installation of traffic signs, guard rails, painting of line marking	High population density areas such as public markets, school areas, accident prone areas of the road segments like blind curves & steep slopes	Visual/ocular	During peak hours AM & PM 2x a day	DPWT officer, Local traffic management authority	DPWT"s budget appropriation Budget. Local traffic management Budget appropriation

113. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

114. Table 8.3 presents the ambient surface water quality parameters.

Table 8.3: Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

115. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise.

Table 8.4: Lao PDR Noise Standard

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014					

DB (A) [1] Lao PDR noise standards

116. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5: Lao PDR Air Quality Parameters and Standards

Parameters/ Symbols	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

117. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the levels of concentrations are not high enough to significantly obscure the visibility along the road.

D. Institutional Arrangements

118. The project's executing agency will be the MPWT and DoR twill be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

119. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

120. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The PTI and DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

IX. CONCLUSION AND RECOMMENDATIONS

121. The environmental screening and assessment conducted for NR 20 was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in the conduct of the environmental analysis and classification of the road maintenance project.

122. The Rapid Environmental Assessment (REA) Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category “B” project.

123. Similarly, under the Lao PDR EIA system the project is classified under Category “1‟ project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category “B” project and will not be subjected to a full EIA study.

124. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

125. The project’s executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

126. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

127. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

128. It is concluded that the future Project will create opportunities for generating both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

Initial Environmental Examination

National Road 16, Xekong Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CB-PBC	Community-based-Performance-based Contract
DBST	Double Bituminous Surface Treatment
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People‟s Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
PPTA	Project Preparation Technical Assistance
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
RoW	Right of Way
SPS	Safeguards Policy Statement
sq. mi.	square miles
USSR	Union of Soviet Socialist Republics

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EXECUTIVE SUMMARY

1. An environmental assessment was made for National Road (NR) 20 under the Lao Road Sector Governance and Maintenance Project funded through a Project Preparation Technical Assistance (PPTA) from the Asian Development Bank (ADB). The purpose of the PPTA is to define maintenance needs and future design requirements for this Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 16 in Attapeu Province is classified under Category B and therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and monitoring plan is required. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and which are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

3. *Project Description*. The NR 16 Road Maintenance Project extends southwards from the urban area of Xekong to the Xekong/Champasak Border over a total distance of 56.0 km. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context.

4. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and community-based contracted efforts.

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5. *Environmental and Socio-economic Conditions*. The population of the province as per 2005 census is 300,000 distributed over eight districts. There are nine villages located within the NR 16 road corridor. The land use alongside the road is dominated by agricultural land devoted to rice cultivation. Vacant areas of land are predominantly covered with shrubby vegetation and native grass species, with some trees dispersed along the road alignment. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible. In addition to rice cultivation, vegetables and commercial crops are also grown, among them cash crops such as coffee, mung-beans, soybeans, peanuts. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

6. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for NR 16. For the pre-maintenance phase, two potential impacts were identified related to missed/incomplete aspects of road and bridge design, and to social conflicts between the local villagers and non-residents in the area due to employment opportunities. Initial climate risk screening showed that NR 16 is a medium risk category, therefore the location and design should consider hydro-meteorological data and parameters relating to water level, to include the peak flows of streams and river tributaries to ensure appropriate design and protection of the bridge, river/stream banks and beds.

7. During maintenance works, potential environmental impacts are: (i) air and noise pollution; (ii) water pollution; (iii) waste management and disposal; (iv) soil erosion and deposition of excess materials (v) water ponding and flooding;, (vi) traffic congestion; (vii) public safety along the road; and (viii) workers‟ health and sanitation at workers‟ camp These impacts are temporary and mitigation measures have been developed for inclusion in the works specifications to ensure their implementation.

8. During operation phase, potential environmental impacts are: (i) increase in road and vehicular accidents; (ii) increase in noise and vibration levels along the road corridor; and (iii) increase in air pollution from increased vehicular traffic. However, rehabilitating NR 16 will also bring positive impacts to the communities, will provide them better access to markets, schools, medical facilities, and will create economic opportunities for them to sell their products.

9. An EMP for NR 16 has been developed to effectively manage the environmental issues during pre-design/maintenance, during maintenance and operations. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP‟s institutional arrangements define the requirements and responsibilities during the project's pre-maintenance, maintenance and operation phases. The project's executing agency will be the MPWT and DoR while the three DPWTs in Xekong, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection, and with the Provincial DoNRE for compliance monitoring of the project.

10. *Consultation and Participation*. A public consultation for NR 16 was conducted on 16 January 2015, chaired and moderated by the Director of the DPWT in Xekong Province, and attended by various stakeholders like representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Xekong Province, mass organizations, village leaders, affected households along the projects‟ road corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system, control of erosion, landslide and deposition along the road, reduction of dust levels, and installation of traffic safety measures. Overall, they gave their support to the project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

11. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will

record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies

12. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for NR 16, the ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, project is classified as Category "B" project and will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable and will generate both direct and indirect benefits for many people and as the project continues, bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

1. INTRODUCTION

1. The purpose of this Project Preparation Technical Assistance (PPTA) is to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and

- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. National Road (NR) 16 is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included Lao PDR‟s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, were also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its offices to verify and confirm the procedural steps and new requirements for the application process of the project's Initial Environmental Examination (IEE) Report and approval and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and Protected Area Management were also visited to gather available secondary data including forest cover maps and protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location of the road alignments as well as physical, ecological, presence of protected species and/or endangered species of wildlife along the project roads was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife by tracks on the ground,

roosting areas, faecal droppings of animals. The presence of endangered species was also confirmed through interviews with local villagers. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. This may be due the absence of appropriate habitat requirements of the species and the noise disturbance along the road corridor generated by vehicular traffic. Historical and socio-cultural features, present conditions of the roads, photo documentation of the vegetation cover as input to the determination of the environmental classification of NR 16 for maintenance interventions under the future „Project".

7. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 16 in Xekong Province is classified under Category „B" and therefore will not be subject to a full EIA procedure. Instead, an IEE report with Environmental Management Plan (EMP) and monitoring plan is required. The REA Checklist for NR 16 in Xekong Province is attached in a separate **Annex R – Rapid Environmental Assessment Checklists [6 Roads]**.

8. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

9. The IEE Report presents the findings of the environmental examination conducted for NR 16 located in the province of Xekong. It is meant to ensure the environmental soundness and sustainability of the Project and to integrate environmental considerations into the Project Design and to the EMP. The IEE was conducted in adherence to the ADB"s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009), and the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

10. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the EPL which was approved by the President on April 3, 1999. It mandates a unified environmental management with the aim of preserving the environment and making rational and sustainable use of natural resources.

11. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to protect the public, natural resources and biodiversity, and to ensure - sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of EPL.

12. Under the EIA Decree no. 112/PM02/2010, the time frame for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after submission of the project IEE document.

13. While other Ministries issue guidelines for implementing provisions of the IEE and EIA and environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, that reviews and issues the ECC.

14. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental standards for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional standards are in place and environmental standards used by international organizations and advanced countries have been adopted as reference compliance standards.

15. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

16. The NR 16 road intervention starts from the Xekong/Champasak border to and runs to the urban areas of Laman over a total distance of 54.0 km – for Study purposes this has been considered to be a single homogenous section. The road is situated in generally flat terrain and its surface condition was found to be sound but with signs of potholes and other forms of wear. Some previously failed sections were noted that were the subject of MPWT maintenance interventions in the recent past and another short section identified where seasonal flooding problems have been reported by DPWT officials. Figure 3.1 shows the location of NR 16 in Xekong Province.

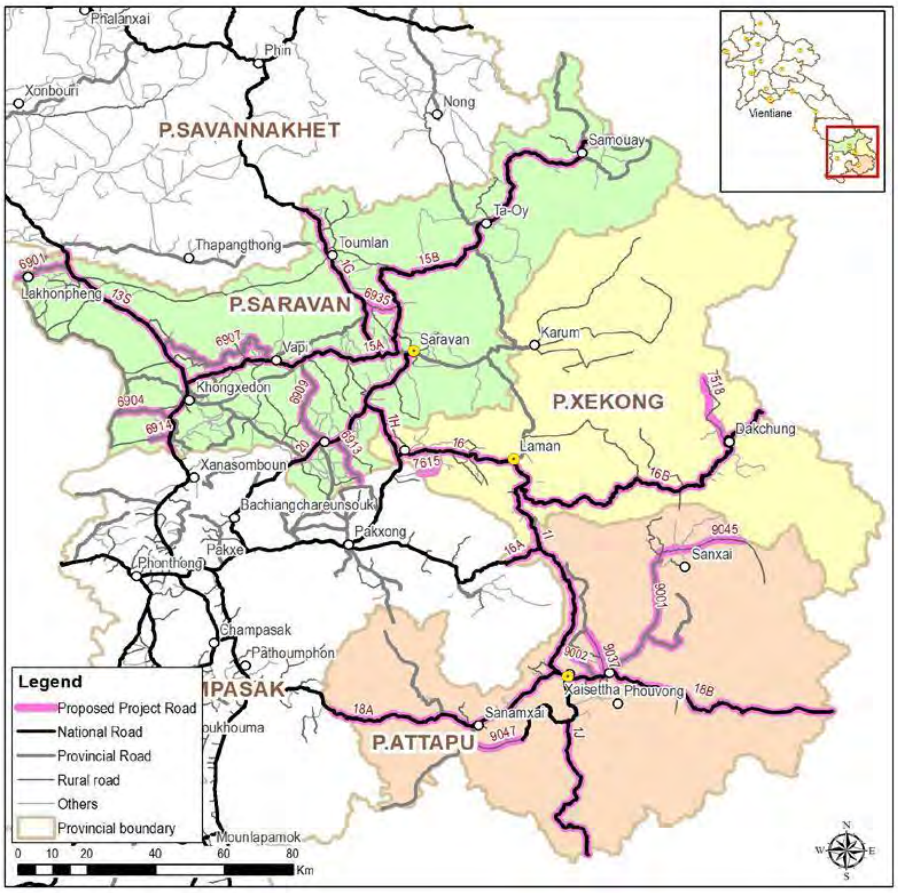


Figure 3.1: Location map of NR 16 in Xekong Province

B. Maintenance Works and Implementation

17. The maintenance works will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and by community-based contracted efforts.

18. The PBC contracts cover only the road carriage way (excluding the roadside maintenance). The PBC contract will be implemented with the Initial Rehabilitation/Improvement works during the first few months of the contract until the road has been “restored” to a condition suitable for regular PBC contracts. The regular Routine Maintenance will be continued until the end of the 3 year period.

19. The Community-based PBC roadside routine maintenance will include culvert and ditch clearing, clearing under bridges and box-culverts and other activities as part of the CBC Maintenance Works and will also be implemented over 3 years. Table 2:1 below presents the various maintenance works and related activities likely to be required for NR-16.

Table 3.1: Maintenance works and activities for NR 16.

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Filling of potholes with base material	Excavating unsuitable material in patch areas	Scarifying of existing road surface
Patching of potholes in DBST surfaces	Repair of base course, incl. new material	Reshaping the road (incl. ditches)
Crack Sealing - minor areas	Prime coat	
Light grading	First seal	
	Second seal	
Spot filling		
Clearing of Ditches by Hand		
Clearing of pipe culverts	Excavating unsuitable materials	
Repair of ditch lining	Pipe culverts with headwalls	
Cleaning of bridge decks Clearing river channels of debris	Excavation of new ditches	
Grass and bush cutting	Construction of scour checks	
	Erosion protection - gabions	
	Erosion protection - vegetation	
Proposed Schedule for Maintenance Works Implementation:		2018 - 2021

IV. DESCRIPTION OF THE ENVIRONMENT

20. Xekong Province is one of the southern provinces of Lao PDR, located about 885 km from the capital city, Vientiane. It covers a total area of 7,665 square kilometres (2,959 sq. mi) and has a total population of 84,985as of 2005. Xekong province is composed of 4 Districts namely: Lanam, Kaleum, Dukchung and Thateng Districts. It is bounded in the north and west by Xekong Province, in the south by Attapeu Province, in the west by Champasak Province and in the east by Vietnam (in Khuangnam province).

21. A brief description of the existing environmental and socioeconomic conditions of the NR 16 influence area is presented in the following subsections:

A. Physical Resources

22. *Topography*. Xekong is one of the most remote areas of Laos, with some of its largest villages inaccessible by road for at least half of the year. The topography of the province is about 65% mountainous and 35% plain. The eastern districts of Dakchung and Kaleum, in particular, are characterized by mostly rugged mountainous terrain. The Xekong river valley has fertile plains interspersed with paddy fields and fruit orchards. The present project road alignment passes through generally flat terrain.

23. *Climate, Rainfall and Temperature.* The climate is dominated by monsoons, with pronounced wet and dry seasons. Most rain falls during May to September when the prevailing winds blow from the southwest. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. The dry season from October to April, is characterized by winds that blow from the north-east. Mean temperatures range from about 10 ^{0}C in January to 38 ^{0}C in July, cooler in the north, warmer in the south. Lowland areas are tropical while the highest elevations and the mountains of the extreme north are sub-tropical. Table 4.1 shows the meteorological data of Xekong Province from 2011-2013.

24. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

25. *Soils*. The soils in the southern part of Lao are generally good and are acid hydromorphic and contain low organic matter and nutrients, which are moderately-well suited to rice production. More fertile soils with high organic matter and good physical properties are also to be found in parts of the southern areas the Lao PDR. Xekong Province is one of the most important coffee producing areas of Laos along with Xekong and Champasak Provinces.

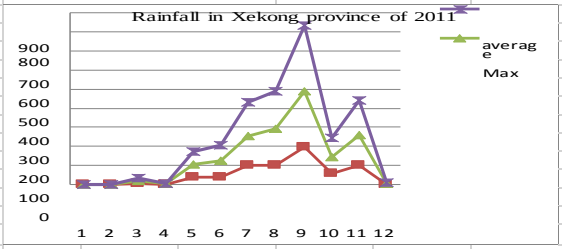
26. *River System*. The Mekong River is the dominant drainage system. It reaches Lao PDR from China in the northwest where it demarcates the international borders with Myanmar and Thailand. It enters Lao PDR, swings eastwards to Luang Prabang; then south to rejoin the border with Thailand, past Vientiane before re-entering the Lao PDR again near Pakse from where it flows south into Cambodia.

27. The Xekong River Basin is one of the most important Mekong tributaries. It originates from the Central Highlands of Vietnam, flows through Laos and then enters Cambodia to join the Mekong River. It contributes 10% of the water inflow to the Mekong River and joins the Sesan and Srepok Rivers to form the 3S River Basin - a major sub-basin of the Mekong River system. It is home to thousands of people from at least 20 different ethnic groups which depend on the surrounding forests, the fish and the fertile lands for food. The river also supports over 300-350 fish species estimated to be present throughout the Xekong River Basin.

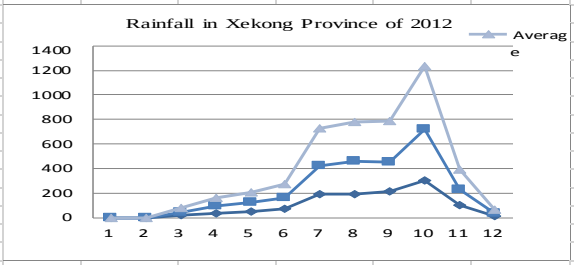
Table 4.1: Meteorological data of Xekong Province, 2011-2013.

METETOROLOGICAL DATA OF XEKONG PROV Rainfall

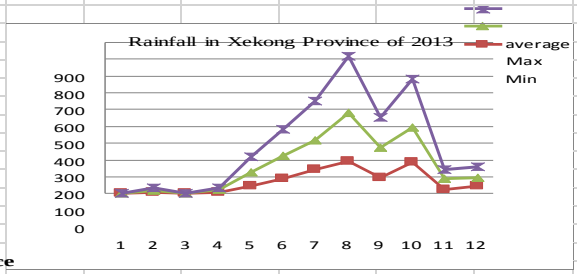
Mont	Min	Max	average
1	0	0	0
2	0	0.2	0.1
3	7.2	14.4	14.4
4	1.2	2.3	2.4
5	37.8	65.8	70.7
6	38.8	86.7	82.2
7	103	151	178.5
8	98.8	196	196.6
9	199	292	345.0
10	56.8	87.7	100.7
11	103	159	182
12	1.3	5.2	3.9



Mont	2012		
	Min	Max	Average
1	0	0	0
2	0	0	0
3	18.9	26.1	32.0
4	37.8	56	65.8
5	48.9	72.6	85.2
6	67.9	93.5	114.7
7	189	234	305.7
8	190	268	324.1
9	210	243	330.9
10	304	415	511.7
11	97.6	133	164.3
12	12.4	25	24.9



Month	2013		
	Min	Max	average
1	0	0	0
2	7.8	13.1	14.35
3	0	0	0
4	7.9	13.9	14.85
5	47.9	81	88.4
6	87.9	137	156.2
7	144	175	231.55
8	190	293	336.3
9	96.3	176	184.05
10	187	205	289.75
11	23.7	65.8	56.6
12	43.9	47.9	67.85

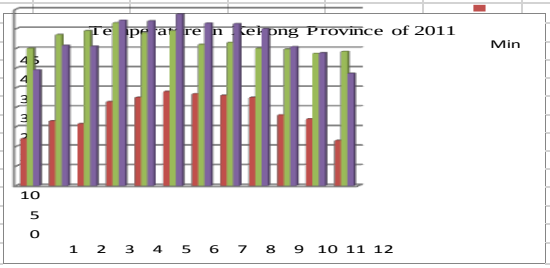


nce

Temperature of Xekong provi

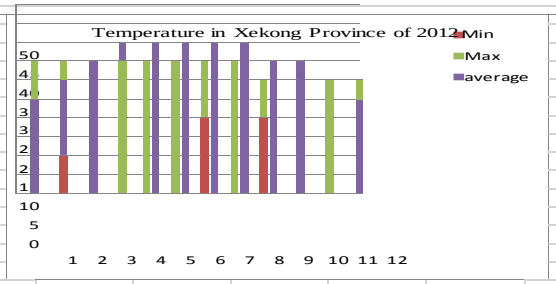
2011

Mont	Min	MAX	average
1	12	35	29.5
2	16.5	38.5	35.8
3	15.8	39.5	35.6
4	21.4	41.5	42.15
5	22.5	39	42
6	24	39.5	43.8
7	23.4	36	41.4
8	23	36.5	41.3
9	22.5	35	40
10	18	34.8	35.4
11	17	33.7	33.9
12	11.5	34.2	28.6



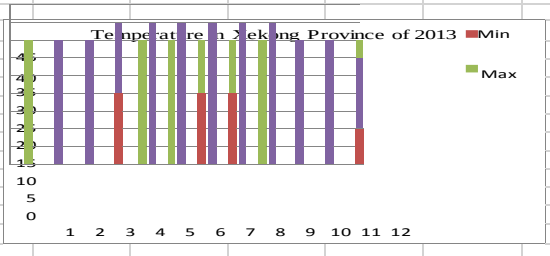
2012

Mont	Min	Max	average
1	11.5	34	28.5
2	13	36.5	31.3
3	18	38	37
4	21	37.5	39.8
5	24	38.5	43.3
6	24	36.7	42.4
7	22.5	34.5	39.8
8	23.2	35.4	40.9
9	22	32.5	38.3
10	19.5	34	36.5
11	16.5	33.5	33.3
12	12.2	33	28.7



2013

Mont	Min	Max	average
1	15.5	35	33
2	16.5	38.5	35.8
3	19.5	37.8	38.4
4	20.5	38.5	39.8
5	23	37.5	41.8
6	23	35.5	40.8
7	22.5	34.5	39.8
8	23	33.8	39.9
9	23	34.5	40.3
10	18	34.5	35.3
11	19.4	35.2	37
12	13.2	35.2	30.8



28. *Water Quality*. Xekong's water supply system was built in 1991. It became a decentralized water supply state enterprise under Xekong's DPWT in 1998, operating a water supply service in 5 service areas: Lanam, Kaluem, Dukchung, Thateng and Chunla villages and the town community of Thateng. The Ministry of Health has issued Decision No 1371/MOH dated 4 October, 2003 on Management of Drinking and Domestic Use Water Standards. However, water quality testing and monitoring for the full 13 parameters is not yet possible. For water quality monitoring, only pH, turbidity and residual chlorine are tested in the water treatment plants and in the water supply distribution networks.

29. *Air Quality*. Air quality monitoring is still not a routine practice in Lao PDR and there is therefore, no information on the concentration of air pollutants although generally, air quality appears to be good. Due to lack of equipment and technical expertise there has been no historic collection of data on air quality and reports on pollution levels remain anecdotal. At the present time air quality is „good" in the Province.

30. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localized pollution does occur and the incidences are likely to increase with increased urbanization unless action is taken to prevent or mitigate them. Identified sources include:

- Uncontrolled incineration of garbage;
- Decaying deposits of uncollected garbage;
- Wind-blown dust and debris resulting from solid waste transportation;
- Dust caused by traffic along unsealed roads; and
- Exhaust from vehicles and motorcycles – exacerbated by poor traffic management.

B. Ecological Resources

31. *Flora and Fauna*. Xekong Province is rich in natural capital and is home to a wide range of rare, endemic and threatened taxa including several large mammals such as tiger, clouded leopard and the Asian elephant (Duckworth and Hedges, 1999). Other species also recorded are, Douc Langur, Dhole, Asiatic Black Bear, and Sambar (Bergmans, 1995). Three large mammals recently discovered to science are small dark muntjac (*Muntiacus truongsonensis*), giant muntjac (*Megamuntiacus (Muntiacus) vuquangensis*) and saola (*Pseudoryx nghetinhensi*). They are endemic along the border between Lao PDR and Viet Nam. Threatened species recorded in Lao PDR, based on the November 1998 data from the WCMC, comprised 220 plants (211 excluding synonyms) and 150 animals. Numbers of threatened animals are listed below. Categories of threat follow those of IUCN.

- Mammals 200
- Birds 750
- Reptiles 70
- Amphibians 40
- Fishes 250

32. Bird diversity is high with three species of international importance – the crested argus, the green peafowl, and the spot bellied eagle owl – all having been observed in the area. Other bird species observed are the ratchet-tailed tree pie and the great hornbill. Because of the remoteness of Xekong Province, forest cover, biodiversity, and ethnic traditions have been observed to change less in recent years compared to other areas in Laos. However, improvement in road infrastructure has lessened this isolation in recent years.

33. *Protected Areas.* The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993. The NPA system covers about 14% of the land area in Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country (see Fig. 4.1). It was created as the Government's commitment to biodiversity conservation.

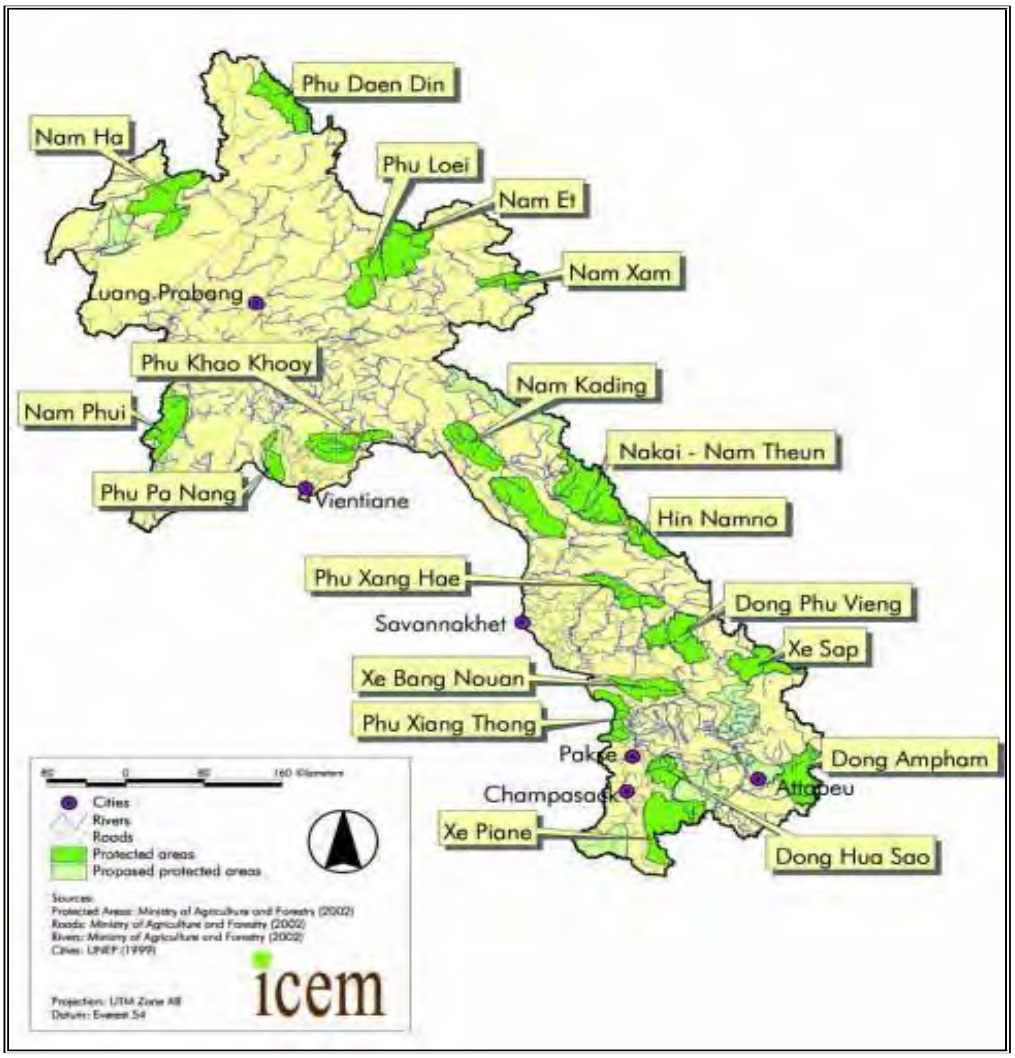


Figure 4.1: National Protected Areas in Lao PDR.

34. The Dakchung Plateau in Xekong Province is considered an Important Bird Area (IBA). It is located at an altitude of 800–1,400 metres (2,600–4,600 ft.) above sea level and occupies an area of 5,140 hectares. It is an important area for the Yellow-billed Nuthatch *Sitta solangiae* classified as Near Threatened, Black-crowned Barwing *Actinodura sodangorum* as Vulnerable. Another IBA is the Xe Sap IBA which is located within the Xe Xap National Biodiversity Conservation Area (NBCA). The NBCA is located at an altitude of 400–2,066 metres (1,312–6,778 ft.) occupies an area of 1, 335 square kilometres and straddles the provinces of Xekong and Xekong. It is home to the Blyth's Kingfisher *Alcedo hercules*, Crested Argus *Rheinardia ocellata*, and Yellow-billed Nuthatch *Sitta solangiae*, many waterfalls, rocky cliffs, mammals (including 18 key species), birds (18 are key species), 48 reptiles and 33 amphibians. A further IBA is the Phou Ahyon IBA which occupies an area of 148,900 hectares and sits at an altitude of 400–2,193 metres (1,312– 7,195 ft.) above sea level. It is home to notable avifauna such as Black-crowned Barwing *Actinodura sodangorum*, Black-hooded Laughing thrush *Garrulax milleti*, Chestnut-eared Laughing thrush *G. konkakinhensis*, Crested Argus *Rheinardia ocellata*, Golden-winged Laughing thrush G*. ngoclinhensis*, and Yellow-billed Nuthatch Sitta solangiae.

C. Economic Development

35. *Economy*. The economy of the province is recognized as being one of the poorest in the country. The province was heavily bombed during the last Indo- China war and the remains of the bombs are still found along the former Ho Chi Minh trail. There are only small and medium scale industrial activities. The industries comprise of small scale furniture factories, sawmills, drinking water factories, rice mills, ice making, meat processing, print shops, TV/radio repair shops, watch repair and garages.

36. Lao PDR is an agricultural economy and this sector contributes more than 60% of the National GDP. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. The traditional varieties of rice are grown in all irrigated areas. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible.

37. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products often grown as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Lao's agricultural sector are timber, lumber, plywood and coffee. Xekong Province is one of the most important coffee producing areas of Lao PDR. It is also the main honey-producing area where tree cavities are a particular tree beekeeping method practiced in three districts: Dakchung, Kalum, and Lama. Most of the commercial crops are grown for export to Thailand.

38. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People grow vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

39. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks and turkeys and develop fish ponds. Buffalos are used to plough rice paddy lands. Livestock is sold in the villages and at district markets to provide additional income for the local population.

40. *Transportation, Communication, Power and Water.* The project corridor serves as the main land route connecting several areas in this southern part of Lao PDR with the surrounding rural areas and enables the transport of agricultural produce from Station Thateng to Salavan, Xekong, Attapeu and Champasak. The major transport modes are small pickups and medium-sized, 2-axle trucks. Other transport modes within Xekong include tuk-tuks, trishaws (lot-sam-lor) and jumbos (small tuk-tuks).

41. There are domestic and international telephone services. In Thateng three companies are operating, namely: Laotel, Enterprise of Communications Lao (ETL), and Unitel. Electricity is supplied through a distribution system from Xeset, Houayhor and Sekhaman hydropower projects to six villages. Most of the water supply is provided by a decentralized water supply state enterprise operating under Xekong"s DPWT since 1998. This serves 5 areas: Lanam, Kaluem, Dukchung, Thateng and Chunla villages plus the community of Thateng. Some villages get their water supply from rivers and streams and other available surface and ground water sources.

D. Socio-cultural Resources

42. *Population and Communities*. The population of Xekong Province is ethnically diverse, with about 3% ethnic Lao and 97% representing at least 14 distinct ethnic minority groups - including Alak (21%), Katu (20%), Tarieng (19%) and Nge/Krieng (11%). This population has been grouped into three simple categories: 1) Lao Loum or low-land Lao, who inhabit valley and plains, practice Buddhism and cultivate paddy and speak Lao-Tai language; 2) Lao Theung or mid-land Lao who live in the hills, are mostly animists, and have traditionally practiced upland rice or shifting cultivation, with community rotating from permanent village, and speak Mon Khmer language; and 3) Lao Sung or upland Lao who had been associated with higher altitudes, are predominantly animists who practice shifting cultivation and tend to be semi migratory, moving their villages when existing plots decline in productivity. Lao Sung speaks the Hmong-lu Mien and China-Tibetan language.

43. The majority of the Lao population is Lao Loum (62%) and Lo-Thai speakers (made up of 8 ethnic groups). Minority groups are predominantly Lao Theung and Mon-Khmer speakers. The project area has a lower proportion of ethnic minorities than the national average with the Lao Loum group being the predominant ethnic race in the project area.

44. *Land Uses*. There are 3 villages located along the road corridor - Ban DoneXa, Ban Nongkan and Ban Kapu as well as the larger community of Thateng in the western end of the corridor. Present land use through most of the corridor is devoted to agricultural use mainly devoted to rice cultivation. Vacant areas are mostly covered with shrubby vegetation and various types of wild grass.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Commercial
NR 16 Section A	54.0	Km 21+600 to km 30+00 Km 51 to km 54	80,000 Km^2	9,613.0 Km^2	Km 46.6 to km 51

45. There are some natural and cultural sites surrounding the project area. The main tourism sites are the waterfalls at Tad Maihia and Tad Nokkhao in Lamarm District, at Tad Mohone, Pa-Ao and Lavan in Thateng District and at Tad Oak in Darkcheung district. Other tourist sites include the Sinouk green tour resort. Xe Sap NBCA, located in north-eastern part close to the Vietnamese border, is also a potential tourist area but travel there is almost impossible in the rainy season and the major transport mode is by truck. Accommodation, medication, telephones, etc. are very rare in the eastern hilly parts. The jungle of Kalum, one of the four districts of Xekong, is known for intensive fighting during the Vietnam War in the 1960s-1970s. Scrap metal from the war – aluminum and iron from bombs, vehicles and aircrafts - are often exported out of the district.

46. The approximate distances of the above attractions from the centre of the subject length of NR 16 are shown in Table 4.3 below:

Table 4.3: Distances of Attractions from Roadway

Location	Attraction	Approx. Distance from Mid-point [km]
	Xe Sap National Biodiversity Conservation Area	30-40
Darkcheung District	Tad Oak Waterfalls	4
Thateng District	Tad Mohone Waterfalls, Pa-Ao Waterfalls and Lavan Waterfalls	24
Kalum District	Historical site: Kalum jungle	12

47. *Public Health*. There are qualified doctors in the district headquarters but their number is very limited. The small clinics at the villages are manned by paramedical staff or nurses. The units are badly equipped and doctors travel to the interior village hospital to check patients. Traditional medicine is still practiced in the villages. Infant mortality is quite high. Poor access to medical care, lack of clean drinking water, and poor sanitation facilities are the major cause of concern for public health. Acute malnutrition and chronically energy-deficiency in children is higher in Xekong Province relative to other areas in Lao PDR.

48. *Education*. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and the bigger villages. The major problem encountered in the school system is the often inadequate level of training of the teaching staff and the distance needed to travel – often affected by the bad condition of the access roads.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

49. Since the Project is considered environment category B, significant negative environmental impacts are not anticipated. The screening identification of potential environmental impacts were based on road designs and specific road maintenance works and activities to be implemented in NR 16, and the presence of environmental sensitivities (e.g. topography, soils, water resources, natural hazards, including forests, protected areas, and habitats of protected species of wildlife) in the project area.

50. The identification and assessment of impacts associated with the NR 16 project cycle include pre-implementation and implementation of maintenance works activities. Three suggestions/recommendations raised by the participants during the public consultation were considered relevant and these are now added into the implementation of mitigations and monitoring plan of NR 16:

1. Improve drainage system to prevent water ponding and flooding;
2. Control land slide, erosion and deposition along the road;
3. Public and workers safety during the maintenance works;
4. Installation of traffic safety measures;
5. Dust suppression; and,
6. Priority given to local villagers for employment.

A. Design/Pre-Implementation Stage

51. Only one potential social impact was identified during the pre-implementation of maintenance works. The potential social conflict was identified and raised during the public consultation held for the NR 16. The potential social impact is a conflict between the local villagers and non-residents in the area largely due to employment opportunities.

52. *Social Conflicts between Local Villagers and Non-residents***.** The potential social conflict between the local villagers and non-residents in the area was identified both during the conduct of field assessment of the road alignment and during the public consultation for NR 16. To prevent the social conflict, the Contractor should prioritize hiring of local villagers over non-residents. To ensure the hiring and employment of the locals, it must be stated in the Contractor's contract that the local residents have the priority over the non-residents.

B. Maintenance Works Stage

54. Based on the maintenance works and activities to be implemented for NR 16 the potential impacts identified are the following: increase of dust levels, pollution of surface water from wastewater and from the bridge maintenance works, and effects of traffic and socio-economic activities for local people.

55. *Noise, Dust and Ambient Air Quality.* There could be an increase in dust levels that can also increase the Total Suspended Particulate (TSP) of the air negatively affecting the ambient air quality in the locality. Emissions from trucks and other transport vehicles and the operation of equipment and machineries during maintenance works and activities are expected to increase including noise levels above the prescribed standard limits for noise, dust and air quality. The increase in levels and concentration of pollutants will be generated by and during the transport, loading and unloading of materials for road maintenance, and the operation of equipment and machines for clearing, grubbing and excavation activities; and from the hauling and transport of excavated and unsuitable materials, garbage and solid waste to the disposal sites.

56. A simultaneous operation of the maintenance works and activities can have a considerable impact on the environment and to the villagers whose houses are located immediately along the road. These impacts however, can be controlled and mitigated by: (i) regular watering of exposed areas; (ii) covering all trucks carrying dispersible materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained; (iv) limiting maintenance works at day time only to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works.

57. Emissions of air pollutants including nitrous oxide, and carbon monoxide are considered as mild to moderate because the number of machineries is small, and the maintenance works will be spread along 56 km distance. Smoke and foul odors may emanate from burning fuel wood for heating bitumen. Impacts to the villagers from air and noise pollution will be low since there are only 3 villages with low population density, throughout the length of NR 16.

58. Concentration levels of dust and air quality will be maintained to the allowable environmental standards (based on Ambient Air Quality Standards of the National Environmental Standards VN02734 /PMU/ (WREA) 2009.

59. *Water pollution*. The bridge maintenance works is limited to bridge decks, there will be no use of harmful chemicals, clearing river channels of debris including excavation. This will cause a temporary increased water turbidity that affects water quality minimally.

60. *Waste management and disposal.* There should be a regular collection and disposal of solid and hazardous wastes by the Contractor. The removal of stockpiles unsuitable materials, debris and other waste materials will be closely monitored to avoid dumping in nearby water bodies. Temporary toilet facilities with adequate water supply and strict enforcement of proper sanitation should be imposed.

61. *Soil erosion and deposition of excess material*s (from road grading and excavation activities) to waterways and farmlands. These cascading impacts are most likely to occur without supervision of the maintenance works and proper storage location of excess materials for future use and disposal of unsuitable materials. The mitigating measures to prevent these impacts is to locate stockpiling of soils in flat areas and far from drainage routes; settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

62. *Water ponding and flooding* due to improper execution of maintenance works and activities can become a regular occurrence if the natural drainage system is clogged and blocked by waste materials and if pipe culverts are broken or deteriorated. Some measures to mitigate these impacts is to locate stockpiling of soils in flat areas and far from drainage routes; settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

63. *Traffic Congestion.* A traffic management plan including rerouting schemes to prevent stalling of vehicles along the road will be prepared by the Contractor prior to implementation of maintenance works. The traffic management plan shall be submitted to the concerned local traffic management authority for its approval. The contractor will maintain coordination with the traffic management authority by giving notice and providing a weekly schedule of road maintenance works.

64. *Public Safety along the Road.* Public safety will be an important responsibility of the Contractor during the implementation of the maintenance works. With strict enforcement of traffic rules and regulations, installation of traffic aides in critical routes during peak hours, coordination with the local traffic management officials will effectively provide public safety along the road.

65. *Workers' Health and Sanitation at Workers' Camp.* The contractor shall identify the appropriate location for the workers‟ camp, with provisions of temporary toilet facilities, wash and bath areas with adequate supply of potable water. Proper sanitation should be strictly enforced.

C. Operational Stage

66. The potential environmental impacts during the operation phase are the following:

i. Increase in road and vehicular accidents;
ii. Increase in noise and vibration levels along the road corridor; and
iii. Air pollution.

67. *Mitigation Measures.* The implementation of the environmental mitigating measures are the responsibilities of the Contractor as stated in his/her contract This includes compliance to the environmental standards of the GoL such as the allowable noise and vibration levels, ambient air and water quality standards.

68. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation Measures are important to avoid and control the unwanted or negative effects of project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

69. *Public Consultation***.** A public consultation/meeting was held at the DPWT Meeting Room in Xekong Province on 16 January 2015 and was chaired by Mr. Bounthavy Nakhonesith, Deputy Director of DPWT Xekong..

70. Participants were representatives from the Districts and Province level, District Governor, mass organizations, village leaders and potentially affected households along the corridor. The objective was to introduce the proposed maintenance project to the local villagers along the corridor by providing the relevant project background, a description of the foreseen maintenance works and the likely implementation schedule.

71. The participants were also informed on the compliance of the project with the environmental and safeguards policy of the ADB as well as to the environmental impact assessment procedures and requirements for the approval of the Project IEE Report and the subsequent the issuance of the Environmental Certificate by the DONRE. Other topics mentioned and clarified during the consultation process included: a) the grievance redress mechanism, b) the roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities, and c) opportunities for community participation during implementation of the project. The participants were also informed that future public consultations will be held during the detailed design preparation and again prior to the implementation of the works. They were also given a Project Information Handout translated into the Lao language.

72. The main activities were described as:

(i) disseminating information with project information handouts;
(ii) presenting the project's objectives, location, preliminary design features and the cost estimates, tentative implementation schedules, potential environmental impacts caused by each project and the proposed mitigation measures to be included as well as the contents of the Environmental Management Plan and Environmental Monitoring Program;
(iii) discussing the opinions, perceptions, and suggestions of the project- affected villagers;
(iv) clarifying procedures to address any loss of land during project implementation;
(v) identifying issues related to project environmental impacts on the community;
(vi) means to include participants" opinions into design alternatives;
(vii) identifying levels and scope of community participation in project implementation; and
(viii) awareness and understanding the overall goals and benefits of the project.

73. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments, issues, clarifications and suggestions of the participants are provided below.

74. Deputy Director DPWT Xekong Province. The Deputy Director reported that the project will be based on contract design and cost estimate, and will follow existing alignment only. He encouraged all villages adjacent to the road to provide support and assistance to the project and participate in solving as soon as possible all issues that could negatively affect the local peoples. He also highlighted the importance of information education to raise the awareness and understanding of villagers of this Project, including compliance to national regulations and Public Work and Transport law. He also proposed that the eventual project design should consider:

a) widening the road in risk areas, particularly in two or three locations with sharp curves;
b) installation of traffic safety measures;
c) construction of bus stops; and
d) support to upgrade the paved road surface surrounding the urban areas of Xekong.

75. The representatives from the Province expressed their appreciation of the project and the potential benefits it will bring such as facilitating access to market and to schools. It was also proposed that the project design should consider measures to avoid accidents such as: a) widening the road in risk areas for bus stops and community markets; b) installation of traffic safety measures; and c) construct detour access. In addition, waste materials from clearing and grubbing should be transported and dumped in proper places approved by local authorities.

76. The representatives of local government agencies in Xekong province recognized the importance of the project for market access, transport network connectivity and economic growth in the region, and expressed support to the project. It was also proposed that the project consider: a) installing traffic signs along risk areas; b) road widening in areas with sharp curves; c) watering to minimize dust dispersing to communities; d) design and install proper drainage system to avoid floods and stagnant waters; and, e) close coordination by DPWT and DoNRE for monitoring and supervision

77. *Mass Organization.* The representative of Young Union of Xekong expressed support for this infrastructure development. He proposed that: a) during construction stage, signboards should be installed in construction areas and villages to ensure safety of workers and the public; b) contractor(s) should carry out the Waste Management Plan including solid waste treatment; c) cross junction areas be widened and traffic signs installed; and d) do roadside maintenance (grass and brush cutting) along slope embankments.

78. *Chiefs of Villages and Villages' Representatives*. The communities along the Project road expressed their support for the project. Many hoped that the road improvement would lead to poverty reduction, food security, income generation opportunities, access to market and medical care, and bring secondary benefits such as electricity, water supply, irrigation, and support for non-formal education and other improvement in quality of life. A number expressed interest in being hired as laborers, and in potential income generation from increased tourism. It was also suggested that the project design and install a proper drainage system to avoid floods and stagnant waters in villages, especially during rainy season.

79. The following suggestions/recommendations raised by the participants during the public consultation were considered and are added into the proposed mitigations and monitoring plan of NR 16:

- Improve drainage system to prevent water ponding and flooding;
- Control land slide, erosion and deposition along the road;
- Public and workers safety during the maintenance works;
- Installation of traffic safety measures;
- Dust suppression; and,
- Priority given to local villagers for employment.

80. *Information Disclosure.* In line with ADB‟s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its website:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and
- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation upon receipt.

VII. GRIEVANCE REDRESS MECHANISM

81. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance sites, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor.

82. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor’s field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance activities.

83. The existence of the Contractor’s field office shall not impede the complainant’s access to the Government’s judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps:

Table 7.1: Steps for resolution of issues under the GRM.

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

84. This section addresses the need for mitigation and management measures for NR-16. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

85. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices. The budgetary requirements of the EMP will be taken as part of project preparation costs. The Contractors‟ office operations costs will be part of the physical works costs while capacity building cost will be part of the construction supervision contract.

A. Environmental Mitigation

86. *Mitigation Measures*. The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 shows the summary matrix of environmental mitigation measures.

B. Environmental Monitoring

87. The environmental monitoring plan of the EMP is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

88. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial PWTs with support provided by the project/construction supervision consultant.

89. The DPWT provincial advisory committee with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Pre-maintenance					
Inappropriate/ incomplete Road Design	Revise & finalize Road Design improvement	Detail design	Road design Consultant	MPWT	MPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Contractor to prioritize hiring of workers from the local villages	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance					
Loss of vegetation Protection & Soil erosion	Replanting of Vegetation, provision of protective cover for exposed soil materials	End of Maintenance Works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Increase levels of noise	Contractors shall comply w/ the levels of noise standards	Transport of works materials, hauling of garbage, debris and unsuitable materials from excavation activities	Contractor	MONRE, PWTI-DPWT Environmental Officer; village representative	Contractor-included in contractor's contract; MONRE-included in MONRE"s budget allocation; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression by watering of dry surface of the road	Grading, excavation of unsuitable materials	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Landslides, erosion of excess and open soils & deposition of rocks on road shoulders and ditches	Erosion Protection by gabions & planting vegetation, Appropriate location and storing of	Clearing & repair of ditches, Repair of sub-base & base coarse including new material, Installation of slope	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	works materials, excess soils & materials from grading & excavation should be protected with cover especially during rainfall	stability measures, Scarifying of existing road			community-based implementation
Siltation & blockage Of water flow	Proper supervision of bridge maintenance works	Cleaning of bridge decks and Clearing river channels of debris	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Flooding	Proper grading and backfilling, appropriate siting & size of culverts for quick flow to the drainage system	Reshaping the road (incl. ditches), Scarifying of existing road, Installation of slope stability measures,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties by deposition of rocks and unsuitable materials, and workers" camp garbage	Suitable site location prepared for the temporary placement excess materials for maintenance works, Proper supervision during maintenance works	Clearing of ditches & pipe culverts, AC surfacing - 50 mm,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Traffic congestion	Implement Traffic rerouting, coordinate traffic management plan w/ the local traffic management authority	Implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of	Repair & installation of new traffic signs, new guard rails, guard posts,	Contractor	PWTI-DPWT Environmental Officer;	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	road lanes and pedestrian lanes	and re-painting of traffic lane lines		Village representative	DPWT‟s budget allocation; Village representative-included in the community-based implementation
Workers‟ protection, health and sanitation	Contractor to provide workers with protective gears, proper location of workers‟ camp and supply of potable water	During implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	During implementation of maintenance works	Contractor	DONRE, PWTI-DPWT Environmental Officer; Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE‟s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management	Maintain traffic signs, guard and protection rails at strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	PWTI-DPWT and members of the local villages	PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Pre-maintenance						
Incomplete road design	Updated road design	Office of the consultant	Determine Changes in road designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget
Social conflict	Employed workers	Contractor's Office & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Construction/ Maintenance						
Excessive dust & Air pollution	Watering of the road surface to suppress dust ra	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Water quality	pH, BOD, coliforms	At bridge Work site & 30 meters downstream	Laboratory Water analysis	1x Before bride works; 1x per month During bridge Works; 1x after Bridge works	MONRE, DPWT & Village representative	Contractor-included in the contractor's contract MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget Villager-included in the community-based

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
						participation
Erosion & deposition Of construction Materials and soil	Exposed & unprotected Construction Materials and soils	All work sites	Ocular/visual Inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks & soils	At bridge works	Ocular/visual inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Flooding	Drainage & canals	Road alignment	Ocular/visual inspection	During rainfall	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	DPWT Environmental officer & Village Representative in coordination with the local management authority	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Public safety/ Road accidents	Installed traffic signs, detour routes, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	DPWT Environmental officer & Village Representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Workers‟ protection, health and sanitation	Provision of appropriate workers‟ camp, protective gears	At workers‟ camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	DPWT Environmental officer & Village	DPWT Environmental officer & Village Representative

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
	and water supply by the contractor				Representative	
Solid waste mgt. and Disposal	Contractors management plan and disposal site	At workers" camp and work sites	Visual/ocular	1x a week	MONRE, DPWT Environmental officer & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Operation						
Road safety & traffic management						

90. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

91. Table 8.3 presents the ambient surface water quality parameters.

Table 8.3 Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

92. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise.

Table 8.4. Lao PDR Noise Standards

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014					

dB (A) [1] Lao PDR noise standards

93. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5 Lao PDR Air Quality Parameters and Standards

Parameters/ Symbol	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

94. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the level of concentrations are not high enough to significantly obscure the visibility along the road.

Institutional Arrangements

95. The project's executing agency will be the MPWT, DoR will be the implementing agency and the three DPWTs in Xekong, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

96. Staff from the MPWT"s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

97. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections, and with the Provincial DoNRE for compliance monitoring of the Project.

IX. CONCLUSION AND RECOMMENDATIONS

98. The environmental screening and assessment conducted for NR 16 was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in the conduct of the environmental analysis and classification of the road maintenance project.

99. The REA Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category "B" project.

100. Similarly, under the Lao PDR EIA system the project is classified under Category „1" project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category "B" project and will not be subjected to a full EIA study.

101. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

102. The project's executing agency will be the MPWT, DoR will be the implementing agency and the three DPWTs in Xekong, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

103. Staff from the MPWT"s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

104. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

105. It is concluded that the future Project will create opportunities for generating both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

Initial Environmental Examination

National Road 18B, Attapeu Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CB-PBC	Community-based-Performance-based Contract
DBST	Double Bituminous Surface Treatment
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People‟s Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
PPTA	Project Preparation Technical Assistance
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
RoW	Right of Way
SPS	Safeguards Policy Statement
sq. mi.	square miles
USSR	Union of Soviet Socialist Republics

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EXECUTIVE SUMMARY

1. An environmental assessment was made for National Road (NR) 20 under the Lao Road Sector Governance and Maintenance Project funded through a Project Preparation Technical Assistance (PPTA) from the Asian Development Bank (ADB). The purpose of the PPTA is to define maintenance needs and future design requirements for this Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 18B in Attapeu Province is classified under Category „B" and therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and monitoring plan is required. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

3. *Project Description*. The NR 18 B maintenance works will be implemented over a distance of 112.0 km. for 3 years period (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and community-based contracted efforts. The maintenance works will be implemented together with the initial rehabilitation and improvement works during the first few months of the contract until the road has been "restored" to a condition suitable for regular PBC contracts. The regular routine maintenance will be continued until the end of the 3 year period.

4. *Environmental and Socio-economic Conditions*. The population of the province as of 2010 is 123,000 distributed over five districts namely Samakkixay, Xaysetha, Sanamxay, Sanxay and Phouvong. The corridor contains 10 villages located along its length most of which are of a „ribbon" development type. The land use along the road starting at about 7 km from Attapeu town is dominated by re-forestation and rubber and palm oil tree plantations. Land from about km 52 to the border at km 112 is steeply cross sloped and is therefore difficult to cultivate and as a result, the local population is relatively sparse. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

5. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for NR 18B. For the pre-maintenance phase, two potential impacts were identified related to missed or exclusion of road design that could potentially cause road failure and create flooding, and social conflicts between

the local villagers and non-residents in the area due to employment opportunities. Initial climate risk screening showed that NR 18B is a medium risk category, therefore the location and design should consider hydro-meteorological data and parameters relating to water level, to include the peak flows of streams and river tributaries to ensure appropriate design and protection of the bridge, river/stream banks and beds.

6. During maintenance works, potential environmental impacts are: (i) air and noise pollution; (ii) water pollution; (iii) waste management and disposal; (iv) soil erosion and deposition of excess materials (v) water ponding and flooding;, (vi) traffic congestion; (vii) public safety along the road; and (viii) workers‟ health and sanitation at workers‟ camp These impacts are temporary and mitigation measures have been developed for inclusion in the works specifications to ensure their implementation.

7. During operation phase, potential environmental impacts are: (i) increase in road and vehicular accidents; (ii) increase in noise and vibration levels along the road corridor; and (iii) increase in air pollution from increased vehicular traffic. However, rehabilitating NR 18B will also bring positive impacts to the communities will provide them better access to markets, schools, medical facilities, and will create economic opportunities for them to sell their products.

8. An EMP for NR 18B has been developed to effectively manage the environmental issues during pre-design/maintenance, during maintenance and operations. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP‟s institutional arrangements define the requirements and responsibilities during the project's pre-maintenance, maintenance and operation phases. The project's executing agency will be the MPWT and the DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection, and with the Provincial DoNRE for compliance monitoring of the project.

9. *Consultation and Participation*. A public consultation for NR 18B was conducted on 22nd January 2015 at Government Meeting Room No. 5. It was chaired by Mr. Sounnakhone Keovongkham, Deputy Director of DPWT and assisted by the Vice Governor of Attapeu Province. It was attended by various stakeholders like representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the projects‟ road corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system, control of erosion, landslide and deposition along the road, reduction of dust levels, and installation of traffic safety measures. Overall, they gave their support to the project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

10. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will record and document all the

complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies

11. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for NR 18B, the ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, project is classified as Category "B" project and will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable and will generate both direct and indirect benefits for many people and as the project continues, bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

1. INTRODUCTION

1. The purpose of this Project Preparation Technical Assistance (PPTA) is to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2 The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and
- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. National Road (NR) 18B is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included Lao PDR"s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, were also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its offices to verify and confirm the procedural steps and new requirements for the application process of the project's Initial Environmental Examination (IEE) Report and approval and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and Protected Area Management were also visited to gather available secondary data including forest cover maps and protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location/siting of the road alignments, physical, ecological, presence of protected species and/or endangered species of wildlife along the project roads was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife by tracks on the ground, roosting areas, faecal droppings of animals. The presence of endangered species was also confirmed through interviews with local villagers. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. The no sightings and encounters with wildlife species may be due to the noise disturbance by vehicular traffic and fact that the road has been opened to traffic for more than 10 years. A photo documentation of physical conditions of the roads, vegetation cover, and determination of the environmental classification of NR 18B for maintenance interventions under the future „Project".

7. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, NR 18B in Attapeu Province is classified under Category „B" and therefore will not be subject to a full EIA procedure. Instead, an IEE report with Environmental Management Plan (EMP) and monitoring plan is required. The REA Checklist for NR 18B in Attapeu Province is in a separate as **Annex R - Rapid Environmental Assessment Checklist [6 Roads]**.

8. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

9. The IEE Report presents the findings of the environmental examination conducted for NR 18B located in the province of Attapeu. It is meant to ensure the environmental soundness and sustainability of the Project and to integrate environmental considerations into the Project Design and to the EMP. The IEE was conducted in adherence to the ADB"s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009), and the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

10. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the EPL which was approved by the President on April 3, 1999. It mandates a unified environmental management with the aim of preserving the environment and making rational and sustainable use of natural resources.

11. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to protect the public, natural resources and biodiversity, and to ensure - sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of EPL.

12. Under the EIA Decree no. 112/PM02/2010, the time frame for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after submission of the project IEE document.

13. While other Ministries issue guidelines for implementing provisions of the IEE

and EIA and environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, that reviews and issues the ECC.

14. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental standards for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional standards are in place and environmental standards used by international organizations and advanced countries have been adopted as reference compliance standards.

15. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

16. The NR 18B Road Maintenance Project starts from a point with the city of Attapeu [near Attapeu Port] and extends to Phoukeua at the Vietnam border over a total distance of 112.0 km. For Study purposes this has been considered to be comprised of two separate sections – Section A of length 14.0 km containing the urban and semi-urban stretch between Attapeu and the community of Xaisettha and Section B of length 97.0km covering the mostly rural length from Xaisettha on to the international border.

17. The route passes initially through flat, riverside land before passing into rolling then mountainous terrain within the last few kilometres to the border. Section A is essentially straight and flat [though with one area is subject to periodic flooding from the adjacent river] while Section B contains several sharp horizontal curves and steep slopes (in the range of 9%-11%) as it traverses the many valleys located in the mountainous section. The latter stretch contains several accident „black spots‟ due to the gradients and winding alignment and many areas of unstable side slope where landslides occur on a frequent basis.

18. In Section A the road surface is still in fairly good condition though devoid of adequate horizontal and vertical signage. Section B on the other hand, has been severely damaged in several areas [due at least in part to loaded truck traffic carrying lumber from about its mid-point out to the international border]. Some of the affected areas have been the subject of previous MPWT maintenance interventions [i.e. excavation, base materials replacement with Double bituminous surface treatment (DBST) surfacing] in the past while others are more recent and remain untreated.

19. Figure 3:1 shows the general road alignment of NR 18B and its proximity to the Dong Amphan National Biodiversity Conservation Area (NBCA). Fig 3:2 shows the location of NR 18B in the province of Attapeu

B. Maintenance Works and Implementation

20. The maintenance works will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and by community-based contracted efforts.

21. The PBC contracts cover only the road carriage way (excluding the roadside maintenance). The PBC contract will be implemented with the Initial Rehabilitation/Improvement works during the first few months of the contract until the road has been "restored" to a condition suitable for regular PBC contracts. The regular Routine Maintenance will be continued until the end of the 3 year period.

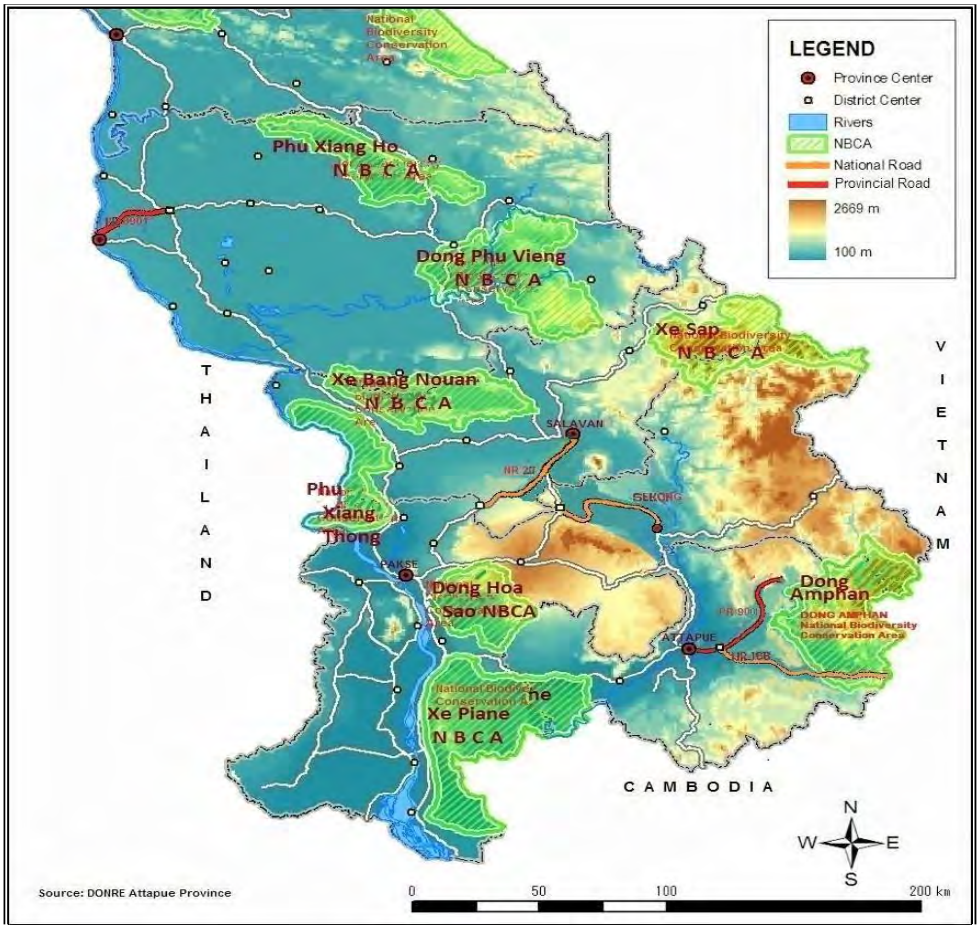


Figure 3.1: NR 18 B Road Alignment near Dong Amphan NBCA.

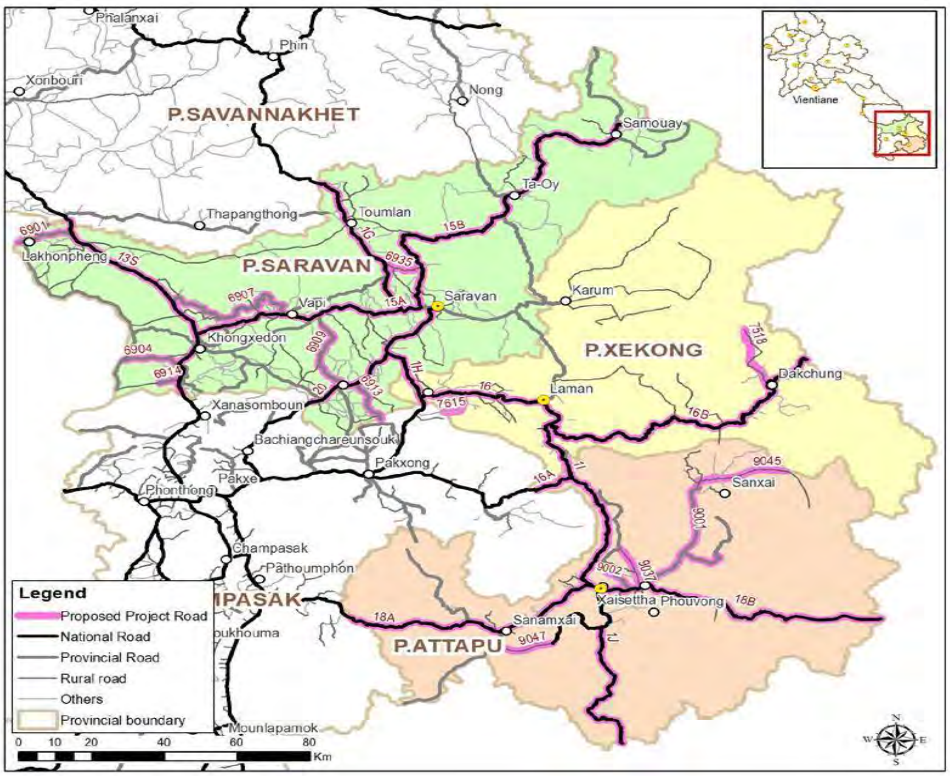


Figure 3.2: Location map of NR 18B in Attapeu Province.

22. The Community-based PBC roadside routine maintenance will include culvert and ditch clearing, clearing under bridges and box-culverts and other activities as part of the CBC Maintenance Works and will also be implemented over 3 years. Table 2:1 below presents the various maintenance works and related activities likely to be required for NR 18B.

Table 3.1: Maintenance works and activities for NR 18B.

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Filling of potholes with base material		Scarifying of existing road
Patching of potholes in AC Surface	Repair of sub-base, including new material	
Patching of potholes in DBST surfaces	Repair of base course, incl. new material	Reshaping the road (incl. ditches)
Crack Sealing – AC areas	AC surfacing - 50 mm	
Re-application of DBST	Prime coat	
	First seal	
	Second seal	
Grading	Excavating unsuitable materials	
Spot filling		
Clearing of ditches by hand	Excavation of new ditches	
Clearing of pipe culverts	Pipe culverts with headwalls	
Repair of ditch lining		
Installation of slope stability measures		
Cleaning of bridge decks Clearing river channels of debris		

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Grass and bush cutting	Construction of scour checks	
Repair / new of signs Repair / new guard rails Repair / new guard posts Re-painting of traffic lane lines	Erosion Protection – Gabions, Riprap, protection of channel banks or beds, Erosion Protection - Vegetation	
Proposed Schedule for Maintenance Works Implementation:		2018 - 2021

IV. DESCRIPTION OF THE ENVIRONMENT

23. Attapeu Province is a southeastern province of Lao PDR covering an area of 1,032 square kilometers (398 sq. mi) with a population of 123,000 as of 2010. It is composed of 5 districts namely Samakkixay, Xaysetha, Sanamxay, Sanxay and Phouvong. It is bounded in the north by Xekong Province, in the west by Champasak Province, in the east by the Annamite Mountain Range which separates Attapeu from Vietnam and in the south by Cambodia. There are two biodiversity areas in the province- Dong Amphan Forest (200,000 ha) and Xepaine Forest. A large part is under the Dong Amphan NBCA.

24. A brief description of the existing environmental and socioeconomic conditions of the NR 18B influence area is presented in the following subsections:

A. Physical Resources

25. *Topography*. Attapeu province is in the transition zone between the Annamite Mountain Range in the east and the Mekong Plains in the west, and is considered rugged, wild and scenic. It is best known for the Bolaven Plateau which shares borders with Xekong in the north, Champasak in the west, Vietnam in the east and Cambodia in the south The Xekong River valley which flows through the middle of the Province is considered the „rice bowl" of Attapeu. It is one of the larger rice growing areas in Lao PDR, although yields are low. Sixty percent is mountainous, seventy percent of which are classified as „very steep". The capital town, Samakkhixay is built in a large valley surrounded by mountains. It has a virgin lake called Nong Fa located in Sanxay District, northeast of Attapeu.

26. *Climate, Rainfall and Temperature.* The climate is dominated by monsoons, with pronounced wet and dry seasons. Most rain falls during May to September when the prevailing winds blow from the southwest. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. Mean temperatures range from about 10 ^{0}C in January to 38 ^{0}C in July, cooler in the north, warmer in the south. There is a marked dry season in Attapeu lasting from November to April, whilst the peak rainfall occurs in August. The climate in Attapeu is noticeably influenced by the Annamite Mountain Range, which acts as a barrier. Regions of the Annamites where the crest is low receive more rain over a longer season. Table 4.1 shows the meteorological data of Attapeu Province from 2011-2013.

27. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

28. *Soils.* The soils in the southern part of Lao are generally good and are acid hydromorphic and contain low organic matter and nutrients, which are moderately-well suited to rice production. Acrisols make up 41% of the soil types. In contrast, soils in the Bolaven Plateau are less acidic and have relatively good water retention and drainage capacity. The Xekong River floodplain is a mixture of alluvial sediments and sedimentary rocks and has highly fertile agricultural soil because of regular flooding.

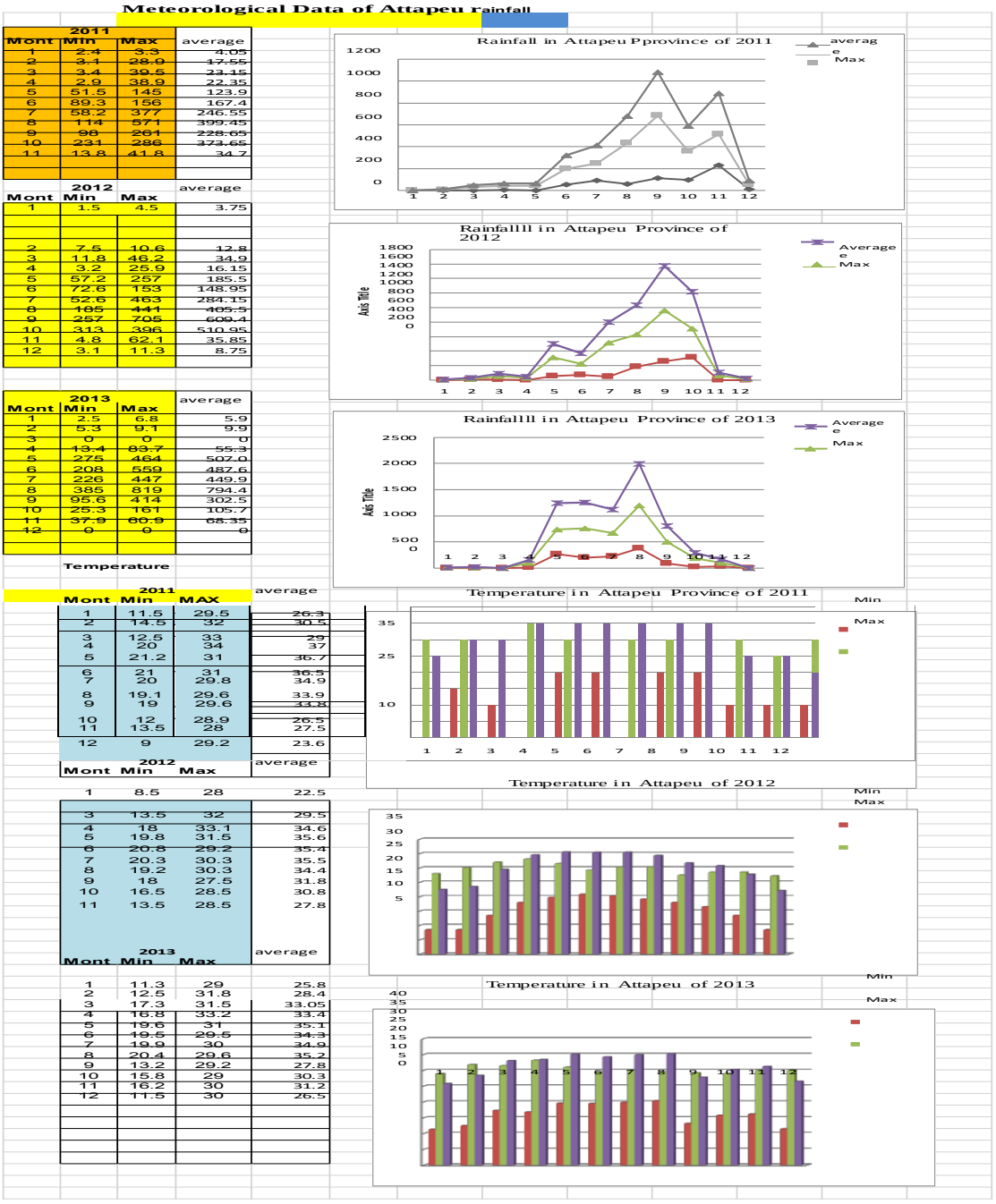
29. *River System*. The Mekong River is a dominant drainage system which reaches Lao PDR from China in the northwest, where it demarcates the international borders with Myanmar and Thailand. It enters Lao PDR, swings eastwards to Luang Prabang; then south to rejoin the border with Thailand, past Vientiane, and re-enters Lao PDR again near Pakse from where it flows south into Cambodia.

30. The Xekong River Basin is one of the most important Mekong tributaries. Its watershed (28,815 ha) includes all of Attapeu province and parts of neighbouring provinces in the country and Cambodia. The Xekong River valley includes sections of Samakkixay, Xaysetha and Sanamxay districts. Attapeu province has at least two wetland regions of global significance: the Xe Pian-Xe Kong (Xekong) Plain Wetlands and the Xe Pian - Xe Khampho wetlands.

31. The urban area of Attapeu straddles the confluence of the Xekong and Nam Xekhaman rivers. Sewage is also finding its way into the drainage system and thereby discharged untreated into the Nam Xekong flow in the central of town Attapeu.

32. *Surface Water and Groundwater*. The Namxekong and Sekhaman rivers are the main river sources in Attapeu. There are no major wetlands or ponds along the corridor which will be affected by the proposed corridor. The loose soils from the mountains are washed away during the rains and make the surface water turbid. The increased turbidity reduces water quality. The villagers consume less of this water due to the poor quality. The rivers are an important resource to the local population as the water is used as a drinking water source, irrigation for the crops and domestic chores.

Table 4.1: Meteorological data of Attapeu Province, 2011-2013.



33. *Air Quality and Noise Levels*. Air quality levels are quite good in this region as the only polluters are occasional tractors or mopeds. The dust emissions can be attributed to the bad condition of the road. The noise levels along the corridor are very minor as there is not much traffic, except for tractors, motorcycles and frequent pickup trucks that add to noise levels. Heavy logging trucks are presently not active in the corridor.

34. Air quality monitoring is still not a routine practice in Lao PDR and there is no information on the concentration of air pollutants. Generally the air quality appears to be good. Due to lack of equipment and technical expertise there has been no historic

collection of data on air quality in Xekong Province reports on pollution levels remain anecdotal. At the present time air quality is „good" in the Province.

35. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localized pollution does occur and the incidences are likely to increase with increased urbanisation unless action is taken to prevent or mitigate them. These include:

- Uncontrolled incineration of garbage;
- Decaying deposits of uncollected garbage;
- Wind-blown dust and debris resulting from solid waste transportation;
- Dust caused by traffic along unsealed roads; and
- Exhaust from vehicles and motorcycles – exacerbated by poor traffic management.

B. Ecological Resources

36. *Flora and Fauna*. Attapeu Province is rich in natural capital. A number of flora and fauna are associated with wetland species from the Xe Pian-Xe Kong (Xekong) Plain Wetlands and the Xe Pian - Xe Khampho wetlands such as Siamese Crocodile, Purple Heron, Chinese Pond Heron, Red-wattled Lapwing, Green Peafowl, Masked Finfoot, small populations of Gaur (Bos frontalis) and Dhole.

37. There are 14 globally threatened (IUCN) Red List wildlife species and 23 CITES- listed species which have been observed in trade in the province. Road improvements are expected to influence market demand and access and increase wildlife trade in the process (Singh et al 2007).

38. *Fisheries.* Fishing is an important secondary activity for many farm households as a source of extra income or to supplement the family's food supply. Two thirds of farm households in Lao PDR engage in capture fisheries. Of these 92% fish in rivers, 40% in lakes and 37% in rice fields. Capture fisheries are widespread around the country: in Phongsaly in the far north, 79% of farm households fish, in Attapeu in the far south, 74% of farm household fish. Fishing is usually carried out for the household's own consumption. Only about a thousand aquaculture producers have aquaculture as the main source of income. A third sells some aquaculture products.

39. *Protected Areas.* The Lao PDR Government uses a forest classification system based on five types: 1) national, provincial and district conservation forests (designed to protect biodiversity); 2) production areas forest (for timber extraction); 3) protection forest (for watershed protection); 4) regeneration forest; and 5) degraded forest (or forest that has been over harvested and no longer able to regenerate naturally). 60% of Attapeu Province contains medium to low density forest with patches of high-density forest cover [1997] while 42% is designated as protected area forest.

40. The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993 (see Figure 4:1). The NPA system covers about 14% of the total land area of Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country. The NPA system was created as the government's commitment to biodiversity conservation.

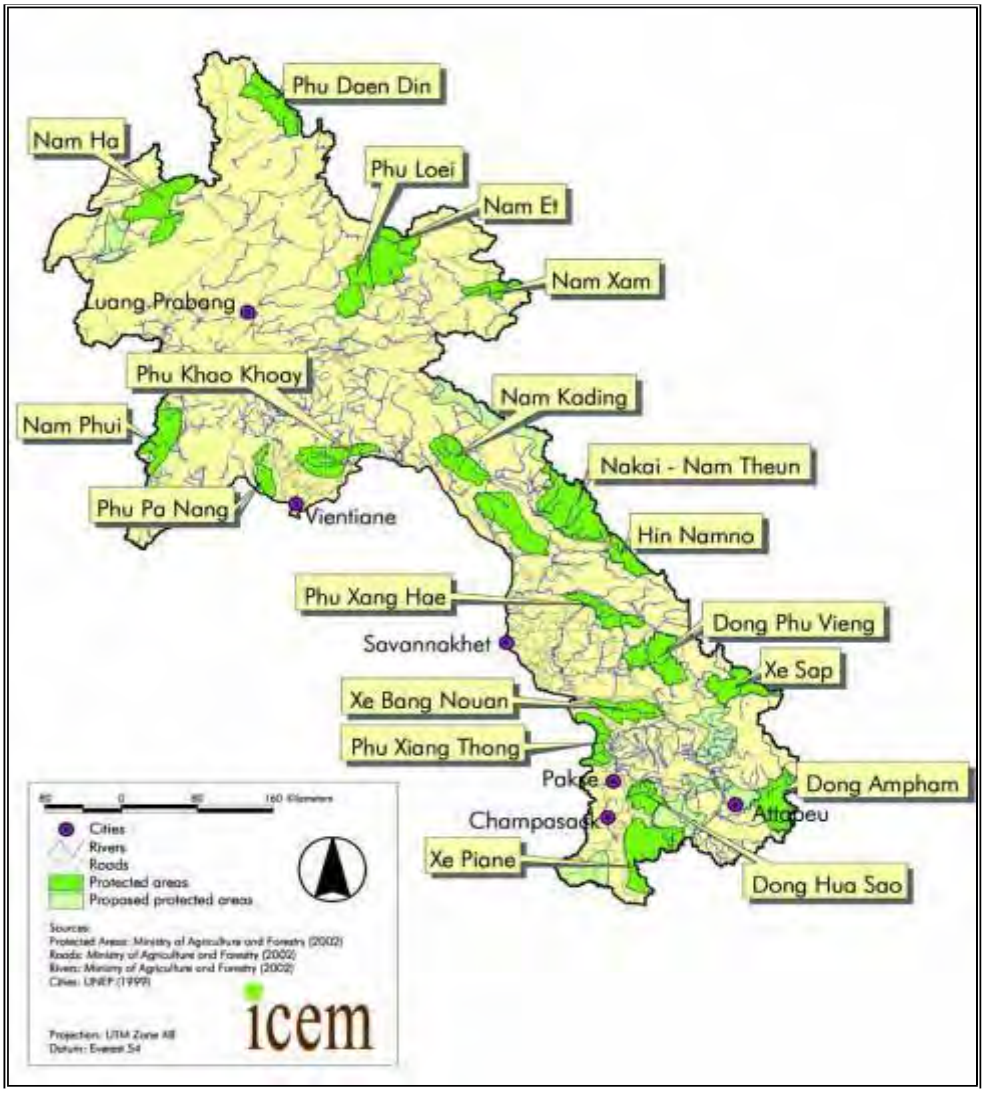


Figure 4.1: National Protected Areas in Lao PDR.

41. Attapeu province is home to two NPAs - Xe Pian NPA which, due to previous development projects, has a management plan - and Dong Ampham NPA. Much of the information about biodiversity in Attapeu province comes from surveys done of these protected areas, which provide critical habitat for several species of global importance.

C. Economic Development

42. *Economy*. The economy of the province is one of the worst in the country. The province was heavily bombed during the last Indo-China war and the remains of bombs are still found along the former Ho Chi Minh trail. There are only small and medium scale industrial activities. The industries comprise of small scale furniture factories, sawmills, drinking water factories [including Saksith], rice mills, ice making, meat processing, print shops, television/radio repair shops, watch repair, and garages.

43. Lao PDR is an agricultural economy and this sector contributes more than 60% to the National GDP. Rice is the staple food for the local population and it is

predominantly grown during the monsoon months in the district of Thateng. The traditional varieties of rice are grown in all irrigated areas. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible.

44. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products often produced as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Laos's agricultural sector are timber, lumber, plywood and coffee. Most of the commercial crops are grown for export to Thailand.

45. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People grow vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

46. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks and turkeys and develop fish ponds. Buffalos are used to plough the agricultural land. Households maintain 1-2 buffaloes that are used as draft animals in the rice paddy lands. Livestock is sold in the villages and at district markets to provide additional income for the local population.

47. *Transportation, Communication, Power and Water.* The project corridor serves as the main land route connecting several regions of the southern part of Lao PDR with the surrounding areas and enables the transport of agricultural produce from Station Thateng to Salavan, Xekong, Attapeu and Champasak. The major transport modes are pickups and medium-sized transport such as 2-axle trucks. Other transport modes include tuk-tuks, trishaws (lot-sam-lor) and jumbos (small tuk-tuks).

48. There are domestic and international telephone services operating, namely: Laotel, Enterprise of Communications Lao (ETL), and Unitel. Electricity is supplied through a distribution system from hydropower projects such as Xeset. There is only partial piped water supply with the rest of the requirement is met from available surface and ground water sources. Water is extracted by villagers from wells, rivers and streams in areas there are no piped water systems.

D. Socio-cultural Resources

49. *Population and Communities***.** Attapeu Province is inhabited by several ethnic groups such as Lao Loum (lowland Lao) which make up only 38% of the population and the Lao Theung (upland Lao or ethnic minority) which make up 62%. Most lowland Lao are found in Samakkixay District around Attapeu town. The upland Lao in Attapeu include the Lave (Brau), Talieng, Oy, Alak, Tsou, Ngae and Cheng, with the Lave as the largest ethnic group in Attapeu.

50. *Land Uses*. The corridor contains 10 villages located frequently along its length most of which are of a „ribbon" development type. The land use along the road starting at about 7 km from Attapeu town is dominated by re-forestation and rubber and palm oil tree plantations. The plantations extend beyond the new airport area at km 30. Land from about km 52 to the border at km 112 is steeply cross sloped and is therefore difficult to cultivate and as a result, the local population is relatively sparse.

51. A summary of the present use of land adjacent to the roadway is contained in Table 4.2 below.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Other
NR 18 B Section A	14.0	Km 0 to km 2 Km 5 to km 14	Km 2 to km5	km? to km?	
NR 18 B Section B	98.0	Km14 to km 17 Km 24 to km26 Km 52 to km 55 Km 99 to km 104 Km 110.7 to km 112	Km 17 to km 24 Km 26 to km35	Km 35 to km 52 Km 55 to km 99 Km 104 to km 110.7	

52. The approximate distances of the cultural attractions from the centre of the subject length of NR 18 B are shown in Table below:

Table 4.3: Distances of Attractions from Roadway

Location	Attraction	Approx. Distance from Mid-point (km)
Vat Thath Chulamane	Handmade ceramic pots	4
Taliang	Weaving	59
Vat Ongsene Soukhalam Sakea Village	Ethnic Village	16
Brao (levea) Village	Ethnic Village	13
USSR Missile site 11DM912	Historical	17
Xe Pian	National Biodiversity Conservation Area (NBCA)	45
Dong Ampham	National Biodiversity Conservation Area (NBCA)	78
Nong Fa Lake, Nong Kai Ok Lake	Natural tourist destinations	62 and 4

53. There are several cultural, historical and natural tourism areas in Attapeu Province. The major cultural tourist destinations are: Vat Thath Chulamane (handmade ceramic pots), Taliang (weaving), Vat Ongsene Soukhalam Sakea Village, Oy Ethnic Villages, and Brao (levea) Villages. Historical tourist destinations include the Ho Chi Minh Trail and the Union of Soviet Socialist Republics (USSR) Missile site 11DM912. Natural tourist destinations include the Xe Pian NBCA, Seepha Waterfall, Saeponglai Waterfall, Samongphak Waterfall, Nong Fa Lake, Nong Kai Ok Lake, Tad Houa Kon and Haomong waterfalls.

54. *Public Health*. Many women and children in the villages of Sanamxay, Xaysetha and Samakkixay districts have symptoms of severe malnutrition (underweight, stunting, wasting) despite its rich wetland and forest products. Diets are low in proteins and fats. In addition, traditional food behaviours and food taboos are also a source of malnutrition. For example, newborns are fed with pre-chewed rice, and pregnant and lactating women are not allowed to eat a wide range of meat, fruit and vegetables containing vital nutrients.

55. Most villages are without adequate health facilities and those from remote villages do not visit health facilities because of distance and cost, unless the problem is serious and urgent. Trained birth assistants help in deliveries. Access to information on family planning or prevention of Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is inadequate, although more male youths are more aware of HIV/AIDS and how to prevent it than female youths.

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56. *Education*. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and the bigger villages. The major problem encountered in the school system is the inadequate level of training of the teaching staff and the distance needed to travel – often affected by the bad condition of the access roads. Generally, there is no statistically significant gender gap in primary and secondary education, although the quality of that education is far below the desirable national standard.

57. *Historical and Cultural Places*. Some important cultural sites in Attapeu Province are: a) Wat Sakae Temple which has a sacred Buddha image and is visited during the Laos New year; b) old Pagoda and Xaysetha Stupa in Xaysetha District built in 1579; c) Wat Luang Muang Mai Temple built in 1939 and notable for original *naga* bargeboards; d) Wat Pha Xaisettha Temple in Pha Meuang where King Setthathirat of the Lan Xang is buried in a stupa.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

58. Since the Project is considered environment Category „B", significant negative environmental impacts are not anticipated. The screening identification of potential environmental impacts were based on road designs and specific road maintenance works and activities to be implemented in NR 18B, and the presence of environmental sensitivities (e.g. topography, soils, water resources, natural hazards, including forest, protected areas, and habitats of protected species of wildlife) in the project area.

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59. The identification and assessment of impacts associated with the NR 18B project cycle include pre-implementation and implementation of maintenance works activities. Three suggestions/recommendations raised by the participants during the public consultation were considered relevant and these are now added into the implementation of mitigations and monitoring plan of NR 18B:

- Improvement of drainage system to prevent water ponding and flooding;
- Control of land slide, erosion and deposition along the road by constructing retaining walls or gabions; and,
- Installation of traffic safety measures such as barricades or guard rails, and road widening in sharp curves.

A. Design/Pre-Implementation Stage

60. There are two potential impacts identified during the pre-implementation of maintenance works and these were also the same potential impacts identified and raised by the participants during the public consultation held for the NR 18B. The potential impacts are the following:

- Missed or exclusion of road design that could potentially cause road failure and create flooding; and
- Social conflicts between the local villagers and non-residents in the area due to employment opportunities.

61. *Climate risk screening.* The result of the initial screening for climate risk showed that NR 18B is a „medium" risk. The siting and/or routing of the road alignment pass on landslide prone areas and is likely to be affected by extreme weather conditions including storms and rainfall events that will exacerbate soil erosion to mass movement of the soils along the steeper slopes. Notwithstanding this weather condition and events, NR 18 B will be closed to vehicular traffic until the failed and barred sections and segments of the road have been cleared and open traffic.

62. As mentioned earlier (the lack of long-term climate data to support projections of future climate trends has limited the assessment and analysis of potential climate change impacts but there is increasing anecdotal evidence of unusual and extreme rainfall and flood events escalating.

63. *Mitigation.* Given this extreme weather events in the recent past, the road design should consider that critical segments are fortified to address such extreme weather events.

64. *On Social Conflicts between Local Villagers and Non-residents***.** The potential social conflict between the local villagers and non-residents in the area was identified both during the conduct of the road assessment and during the public consultation for NR 18 B.

65. *Mitigation*. To prevent the social conflict, the Contractor should prioritize hiring of local villagers over non-residents. To ensure the hiring and employment of the locals, it must be stated in the Contractor's contract that the local residents have the priority over the non-residents.

B. Maintenance Works Stage

66. Based on the maintenance works and activities to be implemented for NR 18 B the potential impacts identified are the following: increase of dust and noise levels, pollution of surface water from wastewater and from the bridge maintenance works, and effects of traffic and socio-economic activities for local people.

67. *Air and noise pollution.* There could be an increase in dust/air and noise pollution levels during transport, loading and unloading of materials for road maintenance works; from clearing, grubbing and excavation activities; and from the hauling and transport of maintenance equipment. Emissions from trucks and other transport vehicles and noise from the operation of equipment can have a considerable impact on the villagers whose houses are located immediately along the road.

68. *Mitigation.* The impacts to ambient air and noise levels will be low to insignificant since the nine villages along the project road corridor are highly dispersed along the 100 km distance with low population density. Nonetheless, Dust/air and noise pollution can be controlled and mitigated by: (i) regular watering of dry and exposed areas; (ii) covering all trucks carrying dispersible materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained; (iv) limiting maintenance works at day time only to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works. Emissions of air pollutants including nitrous oxide, carbon monoxide and hydrocarbons are considered minimal to moderate because the trucks and equipment required for the maintenance works is small. The contractor will be required to the allowable concentration of dust and ambient air quality prescribed by MONRE under the National Environmental Standards Order No. 734/PMU-WREA (2009).

69. *Smoke and foul odors.* This may emanate from burning fuel wood for heating bitumen.

70. *Mitigation*. To reduce and eliminate the smoke and foul odor the bitumen batching plant will be required to be located at least 5 to 7km away from center of town and villages.

71. *Water pollution*. The bridge maintenance works in NR 18 B will be limited to cleaning of bridge decks and clearing river channels of debris including excavation activities. These will have temporary and minimal effects on the physical properties of the water. There will be no use of chemicals that will pollute the quality of water that serves as the water source of the downstream users.

72. *Mitigation*. The bridge maintenance works and the associated activities are meant to clean the channels will have positive impacts after the channels have been cleared of decaying garbage and debris and will improve the BOD content of the water.

73. *Waste management and disposal*. The contractor may resort to indiscriminate dumping and disposal of solid and hazardous waste that could pollute nearby and adjacent water bodies detrimental to aquatic flora and fauna and to the downstream water users.

74. *Mitigation*. There should be a regular collection and disposal of solid and hazardous wastes. Waste deposits should be closely monitored to avoid dumping in nearby water bodies that might have a detrimental effect on aquatic flora and fauna. Temporary toilet facilities with adequate water supply and strict enforcement of proper sanitation should be imposed.

75. *Soil erosion and deposition of excess materials* (from road grading and excavation activities. The removal of topsoil, stockpiles, and maintenance debris can ultimately find their ways to waterways and farmlands.

76. *Mitigation*. To prevent the cascading impacts, close supervision of the maintenance works will have to be ensured and proper storage location will be identified for the excess materials for future use and disposal of unsuitable materials. The stockpiling of soils must be located in flat areas and far from drainage routes; settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

77. *Water ponding and flooding* due to improper execution of maintenance works and activities can become a regular occurrence if the natural drainage system is

clogged and blocked by waste and garbage materials. The siting and location and size of pipe culverts and if pipe culverts are broken or deteriorated may other causes of water ponding and flooding.

78. *Mitigation*. Measures to mitigate ponding and flooding include cleaning and clearing the waterways including pipe culverts, excavation, and siting of new location to install new culverts. To prevent flooding caused by reduced water outflow, the area will be investigated to determine the best solution to prevent ponds and floods to happen.

79. Good supervision of the maintenance works will be required to prevent workers‟ activities that may contribute to run offs, erosion and deposition of soils and unsuitable materials to waterways that further leads to water ponding and floods. In addition, stockpiling of soils and excavated materials must be located in flat areas and far from drainage routes. In the absence of suitable ground, settling ponds and temporary drainage ditches for runoff, and provision of protective cover for exposed soils particularly during rainfall events must be set up.

80. *Traffic Congestion.* A traffic slowdown is likely to happen during maintenance work due to temporary closure of road segments.

81. *Mitigation*. A traffic management plan including rerouting schemes to prevent stalling of vehicles along the road will be prepared by the Contractor prior to implementation of maintenance works. The traffic management plan shall be submitted to the concerned local traffic management authority for its approval. The contractor will maintain coordination with the traffic management authority by giving notice and providing a weekly schedule of road maintenance works.

82. *Public Safety along the Road.* Public safety will be an important responsibility of the Contractor during the implementation of the maintenance works.

83. *Mitigation*. To ensure public safety along the road to prevent vehicular accidents and deaths a strict enforcement of traffic rules and regulations, installation of traffic aides in critical routes during peak hours, coordination with traffic management plan with village officials, these impacts can be prevented or mitigated.

84. *Workers' Health and Sanitation at Workers' Camp*. The improper location of workers camp with no toilet facilities and adequate water supply could compromise workers' health and sanitation of the immediate and adjacent areas.

85. *Mitigation*. The contractor shall identify the appropriate location for the workers‟ camp, with provisions of temporary toilet facilities, wash and bath areas with adequate supply of potable water. Proper sanitation should be strictly enforced.

86. *Local Air Pollution and Noise Due to Concrete Batching Plant*. The operation of the Concrete Batching Plant together with a crushing plant will generate huge amount of dust into the air. Without any mitigating measure, dust generation could be problematic during dry periods and during operation of plant facilities. Prolonged exposure to this type of dust will potentially cause respiratory illness.

87. *Mitigation*. Prior to establishment of construction-related facilities the contractor will secure necessary approvals as well as other required agreements prior to establishment and operation of construction related facilities. The contractor will also ensure that facilities that will result to emission of high dust and elevated noise levels and will be located at least 3,000 m from sensitive receptors (residential/housing areas, schools, medical facilities, places of worship, cultural sites, etc.).

C. Operational Stage

88. The potential environmental impacts during the operation phase are the following:

i. Increase in road and vehicular accidents;
ii. Increase in noise and vibration levels along the road corridor; and
iii. Air pollution.

89. *Mitigation Measures.* The implementation of the environmental mitigating measures are the responsibilities of the Contractor as stated in his/her contract This includes compliance to the national environmental standards of the GoL such as the allowable noise levels, ambient air and water quality standards.

90. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

91. *Public Consultation*. Public consultation meetings were held for the six shortlisted priority Road Maintenance Projects in Salavan, Xekong and Attapeu provinces from 12 to 26 January 2014. The public consultation for NR 18B in Attapeu Province was conducted on 22nd January 2015 at Government Meeting Room No. 5. It was chaired by Mr. Sounnakhone Keovongkham, Deputy Director of DPWT and assisted by the Vice Governor of Attapeu Province

92. The attendees of the public consultation were composed of representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Attapeu Province, mass organizations, village leaders and affected households along the project road corridor. The participants were also given a Project Information Handout translated into the Lao language.

93. The Deputy Director of DPWT officially initiated the public consultation and welcomed the participants to the consultation activities. The objective was to introduce the road maintenance project by providing the project's background and description, the maintenance works and implementation schedule. The background information and description of the Project and maintenance works for NR 18B, potential impacts and benefits to be generated were presented and discussed. The participants were also informed of the compliance of the project to the environmental and safeguards policy of the ADB as well as to the EIA procedures and requirements for the approval of the Project IEE Report, and the subsequent issuance of the ECC by the DoNRE. Other topics mentioned and clarified during the consultation included:

a) grievance redress mechanism;
b) roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities; and
c) community participation during implementation of the project. The participants were also informed that future public consultations will be held for the detailed design and prior to the implementation of the project.

94. The main activities of the public consultation were:

a) disseminating information with project information handouts;
b) presenting the projects" objectives, locations, designs and cost estimates, tentative implementation schedules, the potential environmental impacts caused by each project and proposed mitigation measures, and the EMP and Environmental Monitoring Program;
c) discussing the opinions, perceptions, and suggestions of the project- affected villagers;
d) clarifying loss of their land for sub-project implementation;
e) identifying issues related to project environmental impacts on the community;
f) inclusion of the participants" opinions into design alternatives;
g) identifying levels and scope of community participation in project implementation; and
h) understanding of the overall goals and benefits of the project.

95. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments, issues, clarifications and suggestions of the participants are provided below.

96. The Deputy Director of DPWT of Attapeu Province stated that the project will improve local economic conditions by facilitating transport of agricultural products from the district to the Capital City and increasing opportunities for income generation for the villagers. He encouraged all villages living adjacent to the road for support and assistance to the project, and to help resolve issues arising from potential negative impacts during project implementation. He also encouraged the conduct of educational awareness to all villages to ensure understanding of the project

97. Representatives of Attapeu Province expressed appreciation of donor support and assistance, and acknowledged that the project will bring more opportunities to the local people in terms of safer and faster transportation. Some concerns and recommended actions were raised such as: a) installation of safety measures, e.g. guard rails on all sharp curves, to avoid accidents; b) proper design and construction of retaining walls or gabions along the mountainous area from station No.km 50 up to km102; c) widening and repair of damaged roads from km 95 to km 104 to avoid potential accidents; d) installation of proper drainage system in the central town of Xaysetha district to avoid flooding and stagnant waters; and e) periodic maintenance of access roads joining national roads..

98. Representatives of concerned Local Government Agencies expressed support for the road maintenance project and acknowledged its importance in improving the transportation network connection and in contributing to economic growth in the region. The project will bring more opportunities for trade between local communities and neighboring countries, in anticipation of the Association of Southeast Asian Nations (ASEAN) Economic Community 2015. Some recommendations included: a) installation of traffic safety measures such as signage along high risk places near villages; b) widening of areas with sharp curves (from Xenam Noy traffic to Km 100) to avoid accidents; and c) design and installation of proper drainage system to avoid flooding, esp. along km 0+000 to km 3+000 which is a flat area.

99. In addition, representatives also mentioned that overloaded logging trucks should be strictly monitored especially during rainy season. Traffic should also be managed especially because at present trucks, buses, including passengers stop improperly. This practice and locations of shops and house too close to the right of way (RoW) or built near the road are accident-prone. The DPWT should also conduct information education and communication to all communities living near NR 18B to ensure awareness and understanding of the project objectives, activities and next steps of project implementation.

100. Representative of Mass Organizations expressed appreciation of the project of the Lao Government and ADB support in upgrading this road as the project will facilitate transportation, access to market and lower the costs of bringing local products, esp. coffee and other vegetable products, to the Central market. Concerns and actions were also recommended on specific sections of the road, e.g. a) many houses from starting point to the end project point (km0+000 to km 100) are not built properly and may be prone to accidents; b) traffic management should be improved and barricades or guard rails set up to avoid accidents.

101. Village Chiefs and Representatives of the Villages acknowledged that the project will spur economic development in the region. They expressed hopes that the road improvement will lead to poverty reduction, food security, income generation opportunities, access to market and medical care, and other secondary benefits such as electricity, water supply, irrigation, support for non-formal education and other improvements in quality of life. They also recognized potential income that can be generated from increased tourism. They encouraged the conduct of information education and communication to all village members to ensure awareness and understanding of the project objectives and activities, and speedy resolution of issues on loss of land or other properties associated with the project.

102. The following suggestions/recommendations raised by the participants during the public consultation were considered and are added into the proposed mitigations and monitoring plan of NR 18B:

- Improvement of drainage system to prevent water ponding and flooding;
- Control of land slide, erosion and deposition along the road by constructing retaining walls or gabions; and,
- Installation of traffic safety measures such as barricades or guard rails, and road widening in sharp curves.

103. *Information Disclosure*. In line with ADB‟s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its web-site:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and
- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation upon receipt18B

VII. GRIEVANCE REDRESS MECHANISM

104. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance sites, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor.

105. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance activities.

106. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps:

Table 7.1: Steps for resolution of issues under the GRM.

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

107. This section addresses the need for mitigation and management measures for NR 18B. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

108. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices.

A. Environmental Mitigation

109. *Mitigation Measures.* The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 shows the summary matrix of environmental mitigation measures.

B. Environmental Monitoring

110. The environmental monitoring plan of the EMP is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

111. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial PWTs with support provided by the project/construction supervision consultant.

112. The DPWT provincial Advisory Committee with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Pre-maintenance					
Inappropriate/ incomplete Road Design	Revise & finalize Road Design improvement	Detail design	Road design Consultant	MPWT	MPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Contractor to prioritize hiring of workers from the local villages	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance					
Loss of vegetation Protection & Soil erosion	Replanting of Vegetation, provision of protective cover for exposed soil materials	End of Maintenance Works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Increase levels of noise	Contractors shall comply w/ the levels of noise standards	Transport of works materials, hauling of garbage, debris and unsuitable materials from excavation activities	Contractor	MONRE, PWTI-DPWT Environmental Officer; village representative	Contractor-included in contractor's contract; MONRE-included in MONRE"s budget allocation; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression by watering of dry surface of the road	Grading, excavation of unsuitable materials	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Landslides, erosion of excess and open soils & deposition of rocks on road shoulders and ditches	Erosion Protection by gabions & planting vegetation, Appropriate location and storing of	Clearing & repair of ditches, Repair of sub-base & base coarse including new material, Installation of slope	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	works materials, excess soils & materials from grading & excavation should be protected with cover especially during rainfall	stability measures, Scarifying of existing road			community-based implementation
Siltation & blockage Of water flow	Proper supervision of bridge maintenance works	Cleaning of bridge decks and Clearing river channels of debris	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Flooding	Proper grading and backfilling, appropriate siting & size of culverts for quick flow to the drainage system	Reshaping the road (incl. ditches), Scarifying of existing road, Installation of slope stability measures,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties by deposition of rocks and unsuitable materials, and workers" camp garbage	Suitable site location prepared for the temporary placement excess materials for maintenance works, Proper supervision during maintenance works	Clearing of ditches & pipe culverts, AC surfacing - 50 mm,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Traffic congestion	Implement Traffic rerouting, coordinate traffic management plan w/ the local traffic management authority	Implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of	Repair & installation of new traffic signs, new guard rails, guard posts,	Contractor	PWTI-DPWT Environmental Officer;	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	road lanes and pedestrian lanes	and re-painting of traffic lane lines		Village representative	DPWT‟s budget allocation; Village representative-included in the community-based implementation
Workers‟ protection, health and sanitation	Contractor to provide workers with protective gears, proper location of workers‟ camp and supply of potable water	During implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	During implementation of maintenance works	Contractor	DONRE, PWTI-DPWT Environmental Officer; Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE‟s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management	Maintain traffic signs, guard and protection rails at strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	PWTI-DPWT and members of the local villages	PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Pre-maintenance						
Incomplete road design	Updated road design	Office of the consultant	Determine Changes in road designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget
Social conflict	Employed workers	Contractor's Office & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Construction/ Maintenance						
Excessive dust & Air pollution	Watering of the road surface to suppress dust	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Water quality	pH, BOD, coliforms	At bridge Work site & 30 meters downstream	Laboratory Water analysis	1x Before bride works; 1x per month During bridge Works; 1x after Bridge works	MONRE, DPWT & Village representative	Contractor-included in the contractor's contract MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Erosion & deposition Of construction Materials and soil	Exposed & unprotected Construction Materials and soils	All work sites	Ocular/visual Inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks & soils	At bridge works	Ocular/visual inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Flooding	Drainage & canals	Road alignment	Ocular/visual inspection	During rainfall	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	DPWT Environmental officer & Village Representative in coordination with the local management authority	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Public safety/ Road accidents	Installed traffic signs, detour routes, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	DPWT Environmental officer & Village Representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Workers‟ protection, health and sanitation	Provision of appropriate workers‟ camp, protective gears and water supply	At workers‟ camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	DPWT Environmental officer & Village Representative	DPWT Environmental officer & Village Representative

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
	by the contractor					
Solid waste mgt. and Disposal	Contractors management plan and disposal site	At workers‟ camp and work sites	Visual/ocular	1x a week	MONRE, DPWT Environmental officer & Village representative	MONRE-included in MONRE‟s budget. DPWT-included in DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Operation						
Road safety & traffic management						

113. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

114. Table 8.3 presents the ambient surface water quality parameters.

Table 8.3 Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

115. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise

Table 8.4. Lao PDR Noise Standards

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014					

[1] dB (A) Lao PDR noise standards

116. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5 Lao PDR Air Quality Parameters and Standards

Parameters/ Symbol	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

117. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the level of concentrations is not high enough to significantly obscure the visibility along the road.

D. Institutional Arrangements

118. The project's executing agency will be the MPWT, DoR will be the implementing agency while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

119. Staff from the MPWT"s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

120. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections, and with the Provincial DoNRE for compliance monitoring of the Project.

IX. CONCLUSION AND RECOMMENDATIONS

102. The environmental screening and assessment conducted for NR 18B was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in the conduct of the environmental analysis and classification of the road maintenance project.

103. The REA Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category “B” project.

104. Similarly, under the Lao PDR EIA system the project is classified under Category „1‟ project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category “B” project and will not be subjected to a full EIA study.

105. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

106. The project’s executing agency will be the MPWT, DoR will be the implementing agency while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units.

107. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

108. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

109. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

110. It is concluded that the future Project will create opportunities for generating both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

MINUTES OF MEETING
ENVIRONNMENTAL CONCERNS OF DONG AMPHARM NBCA, ATTAPEU PROVINCE

Venue:	DPWT Meeting room
Date and Time:	4 May 2015, 8:30 AM
Participants:	DoNRE (2), PAFO (1), DPWT (5), DIC (1), Project coordinator (1) and Consultant (1)
Chairman:	Mr. Somexay Keomanivanh Deputy Director of DPWT Attapeu

On 4 May 2015, 8:30 AM, DPWT Attapeu Province organised a meeting concerning Dong Amphan NBCA and the potential impact of the maintenance work on National road 18B as part of the Lao Road Sector Governance and Maintenance Project (Project). The meeting was chaired by Mr. Somexay Keomanivanh Deputy Director of DPWT Attapeu. The meeting was attended by 10 participants; including the government agency managing the Dong Amphan NBCA (detailed attendance list is attached).

1. **Mr. Vinthong** Manivone from consultant explained the purpose of the meeting and that the meeting was necessary to comply with the ADB's environmental safeguards. During the ADB Mission Fact Finding mission 20 - 28 April, 2015, the ADB Mission requested the consultant to carry out the meeting including following: (i) confirm the government agency that has authority over the Don Amphan NBCA; and (ii) confirm with DONRE or the appropriate agency the presence or absence of endangered, rare or threatened species of wildlife (flora and fauna) along the vicinity of the project road alignment that may be affected by the project. Mr. Vinthong presented the main components of the Project, inter alia including the (i) proposed works, (ii) possible environmental impacts and mitigation measures

2. **Mr. Thongsouk** Aphayyalath (DPWT Attapeu), Technical Division, reported background of the road 18B alignment. Survey of the road and design of road maintenance work was done in two sections as follows:

- Section1: km 0 **-** 37 survey of the road and design of road maintenance follows existing alignment with a width of 7m;

- Section 2: km 37 – 109 survey of the road and design of road maintenance follows existing alignment with a width of 6m.

3. **Mr. Soukvilay** Phonesalasean, Deputy Director of DoNRE, informed that National Road 18B is constructed through the core zone of Dong Amphan National Biodiversity Conservation Area (NBCA), which starts at km 52 and continues to km 106. There are two villages along the road at km 53-54 and at km 100-102.

When the Project will be implemented, the **Environmental Protection Law** No.02/99/NA, (1999) will be followed. The law outlines the regulations as: establishment and enforcement of sector environmental plans; mitigation actions for protection against environmental damage. Mr. Soukvilay explained that DPWT of Attapeu and PAFO were coordination

closely with Dong Amphan NBCA management, and would together assign staff for carrying out site inspections and monitoring of whole Dong Amphan area and conduct awareness campaigns to all villages in the Dong Amphan NBCA. The protection of wildlife would be enforced and those found breaking the laws would be penalized. He also informed that the RoW along the Dong Amphan area doesn't have any cemeteries and holy or (worship) trees. Further Mr. Soukvilay informed that there are no endangered, rare or threatened species of wildlife (flora and fauna) along the vicinity of the project road alignment.

4. **Mrs. Bounnam** Bounnaseang, Department of Information and Culture (DIC), reported that the province has a strategy of promoting Dong Amphan NBCA as a nature tourist site.

5. **Mrs. Vong Duean** Phongsamoud, Deputy Director of Agriculture and Forestry Department of Attapeu Province, reported that basic principles, regulations and measures on sustainable management, preservation, development, utilization and inspection of forest resources and Forestland, promotion of regeneration and tree planting, an increase of forest resources in the Dong Amphan area would be applied.

After discussions and comments raised by each Government organization, all meeting participants agreed that:

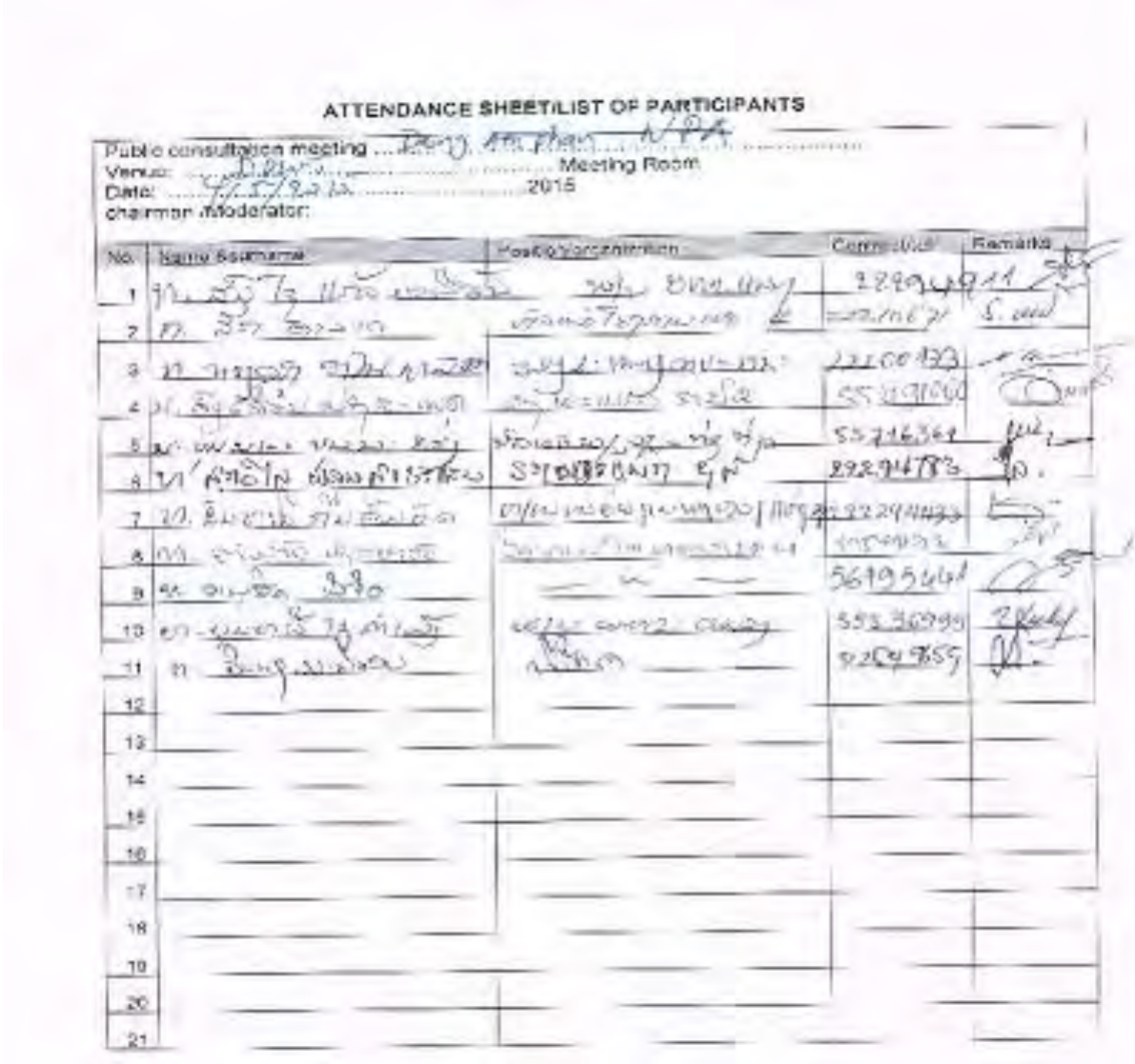
- Department of nature Resources and Environment (DoNRE), Attapeu province, is the government agency with authority of the Don Amphan NBCA, and defines the rules and guidelines for Natural resources standards for managing, restoring, protecting and monitoring in order, to protect the public natural resources and Biodiversity, prohibiting removal, destruction or alteration of any natural artifact in the Dong Amphan NBCA during road maintenance activities on Road 18B.

Mr. Vinthong closed the meeting by expressing thanks to all participants attending the Consultation meeting and closed the meeting at 11:00 AM.

Head of DPWT Attapeu Province **Recorded by**

Mr. Somexay KEOMANIVANH **Mr. Bounthavy**

Signed Attendance list



ATTENDANCE SHEET/LIST OF PARTICIPANTS

Public consultation meeting .....
Venue: ..... Meeting Room
Date: 2015
chairman /Moderator:

No.	Name Surname	Post/Organization	Contact	Remarks
1				
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List of Participants

Meeting: Dong Amphan National Biodiversity Conservation Area (NBCA), Attapeu Province

Venue: DPWT Meeting room

Date: 4 May 2015

Chairman/ Moderator: Mr. Somexay Keomanivanh

No.	Name and Surname	Position	Phone No.
1	Mr. Somexay Keomanivanh	Deputy director of DPWT	22294911
2	Mr. Sakdalath	Project Manager Region-4	22210671
3	Mr. Thongsouk Phayyalath	Deputy head of road Division	22200173
4	Mrs. Vong Deuane Phongsamoud	Deputy of PAFO	55491060
5	Mrs. Boun Nam Bounnaseng	Deputy of DIC	55716361
6	Mr. Soukvilay Phonesanaseng	Deputy of DoNRE	22294783
7	Mr. Khanthali Kinsomebath	Head of Road sector	22294433
8	Mr. Khammao Hongsavath	Road Maintenance Region-4	59549172
9	Mr. Anousith Phychith	Road Maintenance Region-4	5619 5441
10	Mr. Bounthavy Xaykhammang	DPWT Attapeu	55536999
11	Mr. Vinthong Manivone	Consultant	22549659

Photos from Consultation Meeting of Dong Amphan National Biodiversity Conservation Area (NBCA)

Venue: DPWT Meeting Room

Date and Time: 4 May 2015, 8:30 - 11:00 AM

Initial Environmental Examination

Local Road 6901, Salavan Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
PBC	Performance-based Contract
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
IBA	Important Bird Area
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People's Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
PPTA	Project Preparation Technical Assistance
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
SPS	Safeguards Policy Statement
sq. mi.	square miles

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EXECUTIVE SUMMARY

1. An environmental assessment was conducted for Local Road (LR) 9601 under the Lao Road Sector Governance and Maintenance Project funded through a Project Preparation Technical Assistance (PPTA) sponsored by the Asian Development Bank (ADB). The purpose of the PPTA was to define maintenance needs and identify future design requirements for this Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist and the initial climate risk screening, LR 6901 in Salavan Province is classified under Category „B" and a low risk project, therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and monitoring plan is required. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

3. *Project Description*. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The LR 6901 Road Maintenance Project intervention would start from the junction with National Road 13S at Lakhonpheng and run to Ban Paktaphan near the Mekong river. It extends over a total distance of 27.5 km and Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context.

4. The maintenance works and activities will be implemented over a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and some community-based contracted efforts.

5. *Environmental and Socio-economic Conditions*. The population of the province as per 2005 census is 300,000 distributed over eight districts. There are five villages located within the LR 6901 road corridor. The land use alongside the road is dominated by agricultural land devoted to rice cultivation. Vacant areas of land are predominantly covered with shrubby vegetation and native grass species, with some trees dispersed along the road alignment.

6. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible. In addition to rice cultivation, vegetables and commercial crops are also grown, among them cash crops such as coffee, mung-beans, soybeans, peanuts.

7. As of 2010, there has been limited assessment and analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe and the incidence of unusual and extreme flood events escalating.

8. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for LR 6901. For the pre-maintenance phase, two potential impacts were identified related to missed/incomplete aspects of road design, and social conflicts between the local villagers and non-residents in the area due to employment opportunities. Initial climate risk screening showed that LR 6901 is a low risk project. The present location of the alignment and design of the road will have minimal changes to consider in future design of LR 6901.

9. During maintenance works, potential environmental impacts are: (i) air and noise pollution; (ii) water pollution; (iii) improper waste management and disposal; (iv) soil erosion and deposition of excess materials (v) water ponding and flooding; (vi) traffic congestion; (vii) public safety along the road; and (viii) workers‟ health and sanitation at workers‟ camp These impacts are temporary and mitigation measures have been developed for inclusion in the works specifications of the Contractor's works contract to ensure their implementation.

10. During the operational phase, potential environmental impacts are: (i) increase in road and vehicular accidents; (ii) increase in noise levels along the road corridor; and (iii) increase in air pollution from increased vehicular traffic. Nonetheless, maintenance works for LR 6901 will also bring positive impacts to the communities, will provide them better access to markets, schools, medical facilities, and will create economic opportunities for them to sell their products.

11. An EMP for LR 6901 has been developed to effectively manage the environmental issues during pre-design/maintenance, during maintenance and operations. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP‟s institutional arrangements define the requirements and responsibilities during the project's pre-maintenance, maintenance and operation phases. The project's executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection, and with the Provincial DoNRE for compliance monitoring of the project.

12. *Consultation and Participation*. A public consultation for LR 6901 was conducted on 16 January 2015, chaired and moderated by the Director of the DPWT in Salavan Province, and attended by various stakeholders like representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the projects‟ road corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system, control of erosion, landslide and deposition along the road, reduction of dust levels, and installation of traffic safety measures. Overall, they gave their support to the project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

13. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or

questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies

14. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for LR 6901, the ADB Safeguards Policy Statement (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, the LR 6901 is classified as Category "B" and a low risk project. It will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable manner and will generate both direct and indirect benefits for many people and as the project continues, it will bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

I. INTRODUCTION

1. The purpose of this Project Preparation Technical Assistance (PPTA) is to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and institutional capacity in the planning, financial management and implementation of routine and periodic road maintenance activities by the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) in Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and

- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each Province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. Local Road (LR) 6901 is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included the Lao PDR"s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, was also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of current institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its officers to verify and confirm the procedural steps and new requirements for the approvals application process of the project's IEE Report and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and the Protected Area Management section were also visited to gather available secondary data including forest cover maps and details of protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location of the road alignments as well as the natural features of the environment where it passes through. Photo documentation of the vegetation cover and physical condition of the roads were taken as input to the determination of the environmental classification of LR 6901 for maintenance interventions under the future „Project".

7. The presence of protected species and/or endangered species of wildlife along the project roads was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife by tracks on the ground, roosting areas, faecal droppings of animals. The presence and occurrence of endangered species was also confirmed through interviews with local villagers. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. This may be due to the absence of adequate habitat requirements along the road corridor for the rare, endangered and protected wildlife species and due to the noise disturbance generated by vehicular traffic.

8. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, LR 6901 in Salavan Province is classified under Category „B" and the climate risk screening as a low risk project. Therefore will not be subject to a full EIA procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and associated monitoring plan is required. The REA Checklist for LR 6901 in Salavan Province is attached as a separate **Annex R - Rapid Environmental Assessment Checklist [6 Roads],**

9. Similarly, under the Lao PDR EIA system, the project is classified as a Category "1" project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject only to an IEE approach complete with definition of impact management procedures and a corresponding monitoring plan.

10. The IEE Report presents the findings of the environmental examination conducted for LR 6901 located in the province of Salavan. It is meant to ensure the environmental soundness and sustainability of the future Project and to integrate environmental considerations into the Project Design and the EMP. The IEE was conducted in adherence to the ADB"s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009), the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

11. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the Environmental Protection Law (EPL) which was approved by the President on April 3, 1999. It mandates a unified environmental management approach with the aim of preserving the environment and making rational and sustainable use of natural resources.

12. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to safeguard the public, natural resources and biodiversity, and to ensure the sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of the EPL.

13. Under the EIA Decree no. 112/PM02/2010, the timeframe for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after formal submission.

14. While other Ministries issue guidelines for implementing provisions of the IEE and EIA and for environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, is the agency that reviews and issues the ECC.

15. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental conditions for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional versions are in place and corresponding environmental standards used by international organizations and advanced countries have been adopted as reference documents.

16. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

17. The LR 6901 Road Maintenance Project road intervention would start from the junction with National Road 13S at Lakhonpheng and run to Ban Paktaphan near the Mekong river. It extends over a total distance of 27.5 km comprised of the main access route [Section A - 17.0 km long] and a branch from this road at about km 9 to the river crossing at the truck ferry terminal site [Section B - a distance of 5.5 km]. To the above may be added a secondary link [Section C] which joins the pedestrian and truck ferry terminals and runs parallel to the east bank of the river over a distance of 5.0 km. Figure 3.1 shows the location of LR 6901 within Salavan Province.

18. The present road alignment is good and generally located in flat terrain but feature road surfaces in constant need of re-grading – some sections are subject to frequent flooding which greatly affect accessibility. There are 5 villages (i.e., B. Phuangsavanh, B. Leung Noktha, B. Nongxano, B. Nanong Yao, and B. Paktaphan) located along the road corridor. The adjacent land use along the road is predominantly agricultural and devoted largely to rice cultivation. Unused land areas are mostly covered with shrubby vegetation and various types of wild grass.

B. Maintenance Works and Implementation

19. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based road maintenance contract (PBC) approach. This will include all maintenance activities concerning the road surface and main drainage features - community-based contracts (CBC) will cover all roadside maintenance needs.

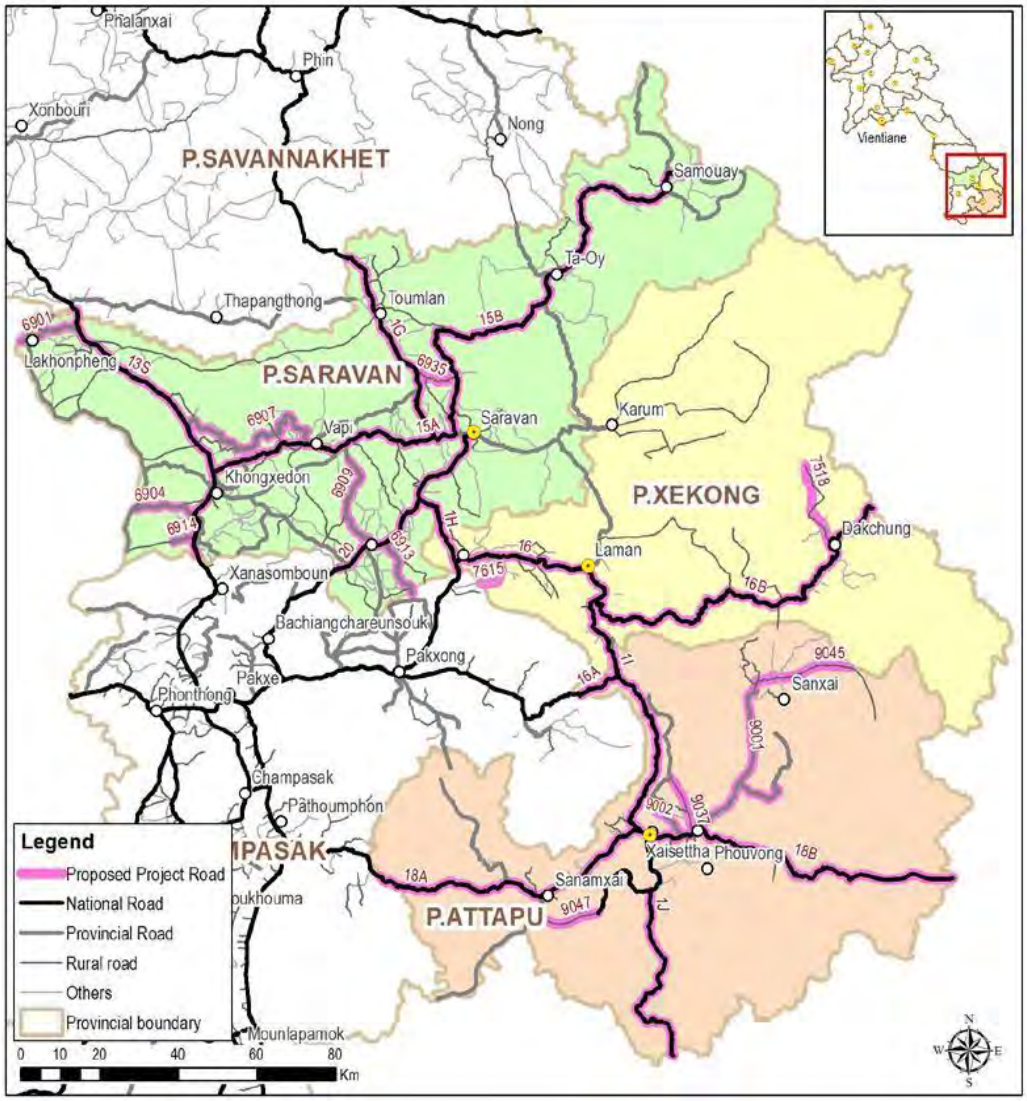


Figure 3.1: Location map of LR 6901 in Salavan Province.

20. The PBC contract will be implemented with the Initial Rehabilitation/Improvement works during the first few months of the contract until the road has been “restored” to a condition suitable for a regular PBC contract approach. The Routine Maintenance will subsequently continue to the end of the 3 year period.

21. The roadside routine maintenance will include culvert and ditch cleaning, clearing under bridges and within box-culverts as part of the CBC Maintenance Works and will also be implemented over the same 3 year period. Table 3:1 presents the various maintenance works and related activities identified for the LR 6901 contracts.

Table 3.1: Maintenance works and activities for LR 6901.

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Filling of potholes with base material	Excavating unsuitable material in patch areas	Scarifying of existing road surface
Grading	Repair of sub-base, including new material	

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Spot filling	Repair of base course, incl. new material	Reshaping the road (incl. ditches)
Clearing of ditches by hand		
Clearing of pipe culverts	Install new pipe culverts with headwalls	
Repair of ditch lining		
Cleaning of bridge decks Clearing river channels of debris	Excavating unsuitable materials	
Grass and bush cutting		
	Excavation of new ditches	
	Construction of scour checks	
	Erosion protection - gabions	
	Riprap protection of river banks or beds,	
	Erosion protection - vegetation	
Proposed Schedule for Maintenance Works Implementation:		2018 - 2021

IV. DESCRIPTION OF THE ENVIRONMENT

22. Salavan Province is one of the southernmost provinces of Lao PDR, about 550 km from the capital city, Vientiane. It covers a total area of 16,389 square kilometers (6,328 sq. mi) and has a total population of 300,000 as of 2005. It is composed of 8 Districts namely: Saravane, Ta Oy, Toomlam, Lakhonepheng, Vapy, Khongsedone, Lao Ngarm, and Samoui. It is bounded in the north by Savannakhét Province, in the west by Thailand, in the south by Champasak Province and in the east by Vietnam.

23. A brief description of the existing environmental and socioeconomic conditions of the LR 6901 influence area is presented in the following subsections:

A. Physical Resources

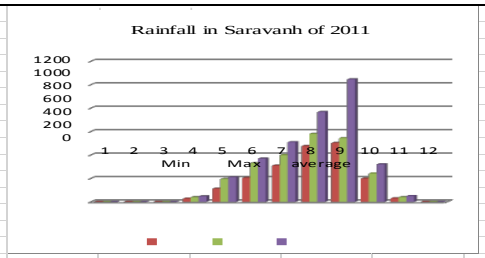
24. *Topography*. The origin of Salavan Province is volcanic with mountains and wide valleys. The central part is located in the Bolaven Plateau, with the Mekong River bordering the west and the Lao-Vietnamese border to the east. 44% of the total land area is flat rising 140-300 metres above sea level and covers the Districts of Saravan, Khongsedone, Laknopheng, Vapy and Toomlam districts.19% of the land area is located on a plateau rising 300-700 metres above sea level and is occupied by Lao Ngam and parts of Saravan, Khongsedone and Vapy Districts. 37% of the Province is mountainous, rising to between 700-1,200 metres above sea level.

25. *Climate, Rainfall and Temperature*. Salavan has a relatively temperate climate compared to other parts of the country. It often is affected by monsoons and has pronounced wet and dry seasons. Most rain falls during the period from May to September when the prevailing winds blow from the south-west. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. The dry season from October to April, is characterized by winds that blow from the north-east. Average temperatures range from about 100C in January to 380C in July, cooler in the north, warmer in the south. Lowland areas are tropical, while the high elevations and the mountains of the extreme north are sub-tropical. Table 4.1 shows the meteorological data of Salavan Province from 2011-2013.

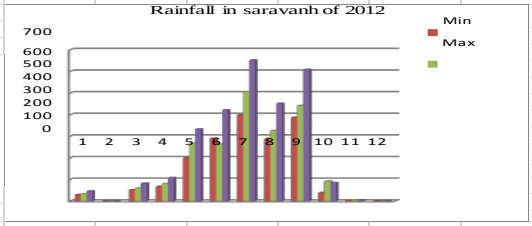
Table 4.1: Meteorological data of Salavan Province, 2011-2013.

METETEOROLOGICAL DATA OF SARAVAN PROVINCE

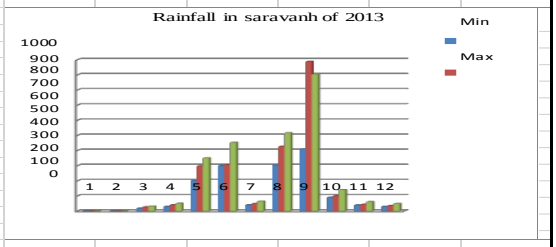
Month	Min	Max	average
1	0	0	0
2	0	0	0
3	0	0	0
4	27.3	39.5	47.05
5	112.3	195	209.8
6	203.7	330.5	368.95
7	309.2	399.7	509.05
8	476.5	580.6	766.8
9	502.3	543.6	1045.9
10	198.9	242.3	320.05
11	29.8	39.7	49.65
12	0	0	0



Month	Min	Max	Average
1	29.7	33.3	46.35
2	0	0	0
3	52.1	60.2	82.2
4	67.8	80.2	107.9
5	199.2	267.8	333.1
6	291	262	422.05
7	399	506	652.1
8	289	326	451.85
9	388	442	608.75
10	38.9	92.1	84.95
11	2.8	5.3	5.45
12	0	0	0

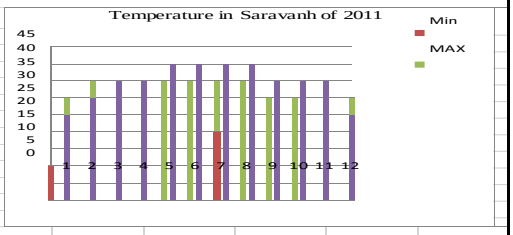


Min	Max	average
0	0	0
0	0	0
17.9	26.6	31.2
29.7	39.9	49.65
202	297	350.3
300	305	452.4
39.8	48.1	63.85
303	427	516.2
410	989	904.1
89.8	100	139.9
38.9	43.6	60.7
30.3	35.8	48.2

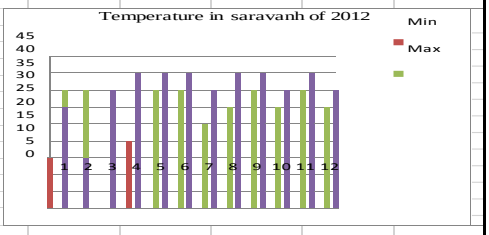


Temperature in Saravanh

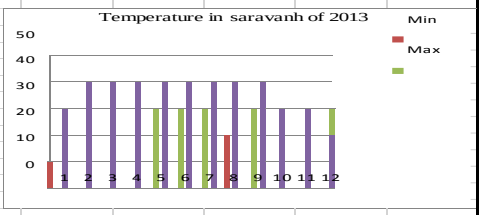
Month	Min	MAX	Average
1	13.5	30	28.5
2	13	36	31
3	18	37.7	36.9
4	19.4	38	38.4
5	23.6	37.3	42.3
6	24	35	41.5
7	22.2	34.5	39.5
8	23	34.5	40.3
9	22	31.6	37.8
10	21.1	33	37.6
11	18.7	32.6	35
12	12.1	31.5	27.9



Month	Min	Max	Average
1	15	34	32
2	16.6	36.4	18.3
3	18.5	37.4	37.2
4	22.4	37.7	41.3
5	22.8	37.6	41.6
6	23.4	34	40.4
7	24.4	27.2	38
8	23.3	33	39.8
9	23	34.5	40.3
10	22.6	32.5	38.9
11	22.7	33.8	39.6
12	19.9	33.1	36.5



Month	Min	Max	average
1	14	34.5	31.25
2	19	38	38
3	18.6	39.5	38.35
4	22	40	42
5	22.2	36.5	40.45
6	23	35	40.5
7	23	34	40
8	24.5	30.1	39.6
9	22.3	33.5	39.1
10	22	30.4	37.2
11	16.3	33.5	33.1
12	11	31.6	26.8



26. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

27. *Soils.* The soils in the southern part of Laos are generally good and are acid hydromorphic and contain low organic matter and nutrients which are moderately-well suited to rice production. More fertile soils with high organic matter and good physical properties are also to be found in parts of the southern areas of the Lao PDR. The agricultural land of Salavan Province is fertile and contributes to food „security" in neighboring Xekong and Attapeu Provinces.

28. *Water Resources*. Saravan Province is rich in water resources and there are more than 30 rivers which flow through the province and serve as sources of water for domestic and irrigation uses. The most important river is the Xedon River which crosses the region and joins the Mekong River at Pakse. Saravan, the provincial capital, is located at a bend in this river which originates from Nang Bua Lake located 15 kilometres (9.3 mi) from the city. The Xedon River flows for about 192 km through the province and supports many people living along its banks. Other key rivers include the Mekong, Se Banguan, Sepone and Seset. The abundant water resources in Saravan Province are also used for hydropower generation, reservoirs, fishing, transportation and tourism.

29. *Water Quality.* Several streams and a number of drainage channels flow into the Xedon within the study area. Grey water from households, markets, restaurants and other establishments in the urban area is mostly discharged directly to these water courses. Sewage is also finding its way into the drainage system and is often discharged untreated into the Xedon. All outfalls are upstream of the intake for the Salavan water supply, giving rise to much local concern over the quality of raw water being delivered. However, it is understood that the intake, which is currently close to the riverbank, will be moved to the center of the river utilizing a provision incorporated into the design of the Xedon Bridge.

30. *Air Quality.* Air quality monitoring is still not a routine practice in Lao PDR and there is therefore no information on the concentration of air pollutants although generally, air quality appears to be good. Due to a lack of equipment and technical expertise there has been no historic collection of data on air quality and reports on pollution levels remain anecdotal. At the present time air quality is considered to be „good" in the Province.

31. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localized air pollution does occur and the incidences are likely to increase with increased urbanization unless action is taken to prevent or mitigate them. Sources include:

a. Uncontrolled incineration of garbage;

b. Decaying deposits of uncollected garbage;

c. Wind-blown dust and debris resulting from solid waste transportation;

d. Dust caused by traffic along unsealed roads; and

e. Exhaust from vehicles and motorcycles – exacerbated by poor traffic management.

B. Ecological Resources

32. *Flora and Fauna*. The forests and other natural areas in Saravan Province host diverse biological resources that support the lives and livelihoods of local peoples. Non-timber forest products and wildlife are often collected for food and for income-generation purposes. Wildlife surveys are limited but studies indicate that some wildlife species are to be found in the Xe Bang-Nouan, Xe Sap and Phou Xiang Thoung National Biodiversity Conservation Areas which are partially located within Salavan, The native species include those identified by IUCN as being of global conservation concern such as pangolin, pig-tailed and long tailed macaques, large loris, etc.

33. Biodiversity is also high in the Important Bird Areas (IBAs) of Xe Sap Important Bird Area (IBA), "Mekong Channel from Phou Xiang Thong to Siphandon" IBA, in the Phou Xiang Thong IBA, and also the Xe Bang Nouan (XBN) Protected Area. Among those observed are: two species of gymnosperm (*Fokine hodginsii* and *Pinus dalatensis*), avifauna (Blyth's Kingfisher *Alcedo hercules*, Yellow-billed Nuthatch *Sitta solangiae*, and Crested Argus *Rheinardia ocellata,* Little Terns *Sternula albifrons*; there are also Small Pratincoles *Glareola lactea*, River Lapwings *Vanellus duvaucelii*, Wire-tailed Swallows *Hirundo smithii*, and River Terns *Sterna aurantia*, Siamese Fireback *Lophura diardi*, Red-collared Woodpecker *Picus rabieri*, Green Peafowl *Pavo muticus*, and Grey-faced Tit Babbler *Macronous kelleyi*), several types of mammals, two types of primates, and one turtle species. There is no reported presence of wildlife including endangered species, near the subject road corridor as reported by local villagers and there are no major forests surrounding the project area.

34. *Protected Areas.* The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993. The NPA system covers about 14% of the land area of Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country (see Fig. 4.1). The NPA system was created as part of the Government's commitment to biodiversity conservation.

35. There are IBAs which straddles two provinces, one of which is Saravan Province: the Xe Sap IBA situated within the Xe Xap National Biodiversity Conservation Area (NBCA); the "Mekong Channel from Phou Xiang Thong to Siphandon" IBA, part of which overlaps with the Phou Xiengthong NBCA; the Phou Xiang Thong IBA (36,650 hectare) situated within the Phou Xiengthong NBCA (120,000 hectare); and the Xe Bang Nouan Protected Area.

C. Economic Development

36. *Economy*. The economy of the province is recognized as being one of the poorest in the country. The region was heavily bombed during the last Indo-china war and remains of the bombs are still found along the former Ho Chi Minh trail. There are only small and medium scale industrial activities which comprise small scale furniture factories, sawmills, drinking water factories [including Saksith], rice mills, ice making and meat processing plants as well as print shops, TV/radio repair shops, watch repair shops and garages.

37. Lao PDR is mainly an agricultural economy and this sector contributes more than 60% of the National GDP. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. The traditional varieties of rice are grown in all irrigated areas. Rice production is based on a system of minimal inputs - fertilizer applications are considered to be low and pesticide use is negligible.

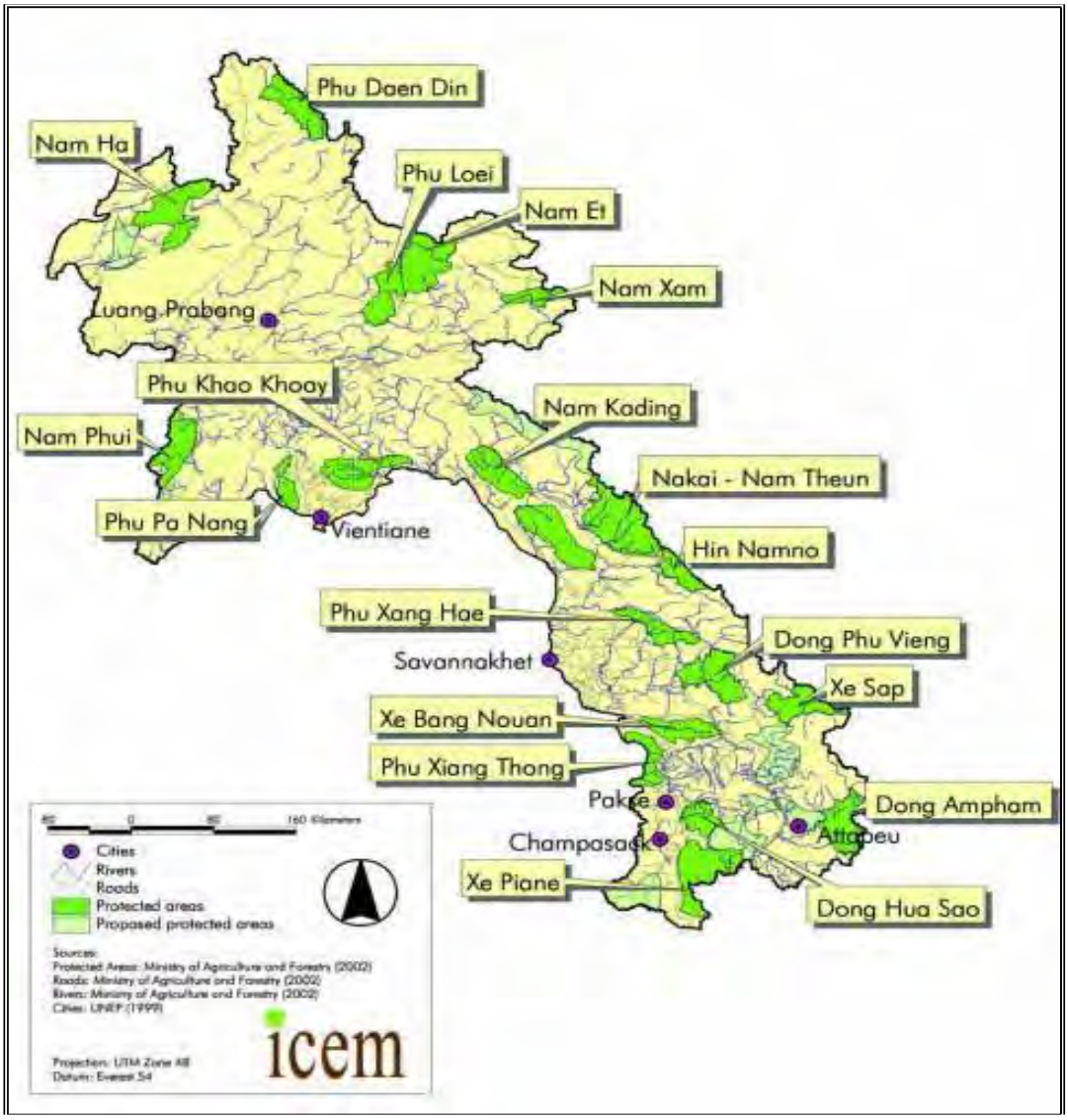


Figure 4.1: National Protected Areas in Lao PDR.

38. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products often grown as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Lao's agricultural sector are timber, lumber, plywood and coffee. Most of the commercial crops are grown for export to Thailand.

39. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People tend vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

40. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks and turkeys and develop fish ponds. Buffalos are used to plough the agricultural land. Households maintain 1-2 buffaloes on average that are used as draft animals in the rice paddy lands. Livestock is sold in the villages and at district markets to provide additional income for the local population

41. *Transportation, Communication, Power and Water.* The project corridor serves as the main land route connecting the various Districts of this part of southern Lao PDR with the surrounding rural areas for the transport of agricultural produce. The major transport modes are small pickups and medium-sized, 2-axle trucks. Other transportation modes include tuk-tuks, trishaws (lot-sam-lor) and jumbos (small tuk-tuks).

42. Salavan Province has fairly developed communications infrastructure with domestic and international telephone services provided by companies such as Laotel, Enterprise of Communications Lao (ETL), and Unitel. Mobile telephone network services are present throughout most of the province as well as a 100-watt radio network situated in Khongsedone, Ta Oy and Samoui.

43. Saravan Province hosts a number of hydropower projects which supplies much of its electricity - namely the Xeset 1 and 2 and Xenalong 2 sites.

44. There is only partial piped water supply. The rest of the requirement is provided by available surface and ground water sources. Water is sourced by villagers from wells, rivers and streams in areas where no piped water supply systems yet exist.

D. Socio-cultural Resources

45. *Population and Communities***.** The population of the province is 300,000, based on 2005 census, distributed over eight districts. The ethnic groups in the province comprise the Tahoy, Pako, Katang, Kado, Suay and Laven. The majority of the people still practice traditional livelihoods, including some shifting cultivation.

46. *Land Uses*. There are 5 villages located along the road corridor. The adjacent land use along the road is predominantly agricultural and devoted largely to rice cultivation. Unused land areas are mostly covered with shrubby vegetation and various types of wild grass. Table 4.2 shows land uses adjacent to the road corridor.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Other
LR 6901 Section A	17.0	Km 0+000 to km 0+758 Km 1+095 to km 2+395 Km 6+705 to km 9+581 Km 14+172 to km 14+700 Km 15+200 to km 17+200	km 2+800 to km 2+901 km 3+683 to km 3+897 km 5+145 to km 6+705 km 6+880 to km 7+541 km 9+581 to km 12+145 km 12+760 to km 14+142	km 1+958 to km 2+800	
LR 6901 Section B	5.5	Km 0+300 to km 0+700 Km 4+800 to km 5+500	Km 0+000 to km 0+300 Km 0+700 to km 1+100	Km 2+100 to km 3+800	
LR 6901 Section C	5.0	Km 3+312 to km 4+780	Km 0+00 to km 5+00		

47. There are several cultural, historical and natural tourist areas near the project area. Tourists can visit the ethnic villages of Suay and Taoy or Katou weavers in Ban Houay Houn, the Ho Chi Minh trail, the Tad Lo Waterfall, the Ho Chi Minh trail or take boat rides on the Xe Lanong River. World-class Arabica coffee beans and handwoven fabrics can also be bought from villagers.

48. The approximate distances of the above attractions from the centre of the subject length of LR 6901 are shown in Table 4.3 below:

Table 4.3: Distances from Roadway

Location	Attraction	Approx. Distance from Mid-point [km]
Ban Houay Houn	Tourists site / Ethnic villages: of Suay and Taoy or Katou weavers	11
Taoy Village	Ethic Weaving	8
Alak Village	handwoven fabrics	13
Suay Village	Ethic Weaving	9
Xe Lanong River	Riverboat Rides	7

49. *Public Health*. The healthcare system in Saravan Province is relatively well developed and covers the rural areas as well. There are more women now giving birth in hospitals or receiving assistance from trained volunteers or nurses than before. Women's clinics have been built in villages and community health stations have increased. Health indicators have improved with a decrease in death rates from tuberculosis and malaria and an increase in access to clean water has been achieved.

50. *Education*. The education system in Salavan Province has improved with 612 schools as of 2010, 570 of which were primary and 42 secondary. There are also 47 kindergarten schools. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and the bigger villages. The major problem countered in the school is the inadequacy of the teaching staff and the distance needed to travel – often affected by the bad condition of some of the access roads.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

51. Since the Project is considered environment Category B, significant negative environmental impacts are not anticipated. The screening identification of potential environmental impacts were based on road designs and specific road maintenance works and activities to be implemented in LR 6901, and the presence of environmental sensitivities (e.g. topography, soils, water resources, natural hazards, including forest, protected areas, and habitats of protected species of wildlife) in the project area.

52. The identification and assessment of impacts associated with the LR 6901 project cycle include the design/pre-implementation, during implementation of maintenance works and operational phases. If impacts are assessed to exceed the acceptable levels of environmental standards, mitigation measures are proposed to reduce the impacts to acceptable levels. The assessments are in line with ADB"s SPS 2009, and the GoL standards. In the absence of GoL set of standards or guidelines the standards given in World Bank's Environmental Health and Safety Guidelines are proposed.

53. During the design/pre-implementation and during implementation phases, all costs of the required environmental mitigation measures will be borne by the contractors and are considered part of their contracts as specified in the contract documents. During the operation phase, all costs of mitigation measures are part of the operation and maintenance costs of MPWT and DPWTs.

A. Design/Pre-Implementation Stage

54. There are two potential impacts identified during the pre-implementation of maintenance works. The social conflict was identified and raised by the participants during the public consultation held for the LR 6901 on 16th January 2015. The potential impacts are:

- Missed/incomplete aspects of road design; and
- Social conflicts between the local villagers and non-residents in the area due to employment opportunities.

55. Road. LR 6901 extends over a total distance of 27.5 km comprised of the main access route. For the purpose of this PPTA study, the subject part of LR 6901 has been divided into 3 lengths, namely: [Section A - 17.0 km long] and a branch from this road at about km 9 to the river crossing at the truck ferry terminal site [Section B - a distance of 5.5 km]. To the above may be added a secondary link [Section C] which joins the pedestrian and truck ferry terminals and runs parallel to the east bank of the river over a distance of 5.0 km.

56. *Climate risk screening.* The result of the initial screening for climate risk indicated that LR 6901 is a low risk project. The future design of the road will have minor considerations of the location of the road alignment in proximity to Mekong River and the occurrence of flooding in some segments of the road.

57. Mitigation. A review of the water levels and peak river flows will be an important consideration for appropriate design and protection of the road.

58. *Social Conflicts between Local Villagers and Non-residents*. The potential social conflict between the local villagers and non-residents in the area was identified during the conduct of field assessments of the road conditions and during the public consultation for LR 6901.

59. Mitigation. To prevent such conflict, the Contractor should be required to prioritize the hiring of local community members rather than non-residents. This could be achieved by including appropriate provisions in the works Contract documents.

B. Maintenance Works Stage

60. Based on the maintenance works and activities to be implemented for LR 6901, the potential impacts identified are the following: increase of dust and noise levels, pollution of surface water from wastewater and from the bridge maintenance works, and effects of traffic and socio-economic activities for local people.

61. *Air and noise pollution.* There could be an increase in dust/air and noise pollution levels during transport, loading and unloading of materials for road maintenance works; from clearing, grubbing and excavation activities; and from the hauling and transport of maintenance equipment. Emissions from trucks and other transport vehicles and noise from the operation of equipment can have a considerable impact on the villagers whose houses are located immediately along the road.

62. Mitigation. Although emissions of air pollutants including nitrous oxide, carbon monoxide and hydrocarbons are considered as mild to moderate because the number of machineries will be small, and the construction area is large. Nonetheless, dust/air and noise pollution can be controlled and mitigated by: (i) regular watering of exposed areas; (ii) covering all trucks carrying dispersible materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained; (iv) limiting maintenance works at day time only to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works. Impacts from air and noise pollution will be low since there are only nine villages, with low population density, throughout the 27.5 km length of LR6901. The concentration levels of dust and air quality will be maintained to the allowable standard levels of Ambient Air Quality, noise, dust and water quality specified in the Lao PDR"s National Environmental Standards, 734/PMU-WREA (2009).

63. *Water pollution.* The bridge maintenance works including excavation and cleaning activities will increase water turbidity affecting water quality and the water users downstream. However, these impacts are considered minimal and temporary in nature. Immediately after the bridge maintenance works have been completed with the clearing of the channels and the excavation activities completed, the turbid condition of the water that look murky and muddy will start to diminish, an indication that water turbidity condition is reduced and water quality is improved. However a prolonged disturbance of the water to its banks and beds will cause serious detrimental effects to the quality of the water and to the plants and animals including people who use or depend on it.

64. Mitigation. To mitigate or prevent the impacts, measures such as settling ponds and temporary drainage ditches for runoff; and training water flows should be implemented.

65. *Waste management and disposal.* This is among the important responsibilities of the Contractor. The contractor may resort to fly tipping or indiscriminate dumping of spoils that could pollute water courses and damage productive land.

66. Mitigation. The Contractor will be required to formulate and implement a waste management and disposal plan for the project. The plan should cover all areas within the project (such as work sites, workers‟ camp, field office) and other areas that may or are occupied by the Contractor. The disposal site should be officially approved by the local concerned authority. The management plan must include a regular collection and disposal of all types of waste and garbage generated during the implementation of the project. The removal, collection and transport of liquid and solid wastes, garbage, unsuitable materials, debris and other waste deposits should be closely monitored to avoid dumping in nearby water bodies as this might have a detrimental effect on aquatic flora and fauna. Temporary toilet facilities with adequate water supply and strict enforcement of proper sanitation should be imposed.

*64. Soil erosion and deposition of excess material*s (from road grading and excavation activities) to waterways and farmlands.

67. Mitigation. These cascading impacts are most likely to occur without supervision of the maintenance works and proper storage location of excess materials for future use and disposal of unsuitable materials. The mitigating measures to prevent these impacts is to locate stockpiling of soils in flat areas and far from drainage routes; settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

68. *Water ponding and flooding* due to improper execution of maintenance works and activities can become a regular occurrence if the natural drainage system is clogged and blocked by waste and garbage materials. Damaged or broken culverts should be replaced.

69. Mitigation. Proper location and installation of new pipe culverts should be ensured. The deposition of materials that block the inflow and outflow of water leads to flooding and creation of water ponds. To prevent these impacts, stockpiling of soils should be located in flat areas and far from drainage routes, settling ponds and temporary drainage ditches for runoff should be installed, and protective cover for exposed soils particularly during rainfall events should be provided.

70. *Traffic Congestion*. A traffic management plan including rerouting schemes to prevent stalling of vehicles along the road.

71. Mitigation. A traffic management plan will be prepared by the Contractor prior to implementation of maintenance works. The traffic management plan shall be submitted to the concerned local traffic management authority for its approval. The contractor will maintain coordination with the traffic management authority by giving notice and providing a weekly schedule of road maintenance works.

72. *Public Safety along the Road.* Public safety will be another important responsibility of the Contractor during the implementation of the maintenance works. This responsibility to keep people safe along the road during the implementation of the maintenance works.

73. Mitigation. Requires coordination and information with the local authorities concerned and the public in general regarding schedules of the maintenance works and related information and updates that may or could potentially affect the activities and movement of the public. The understanding and cooperation of the affected people can be expected by giving or letting them know about the project's activities. Cooperation with the local authorities to enforce traffic rules and regulations and the implementation of the traffic management by the Contractor will be required. Traffic signs and traffic aides in critical routes during peak hours may be considered in the traffic management plan of the Contractor.

74. *Workers' Health and Sanitation at Workers' Camp*. The contractor is expected to erect temporary workers' camps, sanitary wastes from these camps may reach nearby areas and will affect water quality of streams and other water bodies. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for other disease vectors to easily multiply and infect the workers. This may lead to the transmission of diseases from the workers camp to other areas.

75. Mitigation. The contractor shall identify the appropriate location for the workers‟ camp, with provisions of temporary toilet facilities, wash and bath areas with adequate supply of potable water. Prevent surface runoffs from flowing into the workers camps to avoid carrying away any contaminants. The contractor will be required to use temporary diversion drains, catch drains, and silt-traps at these camps if needed. Proper sanitation should be strictly enforced.

C. Operational Stage

76. The potential environmental impacts during the operation phase are the following:

i. Increase in road and vehicular accidents;

ii. Increase in noise and vibration levels along the road corridor; and

iii. Air pollution.

77. Mitigation Measures. The implementation of the environmental mitigating measures are the responsibilities of the Contractor as stated in his/her contract This includes compliance to the environmental standards of the GoL such as the allowable noise and vibration levels, ambient air and water quality standards.

78. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

79. *Public Consultation*. The public consultation for LR6901 in Salavan Province was conducted on 16th January 2015, and chaired and moderated by Mr. Sengdarith Kattignasack, Director DPWT Salavan Province.

80. The attendees of the public consultation were composed of representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the projects" road corridor. The participants were also given a Project Information Handout translated into the Lao language.

81. The Director of DPWT initiated the public consultation and welcomed the participants to the consultation activities. The objective was to introduce the road maintenance project by providing the project's background and description, the maintenance works and implementation schedule. The background information and description of the Project and maintenance works for LR6901, potential impacts and benefits to be generated were presented and discussed by DPWT Director Kattignasack. The participants were also informed of the compliance of the project to the environmental and safeguards policy of the ADB as well as to the EIA procedures and requirements for the approval of the Project IEE Report, and the subsequent issuance of the ECC by the DoNRE. Other topics mentioned and clarified during the consultation included:

a) grievance redress mechanism;
b) roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities; and
c) community participation during implementation of the project. The participants were also informed that future public consultations will be held for the detailed design and prior to the implementation of the project.

82. The main activities of the public consultation were:

a) disseminating information with project information handouts;
b) presenting the projects" objectives, locations, designs and cost estimates, tentative implementation schedules, the potential environmental impacts caused by each project and proposed mitigation measures, and the EMP and Environmental Monitoring Program;
c) discussing the opinions, perceptions, and suggestions of the project- affected villagers;
d) clarifying loss of their land for sub-project implementation;
e) identifying issues related to project environmental impacts on the community;
f) inclusion of the participants' opinions into design alternatives;
g) identifying levels and scope of community participation in project implementation; and
h) understanding of the overall goals and benefits of the project.

83. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments, issues, clarifications and suggestions of the participants are provided below.

84. *Director DPWT Salavan Province*. The Director of DPWT acknowledged that the project will improve the overall infrastructure development in the region. It will also bring more benefits to local villagers such as easy transport of agricultural produce to market, access to schools and health care center. It will provide income to the locals through employment during the maintenance works. He also encouraged the participants to closely coordinate and cooperate with the Project in case there are issues related to land, agriculture and other properties, and to clarify and resolve the issues fairly on both sides.

85. The representatives of Lakhonpheng District, Salavan Province acknowledged the benefits that the Project can bring, among them easy and faster access to markets. It was suggested that the project: a) consider traffic safety measures and a proper design of drainage system to prevent stagnant water and flooding during rainy season; and b) raise public awareness and understanding of the project. The participants were also encouraged to support the project.

86. *Representatives from concerned Local Government Agencies*. The representative of the Social Welfare District recommended that local villagers should be given the priority for employment. The Information and Culture department opines that better transport connectivity will bring more number of tourists to the district. At present the level of tourism is low due to poor connectivity. The present road will not affect any monument or historical places. The representative from the Agriculture and Forest department acknowledged that there will be some impact on the agricultural land and on the households adjacent to the corridor. It was suggested that the project should: a) closely cooperate, during the design phase, with the DPWT and Agriculture and Forest department on the technical aspects of drainage installation, including location of pipe culverts along the road project to ensure proper installation and to avoid negative effects on paddy fields; b) estimate quantity of water outflow and inflow to paddy fields and other agricultural land; and c) prevent erosion and install retaining walls or Gabion in risk areas. The necessary mitigation measures and workers‟ safety should be implemented during the maintenance works.

87. *Mass Organizations*. The representative of the Women‟ Union felt that the project will benefit the local people by providing easier access to market and transport to Thailand. The representative of Young Union feels that the project can bring benefits to local community, particularly in product exchange and commercial development. He suggested that the project should carry out an awareness program for all villages living along the road corridor.

88. *Village Chiefs and Villagers*. The representatives of villagers expressed their strong desire for a paved road that they have long been waiting for, and their interest to be hired as laborers for the road works. Village chiefs expressed hopes that improvement of the road would lead to poverty reduction, food security, income generation opportunities, good access to market and medical care, and that the road improvement would also bring with it secondary benefits such as electricity, water supply, irrigation, and other improvement in quality of life. They also expressed interest in potential income generation from increased tourism.

89. Other views from participants include:

- Rehabilitate village roads as part of the project.
- Take immediate action to restore and rehabilitate borrow pits to prevent accidents in those areas;
- Install traffic safety measures such as signboards along high population density areas like public markets and schools;
- Construct proper drainage system and replace damaged pipe culverts replaced to prevent flooding and accidents during the rainy season;
- Reduce dust levels by regular watering; and,
- Minimize tree cutting.

90. A representative of the Village Leader of Phuangsavanh commented that the issue of settlement and compensation to affected persons of two households should also be addressed at the start of project implementation.

91. Overall, the villagers expect local economic conditions to improve, traffic load to increase, transport costs to decrease, and property values along the road to increase due to improved road condition. They also expect more trade not only with Thailand but also with Vietnam and Cambodia.

92. The following suggestions/recommendations raised by the participants during the public consultation were considered and are incorporated into the proposed mitigation and monitoring plan:

i. Public and workers safety during the maintenance works;
ii. Proper design and installation of drainage system;
iii. Installation of traffic safety measures;
iv. Dust suppression; and,
v. Priority given to local villagers for employment.

93. *Information Disclosure.* In line with ADB‟s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its website:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and
- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation upon receipt.

VII. GRIEVANCE REDRESS MECHANISM

94. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance sites, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor.

95. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor’s field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance activities.

96. The existence of the Contractor’s field office shall not impede the complainant’s access to the Government’s judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps

Table 7.1: Steps for resolution of issues under the GRM

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

97. This chapter addresses the need for mitigation and management measures for LR6901. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

98. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices. The budgetary requirements of the EMP will be taken as part of project preparation costs. The Contractors‟ contracts, office operations and maintenance cost, and capacity building cost will be part of the construction supervision contract.

A. Environmental Mitigation

99. *Mitigation Measures*. The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 shows the summary matrix of environmental mitigation measures.

B. Environmental Monitoring

100. The environmental monitoring plan of the EMP is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

101. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial PWTs with support provided by the project/construction supervision consultant.

102. The Provincial Advisory Committees with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Design/Pre-implementation					
Inappropriate/ incomplete Road & bridge design	Review & finalize Road & bridge Design improvement	Road and bridges design	Road design Consultant	MPWT & DPWT	MPWT, DPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Include in the Contractor's contract a provision to prioritize hiring of workers	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance Works Implementation					
Loss of vegetation Protection & Soil erosion	Replanting of vegetation	Grading and road side maintenance Works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI- DPWT"s budget allocation; Village representative-included in the community-based implementation
Noise and vibration	Contractors Shall follow the noise and vibration standards of GoL	Minor improvement/rehabilitation works	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI- DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression by water; Contractor must ensure trucks used for maintenance works are not smoke belchers	Transport/hauling of road maintenance materials along the road alignment	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI- DPWT"s budget allocation; Village representative-included in the community-based implementation
Erosion & deposition Of maintenance Materials and excess soils materials from grading, borrow pits, cut and fill	Proper storing and covering of soil materials to protect against wind and during rainfall	Grading, excavation of new ditches and unsuitable materials	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI- DPWT"s budget allocation; Village representative-included in the community-based implementation

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Siltation & blockage Of water flow	Proper supervision of bridge works	Bridge maintenance works: Replacement of steel bridges with box culverts	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Water ponding and flooding	Proper grading and backfilling of borrow materials, installation of pipe culverts and cleaning of water channels	Maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties and cultivated land	Proper supervision during road grading and backfilling	During maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation Contractor-included in contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Traffic congestion due to limited road access road blockade	Implement Traffic management plan and observe maintenance works schedule	Filling and patching of potholes, repair of sub-base materials, scarifying and reshaping of the road	Contractor	PWTI-DPWT Environmental Officer; Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of road lanes and pedestrian lanes	Bridge maintenance works: Repair of steel decking* Repair/replacement of timber decks & running strips*	Contractor	PWTI-DPWT Environmental Officer; Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Workers" protection, health and sanitation	Contractor to provide workers with protective gears, proper location of workers" camps and supply of potable water	All maintenance works area, storage, field office and workers" camps	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in contractor's contract; DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	All maintenance works area, storage, field office and workers" camps	Contractor	DONRE, PWTI-DPWT Environmental Officer; Village representative	Contractor-included in the contractor's contract; DONRE-included in DONRE"s budget allocation; Contractor-included in contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management and vehicular accidents	Maintain traffic signs, speed limits, guard and protection rails at high population density areas, strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	PWTI-DPWT and members of the local villages	PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan [EMoP]

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Design/Pre- Implementation						
Incomplete/inappropriate road & bridge design	Updated road & bridge design	Office of the consultant	Determine Changes in road & bridge designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget MPWT- included in operating expenses
Social conflict	Employed workers	Maintenance work area, workers‟ camp & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Implementation of Maintenance Works and Activities						
Excessive dust & Air pollution	Dry road surface, and watering Of the road to Suppress Dust, trucks/transport vehicle maintenance service records	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, PWTI, DPWT & Village representative	MONRE-included in MONRE‟s budget. PWTI-DPWT-included in PTI-DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Sound/noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, PWTI, DPWT & Village representative	MONRE-included in MONRE‟s budget. PWTI-DPWT-included in PWTI-DPWT‟s budget appropriation Budget. Villager-included in the community-based participation

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Water quality	pH, BOD, coliforms	At bridge work site & 30 meters downstream	Laboratory Water analysis	1x before bride works; 1x per month During bridge Works; 1x after Bridge works	MONRE, WPTI, DPWT & Village representative	Contractor-included in the contractor's contract MONRE-included in MONRE"s budget. PWTI-DPWT-included in PWTI-DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Erosion & deposition Of construction Materials and soil	Exposed & unprotected Construction Materials and soils	All work sites	Ocular/visual inspection	1x per week	PWTI, DPWT Environmental officer & Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks, decaying garbage materials & soils	At bridge works, cleaning of ditches,, pipe culverts, excavation of new ditches	Ocular/visual inspection	1x per week	PWTI, DPWT Environmental officer & Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Water ponding and flooding	Incorrect location & installation of pipe culverts, excavation of ditches	Road grading and reshaping of road; water channels	Ocular/visual inspection	During and after rainfall	PWTI, DPWT Environmental officer & Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling, filing of excavated materials	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	PWTI, DPWT Environmental officer & Village representative	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	PWTI, DPWT Environmental officer & Village Representative in	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
					coordination with the local management authority	budget of community-based participation
Public safety/ Road accidents	Installed traffic signs, detour routes, guard posts, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	PWTI- DPWT Environmental officer & Village Representative	PWTI-DPWT-included in PWTI-DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Workers" protection, health and sanitation	Provision of appropriate workers" camp, protective gears and water supply by the contractor	At workers" camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	PWTI- DPWT Environmental officer & Village Representative	PWTI-DPWT Environmental officer & Village Representative-included in their CBC and PBC
Solid waste mgt. and Disposal	Contractors" waste collection management plan and disposal sites	At workers" camp and work sites and approved disposal sites by the local authority	Visual/ocular	1x a week	MONRE, PWTI-DPWT Environmental officer & Village representative	MONRE-included in MONRE"s budget. PWTI-DPWT-included in PWTI-DPWT"s budget appropriation Budget. Villager-included in the CBC and PBC budgets
Operation						
Road safety & traffic management	Repair and installation of traffic signs, guard rails, painting of line marking	High population density areas such as public markets, school areas, accident prone areas of the road segments like blind curves & steep slopes	Visual/ocular	During peak hours AM & PM 2x a day	PWTI-DPWT officer, Local traffic management authority	PWTI-DPWT"s budget appropriation Budget. Local traffic management Budget appropriation

103. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

104. Table 8.3 presents the ambient surface water quality parameters.

Table 8.3 Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

105. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise

Table 8.4. Lao PDR Noise Standards

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014 dB (A) [1] Lao PDR noise standards					

106. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5 Lao PDR Air Quality Parameters and Standards

Parameters/ Symbol	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

107. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the levels of concentrations are not high enough to significantly obscure the visibility along the road.

D. Institutional Arrangements

108. The project's executing agency will be the MPWT and DoR will be the implementation agency, while the the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

109. Staff from the MPWT"s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

110. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The PTI and DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

IX. CONCLUSION AND RECOMMENDATIONS

111. The environmental screening and assessment conducted for LR6901 was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in the conduct of the environmental analysis and classification of the road maintenance project.

112. The Rapid Environmental Assessment (REA) Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category “B” project.

113. Similarly, under the Lao PDR EIA system the project is classified under Category „1‟ project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category “B” project and will not be subjected to a full EIA study.

114. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

115. The project’s executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

116. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

117. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

118. It is concluded that the future Project will create opportunities for generating both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

Initial Environmental Examination

Local Road 7615, Xekong Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CB-PBC	Community-based-Performance-based Contract
DBST	Double Bituminous Surface Treatment
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People's Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
PPTA	Project Preparation Technical Assistance
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
RoW	Right of Way
SPS	Safeguards Policy Statement
sq. mi.	square miles
USSR	Union of Soviet Socialist Republics

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EXECUTIVE SUMMARY

1. An environmental assessment was made for Local Road (LR) 7615 under the Lao Road Sector Governance and Maintenance Project funded through a Project Preparation Technical Assistance (PPTA) from the Asian Development Bank (ADB). The purpose of the PPTA is to define maintenance needs and future design requirements for this Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, LR 7615 in Xekong Province is classified under Category “B“ and therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and Environmental Monitoring Plan [EMoP] is required. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

3. *Project Description*. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The LR 7615 Road Maintenance Project starts from its junction with National Road No. 16, at Ban Kongtayonue and ends at the junction with National Road 16 at Ban Khamkok over a total distance of 22.7 km. this is comprised of 3 Sections [A, B and C] having individual lengths of 14.0, 6.0 and 2.7 km respectively. The present alignments in Sections A and C are good though unpaved while Section B is narrow and follows a winding horizontal alignment with steep gradients in the central mountainous stretch. The present road alignments in Sections C and A are mostly „good“ but with some steep vertical gradients where they lie in undulating terrain - Section B however is regarded as being „very poor“ in terms of alignment and section width. All road surfaces are presently unpaved and parts of Section A are in frequent need of re-grading efforts with some areas subjected to flooding often creating severe access problems for users. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and community-based contracted efforts.

4. *Environmental and Socio-economic Conditions*. The population of the province as per 2005 census is 300,000 distributed over eight districts. There are seven villages located within the LR 7615 road corridor. The land use alongside the road is deforested land currently converted to agricultural use planted to upland rice, corn and vegetables. Some of the farmlands extend to the forest edges. Vacant areas of land are predominantly covered with and native grass species, and shrubby vegetation. Rice is the staple food for the local population and it is predominantly

grown during the monsoon months. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible. In addition to rice cultivation, vegetables and commercial crops are also grown, among them cash crops such as coffee, mung-beans, soybeans, peanuts. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

6. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for LR 7615. For the pre-maintenance phase, one potential impact was identified and raised by the participants during the public consultation related to the poor design and the implementation of the needed interventions. Initial climate risk screening showed that LR 7615 is a medium risk project, therefore the location and design should consider hydro-meteorological data and parameters relating to water level, to include the peak flows of streams and river tributaries to ensure appropriate design and protection of the road, bridge, river/stream banks and beds.

7. During maintenance works, potential environmental impacts are: (i) noise and air pollution; (ii) water pollution; (iii) waste management and disposal; (iv) soil erosion and deposition of excess materials (v) water ponding and flooding;, (vi) traffic congestion; (vii) public safety along the road; and (viii) workers‟ health and sanitation at workers‟ camp. These impacts are temporary and mitigation measures have been developed for inclusion in the works specifications to ensure their implementation.

8. During operation phase, potential environmental impacts are: (i) increase in road and vehicular accidents; (ii) increase in noise and vibration levels along the road corridor; and (iii) increase in air pollution from increased vehicular traffic. However, rehabilitating NR 20 will also bring positive impacts to the communities, will provide them better access to markets, schools, medical facilities, and will create economic opportunities for them to sell their products.

9. An EMP for LR 7615 has been developed to effectively manage the environmental issues during pre-design/maintenance, during maintenance and operations. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP‟s institutional arrangements define the requirements and responsibilities during the project’s pre-maintenance, maintenance and operation phases. The project’s executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection, and with the Provincial DoNRE for compliance monitoring of the project.

10. *Consultation and Participation*. A public consultation session for LR 7615 was conducted on 20 January 2015, Mr. Khamphay Syphalath, Deputy Governor of Thateng was the Chairman/moderator and attended by various stakeholders like representatives from the Districts and Provincial DPWT, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the projects" road corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system, control of erosion, landslide and deposition along the road, reduction of dust levels, and installation of traffic safety measures. Overall, they gave their support to the project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

11. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies

12. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for LR 7615, the ADB environmental assessment and safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, project is classified as Category "B" project and will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable manner and will generate both direct and indirect benefits for many people and as the project continues, bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

1. INTRODUCTION

1. The purpose of this Project Preparation Technical Assistance (PPTA) is to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and

- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. Local Road (LR) 7615 is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included Lao PDR"s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, were also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its offices to verify and confirm the procedural steps and new requirements for the application process of the project's Initial Environmental Examination (IEE) Report and approval and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and Protected Area Management were also visited to gather available secondary data including forest cover maps and protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location/siting of the road alignments, physical, ecological, economic and socio- cultural features, physical conditions of the roads, photo documentation of the vegetation cover, and determination of the environmental classification of LR 7615 for maintenance interventions under the future „Project". The field survey and assessment activities included taking notes on the location of the road alignments as well as physical, ecological, presence of protected species and/or endangered species of wildlife along the project roads was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife by tracks on the ground, roosting areas, faecal droppings of animals. The presence of endangered species was also confirmed through interviews with local villagers. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. This can be attributed to the noise disturbance and lack of appropriate habitat requirements of the rare, threatened and protected species of wildlife along the road corridor.

7. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, LR 7615 in Xekong Province is classified under Category „B" and therefore will not be subject to a full EIA procedure. Instead, an IEE report with Environmental Management Plan (EMP) and monitoring plan is required. The REA Checklist for LR 7615 in Xekong Province is in a separate **Annex R - Rapid Environmental Assessment Checklist [6 Roads]**.

8. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

9. The IEE Report presents the findings of the environmental examination conducted for LR 7615 located in the province of Xekong. It is meant to ensure the environmental soundness and sustainability of the Project and to integrate environmental considerations into the Project Design and to the EMP. The IEE was conducted in adherence to the ADB"s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009), and the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

10. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the EPL which was approved by the President on April 3, 1999. It mandates a unified environmental management with the aim of preserving the environment and making rational and sustainable use of natural resources.

11. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to protect the public, natural resources and biodiversity, and to ensure - sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of EPL.

12. Under the EIA Decree no. 112/PM02/2010, the time frame for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after submission of the project IEE document.

13. While other Ministries issue guidelines for implementing provisions of the IEE and EIA and environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, that reviews and issues the ECC.

14. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental standards for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional standards are in place and environmental standards used by international organizations and advanced countries have been adopted as reference compliance standards.

15. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

16. LR 7615 starts from its junction with National Road No. 16, at Ban Kongtayonue and ends at the junction with National Road 16 at Ban Khamkok over a total distance of 22.7 km. this is comprised of 3 Sections [A, B and C] having individual lengths of 14.0, 6.0 and 2.7 km respectively. The present alignments in Sections A and C are good though unpaved while Section B is narrow and follows a winding horizontal alignment with steep gradients in the central mountainous stretch. Figure 3.1 shows the location of LR 7615 in Xekong Province.

17. In reverse order coming from Ban Khamkok, Section C has a narrow width [down to 3.0-3.5 m wide towards its southern end] and extends over a length of about 2.7 km leading directly to Section B. The latter section has steep gradients, narrow width and contains two deep stream crossings [subject to high water levels during the rainy season] and that are presently impassable by 4-wheeled vehicles. The remnants of an old wooden bridge still remains beside the road at one stream and the DPWT would like to replace this under the Project with a steel „Bailey‟ type of bridge presently stored elsewhere. This section of the route continues as a narrow track though the central section before reaching Section A. The latter section contains four villages, a hydro-electric dam being constructed in the valley below and a major tree plantation [with a large community of workers‟ houses] off to the west. The land use immediately adjacent to the roads is dominated by agricultural operations devoted largely to rice cultivation.

18. The present road alignments in Sections C and A are mostly „good‟ but with some steep vertical gradients where they lie in undulating terrain - Section B however is regarded as being „very poor‟ in terms of alignment and section width. All road surfaces are presently unpaved and parts of Section A are in frequent need of re-grading efforts with some areas subjected to flooding often creating severe access problems for users.

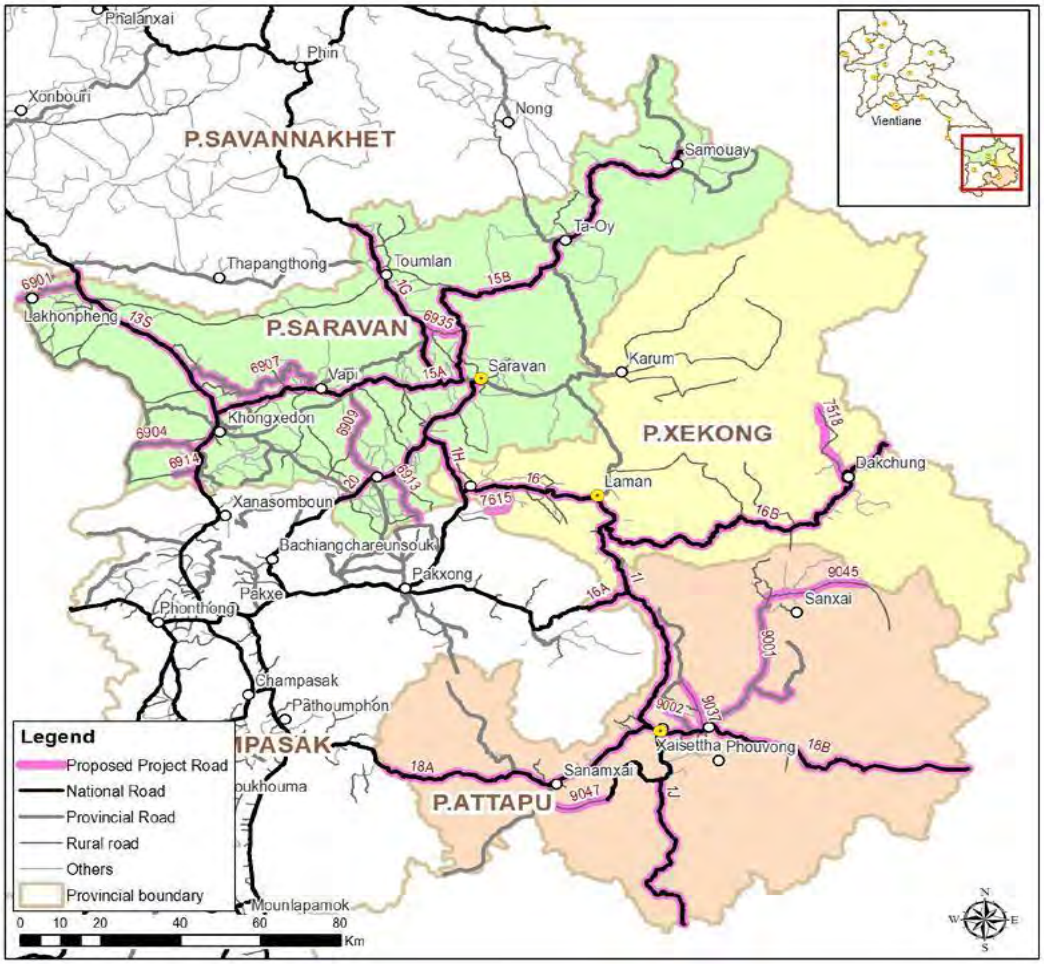


Figure 3.1: Location map of LR 7615 in Xekong Province.

B. Maintenance Works and Implementation

19. The maintenance works will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and by community-based contracted efforts.

20. The PBC contracts cover only the road carriage way (excluding the roadside maintenance).The PBC contract will be implemented within the Initial Rehabilitation/Improvement works during the first few months of the contract until the road has been “restored” to a condition suitable for regular PBC contracts. The regular Routine Maintenance will be continued until the end of the 3 year period.

21. The Community-based PBC roadside routine maintenance will include culvert and ditch clearing, clearing under bridges and box-culverts and other activities as part of the CBC Maintenance Works and will also be implemented over 3 years. Table 3:1 below presents the various maintenance works and related activities likely to be required for LR 7615.

Table 3.1: Maintenance works and activities for LR 7615.

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Filling of potholes with base material	Excavating unsuitable material in patch areas	Scarifying of existing road surface
Grading	Repair of sub-base, including new material	
Spot filling	Repair of base course, incl. new material	Reshaping the road (incl. ditches)
Clearing of ditches by hand		
Clearing of Pipe Culverts	Installation of new pipe culverts with headwalls	
Repair of Ditch Linings		
Installation of Bailey bridge and new box culvert –in Section Clearing river channels of debris	Excavating unsuitable materials	
Grass and bush cutting		
	Excavation of new ditches	
	Construction of scour checks	
	Erosion protection - gabions	
	Riprap protection of river banks or beds,	
	Erosion protection - vegetation	
Proposed Schedule for Maintenance Works Implementation:		2018 - 2021

IV. DESCRIPTION OF THE ENVIRONMENT

22. Xekong is one of the most remote areas of Laos, with some of its largest villages inaccessible by road for at least half of the year. The topography of the Province is about 65% mountainous and 5% plain. The eastern districts of Dakchung and Kaleum in particular, are characterized by mostly rugged mountainous terrain. The Xekong river valley has fertile plains interspersed with paddy fields and fruit orchards. The present project road alignment in Xekong passes through flat and undulating terrain with the central section [Section B] being mostly hilly to mountainous in nature.

23. A brief description of the existing environmental and socioeconomic conditions of the LR 7615 influence area is presented in the following subsections:

A. Physical Resources

24. *Topography*. Xekong is one of the most remote areas of Laos, with some of its largest villages inaccessible by road for at least half of the year. The topography of the Province is about 65% mountainous and 5% plain. The eastern districts of Dakchung and Kaleum, in particular, are characterized by mostly rugged mountainous terrain. The Xekong river valley has fertile plains interspersed with paddy fields and fruit orchards. The present project road alignment in Xekong passes through a generally flat and undulating terrain with the central section [Section B] being mostly hilly to mountainous in nature.

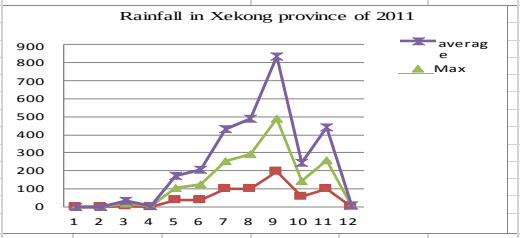
25. *Climate, Rainfall and Temperature*. The climate is dominated by monsoons, with pronounced wet and dry seasons. Most rain falls during May to September when the prevailing winds blow from the southwest. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. The dry season from October to April, is characterized by winds that blow from the north-east.

26. Mean temperatures range from about 10 0C in January to 38 0C in July, cooler in the north, warmer in the south. Lowland areas are tropical, while the highest elevations and the mountains of the extreme north are sub-tropical. Table 4.1 shows the meteorological data of Xekong Province from 2011-2013.

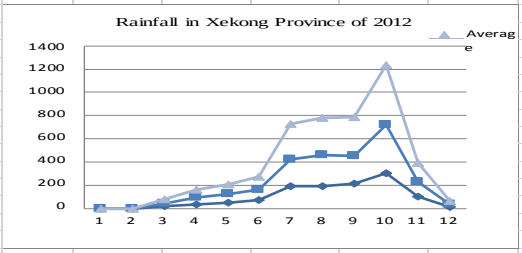
Table 4.1: Meteorological data of Xekong Province, 2011-2013.

METEOROLOGICAL DATA OF XEKONG PROV Rainfall

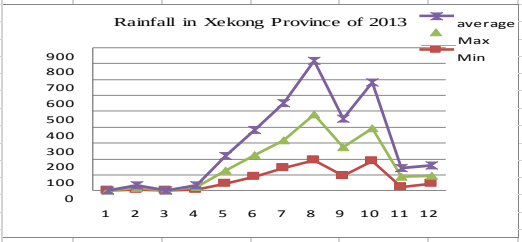
Mont	Min	Max	average
1	0	0	0
2	0	0.2	0.1
3	7.2	14.4	14.4
4	1.2	2.3	2.4
5	37.8	65.8	70.7
6	38.8	86.7	82.2
7	103	151	178.5
8	98.8	196	196.6
9	199	292	345.0
10	56.8	87.7	100.7
11	103	159	182
12	1.3	5.2	3.9



Month	2012		
	Min	Max	Average
1	0	0	0
2	0	0	0
3	18.9	26.1	32.0
4	37.8	56	65.8
5	48.9	72.6	85.2
6	67.9	93.5	114.7
7	189	234	305.7
8	190	268	324.1
9	210	243	330.9
10	304	415	511.7
11	97.6	133	164.3
12	12.4	25	24.9



Month	2013		
	Min	Max	average
1	0	0	0
2	7.8	13.1	14.35
3	0	0	0
4	7.9	13.9	14.85
5	47.9	81	88.4
6	87.9	137	156.2
7	144	175	231.55
8	190	293	336.3
9	96.3	176	184.05
10	187	205	289.75
11	23.7	65.8	56.6
12	43.9	47.9	67.85



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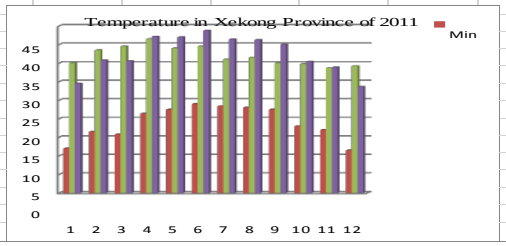
Temperature of Xekong provin

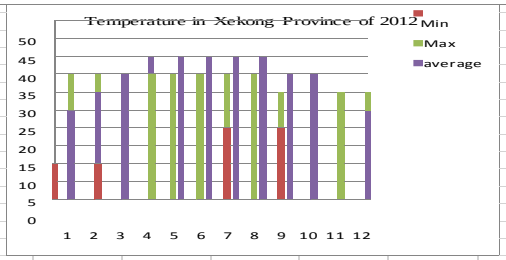
2011

Mont	Min	MAX	average
1	12	35	29.5
2	16.5	38.5	35.8
3	15.8	39.5	35.6
4	21.4	41.5	42.15
5	22.5	39	42
6	24	39.5	43.8
7	23.4	36	41.4
8	23	36.5	41.3
9	22.5	35	40
10	18	34.8	35.4
11	17	33.7	33.9
12	11.5	34.2	28.6



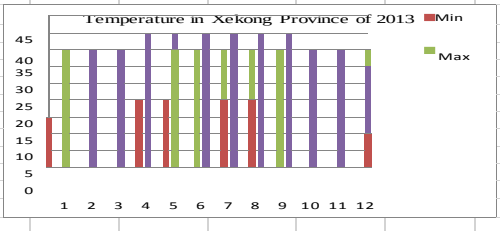
2012

Mont	Min	Max	average
1	11.5	34	28.5
2	13	36.5	31.3
3	18	38	37
4	21	37.5	39.8
5	24	38.5	43.3
6	24	36.7	42.4
7	22.5	34.5	39.8
8	23.2	35.4	40.9
9	22	32.5	38.3
10	19.5	34	36.5
11	16.5	33.5	33.3
12	12.2	33	28.7



2013

Mont	Min	Max	average
1	15.5	35	33
2	16.5	38.5	35.8
3	19.5	37.8	38.4
4	20.5	38.5	39.8
5	23	37.5	41.8
6	23	35.5	40.8
7	22.5	34.5	39.8
8	23	33.8	39.9
9	23	34.5	40.3
10	18	34.5	35.3
11	19.4	35.2	37
12	13.2	35.2	30.8



27. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and the incidence of unusual and extreme flood events appears to be escalating.

28. *Soils.* The soils in the southern part of Lao are generally good soils and are acid hydromorphic and contain low organic matter and nutrients that moderately well suited to rice production. More fertile soils with high organic matter and good physical properties are found in the southern portion of the Laos. Xekong Province is one of the most important coffee producing areas of Laos along with Saravan and Champasak Provinces.

29. *River System*. The Mekong River is the dominant drainage system. It reaches Lao PDR from China in the northwest, where it demarcates the international borders with Myanmar and Thailand and after it enters Lao PDR, swings eastwards to Luang Prabang; then south to rejoin the border with Thailand, passing through before and re-entering totally into PDR Pakse from where it flows southwards into Cambodia.

30. The Xekong River Basin is one of the most important Mekong tributaries. It originates from the Central Highlands of Vietnam, flows through Laos and then enters Cambodia to join the Mekong River. It contributes 10% of the water inflow to the Mekong River and joins the Sesan and Srepok Rivers to form the 3S River Basin - a major sub-basin of the Mekong River system. It is home to thousands of people from at least 20 different ethnic groups which depend on the surrounding forests, the fish and the fertile lands for food. The river also supports over 300-350 fish species estimated to be present throughout the Xekong River Basin.

31. *Water Quality.* Xekong‟s water supply system was built in 1991. It became a decentralized water supply state enterprise under Xekong‟s DPWT in 1998, operating a water supply service in 5 service areas: Lanam, Kaluem, Dukchung, Thateng and Chunla village community of Thateng town. The Ministry of Health has issued Decision No 1371/MOH dated 4 October 2003 on Management of Drinking and Domestic Use Water Standards. However, water quality testing and monitoring for the whole 13 parameters defined, is not yet possible. For water quality monitoring, only pH, turbidity and residual chlorine are tested in the water treatment plants and in the water supply distribution networks.

32. *Air Quality*. Air quality monitoring is still not a routine practice in Lao PDR and there is therefore no information on the concentration of air pollutants. Generally the air quality appears to be good. Due to lack of equipment and technical expertise there has been no historic collection of data on air quality in Xekong Province either and reports on pollution remain anecdotal. At the present time air quality is also good in this Province.

33. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localised pollution does occur and the incidences are likely to increase with increased urbanisation unless action is taken to prevent or mitigate them. These include:

- Uncontrolled incineration of garbage;
- Decaying deposits of uncollected garbage;
- Wind-blown dust and debris resulting from solid waste transportation;

- Dust caused by traffic along unsealed roads; and
- Exhaust from vehicles and motorcycles – exacerbated by poor traffic management.

B. Ecological Resources

34. *Flora and Fauna*. Xekong Province is rich in natural capital and is home to a wide range of rare, endemic and threatened taxa including several large mammals such as tiger, clouded leopard and the Asian elephant (Duckworth and Hedges, 1999). Other species also recorded are, Douc Langur, Dhole, Asiatic Black Bear, and Sambar (Bergmans, 1995). Three large mammals recently discovered to science are small dark muntjac (*Muntiacus truongsonensis*), giant muntjac (*Megamuntiacus (Muntiacus) vuquangensis*) and saola (*Pseudoryx nghetinhensi*). They are endemic along the border between Lao PDR and Viet Nam. Threatened species recorded in Lao PDR, based on the November 1998 data from the WCMC, comprised 220 plants (211 excluding synonyms) and 150 animals. Numbers of threatened animals are listed below. Categories of threat follow those of IUCN.

- Mammals 200
- Birds 750
- Reptiles 70
- Amphibians 40
- Fishes 250

35. Bird diversity is high with three species of international importance – the crested argus, the green peafowl, and the spot bellied eagle owl – all having been observed in the area. Other bird species observed are the ratchet-tailed tree pie and the great hornbill. Because of the remoteness of Xekong Province, forest cover, biodiversity, and ethnic traditions have been observed to change less in recent years compared to other areas in Laos. However, improvement in road infrastructure has lessened this isolation in recent years.

36. *Protected Areas.* The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993. The NPA system covers about 14% of the land area in Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country (see Fig. 4.1). It was created as the Government's commitment to biodiversity conservation.

37. The Dakchung Plateau in Xekong Province is considered an Important Bird Area (IBA). It is located at an altitude of 800–1,400 metres (2,600–4,600 ft) above sea level and occupies an area of 5,140 hectares. It is an important area for the Yellow-billed Nuthatch *Sitta solangiae* classified as Near Threatened, Black-crowned Barwing *Actinodura sodangorum* as Vulnerable. Another IBA is the Xe Sap IBA which is located within the Xe Xap National Biodiversity Conservation Area (NBCA).

38. The NBCA is located at an altitude of 400–2,066 metres (1,312–6,778 ft) occupies an area of 1, 335 square kilometres and straddles the provinces of Xekong and Saravan. It is home to the Blyth's Kingfisher *Alcedo hercules*, Crested Argus *Rheinardia ocellata*, and Yellow-billed Nuthatch *Sitta solangiae*, many waterfalls, rocky cliffs, mammals (including 18 key species), birds (18 are key species), 48 reptiles and 33 amphibians. A further IBA is the Phou Ahyon IBA which occupies an area of 148,900 hectares and sits at an altitude of 400–2,193 metres (1,312–7,195 ft) above sea level. It is home to notable avifauna such as Black-crowned Barwing *Actinodura sodangorum*, Black-hooded Laughing thrush *Garrulax milleti*, Chestnut-

eared Laughing thrush *G. konkakinhensis*, Crested Argus *Rheinardia ocellata*, Golden-winged Laughing thrush *G. ngoclinhensis*, and Yellow-billed Nuthatch *Sitta solangiae*.

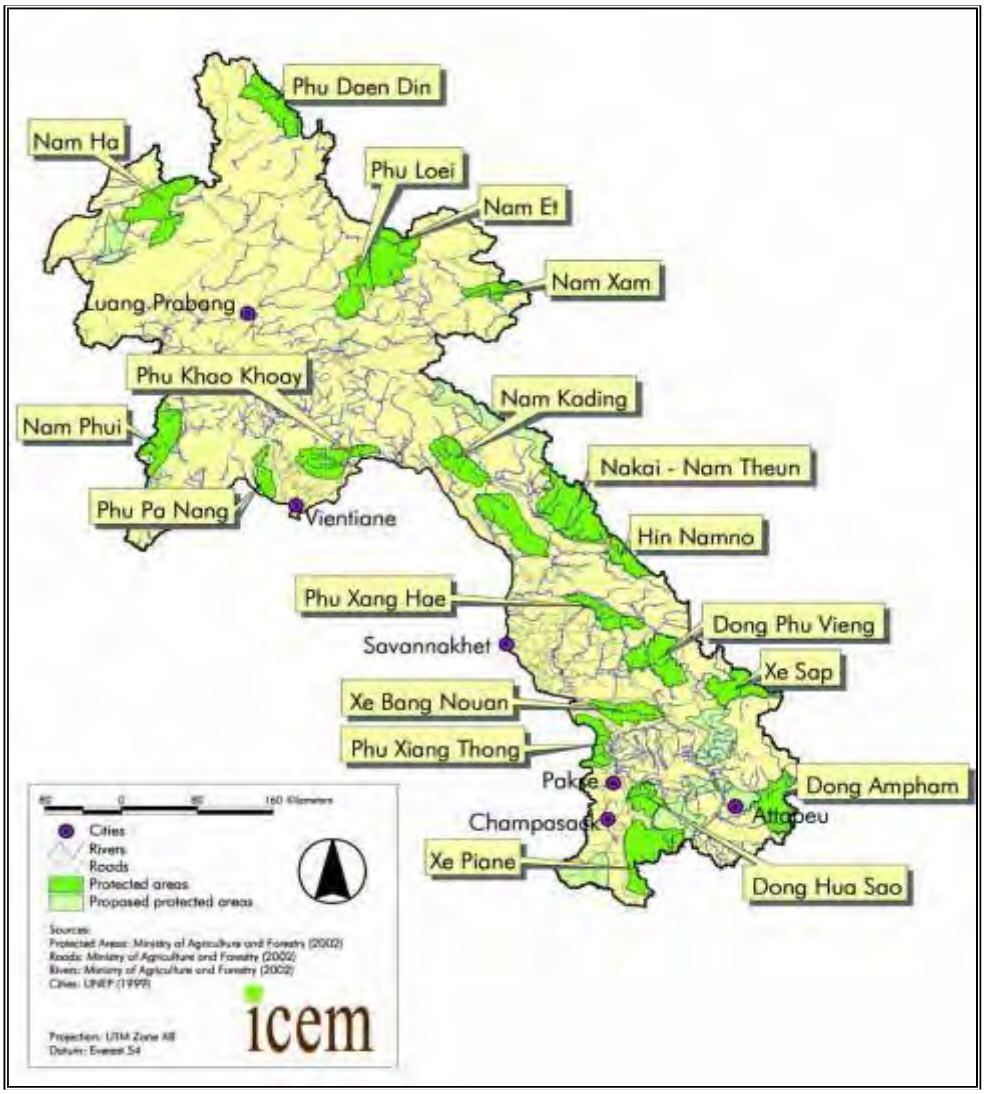


Figure 4.1: National Protected Areas in Lao PDR.

C. Economic Development

39. *Economy*. The economy of the province is one of the worst in the country. The province was heavily bombed during the last Indo-China war and the remains of the bombs are still found along the former Ho Chi Minh trail. There are only small and medium scale industrial activities. The industries comprise of small scale furniture factories, sawmills, drinking water factories, rice mills, ice making and meat processing plants as well as print shops, TV/radio repair shops, watch repair, vehicle repair garages and drinking water processing factories.

40. Lao PDR is an agricultural economy and this sector contributes more than 60% of the National GDP. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. The traditional varieties of rice are grown in all irrigated areas. Rice production is based on a system of minimal inputs - fertilizer applications are considered to be low and pesticide use is at negligible level.

41. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products produced as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Lao's agricultural sector are timber, lumber, plywood and coffee. Xekong Province is one of the most important coffee producing areas of Lao PDR. It is also the main honey-producing area where tree cavities are a particular tree beekeeping method practiced in three districts: Dakchung, Kalum, and Lama.

42. Most of the commercial crops are grown for export to Thailand. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People grow vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

43. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks, and turkeys and develop fish ponds. Buffalos are used to plough the agricultural land and many households maintain 1-2 buffaloes that are used as drought animals in paddy lands. Livestock is sold in the villages and at district markets to provide additional income for the local population.

44. *Transportation, Communication, Power and Water.* The project corridor serves as the main land route connecting the main districts of the southern part of Lao PDR with the underdeveloped district, and transport of agricultural produce from Station Thateng to Salavan, Xekong, Attapeu and Champasak. The major transport modes are pickups and medium-sized transport including 2-axle trucks. Transport within Xekong includes tuk-tuks, trishaws (lot-sam-lor) and jumbos (small tuk-tuks).

45. There are domestic and international telephone services. In Thateng three companies are operating, namely: Laotel, Enterprise of Communications Lao (ETL), and Unitel. Electricity is supplied through a distribution system from Xeset, Houayhor and Sekhaman hydropower projects to six villages. Most of the water supply is provided by a decentralized water supply state enterprise operating under Xekong‟s DPWT since 1998. This serves 5 areas: Lanam, Kaluem, Dukchung, Thateng and Chunla villages plus the community of Thateng. Some villages get their water supply from rivers and streams and other available surface and ground water sources.

D. Socio-cultural Resources

46. *Population and Communities***.** The population of Xekong Province is ethnically diverse, with about 3% ethnic Lao and 97% representing at least 14 distinct ethnic minority groups- Alak (21%), Katu (20%), Tarieng (19%) and Nge/Krieng (11%). This population has been grouped into three simple categories:
1) Lao Loum or low-land Lao, who inhabit valley and plains, practice Buddhism and cultivate paddy and speak Lao-Tai language; 2) Lao Theung or mid-land Lao who live in the hills, are mostly animists, and have traditionally practiced upland rice or shifting cultivation, with community rotating from permanent village, and speak Mon Khmer language; and, 3) Lao Sung or upland Lao who had been associated with higher altitudes, are predominantly animists who practice shifting cultivation and tend to be semi migratory, moving their villages when existing plots decline in productivity. Lao Sung speaks the Hmong-lu Mien and China-Tibetan language.

47. The majority of the Lao population is Lao Loum (62%) and Lao-Thai speakers (made up of 8 ethnic groups). Minority groups are predominantly Lao Theung and

Mon-Khmer speakers. The project area has a lower proportion of ethnic minorities than the national average with the Lao Loum group being the predominant ethnic race.

48. *Land Uses*. The present road alignment in Section A contains four villages road corridor, a hydro-electric dam being constructed in the valley below and a major tree plantation [with a large community of workers" houses] off to the west. The land use immediately adjacent to the roads is dominated by agricultural operations devoted largely to rice cultivation. Table 4.2 shows land uses adjacent to the road corridor.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Other
LR 7615 Section A	15.0	Km 7 to km 7.4 Km 14.4 to km 14.95	Km 1 to km 7 Km 7.4 to km 14.4	Km 15 to km 21	Km 14.95 to km 15
LR 7615 Section B	5.0		Km 15 to km 19.5	Km 19.5 to km 20	
LR 7615 Section C	2.7	Km 21 to km 22.7	Km 20 to km 21		

49. There are some natural and cultural sites surrounding the project area. The main tourism sites are the waterfalls at Tad Maihia and Tad Nokkhao in Lamarm District, at Tad Mohone, Pa-Ao and Lavan in Thateng District and at Tad Oak in Darkcheung district. Other tourist sites include the Sinouk green tour resort. Xe Sap NBCA, located in north-eastern part close to the Vietnamese border, is also a potential tourist area but travel there is almost impossible in the rainy season and the major transport mode is by truck. Accommodation, medication, telephones, etc. are very rare in the eastern hilly parts. The jungle of Kalum, one of the four districts of Xekong, is known for intensive fighting during the Vietnam War in the 1960s-1970s. Scrap metal from the war – aluminum and iron from bombs, vehicles and aircrafts - are often exported out of the district.

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50. The approximate distances of the above attractions from the centre of the subject length of LR 7615 are shown in Table 4.3 below:

Table 4.3: Distances from Roadway

Location	Attraction	Approx. Distance from Mid-point [km]
Lamarm District	Tad Maihia" Tad Nokkhao	12
Thateng District	Tad Mohone, Pa-Ao and Layan	8 and 7
Darkcheung District	Tad Oak	15
	Sinouk Green Tour Resort	5
	Xe Sap NBCA	35

Location	Attraction	Approx. Distance from Mid-point [km]
Kalum	Kalum jungle (Vietnam War area)	12

51. *Public Health*. There are qualified doctors in the district headquarters but the number is very limited. The small hospitals at the villages are manned by paramedical staff or nurses. The hospitals are badly equipped and doctors travel to the interior village hospital to check patients. Traditional medicine is still practiced in the villages. Infant mortality is quite high. Poor access to medical care, lack of clean drinking water, and poor sanitation facilities are the major cause of concern for public health. Acute malnutrition and chronically energy-deficiency in children is higher in Xekong Province relative to other areas in Lao PDR.

52. *Education*. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and bigger villages. The major problem countered in the school is the inadequacy of the teaching staff and the distance needed to travel due to bad roads.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

53. Since the Project is considered environment category B, significant negative environmental impacts are not anticipated. The screening identification of potential environmental impacts were based on anticipated road maintenance interventions and miscellaneous related activities to be implemented in the LR 7615 section, and the presence of environmental sensitivities (e.g. topography, soils, water resources, natural hazards, including forests, protected areas, and habitats of protected species of wildlife) in the project area.

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54. The identification and assessment of impacts associated with the LR 7615 project cycle include pre-implementation and implementation of maintenance works activities. Three suggestions/recommendations raised by the participants during the public consultation were considered relevant and these are now added into the implementation of mitigations and monitoring plan of LR 7615:

- Public and workers safety during the maintenance works;
- Improvement of drainage system to prevent water ponding and flooding;
- Control of land slide, erosion and deposition along the road by constructing retaining walls or gabions; and,
- Installation of traffic safety measures such as barricades or guard rails, and road widening in sharp curves.

A. Design/Pre-Implementation Stage

55. There are two potential impacts identified during the pre-implementation of maintenance works and 1 of the potential impact was identified and raised by the participants during the public consultation referring to the drainage system to prevent flooding. The potential impacts are the following:

- Missed/incomplete aspects of road design; and

- Social conflicts between the local villagers and non-residents in the area due to employment opportunities.

53. *Climate risk screening*. The result of the initial screening for climate risk showed that LR 7615 is a medium risk project.

54. Mitigation: The maintenance needs and future design requirements to replace the old and broken wood bridge with a steel „Bailey" type of bridge and the location Section B of the existing road alignment must consider hydro-meteorological data and parameters relating to reliable water level, to include the peak flows of streams and river tributaries to ensure appropriate design and protection of the road, bridge, river/stream banks and beds. As mentioned earlier, the lack of long-term climate data to support projections of future climate trends has limited the assessment and analysis of potential climate change impacts but there is increasing anecdotal evidence of unusual and extreme flood events escalating.

55. *Social Conflicts between Local Villagers and Non-residents***.** There is the prospect of social conflict between the local villagers and non-residents in the area due to employment needs.

56. Mitigation: To prevent this, the Contractor should be required to prioritize the hiring of local villagers as laborers over non-residents. To encourage the hiring and employment of the locals, it must be stated in the Contractor's contract that the local residents have the priority over the non-residents.

B. Maintenance Works Stage

57. Based on the maintenance works and activities to be implemented for LR 7615, the potential impacts identified are the following: increased levels of noise and dust, pollution of surface water from wastewater and from the bridge maintenance works, and the effects of traffic and socio-economic activities for local people.

58. *Noise and Air pollution.* The increase in noise and dust and air pollution levels are expected during transport, loading and unloading of materials for road maintenance works; from clearing, grading grubbing and excavation activities; and from the hauling and transport of excess materials and from the operation of machines and equipment doing maintenance works. Emissions from trucks and other transport vehicles and noise from the operation of equipment can have a considerable impact on the villagers whose houses are located immediately along the road.

59. Mitigation: Dust/air and noise pollution can be controlled and mitigated by: (i) regular watering of dry and exposed areas; (ii) covering all trucks carrying dispersible materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained and installed with noise reducing mufflers; (iv) limiting maintenance works at day time only to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works. Emissions of air pollutants including nitrous oxide, carbon monoxide although considered to be mild to moderate because the few number of operating machineries will be spread over the length of the road. Nonetheless, the contractor shall comply with the noise, dust, ambient air and water quality national standards prescribed in Lao PDR"s National Environmental Standards VN02734 /PMU WREA 2009).

60. *Water pollution*. The installation of Bailey bridge, new box culverts and clearing of river channels of debris are the major maintenance works and activities that will cause temporary changes in water quality. The works and activities will not use chemicals harmful to the environment. The works and activities mentioned including excavation will increase water turbidity affecting water quality and the water users downstream. However, these impacts are considered minimal and temporary in nature.

61. Mitigation: It can be easily mitigated with some measures, such as settling ponds and temporary drainage ditches for runoff; and training water flow and directions.

62. *Waste management and disposal*. Indiscriminate dumping and disposal of solid and hazardous wastes could pollute nearby water bodies that could also have detrimental effect on aquatic flora and fauna.

63. Mitigation: The waste management and disposal will the responsibility of the Contractor. he Contractor shall maintain a regular collection and disposal of solid and hazardous wastes. The removal of topsoil, stockpiles, maintenance debris and other waste deposits will be closely monitored to avoid dumping in nearby water bodies might have a detrimental effect on aquatic flora and fauna and should be avoided. Temporary toilet facilities with adequate water supply and strict enforcement of proper hygiene and sanitation procedures must be imposed.

64. *Landslide, Soil erosion and deposition of material*s. Any such events without proper mitigation will ultimately lead to material being deposited along the road and spilling into to watercourses - then possibly onto private land where flooding might be the result.

65. Mitigation: These impacts can be prevented and mitigated by good supervision of the maintenance works, proper storage location of excess materials for future use and disposal of unsuitable materials in flat areas and far from drainage routes. Settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

66. *Water ponding and flooding* due to improper execution of maintenance works and activities can become a regular occurrence if the natural drainage system is clogged and blocked by garbage and waste materials and if pipe culverts are broken or deteriorated.

67. Mitigation: Some measures to mitigate these impacts will include proper location and installation of new culverts, locate flat grounds for stockpiling of surplus soils, excavated and unsuitable materials far from drainage routes.

68. *Traffic Congestion.* A traffic slowdown is likely to happen during maintenance works due to temporary closure of road segments.

69. Mitigation: A traffic management plan including single lane operation provisions to prevent stalling of vehicles along the road must prepared by the Contractor prior to implementation of maintenance works The traffic management plan shall be submitted to the supervising firm for referral to the concerned local authorities to seek approval. The Contractor must maintain regular contact with the authority and issue notices to provide advance warning of scheduled of road maintenance works.

70. *Public Safety along the Road.* Public safety will be an important responsibility of the Contractor during the implementation of the maintenance works.

71. Mitigation: With strict enforcement of traffic rules and regulations, posting of traffic aides in critical routes during peak hours, and coordination with traffic management officials, public safety along the road will be maintained.

72. *Workers' Health and Sanitation at Workers' Camp.* The improper location of workers' camp and absence of toilet facilities and adequate water supply could compromise workers' health and poor sanitation of the immediate and adjacent areas can bring disease and sickness to the local population.

73. Mitigation: The Contractor shall identify the appropriate location for the workers‟ camp, with provisions of temporary toilet facilities, wash and bath areas with adequate supply of potable water. Proper sanitation processes must be strictly mandated and enforced.

C. Operational Stage

74. The potential environmental impacts during the operation phase are the following:

i. Increase in road and vehicular accidents;

ii. Increase in noise and vibration levels along the road corridor; and

iii. Air pollution.

75. Mitigation Measures: The implementation of the environmental mitigating measures are the responsibilities of the Contractor as stated in his/her contract This includes compliance to the environmental standards of the GoL such as the allowable noise and vibration levels, ambient air and water quality standards.

76. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

77. *Public Consultation*. A public consultation/meeting was held at the DPWT Meeting Room in Xekong Province on 20th January 2015 and was chaired by Mr. Khamphay Syphalath, Deputy Governor of Thateng.

78. Participants were representatives from the Districts and Province levels, District Governor, mass organizations, village leaders and potentially affected households along the corridor. The objective was to introduce the proposed maintenance project to the local villagers along the corridor by providing the relevant project background, a description of the foreseen maintenance works and the likely implementation schedule.

79. The participants were also informed on the compliance of the project with the environmental and safeguards policy of the ADB as well as to the environmental impact assessment procedures and requirements for the approval of the Project IEE

Report and the subsequent the issuance of the Environmental Certificate by the DONRE. Other topics mentioned and clarified during the consultation process included: a) the grievance redress mechanism, b) the roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities, and c) opportunities for community participation during implementation of the project. The participants were also informed that future public consultations will be held during the detailed design preparation and again prior to the implementation of the works. They were also given a Project Information Handout translated into the Lao language.

80. The main activities were described as:

(i) disseminating information with project information handouts

(ii) presenting the project's objectives, location, preliminary design features and the cost estimates, tentative implementation schedules, potential environmental impacts caused by each project and the proposed mitigation measures to be included as well as the contents of the Environmental Management Plan and Environmental Monitoring Program;
(iii) discussing the opinions, perceptions, and suggestions of the project- affected villagers;
(iv) clarifying procedures to address any loss of land during project implementation;
(v) identifying issues related to project environmental impacts on the community;
(vi) means to include participants" opinions into design alternatives;
(vii) identifying levels and scope of community participation in project implementation; and
(viii) awareness and understanding the overall goals and benefits of the project.

81. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments, issues, clarifications and suggestions of the participants are provided below.

82. The head of the Public Works and Transport Office (PWTO) acknowledged that the project will bring more benefits to local communities, and mentioned that all villages and their village members along the road project should avoid closing the existing alignment, and build houses or shops along the road corridor. He also encouraged all villages living adjacent to the road to provide support and assistance. If there are negative impacts affecting the local communities during project implementation, all the village members are encouraged to resolve the problems as soon as possible. It was suggested that a public education campaign should be conducted to ensure awareness and understanding of the project by the villagers. It was further suggested that the project design should consider road widening at risk places and installation of traffic safety measures.

83. The representatives of Thateng District expressed support to the project and encouraged the participants to also support the project so that the project can be implemented soon. It was suggested that PWTO should conduct information education in all villages to ensure understanding of the project, and that it follows national regulation and Public Work and Transport law. All villages and their members should also be informed about project activities that may affect those living close to the road alignment, potential solutions to problems, and the Lao strategies from year 2015-2020. It was also suggested that all organizations in this district should be involved; local villages should participate and be made to understand the goals and objectives of the project. Some concerns were also raised about the many

borrow pits located in villages that should be restored properly for safety purposes.

84. The representatives of local government agencies in Xekong province recognized the importance of the project and the benefits it brings to communities such as: a) increase in the traffic load due to the good condition of the road; b) easy transport of agricultural produce to neighboring villages; c) likely reduction in bus fares, and d) rise in property values. The participants were encouraged to support the project and to raise their concerns so that these can be resolved soon Other benefits that can be derived are its potential contribution to poverty reduction, food security, income generation opportunities, access to market and medical care, and will also bring with it secondary benefits such as electricity, water supply, irrigation, and support for non-formal education and other improvements in quality of life.

85. *Mass Organization*. The representative of the Women Union of Thateng District Expressed appreciation of this project of the Lao Government and the support of ADB as it will provide easy access to Central Market, especially for local agricultural products like coffee and cassava, and lower costs.

86. *Chiefs of Villages* expressed their support for the project. Many hoped that the road improvement would lead to poverty reduction, food security, income generation opportunities, access to market and medical care, and bring secondary benefits such as electricity, water supply, irrigation, etc. Listed below are the comments of the Chiefs of the villages:

Mr. Somphanh, Village leader of Kong village:

- The project will bring more benefits to local peoples such as easy transport to market, schools and health care center;
- There will be easier access to market of agricultural products such as coffee and cassava;
- The project will be useful for infrastructure development in this region. There should be close cooperation with governor of Thateng to ensure fair resolution of issues affecting communities such as in land use, agriculture and land properties.

Mr. Sengthong Seanpannglong, Village Leader of Houaydam village:

- The project will provide easy and fast access to market of local products;
- The value of the food products from 5 villages along the project road will improve and opportunities open to local peoples due to easy to access to the District;
- The local economy depends on the fluctuating economy of the neighboring countries.

Mr. Onla, Village leader of Thongyai village:

- During rainy season, many locations along the road are flooded and affect local farmers and transportation to district. The drainage system should be properly designed and installed to make sure proper water flow.

Mr. Khamchack, Village leader of Kong Tayoune village:

- The project will consider road widening or not if allowed, existing road alignment should not affect land use, garden and household;
- Proposed that the DPW office identify and investigate old road alignment from staring point Ban Kong Tayoune to the end road project;

- The project can bring benefits to local community, particularly for commerce and trade of their products;
- The project should carry out the awareness program for all villages living along the project.

Mr. Khamtong, Village leader of Donexa village

- The existing road alignment is close to cemetery and rice bin storage, and may affect worship area. This should be considered in project implementation.

Representative, Ban Houaydam village:

- The project should be carried out as soon as possible for local people living here to improve their agriculture production mainly rice and coffee, cassava and other vegetable crops;
- Suggested that the project should pave whole road and construct bridge because of years of flooding which affect the local community.

87. The following suggestions/recommendations raised by the participants during the public consultation were considered and incorporated into the proposed mitigation and monitoring plan:

i. Public and workers safety during the maintenance works;
ii. Proper design and installation of drainage system;
iii. Control of land slide, erosion and deposition along the road; and
iv. Installation of traffic safety measures.

88. *Information Disclosure*. In line with ADB"s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its website:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and

- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation upon receipt.

VII. GRIEVANCE REDRESS MECHANISM

89. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance sites, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor.

90. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance activities.

91. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps:

Table 7.1: Steps for resolution of issues under the GRM.

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the Contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or Contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and Contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/Contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/Contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/Contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the Contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/Contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

92. This section addresses the need for mitigation and management measures for LR 7615. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

93. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices. The budgetary requirements of the EMP will be taken as part of project preparation costs while the Contractors" office operations will be part of the overall maintenance costs. The capacity building cost will be part of the construction supervision contract.

A. Environmental Mitigation

94. *Mitigation Measures.* The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 shows the summary matrix of environmental mitigation measures.

B. Environmental Monitoring

95. The environmental monitoring plan of the EMP is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

96. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial PWTs with support provided by the project/construction supervision consultant.

97. The DPWT provincial steering committees with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Pre-maintenance					
Inappropriate/ incomplete Road Design	Revise & finalize Road Design improvement	Detail design	Road design Consultant	MPWT	MPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Contractor to prioritize hiring of workers from the local villages	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in Contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance					
Loss of vegetation Protection & Soil erosion	Replanting of Vegetation, provision of protective cover for exposed soil materials	End of Maintenance Works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Increase levels of noise	Contractors shall comply w/ the levels of noise standards	Transport of works materials, hauling of garbage, debris and unsuitable materials from excavation activities	Contractor	MONRE, PWTI-DPWT Environmental Officer; village representative	Contractor-included in Contractor's contract; MONRE-included in MONRE"s budget allocation; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression by watering of dry surface of the road	Grading, excavation of unsuitable materials	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the Contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Landslides, erosion of excess and open soils & deposition of rocks on road shoulders and ditches	Erosion Protection by gabions & planting vegetation, Appropriate location and storing of	Clearing & repair of ditches, Repair of sub-base & base coarse including new material, Installation of slope	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	works materials, excess soils & materials from grading & excavation should be protected with cover especially during rainfall	stability measures, Scarifying of existing road			community-based implementation
Siltation & blockage Of water flow	Proper supervision of bridge maintenance works	Cleaning of bridge decks and Clearing river channels of debris	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Flooding	Proper grading and backfilling, appropriate siting & size of culverts for quick flow to the drainage system	Reshaping the road (incl. ditches), Scarifying of existing road, Installation of slope stability measures,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties by deposition of rocks and unsuitable materials, and workers" camp garbage	Suitable site location prepared for the temporary placement excess materials for maintenance works, Proper supervision during maintenance works	Clearing of ditches & pipe culverts, AC surfacing - 50 mm,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Traffic congestion	Implement Traffic rerouting, coordinate traffic management plan w/ the local traffic management authority	Implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of	Repair & installation of new traffic signs, new guard rails, guard posts,	Contractor	PWTI-DPWT Environmental Officer;	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	road lanes and pedestrian lanes	and re-painting of traffic lane lines		Village representative	DPWT‟s budget allocation; Village representative-included in the community-based implementation
Workers‟ protection, health and sanitation	Contractor to provide workers with protective gears, proper location of workers‟ camp and supply of potable water	During implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	During implementation of maintenance works	Contractor	DONRE, PWTI-DPWT Environmental Officer; Village representative	Contractor-included in the Contractor's contract; MONRE-included in MONRE‟s budget allocation; Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management	Maintain traffic signs, guard and protection rails at strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	PWTI-DPWT and members of the local villages	PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Pre-maintenance						
Incomplete road design	Updated road design	Office of the consultant	Determine Changes in road designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget
Social conflict	Employed workers	Contractor's Office & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Construction/ Maintenance						
Excessive dust & Air pollution	Watering of the road surface to suppress dust ra	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Water quality	pH, BOD, coliforms	At bridge Work site & 30 meters downstream	Laboratory Water analysis	1x Before bride works; 1x per month During bridge Works; 1x after Bridge works	MONRE, DPWT & Village representative	Contractor-included in the Contractor's contract MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Erosion &	Exposed &	All work sites	Ocular/visual	1x per week	DPWT	DPWT-included in DPWT"s

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
deposition Of construction Materials and soil	unprotected Construction Materials and soils		Inspection		Environmental officer & Village representative	budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks & soils	At bridge works	Ocular/visual inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Flooding	Drainage & canals	Road alignment	Ocular/visual inspection	During rainfall	DPWT Environmental officer & Village representative	DPWT-included in DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	DPWT Environmental officer & Village representative	DPWT-included in DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	DPWT Environmental officer & Village Representative in coordination with the local management authority	DPWT-included in DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Public safety/ Road accidents	Installed traffic signs, detour routes, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	DPWT Environmental officer & Village Representative	DPWT-included in DPWT"s budget appropriation; Villager-included in the budget of community-based participation
Workers" protection, health and sanitation	Provision of appropriate workers" camp, protective gears and water supply by the Contractor	At workers" camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	DPWT Environmental officer & Village Representative	DPWT Environmental officer & Village Representative

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Solid waste mgt. and Disposal	Contractors management plan and disposal site	At workers‟ camp and work sites	Visual/ocular	1x a week	MONRE, DPWT Environmental officer & Village representative	MONRE-included in MONRE‟s budget. DPWT-included in DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Operation						
Road safety & traffic management						

98. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

99. Table 8.3 presents the ambient surface water quality parameters...

Table 8.3 Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

100. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise.

Table 8.4. Lao PDR Noise Standards

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014					

dB (A) [1] Lao PDR noise standards

101. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5 Lao PDR Air Quality Parameters and Standards

Parameters/ Symbol	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

102. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the level of concentrations are not expected to be high enough to significantly obscure the visibility along the road.

Institutional Arrangements

103. The project's executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

104. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

105. The Contractor of the road maintenance works shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections, and with the Provincial DoNRE for compliance monitoring of the Project.

IX. CONCLUSION AND RECOMMENDATIONS

106. The environmental screening and assessment conducted for LR 7615 was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in the conduct of the environmental analysis and classification of the road maintenance project.

107. The REA Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category “B” project.

108. Similarly, under the Lao PDR EIA system the project is classified under Category „1‟ project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category “B” project and is not therefore required to be subjected to a full EIA study.

109. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

110. The project’s executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

111. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

112. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

113. It is concluded that the future Project will create opportunities for both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

Initial Environmental Examination

Local Road 9001, Attapeu Province
Lao PDR: Road Sector Governance and Maintenance Project

ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CB-PBC	Community-based-Performance-based Contract
DBST	Double Bituminous Surface Treatment
DoNRE	Department of Environment and Natural Resources
DOR	Department of Roads
DPWT	Department of Public Works and Transport
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection Law
ETL	Enterprise of Telecommunications Lao
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature
km	kilometer
Lao PDR	Lao People‟s Democratic Republic
mm	millimeter
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NBCA	National Biodiversity Conservation Area
NPA	National Protected Areas
NR	National Road
LR	Local Road
PPTA	Project Preparation Technical Assistance
PWTI	Public Works Transport Institute
REA	Rapid Environmental Assessment
RoW	Right of Way
SPS	Safeguards Policy Statement
sq. mi.	square miles
USSR	Union of Soviet Socialist Republics

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EXECUTIVE SUMMARY

1. An environmental assessment was made for Local Road (LR) 9001 under the Lao Road Sector Governance and Maintenance Project funded through a Project Preparation Technical Assistance (PPTA) from the Asian Development Bank (ADB). The purpose of the PPTA is to define maintenance needs and future design requirements for this Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao Peoples Democratic Republic (PDR).

2. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, LR 9001 in Attapeu Province is classified under Category „B" and therefore will not be subject to a full Environmental Impact Assessment (EIA) procedure. Instead, an Initial Environmental Examination (IEE) report with Environmental Management Plan (EMP) and monitoring plan is required. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

3. *Project Description*. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The LR 9001 Road Maintenance Project starts from the junction with National road 18B in Xaisettha District and continues to Xenxai District over a total distance of 54.1 km. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context.

4. The maintenance works and activities will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and community-based contracted efforts.

5. *Environmental and Socio-economic Conditions*. Attapeu Province has five districts (Samakkixay, Xaysetha, Sanamxay, Xanxai and Phouvong), with a population of 138,125 as of 2011. There are seven villages located within the LR 9001 road corridor. The land use alongside the road is dominated by deforested land presently converted to agricultural use for upland rice, corn and vegetables. Vacant areas of land are predominantly covered with shrubby vegetation and native grass species, with some trees dispersed along the road alignment. Rice is the staple food for the local population and it is predominantly grown during the monsoon months. Rice production is based on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible. In addition to rice cultivation, vegetables and commercial crops are also grown, among them cash crops such as coffee, mung-beans, soybeans, peanuts. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing

anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

6. *Impacts and Environmental Management Plan (EMP)*. A comprehensive screening for impacts was made for LR 9001. For the pre-maintenance phase, two potential impacts were identified related to missed/incomplete aspects of road design, and the social conflicts between the local villagers and non-residents in the area due to employment opportunities. Initial climate risk screening showed that LR 9001 is a „medium" risk category, therefore the location and design should consider meteorological data and parameters relating to severe weather conditions such as severe tropical typhoons and rainfall events to ensure appropriate future design and protection of the vulnerable sections of the road.

7. At the maintenance works stage, potential environmental impacts are: (i) Noise and air pollution; (ii) improper waste management and disposal; (iii) soil erosion and deposition of excess materials; (iv) water ponding and flooding; (v) traffic congestion; (vi) public safety along the road; and (vii) workers" health and sanitation at workers" camp These impacts are temporary and mitigation measures have been developed for inclusion in the works specifications to ensure their implementation.

8. At operational stage, potential environmental impacts are: (i) increase in road and vehicular accidents; (ii) increase in noise levels along the road corridor; and (iii) increase in air pollution from increased vehicular traffic. However, rehabilitating LR 9001 will also bring positive impacts to the communities, will provide them better access to markets, schools, medical facilities, and will create economic opportunities for them to sell their products.

9. An EMP for LR 9001 has been developed to effectively manage the environmental issues during pre-design/maintenance, during maintenance and operations. The plan includes: (i) mitigating measures to be implemented; (ii) required monitoring associated with the mitigating measures; and (iii) institutional arrangements. The EMP"s institutional arrangements define the requirements and responsibilities during the project's pre-maintenance, maintenance and operation phases. The project's executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. A National Steering Committee and a Regional Advisory Committee will be set up for the overall management of the project. The Contractor shall have the responsibility to implement the mitigation measures identified in the EMP. The Public Works Transport Institute and DPWT staff shall be responsible in coordinating with the Environmental Inspecting Agencies for environmental inspection, and with the Provincial DoNRE for compliance monitoring of the project.

10. *Consultation and Participation*. A public consultation for LR 9001 was conducted on 26 January 2015, chaired and moderated by Mr. Phetmixay Khamphakdy, Director of DPWT and assisted by Mr. Boun Nam, Deputy Governor of Xanxai. The consultation was attended by various stakeholders like representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Salavan Province, mass organizations, village leaders, affected households along the projects" road corridor. Details of the proposed project were presented to the stakeholders and their views were requested. Issues that stakeholders raised included the need for a proper design and installation of drainage system to prevent water ponding and flooding; control of erosion, landslide and deposition along the road; installation of traffic safety measures; and public and workers" safety during maintenance works. Overall, they gave their support to the

project as it will improve the local economy and facilitate access to markets, schools, medical facilities, among others.

11. *Grievance Redress Mechanism (GRM)*. Prior to commencement of maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor's field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their property/life/ business/health are compromised or damaged by the maintenance activities. The existence of the Contractor's field office shall not impede the complainant's access to the Government's judicial or administrative remedies.

12. *Conclusion and Recommendation*. Based on the environmental screening and assessment conducted for LR 9001, the ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR, project is classified as Category "B" project and will not be subjected to a full EIA study. Provided that the EMP is enforced, the project can be implemented in an environmentally acceptable and will generate both direct and indirect benefits for many people and as the project continues, bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.

1. INTRODUCTION

1. The purpose of the Project Preparation Technical Assistance (PPTA) was to define maintenance needs and future design requirements for the Lao Road Sector Governance and Maintenance Project which will help cultivate sustainable and efficient road asset management practices. This is to be done by strengthening governance and capacity in the planning, financial management and implementation of routine and periodic road maintenance activities within the Ministry of Public Works and Transport (MWPT) and the provincial Departments of Public Works and Transport (DPWTs) of Salavan, Xekong and Attapeu Provinces. The PPTA is expected to contribute to social and economic development through improved conditions for road transport in Lao PDR.

2. The Project will be implemented in the three southern provinces of Salavan, Xekong and Attapeu. The project design will include components for:

- Strengthening the institutional capacity of the MPWT and the provincial DPWTs in the undertaking of road maintenance work; and

- Financing of routine and periodic maintenance intervention programs on selected National and Local road links within the target Provinces.

3. The work in each province will include both national road and provincial/local road maintenance. Project implementation will cover road maintenance requirements definition, identification of the probable contents of future Works contracts and the establishment of appropriate procurement procedures for road maintenance in the Lao context. The responsibility for national roads falls on the MPWT through its Department of Roads (DOR) while corresponding works on local roads are implemented by the individual DPWTs located in the provincial capitals.

4. Local Road (LR) 9001 is one of the six shortlisted priority roads proposed under the Lao Road Sector Governance and Maintenance Project. Secondary data gathering, field assessment and environmental examination were conducted to determine the environmental classification of the proposed road project. The review of available project documents and related information included Lao PDR"s environmental laws, regulations and applicable environmental standards such as the legal and administrative framework for the approval and issuance of Environmental Compliance Certificate (ECC) for the Project. Data on the physical, ecological, economic and socio-cultural resources, where available, were also collected.

5. Meetings were held with the Provincial Directors of the DPWT and their concerned personnel in the District Offices to gather additional data and information on the organizational set up, staff positions and functions in preparation for the review of institutional arrangements. Meetings were also held with the Provincial Department of Natural Resources and Environment (DoNRE) and its offices to verify and confirm the procedural steps and new requirements for the application process of the project's Initial Environmental Examination (IEE) Report and approval and issuance of the ECC. Several offices of the DoNRE such as the Forest and Watershed, and Protected Area Management were also visited to gather available secondary data including forest cover maps and protected areas. Likewise, the Department of Information and Culture of the three provinces were also visited to verify the presence/location of cultural and historical sites.

6. The field survey and assessment activities included taking notes on the location/siting of the road alignments, physical, ecological, economic and socio- cultural features, physical conditions of the roads, photo documentation of the vegetation cover, and determination of the environmental classification of LR 9001 for maintenance interventions under the future „Project". The presence of protected species and/or endangered species of wildlife along the project road was investigated. These activities were conducted through ocular surveys and investigations of potential signs of the presence and/or occurrence of endangered species of wildlife by tracks on the ground, roosting areas, faecal droppings of animals. The presence of endangered species was also confirmed through interviews with local villagers. Throughout the field surveys there was no rare, endangered and protected species of wildlife encountered along the entire length of the road corridor. This can be attributed to the absence of favorable habitat requirements of the species and noise disturbance created by vehicles passing along the road.

7. The environmental examination made use of the Rapid Environmental Assessment (REA) Checklist for Roads and Highway Sector developed by ADB. Based on the REA Checklist, LR 9001 in Attapeu Province is classified under Category „B" and therefore will not be subject to a full EIA procedure. Instead, an IEE report with Environmental Management Plan (EMP) and monitoring plan is required. The REA Checklist for LR 9001 in Attapeu Province is attached as a separate **Annex R – Rapid Environmental Assessment Checklist [6 Roads].**

8. Similarly, under the Lao PDR EIA system, the project is classified under Category 1 project, i.e. projects that are small or create few impacts on the environment and society - and that are consequently required to be subject to an IEE complete with management procedures for impacts and monitoring plan.

9. The IEE Report presents the findings of the environmental examination conducted for LR 9001 located in the province of Attapeu. It is meant to ensure the environmental soundness and sustainability of the Project and to integrate environmental considerations into the Project Design and to the EMP. The IEE was conducted in adherence to the ADB"s environmental assessment guidelines and the Safeguards Policy Statement (SPS, 2009), and the Decree on EIA and the Environmental Protection Law (EPL) of the Government of Lao PDR.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

10. The legal framework for environmental management of development projects is embodied in the National Law 02/1999 or the EPL which was approved by the President on April 3, 1999. It mandates a unified environmental management with the aim of preserving the environment and making rational and sustainable use of natural resources.

11. The EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to protect the public, natural resources and biodiversity, and to ensure - sustainable socio-economic development, health and improved quality of life of the nation. The Ministry of Natural Resources and the Environment (MoNRE) is responsible for the implementation of EPL.

12. Under the EIA Decree no. 112/PM02/2010, the time frame for the review and approval of the Project IEE Document prior to the issuance of the ECC is 30 days after submission of the project IEE document.

13. While other Ministries issue guidelines for implementing provisions of the IEE and EIA and environmental protection, it is the MoNRE that is responsible for the review of the IEE and EIA and that will issue the ECC. In the case of the Road Maintenance Project, the Provincial DoNRE, where the said road is located, that reviews and issues the ECC.

14. The Decree of 2002 provides the legal tool for the implementation of the EPL and the Environmental Management Standard of 2001 which stipulates the minimum environmental standards for a Project's compliance. The Lao environmental standards have not yet been fully established but some provisional standards are in place and environmental standards used by international organizations and advanced countries have been adopted as reference compliance standards.

15. The Project is closely aligned with the Lao PDR‟s decentralization policy and ADB Country Partnership Strategy for Lao PDR 2012 to 2016, both of which support sustainable economic growth and poverty reduction by focusing on rural areas. ADB‟s 2011 Transport Sector Assessment, Strategy and Road Map for Lao PDR recognizes the need to support road maintenance as a key component of ADB‟s future assistance to the Lao PDR transport sector.

III. DESCRIPTION OF THE PROJECT

A. Location

16. The LR 9001 Road Maintenance Project starts from its junction with National road 18B in Xaisettha District and continues to Xanxai District over a total distance of 54.1 km. The first 17.0 kilometres of the route up to Ban Paam is surfaced having a DBST treatment applied under a previous ADB intervention in 2014. For PPTA purposes this segment has been assigned as Section A. Beyond section A, the road features a rough graveled surface road of about 4m width which was also reconstructed under ADB 2004 but to a sub-base course level only. For the PPTA this has been designated as Section B having a total length of 37.1 km.

17. While Section A is located in flat terrain Section B becomes progressively steeper and contains some mountainous areas in the latter half of its length where some areas have steep to very steep gradients (15% to 18%). Landslides were noted to occur at the higher elevations of the alignment between 40 km to 60 km. A total of 7 villages were noted along the road corridor. Figure 3.1 below shows the location of LR 9001 in Attapeu Province.

B. Maintenance Works and Implementation

18. The maintenance works will be implemented for a period of three years (tentatively scheduled from 2018 to 2021) through a performance based contract (PBC) and by community-based contracted efforts.

19. The PBC contracts cover only the road carriage way (excluding the roadside maintenance). The PBC contract will be implemented with the Initial Rehabilitation/Improvement works during the first few months of the contract until the road has been “restored” to a condition suitable for regular PBC contracts. The regular Routine Maintenance will be continued until the end of the 3 year period.

20. The Community-based PBC roadside routine maintenance will include culvert and ditch clearing, clearing under bridges and box-culverts and other activities as part of the CBC Maintenance Works and will also be implemented over 3 years. Table 3:1 below presents the various maintenance works and related activities likely to be required for LR 9001.

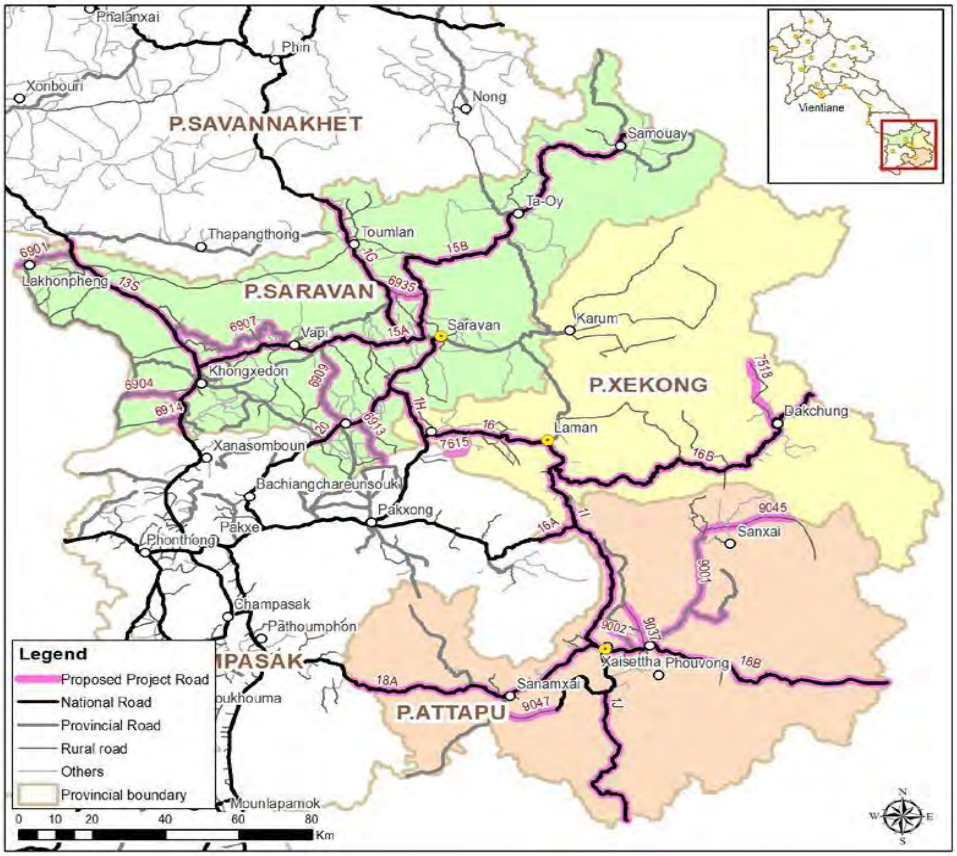


Figure 3.1: Location map of LR 9001 in Attapeu Province.

Table 3.1: Maintenance works and activities for LR 9001.

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
Patching of Potholes in DBST Surface	Repair of Sub-base, including New Material	Replacement of Timber Decks
Crack Sealing - Minor Areas	Repair of Base Course, incl. New Material	Reshaping the Road (incl. ditches)
Grading	RE-gravelling	
Spot Filling	Prime Coat	
Clearing of Ditches	First & Second Seals	
Clearing of Pipe Culverts	Install new pipe culverts with headwalls	
Repair of Ditch Lining		
Cleaning of Bridge decks Clearing River Channels of Debris	Excavation of unsuitable materials	
Maintenance of parapet rails	Maintenance of joints and bearings	
Grass and bush Cutting	Construction of Scour Checks	
	Riprap, Protection of Banks or Bed,	
	Erosion Protection by Vegetation	

ROUTINE MAINTENANCE WORKS	MINOR IMPROVEMENT WORKS	PERIODIC MAINTENANCE WORKS
TRAFFIC SAFETY:		
Repair of Signs Repair of Guard Rails	Installation of new signage	
Repair of Guard Posts Painting of line markings	Installation of new features	
Installation of slope stability measures		
Proposed Schedule for Maintenance Works Implementation:		2018 – 2021

IV. DESCRIPTION OF THE ENVIRONMENT

21. Attapeu Province is a south-eastern province of Lao PDR covering an area of 1,032 square kilometres (398 sq mi) and with a population of 123,000 as of 2010. It is composed of 5 districts namely Samakkixay, Xaysetha, Sanamxay, Xanxai and Phouvong and is bounded in the north by Xekong Province, in the west by Champasak Province, in the east by the Annamite Mountain Range which separates Attapeu from Vietnam and in the south by Cambodia.

22. A brief description of the existing environmental and socioeconomic conditions of the LR 9001 influence area is presented in the following subsections:

A. Physical Resources

23. *Topography*. Attapeu province is in the transition zone between the Annamite Mountain Range in the east and the Mekong Plains in the west, and is considered rugged, wild and scenic. It is best known for the Bolaven Plateau which shares borders with Xekong in the north, Champasak in the west, Vietnam in the east and Cambodia in the south The Xekong River valley which flows through the middle of the Province is considered as the „rice bowl" of Attapeu. It is one of the larger rice growing areas in Lao PDR, although yields are low. Up to 60% of the land area is mountainous with about 70% of that classified as being „very steep". The capital town, Samakkhixay is built in a large valley surrounded by mountains and has a virgin lake called Nong Fa located in Xanxai District to the northeast of Attapeu.

24. *Climate, Rainfall and Temperature.* The climate is dominated by monsoons, with pronounced wet and dry seasons. Most rain falls during May to September when the prevailing winds blow from the southwest. Annual rainfall ranges from 1,000 mm in the extreme south to 3,000 mm in the north. Mean temperatures range from about 10 ^{0}C in January to 38 ^{0}C in July, cooler in the north, warmer in the south. There is a marked dry season in Attapeu lasting from November to April, whilst the peak rainfall occurs in August. The climate in Attapeu is noticeably influenced by the Annamite Mountain Range, which acts as a barrier. Regions of the Annamites where the crest is low, receive more rain over a longer wet season. Table 4.1 shows the meteorological data of Attapeu Province from 2011-2013.

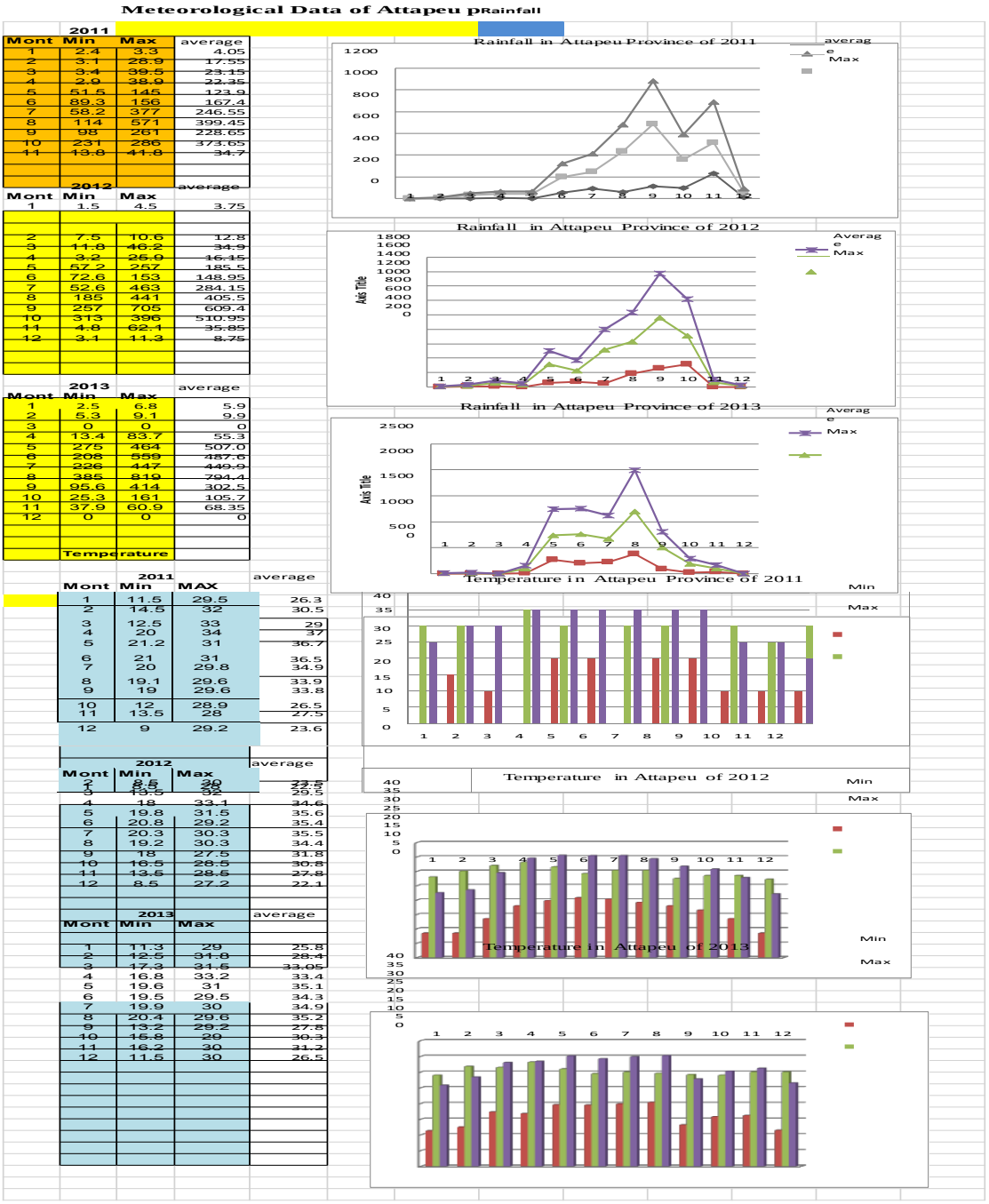
25. As of 2010, there has been limited assessment, analysis or projections concerning potential climate change impacts on the physical and social environment in Lao PDR, due to the lack of long-term climate data to support projections of future climate trends. There is, however, increasing anecdotal evidence of the dry season becoming longer, droughts becoming more frequent and severe, and incidence of unusual and extreme flood events escalating.

26. *Soils.* The soils in the southern part of Lao are generally good soils and are acid hydromorphic and contain low organic matter and nutrients, which are moderately-well suited to rice production. Acrisols make up 41% of the soil types in the lower areas. In contrast, soils in the Bolaven Plateau are less acidic and have relatively good water retention and drainage characteristics. The Xekong River floodplain is a mixture of alluvial sediments and sedimentary rocks and has highly fertile agricultural soil because of the regular flooding it receives.

27. *River System*. The Mekong River is the dominant drainage system which reaches Lao PDR from China. It enters Lao PDR, swings eastwards to Luang Prabang; then south past Vientiane then to Pakse from where it flows south into Cambodia. The Xekong River Basin is one of the most important Mekong tributaries. Its watershed (28,815 ha) includes all of Attapeu province and parts of neighbouring provinces in the country and in Cambodia. The Xekong River valley includes sections of Samakkixay, Xaysetha and Sanamxay districts. Attapeu province has at least two wetland regions of global significance: the Xe Pian-Xe Kong (Xekong) Plain Wetlands and the Xe Pian - Xe Khampho wetlands. The urban area of Attapeu straddles the confluence of the Xekong and Nam Xekhaman rivers and a lack of adequate control results in sewage finding its way into the drainage system which thereafter discharged untreated into the Nam Xekong near the central of town.

28. *Surface Water and Groundwater*. The Namxekong and Sekhaman Rivers are the main river sources of water in Attapeu Province. There are no major wetlands or ponds along the subject corridor which will be affected by the proposed maintenance interventions. The loose soils from the mountains are washed away during the rains and make the surface water turbid which in turn. The increased turbidity reduces water quality. The villagers consume less of this water due to the poor quality. The rivers are all an important resource for the local population as the water is used as a drinking water source, as irrigation for the crops and for miscellaneous other domestic uses.

Table 4.1: Meteorological data of Attapeu Province, 2011-2013.



2011			
Mont	Min	Max	average
1	2.4	3.3	4.05
2	3.1	28.9	17.55
3	3.4	39.5	23.15
4	2.9	38.9	22.35
5	51.5	145	123.9
6	89.3	156	167.4
7	58.2	377	246.55
8	114	571	399.45
9	98	261	228.65
10	231	286	373.65
11	13.8	41.8	34.7
2012			average
Mont	Min	Max	
1	1.5	4.5	3.75
2	7.5	10.6	12.8
3	11.8	46.2	34.9
4	3.2	26.9	16.15
5	57.2	257	185.5
6	72.6	153	148.95
7	52.6	463	284.15
8	185	441	405.5
9	257	705	609.4
10	313	396	510.95
11	4.8	62.1	35.85
12	3.1	11.3	8.75
2013			average
Mont	Min	Max	
1	2.5	6.8	5.9
2	5.3	9.1	9.9
3	0	0	0
4	13.4	83.7	55.3
5	275	464	507.0
6	208	559	487.6
7	226	447	449.9
8	385	819	704.4
9	95.6	414	302.5
10	25.3	161	105.7
11	37.9	60.9	68.35
12	0	0	0
	Temperature		
2011			average
Mont	Min	MAX	
1	11.5	29.5	26.3
2	14.5	32	30.5
3	12.5	33	29
4	20	34	37
5	21.2	31	36.7
6	21	31	36.5
7	20	29.8	34.9
8	19.1	29.6	33.9
9	19	29.6	33.8
10	12	28.9	26.5
11	13.5	28	27.5
12	9	29.2	23.6
2012			average
Mont	Min	Max	
2	8.5	30	23.5
3	13.5	32	29.5
4	18	33.1	34.6
5	19.8	31.5	35.6
6	20.8	29.2	35.4
7	20.3	30.3	35.5
8	19.2	30.3	34.4
9	18	27.5	31.8
10	18.5	28.5	30.8
11	13.5	28.6	27.8
12	8.5	27.2	22.1
2013			average
Mont	Min	Max	
1	11.3	29	25.8
2	12.5	31.8	28.4
3	17.3	31.6	33.05
4	16.8	33.2	33.4
5	19.6	31	35.1
6	19.5	29.5	34.3
7	19.9	30	34.9
8	20.4	29.6	35.2
9	13.2	29.2	27.8
10	15.8	29	30.3
11	16.2	30	31.2
12	11.5	30	26.5

29. *Air Quality and Noise Levels***.** Air quality levels are quite good in this region as the only polluters are occasional tractors, or mopeds and other road vehicles and. The dust emissions can be attributed to the bad condition of many of the roads. The noise levels along the corridor are very minor as there is not much traffic at present times in Section B of the subject corridor other than farm, except by tractors and the occasional motorcycle and pickup trucks that add to noise levels.

30. Air quality monitoring is still not a routine practice in Lao PDR and there is therefore, no information on the concentration of air pollutants although generally the air quality appears to be good. Due to lack of equipment and technical expertise there has been no historic collection of data on air quality in Attapeu

Province and reports. Reports on pollution levels remain anecdotal. At the present time, air quality is considered to be „good" in the Province.

31. There are almost no industries and traffic volumes are currently low by international standards. Nevertheless localised pollution does occur and the incidences are likely to increase with increased urbanisation unless action is taken to prevent or mitigate them. Identified sources include:

- Uncontrolled incineration of garbage;
- Decaying deposits of uncollected garbage;
- Wind-blown dust and debris resulting from solid waste transportation;
- Dust caused by traffic along unsealed roads; and
- Exhaust from vehicles and motorcycles – exacerbated by poor traffic management

B. Ecological Resources

32. *Flora and Fauna*. Attapeu Province is rich in natural capital. A number of flora and fauna are associated with wetland species from the Xe Pian-Xe Kong (Xekong) Plain Wetlands and the Xe Pian - Xe Khampho wetlands such as Siamese Crocodile, Purple Heron, Chinese Pond Heron, Red-wattled Lapwing, Green Peafowl, Masked Finfoot, small populations of Gaur (Bos frontalis) and Dhole.

33. The project road does not pass through any forest area. Mostly one can observe agricultural operations along the project corridor. Degraded secondary forests have been cut and developed into agricultural lands for rice cultivation, teak plantation, Coffee trees and gardening could be observed at some places. Undisturbed secondary forests are found away from project road. With the land use allocation program, the secondary forests are allocated to villagers for conservation.

34. *Fisheries.* Fishing is an important secondary activity for many farm households as a source of extra income or to supplement the family's food supply. Two thirds of farm households in Lao PDR engage in capture fisheries. Of these 92% fish in rivers, 40% in lakes and 37% in rice fields. Capture fisheries are widespread around the country: in Phongsaly in the far north, 79% of farm households fish, in Attapeu in the far south, 74% of farm household fish. Fishing is usually carried out for the household's own consumption. Only about a thousand producers have aquaculture as their main source of income. About a third of them sell some of their aquaculture products.

35. *Protected Areas.* The Lao PDR Government uses a forest classification system based on five types: 1) national, provincial and district conservation forests (designed to protect biodiversity); 2) production areas forest (for timber extraction); 3) protection forest (for watershed protection); 4) regeneration forest; and 5) degraded forest (or forest that has been over harvested and no longer able to regenerate naturally). 60% of Attapeu Province contains medium to low density forest with patches of high-density forest cover [1997] while 42% is designated as protected area forest.

36. The system of National Protected Areas (NPAs) is relatively new, having been decreed only in 1993 (see Figure 4:1). The NPA system covers about 14% of the total land area of Lao PDR, which together with protected areas established at provincial and local level, covers more than 20% of the country. The NPA system was created as the Government's commitment to biodiversity conservation.

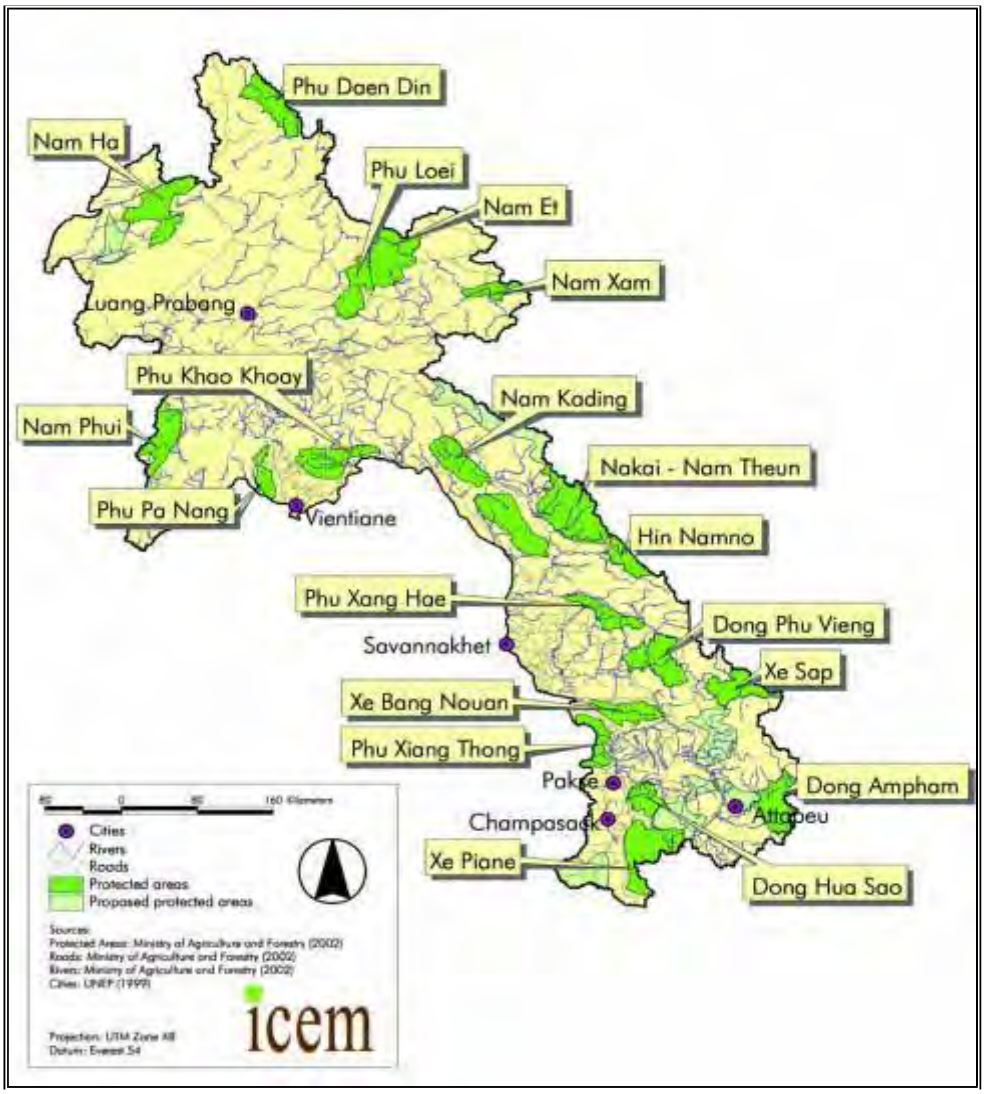


Figure 4.1: National Protected Areas in Lao PDR.

37. Attapeu province is home to two National Biodiversity Conservation Areas (NBCAs) - Xe Pian NBCA and Dong Amphan NBCA . Much of the information about biodiversity in Attapeu province comes from surveys done of these protected areas, which provide critical habitat for several species of global importance.

C. Economic Development

38. *Economy*. The economy of the province is one of the worst in the country. The province was heavily bombed during the last Indo-China war and the remains of bombs are still found along the former Ho Chi Minh trail.

39. There are only small and medium scale industrial activities in Xanxai District. The industries comprise of small scale furniture factories, sawmills, drinking water factories [including Saksith], rice mills, ice making, meat processing, print shops, television/radio repair shops, watch repair, and vehicle repair garages.

40. Lao PDR is an agricultural economy and this sector contributes more than 60% to the National GDP. Rice is the staple food for the local population and it is predominantly grown during the monsoon months in the district of Thateng. The traditional varieties of rice are grown in all irrigated areas. Rice production is based

on a system of minimum inputs - fertilizer applications are considered to be low and pesticide use is negligible.

41. In addition to rice cultivation, vegetables and commercial crops are also grown in the project area. Among the agricultural products often produced as cash crops are coffee, mung-beans, soybeans, peanuts, tobacco, cotton, sugarcane, coffee, corn, white sesame and tea. The major export products from Lao's agricultural sector are timber, lumber, plywood and coffee. Most of the commercial crops are grown for export to Thailand.

42. Most of the fruit trees found in the area are banana, orange, mango, longan, jack fruit, tamarind, guava and pineapple. People grow vegetable gardens near streams and river banks and near their houses to generate income. A variety of vegetables are grown such as cabbage, cucumber, tomatoes, lettuce, chilly eggplant and pumpkin.

43. Rural households raise pigs, goats, cows, and poultry such as chicken, ducks and turkeys and develop fish ponds. Buffaloes are used to plough the agricultural land and many households maintain 1-2 buffaloes that are used as draft animals in the rice paddy lands. Livestock is sold in the villages and at district markets to provide additional income for the local population.

44. *Transportation, Communication, Power and Water.* Attapeu Province is accessible by land, air and waterways, and accessible by passenger bus, and tour buses to Thailand, Vietnam and Cambodia. The bus terminal in the town center provides service to (Vientiane, Savannakhet Pakse, Thakek, other provinces in southern Lao PDR and international service to Thailand and Viet Nam (Hue, Da Nang and H0 Chi Minh City). Attapeu does not have an airport, but one is under construction located Nongkhang, in the southern part of the capital town. The closest airport is Pakse airport in Champasack province, which operates flights to Savannakhet, Vientiane and Luang Prabang, as well as internationally to Siem Riep, Bangkok and Ho Chi Minh City.

45. There are domestic and international telephone services operating, namely: Laotel, Enterprise of Telecommunications Lao (ETL), and Unitel. Electricity is supplied through a distribution system from hydropower projects such as Xeset, Houayhor and Sekhaman hydropower projects. There is only partial piped water supply with the rest of the requirement is met from available surface and ground water sources. Water is extracted by villagers from wells, rivers and streams in areas there is no piped water systems.

D. Socio-cultural Resources

46. *Population and Communities***.** Attapeu Province is composed of five districts (Samakkixay, Xaysetha, Sanamxay, Xanxai and Phouvong), with a population of 138,125 from year 2011. Its capital city lies at Attapeu (Muang Samakkixay. It was known as the "land of the Heroism". It is inhabited by several ethnic groups such as Lao Loum (lowland Lao) which make up only 38% of the population and the Lao Theung (upland Lao) which make up 62%. Most lowland Lao are found in Samakkixay District around Attapeu town. The upland Lao in Attapeu include the Lave (Brau), Talieng, Oy, Alak, Tsou, Ngae and Cheng, with the Lave being the largest ethnic group in Attapeu.

47. *Land Uses*. There are 7 villages along the project road corridor. The main land use along the road is devoted to coffee plantation, upland rice and corn. On hilly

areas with gently sloping and steep slopes areas are both cultivated and idle. This type of land use extends up to the forest edges. Rice cultivation, corn and vegetables is minimal in the area, coffee is the main agricultural product in the area. Between Ban Somboun to km 40 represent the most rugged terrain with steep to steeper slopes difficult and not suitable to cultivate for crop production.

Table 4.2 shows land uses adjacent to the road corridor.

Table 4.2: Adjacent Land Use

Ref. / Type	Length [km]	Residential / Commercial	Agricultural	Forest	Other
LR 9001 Section A	17.0	Km 0 to km 2 Km 12 to km 17	Km 2 to km12		
LR 9001 Section B	37.1	Km 53.7 to km 54.1	Km 17 to km 24	Km 24 to km 53.7	

48. There are several cultural, historical and natural tourism areas in Attapeu Province. The major cultural tourist destinations are: Vat Thath Chulamane (handmade ceramic pots), Taliang (weaving), Vat Ongsene Soukhalam Sakea Village, Oy Ethnic Villages, and Brao (levea) Villages. Historical tourist destinations include the Ho Chi Minh Trail and the Union of Soviet Socialist Republics (USSR) Missile site 11DM912. Natural tourist destinations include the Xe Pian NPA, Seepha Waterfall, Saeponglai Waterfall, Samongphak Waterfall, Dong Ampham NPA, Nong Fa Lake, Nong Kai Ok Lake, Tad Houa Kon and Haomong waterfalls.

49. The approximate distances of the above attractions from the centre of the subject length of LR 9001 are shown in Table 4.3 below:

Table 4.3: Distances from Roadway

Location	Attraction	Approx. Distance from Mid-point [km]
Vat Thath Chulamane	Handmade ceramic pots	6
Taliang	Weaving	5
Ongsene Soukhalam Sakea Village	Ethnic Village	17
Brao (levea) Village	Ethnic Village	2
(USSR) Missile site 11DM912	Historical site	Beside Road
	Wat Pha Saysettha	5
Xe Pian NPA	National Protected Area	45
Dong Ampham NPA	National Protected Area	89
	Nong Fa Lake	152
Tad Houa Kon	Nong Kai Ok Lake	165

50. *Public Health*. Many women and children in the villages of Sanamxay, Xaysetha and Samakkixay districts have symptoms of severe malnutrition (underweight, stunting, wasting) despite its rich wetland and forest products. Diets are low in proteins and fats. In addition, traditional food behaviours and food taboos are also a source of malnutrition. For example, newborns are fed with pre-chewed rice, and pregnant and lactating women are not allowed to eat a wide range of meat, fruit and vegetables containing vital nutrients.

51. Most villages are without adequate health facilities and those from remote villages do not visit health facilities because of distance and cost, unless the problem is serious and urgent. Trained birth assistants help in deliveries. Access to information on family planning or prevention of Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is inadequate, although more male youths are more aware of HIV/AIDS and how to prevent it than female youths.

52. *Education*. Primary and secondary schools are very limited in the project area. Schools are in district headquarters and the bigger villages. The major problem encountered in the school system is the inadequate level of training of the teaching staff and the distance needed to travel – often affected by the bad condition of the access roads. Generally, there is no statistically significant gender gap in primary and secondary education, although the quality of that education is far below the desirable national standard.

53. *Historical and Cultural Places*. Some important cultural sites in Attapeu Province are: a) Wat Sakae Temple which has a sacred Buddha image and is visited during the Lao's New year; b) old Pagoda and Xaysetha Stupa in Xaysetha District built in 1579; c) Wat Luang Muang Mai Temple built in 1939 and notable for original naga bargeboards; d) Wat Pha Xaisettha Temple in Pha Meuang where King Setthathirat of the Lan Xang is buried in a stupa.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

54. Since the Project is considered environmental Category „B", significant negative environmental impacts are not anticipated. The screening identification of potential environmental impacts were based on road designs and specific road maintenance works and activities to be implemented in LR 9001, and the presence of environmental sensitivities (e.g. topography, soils, water resources, natural hazards, including forest, protected areas, and habitats of protected species of wildlife) in the project area.

55. The identification and assessment of impacts associated with the LR 9001 project cycle include pre-implementation and implementation of maintenance works activities. Three suggestions/recommendations raised by the participants during the public consultation were considered relevant and these are now added into the implementation of mitigations and monitoring plan of LR 9001:

1. Improve/install proper drainage system to prevent water ponding and flooding;
2. Control landslides, erosion and deposition along the road;
3. Installation of traffic safety measures; and
4. The public and workers safety during the maintenance works.

A. Design/Pre-Implementation Stage

56. There are two potential impacts identified during the pre-implementation of maintenance works and these were also the same potential impacts identified and raised by the participants during the public consultation held for the LR 9001. The potential impacts are the following:

a. Missed/incomplete aspects of road and bridges design; and

b. Social conflicts between the local villagers and non-residents in the area due to employment opportunities.

57. *Road* A total of 5 bridges are present in the corridor, most of which are in good or very good condition due to the fact that they were all replaced under the aDB-10 project. They are all of concrete construction [all but 1 are single-span] and of adequate width for two lanes of traffic. The only interventions anticipated at this time are of a routine maintenance nature but with the additional of protective steel guardrail at 3 sites and some miscellaneous repairs of the original erosion protection measures.

58. *Climate risk screening.* The result of the initial screening for climate risk showed that LR 9001 is a „medium" risk project. The existing location of the road is partially situated in mountainous terrain with steep slopes that are prone to landslides during heavy rainfall events.

59. Mitigation: The extreme weather events are important and must be considered in the future design of LR 9001 – a preliminary treatment for selected area has been included in the PPTA cost estimates on a „pilot" program basis. As mentioned earlier, the lack of substantial long-term climate data to support projections of future climate trends has limited the assessment and analysis of potential impacts but there is increasing anecdotal evidence of unusual and extreme flood events escalating in the region as a whole.

60. *Social Conflicts between Local Villagers and Non-residents***.** The potential social conflict between the local villagers and non-residents in the area was identified both during the conduct of field assessment of the road alignment and during the public consultation for LR 9001.

61. Mitigation: To prevent the social conflict, the Contractor should prioritize the hiring of local villagers over non-residents for routine and other maintenance work. To ensure the hiring and employment of the locals, it must be stated in the Contractor's contract that the local residents have the priority over the non-residents.

B. Maintenance Works Stage

62. Based on the maintenance works and activities to be implemented for LR 9001, the potential impacts identified were the following: increase of dust and noise levels, pollution of surface water from wastewater and from the anticipated bridge maintenance works, and the effects of traffic and socio-economic activities.

63. *Noise and Air pollution*. There could be an increase in dust/air and noise pollution levels during transport, loading and unloading of materials for road maintenance works; from clearing, grubbing and excavation activities; and from the

hauling and transport of maintenance equipment. Emissions from trucks and other transport vehicles and noise from the operation of equipment can have a considerable impact on the villagers whose houses are located immediately along the road.

64. Mitigation: Dust/air and noise pollution can be controlled and mitigated by: (i) regular watering of exposed areas; (ii) covering all trucks carrying dispersible materials to or from the site; (iii) ensuring all construction vehicles and equipment are well-maintained; (iv) limiting maintenance works at day time only to avoid noise at night time; and (v) informing local communities about the schedule and duration of the maintenance works. Emissions of air pollutants including nitrous oxide, carbon monoxide and hydrocarbons are considered as mild to moderate because the number of machineries is small, and the construction area is large. Smoke and foul odors may emanate from burning fuel wood for heating bitumen. Impacts from air and noise pollution will be low since there are only nine villages, with low population density, throughout the length of LR 9001. Concentration levels of dust and air quality will be maintained to the allowable environmental standards (based on Ambient Air Quality Standards of the National Environmental Standards VN02734 /PMU/WREA (2009).

65. *Waste management and disposal.* Indiscriminate dumping and disposal of solid and hazardous wastes could pollute nearby water bodies and cause detrimental effects to aquatic flora and fauna and to downstream water users,

65. Mitigation: There should be a regular collection and disposal of solid and hazardous wastes. The removal of topsoil, stockpiles, maintenance debris and other waste deposits should be closely monitored to avoid dumping in nearby water bodies might have a detrimental effect on aquatic flora and fauna and should be avoided. Temporary toilet facilities with adequate water supply and strict enforcement of proper sanitation procedures should be imposed.

66. *Soil erosion and deposition of excess material*s from road grading and excavation activities to waterways and farmlands.

67. Mitigation: These cascading impacts are most likely to occur without supervision of the maintenance works and proper storage location of excess materials for future use and disposal of unsuitable materials. The mitigating measures to prevent these impacts is to locate stockpiling of soils in flat areas and as far as possible from drainage routes; settling ponds and temporary drainage ditches; and the provision of protective cover for exposed soils particularly during rainfall events.

68. *Water ponding and flooding* due to improper execution of maintenance works and activities can become a regular occurrence if the natural drainage system is clogged and blocked by waste materials and if pipe culverts are broken or have deteriorated.

69. Mitigation: Some measures to mitigate these impacts is to locate stockpiling of soils in flat areas and far from drainage routes; settling ponds and temporary drainage ditches for runoff; and provision of protective cover for exposed soils particularly during rainfall events.

70. *Traffic Congestion*. A traffic slowdown is likely to happen during maintenance works due to temporary road closure.

71. Mitigation: A traffic management plan including single lane operation schemes to prevent stalling of vehicles along the road must be prepared by the Contractor prior to implementation of maintenance works The traffic management

plan shall be submitted to the supervision staff for referral to concerned local authorities as part of the approval process well in advance of operations. The Contractor will maintain compliance with the approved traffic management plan and shall give notice of impending works in a weekly schedule submission.

72. *Public Safety along the Road.* Public safety will be an important responsibility of the Contractor during the implementation of the maintenance works to prevent vehicular road accidents and loss of human lives.

73. Mitigation: With strict enforcement of traffic rules and regulations, designation of traffic control operators in critical times and compliance with the traffic management plan, these impacts will be prevented or mitigated.

74. *Local Air Pollution and Noise.* Due to Concrete Batching Plant. The operation of the Concrete Batching Plant together with a crushing plant will generate huge amount of dust into the air. Without any mitigating measure, dust generation could be problematic during dry periods and during operation of plant facilities. Prolonged exposure to this type of dust will potentially cause respiratory illness.

75. Mitigation Prior to establishment of construction-related facilities the contractor will secure necessary approvals as well as other required agreements prior to establishment and operation of construction related facilities. The contractor will also ensure that facilities that will result to emission of high dust and elevated noise levels and will be located at least 3,000 m from sensitive receptors (residential/housing areas, schools, medical facilities, places of worship, cultural sites, etc.).

76. *Workers' Health and Sanitation at Workers' Camp*. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for disease vectors to easily multiply and infect the workers. This may lead to the transmission of diseases from the workers camp to other areas.

77. Mitigation. The Contractor shall identify the appropriate location for the workers‟ camp, with provisions of temporary toilet facilities, wash and bath areas with adequate supply of potable water. Proper sanitation processes must be strictly enforced.

C. Operational Stage

78. The potential environmental impacts during the operation phase are the following:

i. Increase in road and vehicular accidents;
ii. Increase in noise and vibration levels along the road corridor; and
iii. Air pollution.

79. *Mitigation Measures.* The implementation of the environmental mitigating measures are the responsibilities of the Contractor as stated in his/her contract This includes compliance to the environmental standards of the GoL such as the allowable noise and vibration levels, ambient air and water quality standards.

80. The corresponding mitigation measures for impacts during the stages of project implementation are (i.e. pre-maintenance, maintenance and operation) are given in Table 8.1. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

81. *Public Consultation*. Public consultation meetings were held for the six shortlisted priority Road Maintenance Projects in Salavan, Xekong and Attapeu provinces from 12 to 26 January 2014. The public consultation for LR 9001 in Attapeu Province was conducted on 26 January 2015, chaired by Mr. Phetmixay Khamphakdy, Director of DPWT and assisted by Mr. Boun Nam, Deputy Governor of Xanxai as Vice Chairman.

82. The attendees of the public consultation were composed of representatives from the Districts and Provincial DPWT, District Governor, concerned local government agencies of Attapeu Province, mass organizations, village leaders, affected households along the projects" road corridor. The participants were also given a Project Information Handout translated into the Lao language.

83. The Director of DPWT officially initiated the public consultation and welcomed the participants to the consultation activities. The objective was to introduce the road maintenance project by providing the project's background and description, the maintenance works and implementation schedule. The background information and description of the Project and maintenance works for LR 9001, potential impacts and benefits to be generated were presented and discussed. The participants were also informed of the compliance of the project to the environmental and safeguards policy of the ADB as well as to the EIA procedures and requirements for the approval of the Project IEE Report, and the subsequent issuance of the ECC by the DoNRE. Other topics mentioned and clarified during the consultation included:

84. The main activities of the public consultation were:

a) grievance redress mechanism;
b) roles and responsibilities of concerned government agencies for implementation of mitigating measures and monitoring activities; and
c) community participation during implementation of the project. The participants were also informed that future public consultations will be held for the detailed design and prior to the implementation of the project.
d) disseminating information with project information handouts;
e) presenting the projects" objectives, locations, designs and cost estimates, tentative implementation schedules, the potential environmental impacts caused by each project and proposed mitigation measures, and the EMP and Environmental Monitoring Program;
f) discussing the opinions, perceptions, and suggestions of the project- affected villagers;
g) clarifying loss of their land for sub-project implementation;
h) identifying issues related to project environmental impacts on the community;
i) inclusion of the participants" opinions into design alternatives;
j) identifying levels and scope of community participation in project implementation; and
k) understanding of the overall goals and benefits of the project.

85. The participants were encouraged to give or raise their comments, issues, clarifications and suggestions about the proposed maintenance works, road design and implementation. A synthesis of the comments, issues, clarifications and suggestions of the participants are provided below.

86. *Head of DPWT of Attapeu Province*

- The project will bring more benefits to local communities so all parties concerned should be responsible for maintaining the road so that it lasts longer and provide convenience in public transport throughout the year;
- The road maintenance project is important for all member communities for easy transportation, poverty reduction and infrastructure development;
- All communities should participate in maintenance and join social-economic development in this region;
- Conduct educational awareness and understanding about this project to all villages and should follow national regulation and Public Work and Transport law;
- During rainy season, several areas in the mountainous region have eroded and damaged many roads. Therefore, the government support budget for maintenance work every year;
- Segment Km 33-36 is a very mountainous area and often during the rainy season, several areas become eroded and materials often slip down to the road surface. There is inefficient drainage systems particularly from in the segment from km 34-35 and min or retaining wall or gabion protection is likely to be required
- Rural roads in Attapeu province are supported by donors such as KFW (Germany), IFAD, WB and ADB. Therefore, all organizations concerned should maintain the roads and keep them in good condition.

87. *Representatives of Xanxai District*

- This project very useful for all staff in Xanxai district. It will provide more economic benefits (commercial exchange);
- In the mountainous areas, there are many areas where erosion and sedimentation occur. Road maintenance is important for economic growth in this region, especially for transport of vegetable products to the market and easy access to public health and education facilities;
- The design and monitoring should follow technical standard of Public Work and Transport guideline (PWT), for quality control effectiveness;
- Expressed that this public consultation meeting will bring success; hoped that the project will be implemented timely, with strong support and assistance, and understanding of the main objectives and goals of the project;
- Drainage system should be stable and installed properly to ensure water flows smoothly in inlet and outlet of drainage system;
- Materials used such as sand, soil should be controlled properly;
- Retaining wall should be properly constructed at risk places; concrete pave at some risk section of the mountainous area;
- Sharp curve should be widened to avoid accident; and
- Educate all staff so they understand the project activities, especially traffic signs and regulation and PWT Law.

88. *Concerned Local Government Agencies of Xanxai District*

- Raised the need to install erosion protection in high embankment because of erosion in several areas during heavy rains Support and cooperate with project during implementation stage;
- Install traffic signs and barricades in mountainous areas;
- Consider road widening for Bus Stops in some areas;
- Expressed the benefits from the project such as: a) local population can send their children to the schools; b) access to the health centers will be improved; in case of emergency they can consult the district hospital which is fairly equipped with medical equipment; c) Property prices by the road will also go up;
- Raised the need for all concerned people living along the road project to closely; participate in the project during construction phase;
- All traffic signs should be maintained properly; and
- Educate all communities so they understand and help in management of road improvement.

89. *Mass Organizations*

- The project will be useful for infrastructure development in this region;
- Existing drainage system should be maintained as many locations within the village have been blocked and heavily damaged. Every year, there are floods during the rainy season affecting villagers and other property aspects; and
- Raised the need to support this project so that it will be completed on time, observe proper road designs, keep standards and follow PWT regulation.

90. *Chief of Villages and Local Villagers' Perspective*

- This project will bring more benefits to local peoples for transportation- easy access to market, schools and health care center;
- It will be useful for infrastructure development in this region
- There should be close cooperation with Governor of Xanxai to solve issues affecting the community such as in land use, agriculture and any land properties;
- The project will improve local production as it will provide easy access to market and facilitate commercial exchange/ trade between local community and Xanxai District;
- Villagers are happy to hear that the project will be implemented as soon as possible, since it will facilitate access to school, local market and hospital; and
- Raised the issue of flooding during rainy season, because currently Ban Vangxay is located lower than the existing road; suggested that the project should install proper drainage to avoid flooding and bad odor in the communities.

91. The following suggestions/recommendations raised by the participants during the public consultation were considered where possible, added into the proposed mitigations and monitoring plan for LR 9001:

- Improve/install proper drainage system to prevent water ponding and flooding;

- Control land slide, erosion and deposition along the road;
- Installation of traffic safety measures; and
- The public and workers safety during the maintenance works.

92. *Information Disclosure*. In line with ADB‟s Public Communications Policy, relevant information (whether positive or negative) about social and environmental safeguard issues will be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation. ADB will post the safeguard documents on its website:

- The Initial Environmental Examination Report and the Environmental Management Plan (EMP); and
- Public consultation/meeting report and the Environmental Monitoring Reports submitted during project implementation, upon receipt.

VII. GRIEVANCE REDRESS MECHANISM

93. Prior to commencement of site maintenance works or other project activities, the Project Manager and the Contractor will institute a system that will allow for receiving/recording and immediately responding to any project-related complaints. The field office of the Contractor shall serve as the office to receive the complaints of the project-affected person or group of persons and the members of the communities along the project road maintenance. At road maintenance sites, the Contractor will install notice boards to publicize the name and telephone numbers of the Contractor.

94. The Contractor, in coordination with the environmental officer, will record and document all the complaints received by the Contractor’s field office. The Contractor and the environmental officer shall immediately process and resolve the complaints, disputes or questions received about the road maintenance. Any individual, household or organization can lodge a complaint against the Contractor if her/his or their properties/life/ business/health are compromised or damaged by the maintenance active

95. The existence of the Contractor’s field office shall not impede the complainant’s access to the Government’s judicial or administrative remedies. Resolution of issues under the Grievance Redress Mechanism (GRM) shall consist of the following steps:

Table 7.1: Steps for resolution of issues under the GRM.

Grievance Resolution Step	Process
Receiving a Complaint	A complaint may be made verbally or in written form and shall be filed in the field office of the Contractor. A grievance letter can also be sent to the DPWT office with a copy to the local government units. If the complainant does not know how to send a grievance letter, the assistance of third-parties, such as media or local government officials, can be tapped to send this letter to the Contractor and/or to the DPWT.
Receive and Register a Complaint	Once a complaint has been received, it is registered by the DPWT/ RRMO with local officials and all concerned parties notified properly. Within a maximum 5 calendar days a reply in written form from the DPWT or Contractor will be sent back to the complainant with a copy to the local officials.
Screen for Eligibility and Assess the Complaint	DPWT officer, in close coordination with Contractor, should determine if the complaint is attributable to the Project and if it is within the scope of the Grievance Redress Mechanism. It then identifies who will conduct the assessment of the problem. This may include technical officers from the Project team or its consultants and Contractors.
Assess the Problem Caused by the Project maintenance activities	In case the complaint is related to the Project activities, representatives of the DPWT and the chosen assessment unit will visit the complainant and the site where a problem is reported. The assessment should be implemented with participation of the complainant and witnesses, such as local officials and the results of the assessment should be agreed upon and signed by the complainant, representatives of project owner/Contractor, DPWT, assessment unit and local officials. If one side is not satisfied with the assessment results, they can propose another method or another assessment unit to re-assess the impacts until the assessment satisfies both sides.
Select Grievance Resolution Approaches	Resolution of the grievance may be approached several ways. Some common approaches are as follows: a. The complainant proposes a solution, based on their self-evaluation of their impact or damages; b. The project owner/Contractor proposes a solution, based on the legal regulation and their assessment of the damages; c. The complainant and project owner/Contractor negotiate; or d. The two sides defer to a third party (local mediating committee), government agencies with the participation of environmental management units. In case resolution is not achieved by these bodies, both sides may request a court to decide.
Compensate Damages Caused by the Project Activities and Communicate Back to All Parties Involved	After arriving at an agreement, the Contractor will immediately compensate the complainant, if appropriate. The compensation may be in money and/or in kind (for example land, construction materials, house, etc.) depending on the agreement between the two sides or by decision of courts. Compensation also includes restoration of the damaged environment caused by the project activities, if the complainant requires.
Closure	A documentation of the process is prepared and signed by the complainant, representatives of the project owner/Contractor and local PC and distributed. The process may be monitored by Community officials/organizations

VIII. ENVIRONMENTAL MANAGEMENT PLAN

96. This section addresses the need for mitigation and management measures for LR 9001. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) institutional arrangement for implementation.

97. To ensure funds will be allocated and made available for the implementation of the EMP, provisions in the bid documents should include the cost of implementing the EMP to be borne by the Contractor. Likewise, the Contractor's contract document should also contain the bid prices. The budgetary requirements of the EMP will be taken as part of project preparation costs. The Contractors‟ office operations will be included in the maintenance works costs. Capacity building cost will be part of the construction supervision contract.

A. Environmental Mitigation

98. Mitigation Measures. The corresponding mitigation measures for impacts during the stages of project implementation (i.e. pre-maintenance, maintenance and operation) are given in the matrix below. The mitigation measures for each impact are meant to eliminate if not reduce the significance to manageable and acceptable level. Timely implementation of the mitigation measures is important to avoid and control the unwanted or negative effects of project implementation. Table 8:1 shows the summary matrix of environmental mitigation measures.

B. Environmental Monitoring

99. The Environmental Monitoring Plan [EMoP] is provided in Table 8:2. The monitoring plan focuses on the three phases of the project implementation (i.e., Design/pre-maintenance, maintenance works, and operation), monitoring locations, frequency, method of data collection, and responsible institutions. It includes the estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected negative environmental impacts of the project.

C. Reporting

100. The monitoring plan spans the project cycle from design/pre-implementation, maintenance works and operational phases of the projects. The EA will be in charge of project and shall oversee the implementation of the monitoring plans by the provincial PWTs with support provided by the project/construction supervision consultant.

101. The DPWT provincial steering committees with the assistance of project/construction supervision consultant are responsible for preparing and submission of the quarterly reports on the evaluation and results of the monitoring activities to the National Steering Committee for consolidation and subsequent submission to ADB. The quarterly reports will include compiled monthly reports submitted by the contractors, and environment specialists.

Table 8.1: Summary Matrix of Environmental Mitigation Measures

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
Pre-maintenance					
Inappropriate/ incomplete Road Design	Revise & finalize Road Design improvement	Detail design	Road design Consultant	MPWT	MPWT-Included in the Ministry's budget appropriation; Consultant-included in the consultant's budget
Social conflict	Contractor to prioritize hiring of workers from the local villages	Employment/ Hiring of Workers	Contractor	DPWT Environmental Officer	Contractor-included in Contractor's contract; DPWT-included in DPWT"s budget allocation
Maintenance					
Loss of vegetation Protection & Soil erosion	Replanting of Vegetation, provision of protective cover for exposed soil materials	End of Maintenance Works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Increase levels of noise	Contractors shall comply w/ the levels of noise standards	Transport of works materials, hauling of garbage, debris and unsuitable materials from excavation activities	Contractor	MONRE, PWTI-DPWT Environmental Officer; village representative	Contractor-included in Contractor's contract; MONRE-included in MONRE"s budget allocation; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Dust annoyance & air pollution	Dust suppression by watering of dry surface of the road	Grading, excavation of unsuitable materials	Contractor	MONRE, PWTI-DPWT Environmental officer & Village representative	Contractor-included in the Contractor's contract; MONRE-included in MONRE"s budget allocation; Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Landslides, erosion of excess and open soils & deposition of rocks on road shoulders and ditches	Erosion Protection by gabions & planting vegetation, Appropriate location and storing of	Clearing & repair of ditches, Repair of sub-base & base coarse including new material, Installation of slope	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	works materials, excess soils & materials from grading & excavation should be protected with cover especially during rainfall	stability measures, Scarifying of existing road			community-based implementation
Siltation & blockage Of water flow	Proper supervision of bridge maintenance works	Cleaning of bridge decks and Clearing river channels of debris	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in DPWT"s budget allocation; Village representative-included in the community-based implementation
Flooding	Proper grading and backfilling, appropriate siting & size of culverts for quick flow to the drainage system	Reshaping the road (incl. ditches), Scarifying of existing road, Installation of slope stability measures,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Encroachment of Public properties by deposition of rocks and unsuitable materials, and workers" camp garbage	Suitable site location prepared for the temporary placement excess materials for maintenance works, Proper supervision during maintenance works	Clearing of ditches & pipe culverts, AC surfacing - 50 mm,	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Traffic congestion	Implement Traffic rerouting, coordinate traffic management plan w/ the local traffic management authority	Implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT"s budget allocation; Village representative-included in the community-based implementation
Public safety/ Road accidents	Proper placement of traffic and warning signs, painting of	Repair & installation of new traffic signs, new guard rails, guard posts,	Contractor	PWTI-DPWT Environmental Officer;	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-

Type of Impact	Mitigation Measures	Project Component	Institutional Responsibilities		Cost Estimates
			Implementation	Monitoring	
	road lanes and pedestrian lanes	and re-painting of traffic lane lines		Village representative	DPWT‟s budget allocation; Village representative-included in the community-based implementation
Workers‟ protection, health and sanitation	Contractor to provide workers with protective gears, proper location of workers‟ camp and supply of potable water	During implementation of maintenance works	Contractor	PWTI-DPWT Environmental Officer; Village representative	Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Solid waste mgt. and Disposal	Periodic collection and proper disposal at approved site by local authorities	During implementation of maintenance works	Contractor	DONRE, PWTI-DPWT Environmental Officer; Village representative	Contractor-included in the Contractor's contract; MONRE-included in MONRE‟s budget allocation; Contractor-included in Contractor's contract; PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation
Operation					
Road safety & traffic management	Maintain traffic signs, guard and protection rails at strategic locations; traffic management turn over to local authorities	End of maintenance works	DPWT	PWTI-DPWT and members of the local villages	PWTI-DPWT-included in PWTI-DPWT‟s budget allocation; Village representative-included in the community-based implementation

Table 8.2: Environmental Monitoring Plan

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
Pre-maintenance						
Incomplete road design	Updated road design	Office of the consultant	Determine Changes in road designs	Prior to implementation	MPWT	Included in the Design consultant appropriated budget
Social conflict	Employed workers	Contractor's Office & worksites	Check Contractor's Record of Employed workers	Prior to project implementation	DPWT	DPWT-included in operating expenses
Construction/ Maintenance						
Excessive dust & Air pollution	Watering of the road surface to suppress dust	All work sites of the road	Ocular/visual inspection	During works activities	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Noise and vibrations	Level of Noise and vibration	All work sites	Noise meter	9:00 AM to 10:00 AM and 2:00 PM to 3:00 PM	MONRE, DPWT & Village representative	MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based participation
Water quality	pH, BOD, coliforms	At bridge Work site & 30 meters downstream	Laboratory Water analysis	1x Before bride works; 1x per month During bridge Works; 1x after Bridge works	MONRE, DPWT & Village representative	Contractor-included in the Contractor's contract MONRE-included in MONRE"s budget. DPWT-included in DPWT"s budget appropriation Budget. Villager-included in the community-based

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
						participation
Erosion & deposition Of construction Materials and soil	Exposed & unprotected Construction Materials and soils	All work sites	Ocular/visual Inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Siltation & blockage Of water flow	Deposition of debris, rocks & soils	At bridge works	Ocular/visual inspection	1x per week	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Flooding	Drainage & canals	Road alignment	Ocular/visual inspection	During rainfall	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Encroachment of Private properties	Deposition of excess soils from grading and backfilling	Road alignment for grading and backfilling	Ocular/visual inspection	During road grading and backfilling	DPWT Environmental officer & Village representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Traffic congestion	Contractor's traffic management plan	At high population density areas (e.g. markets & schools)	Visual/ocular	During high activity hours in the AM and PM	DPWT Environmental officer & Village Representative in coordination with the local management authority	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Public safety/ Road accidents	Installed traffic signs, detour routes, protection/guard Rails, painting of Road lanes	At road junctions, markets and school zones	Visual/ocular	During maintenance works	DPWT Environmental officer & Village Representative	DPWT-included in DPWT‟s budget appropriation; Villager-included in the budget of community-based participation
Workers‟ protection, health and sanitation	Provision of appropriate workers‟ camp, protective gears	At workers‟ camp and work sites	Visual/ocular	During working hours and 1x a week for health and sanitation	DPWT Environmental officer & Village	DPWT Environmental officer & Village Representative

Issues	What to monitor	Where to monitor	How to Monitor	When to Monitor	Who will monitor	Estimated Cost
	and water supply by the Contractor				Representative	
Solid waste mgt. and Disposal	Contractors management plan and disposal site	At workers‟ camp and work sites	Visual/ocular	1x a week	MONRE, DPWT Environmental officer & Village representative	MONRE-included in MONRE‟s budget. DPWT-included in DPWT‟s budget appropriation Budget. Villager-included in the community-based participation
Operation						
Road safety & traffic management						

102. The environmental parameters to monitor the project's compliance to the environmental regulations and standards of the GoL are presented in the tables below. These environmental standards and parameters are prescribed in the National Environmental Standards Order No. 734/PMU-WREA (2009). The environmental standards for noise levels, air and water quality will be complied by the Project if necessary, and shall be monitored by the DoNRE, Environmental Officer of the DPWT and representatives from the local villagers.

103. Table 8.3 presents the ambient surface water quality parameters.

Table 8.3 Lao PDR Ambient Surface Water Quality Parameters and Standards

Parameters	Units	Standard Value1 Lao PDR	CA – Annex C Standard[2]
pH		5-9	
Dissolved Oxygen	mg/l	6.0 >6.0 -	
BOD5	mg/l	1.5	1.5 -
Total coliform bacteria	MPN/ml	5,000	5,000 -
Total faecal coliform	MPN/ml	1,000	1,000 -
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014			

104. Table 8.4 presents the noise standards for different type of areas with the required standard values and time duration for each area. Noise emission and ambient noise levels shall be in compliance with the Lao National Environmental Standard for noise

Table 8.4. Lao PDR Noise Standards

Type of Area	Time & Standard Value in dB(A)[1]			WHO Guideline[2] in dB(A)	
	6:00-18:00	18:00-22:00	22:00-6:00	Indoor	Outdoor
Quiet Areas: Hospitals, treatment places and schools	50	45	40	#1-35	55
Residential Areas: Hotels and Houses	55	55	45	30-35	45
Commercial & Service Areas	70	70	50	70-85	70-85
Small Industrial located in residential areas	70	70	50	70	70
SOURCE: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project May, 2014 dB (A) [1] Lao PDR noise standards					

105. Table 8.5 presents air quality standards and the parameters to monitor. Air emission and ambient air levels shall be in compliance with the Lao PDR's National Environmental Standard (2009) for ambient air quality.

Table 8.5 Lao PDR Air Quality Parameters and Standards

Parameters/ Symbol	Average Time Unit[1] (hr.)		
	1 hr.	8 hr.	24 hr.
Carbon monoxide / CO	30	10.26	-
Nitrogen dioxide / NO2	0.32	-	-
Sulphur dioxide / SO2	0.78	-	0.30
Total suspended Particulate / TSP	-	-	0.12
Particulate Matter less than 10 microns / PM-10	-	-	0.12
Source: Updated Environmental Impact Assessment for Nam Ngiep 1 Hydropower Project			

106. Currently, the air quality of three project provinces in southern Lao PDR is still relatively good. The gaseous pollutants like carbon monoxide, sulphur dioxide, nitrogen dioxide from vehicular traffic is well dispersed in the open terrain and with adequate dispersion in the wide streets of the villages and towns. Dust arises as traffic passes over unsealed shoulders of roads. This road condition is a common observation along segments of the proposed road project corridor. The areas near the towns also have potential sources of air pollution mainly from domestic sources.

107. These areas are more polluted due to some significant town development as well as emissions from a few low industrial establishments but these are not yet significant to cause impacts on air quality based on observation. The other source of air pollutant is dust arising from the ground and soil disturbance. Based on observation and as experienced during the environmental assessment, dust concentrations from the shoulders of the road as vehicles pass will be higher within a distance of 10m. However, the level of concentrations are not expected to be high enough to significantly obscure the visibility along the road.

Institutional Arrangements

108. The project's executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

109. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PWTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

110. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections, and with the Provincial DoNRE for compliance monitoring of the Project.

IX. CONCLUSION AND RECOMMENDATIONS

111. The environmental screening and assessment conducted for LR 9001 was performed to determine the environmental classification of the proposed project. The ADB environmental safeguards policy (SPS, 2009) and the Decree on EIA and the Environmental Protection Law of the Government of Lao PDR were followed in conduct of the environmental analysis and classification of the road maintenance project.

112. The REA Checklist developed by ADB for roads and highways sector was used to categorize the priority road maintenance project under the Lao Road Sector Governance and Maintenance Project. The results of the assessments indicate that the project is classified as Category “B” project.

113. Similarly, under the Lao PDR EIA system the project is classified under Category „1‟ project as it is small and creates few impacts on the environment and society. It therefore requires only an IEE Report with associated management of impacts and a monitoring plan. The road project is classified as Category “B” project and will not need to be subjected to a full EIA study.

114. The following Institutional arrangement is proposed as a recommendation for the implementation of the EMP and monitoring plan as follows:

115. The project’s executing agency will be the MPWT and DoR will be the implementing agency, while the three DPWTs in Salavan, Xekong and Attapeu will be the implementing units. For the overall management of the project, a National Steering Committee and a Regional Advisory Committee will be set up.

116. Staff from the MPWT‟s Division of Environmental Management under the Public Works Transport Institute (PTI) will be involved in the Environmental Monitoring and Evaluation, together with the Provincial and District offices of DPWT.

117. The Contractor of the road maintenance shall have the responsibility to implement the mitigation measures identified in the EMP. The DPWT staff shall have the duty and responsibility to coordinate with the Environmental Inspecting Agencies to conduct environmental inspections and with the Provincial DoNRE for compliance monitoring of the Projects.

118. It is concluded that the future Project will create opportunities for generating both direct and indirect benefits for many people and as the project continues, to bring about poverty reduction - an important goal of both the Government of the Lao PDR and of the ADB.