

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity



Ministry of Public Works and Transport
Department of Water Supply



Scaling-Up Water Supply, Sanitation, and Hygiene Project

IDA Project No.: SWSSHP (P-164901)

**Jointly Implemented by the Ministry of Public Works and
Transport & the Ministry of Health of Lao PDR**

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
FOR WATER SUPPLY SYSTEM (WSS)
IN OUDOMXAY PROVINCE

April 2024

ABBREVIATIONS

| | | |
|----------|---|---|
| AMSL | : | Above Mean Sea Level |
| CCL | : | Comité de Coopération avec Laos (a French Non-Governmental Organization) |
| C-ESMP | : | Contractor's Environmental and Social Management Plan |
| CLTS | : | Community-Led Total Sanitation |
| CMU | : | Component Management Unit |
| CWSS | : | Community Water Supply System |
| DHHP | : | Department of Hygiene and Health Promotion |
| DMA | : | District Metering Area |
| DONRE | : | District Natural Resources and Environment Department |
| DPD | : | N,N-diethyl-p-phenylenediamine (A method of measuring the chlorine residual in water) |
| DPWT | : | Department of Public Works and Transport |
| DWS | : | Department of Water Supply |
| EC | : | Electronic Conductivity |
| EPL | : | Environmental Protection Law |
| ES | : | Environmental and Social |
| ES COP | : | Environmental and Social Codes of Practices |
| ESHS | : | Environmental, Social, Health and Safety |
| ESMF | : | Environmental and Social Management Framework |
| ESMP | : | Environmental and Social Management Plan |
| ESS | : | Environmental and Social Screening |
| HGN DP | : | Health Governance and Nutrition Development Project |
| HH | : | Households |
| HMIS | : | Health Management Information System |
| ICT | : | Information and Communication Technologies |
| IEE | : | Initial Environmental Examination |
| Lao PDR | : | Lao People's Democratic Republic |
| M&E | : | Monitoring and Evaluation |
| MOH | : | Ministry of Health |
| MONRE | : | Ministry of Natural Resources and Environment |
| MPWT | : | Ministry of Public Works and Transportation |
| Nam Saat | : | National Center for Environmental Health and Water Supply |
| NGPES | : | National Growth and Poverty Eradication Strategy |
| NSEDP | : | National Social Economic Development Plan |
| NTU | : | Nephelometric Turbidity Units |
| O&M | : | Operation and Maintenance |
| ODF | : | Open Defecation Free |
| OP/BP | : | The World Bank's Operational Policy/Bank Procedure |

| | | |
|--------|---|---|
| PDO | : | Project Development Objective |
| PH | : | Potential of Hydrogen |
| PIUs | : | Project Implementation Units |
| PMU | : | Project Management Unit |
| PNP | : | Provincial Nam Papa |
| PONRE | : | Provincial Natural Resources and Environment Department |
| PSC | : | Project Steering Committee |
| RP | : | Resettlement Plan |
| SBCC | : | Social and Behavior Change and Communications |
| SDG | : | Sustainable Development Goal |
| SF | : | Sanitation Facilities |
| SWSSHP | : | Scaling-Up Water Supply, Sanitation and Hygiene Project |
| TDS | : | Total Dispersible Soluble |
| UXO | : | Un Exploded Ordinance |
| VDC | : | Village Development Committee |
| WASH | : | Water Supply, Sanitation and Hygiene |
| WSP | : | Water and Sanitation Program |
| WSS | : | Water Supply System (Nam Papa) |
| WTP | : | Water Treatment Plant |

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1. Introduction

1. The Scaling-Up Water Supply, Sanitation and Hygiene Project (SWSSHP, the Project) supports the multi-sector convergence on nutrition. The Project budget is US\$25 million, funded by the Government of Lao PDRs and the World Bank. SWSSHP is implemented by the Ministry of Public Works and Transport (MPWT) and the Ministry of Health (MOH). A Project Management Unit (PMU) has been established in the Department of Water Supply (DWS) under the MPWT and a Component Management Unit (CMU) has been established in the Department of Hygiene and Health Promotion (DHHP) under the MOH.

2. The SWSSHP aims to provide access to improved water supply, sanitation and hygiene services in selected rural and peri-urban areas. The Project has four components, including: (1) Delivery of infrastructure and sustainability of water supply and sanitation, (2) Sustainability of community water supply, sanitation, and hygiene support, (3) Implementation support and sector development, and (4) Contingency emergency response. The project has been being implemented in 12 districts of four provinces located in the northern mountainous region of Lao PDR including Phongsaly, Oudomxay, Houaphan and Xiengkhouang provinces. The Project planned to support Water Supply Systems (WSS) in 12 Clusters and 68 Community Water Supply Systems (CWSSs, of very small scale), and 90 sanitation facilities (SF) at existing schools and health centers. For Oudomxay province, 2 WSSs (Moutun and Phonexay), 10 CWSS and 24 SF were proposed.

3. The Project's Environmental and Social Management Framework (ESMF) was prepared during Project preparation. Accordingly, Environmental and Social Screening (ESS) was conducted for the WSS subprojects. Meanwhile, Environmental and Social Codes of Practices (ESCOPs, introduced in the ESMF) has been/will be applied for the construction of smaller Community Water Supply Systems (CWSS) and SF.

4. ESS was conducted by the Project Implementation Units (PIUs) based on two ESS checklist forms in the ESMF. The results of ES screenings for the two WSSs (Moutun and Phonexay Clusters) in Odomxay province are summarized below.

- None of proposed Moutun and Phonexay WSSs are in the Negative List (Annex 4) of the ESMF. The main elements of each proposed WSS (such as water treatment plan and office, access roads, raw water intake and clean water distribution pipes) are not located in protected areas. Therefore, both WSSs are eligible for receiving financing (for more refer to annex-1 screening form).
- As the siting of the WSS facilities (intakes, WTP, pipelines, access roads etc.) already avoided residential houses and existing structures, no resettlement of houses would be required, only six rice storage huts own by some households will be relocated at costs covered under construction contract.
- There will be temporary environmental and social (ES) impacts and risks during the construction period of each WSS. The potential impacts and risks include ground disturbance leading to reduced or loss of some vegetation cover and trees, nuisances to communities related to generation of dusts, noise, and exhaust emissions, occupational and community health and safety risks, generation of wastes and excavated materials, traffic disturbance and increased traffic safety risks, community disturbance due to construction activities, and increased erosion/landslide risks especially on steep topography.. Most of the potential ES impacts and risks during the construction phase are anticipated to be localized, temporary and short term, at low to moderate levels. These ES risks and impacts should be manageable by the measures incorporated into project detail design and construction practices (readily known and available in the form

of Environmental and Social Codes of Practices – ESCOPs) and site-specific mitigation measures to be determined based on specific baseline conditions and types of construction activities. During operation phase, there will be occupational health and safety risks, and waste/wastewater will be generated. These can be managed through engineering design of the WTP and operational procedures.

5. Screening results confirmed that the Project is classified as Environment Category B (according to OP/BP 4.01). In accordance with the ESMF, an Environmental and Social Management Plan (ESMP, this document) is prepared for the two Water Supply Systems (WSS) clusters in Oudomxay province.

6. The ESMP (in language understandable to the local communities) will be disclosed at public accessible places in project areas before construction is started. Relevant parts of the ESMP (particularly the mitigation measures, contractors' responsibilities) will be included in the Construction Bidding Documents and contractual documents.

2. Policy, Legal and Administrative Framework

2.1 Responsible Agencies

7. The MPWT has been traditionally mandated with the planning and development of urban water supply and sanitation systems, it also increasingly taking care of water supply systems for rural clusters. Survey and design of gravity-fed piped water supply systems being increasingly transferred to DWS and with time, increasing numbers of water supply systems moving to the purview of the water utilities, or Provincial Nam Papa (PNP). The development of community water supply systems (CWSS) also comes under the PNP. The focus of MOH will be on the reduction of open defecation, promotion of sanitation and hygiene, water quality improvement, and collection and validation of sector information.

2.2 Lao PDR Environmental and Social Legislations

8. The Key government legislation applicable to the project includes the following:
- Environmental Protection Law (2012) EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment from pollution. The aim is to protect the public, natural resources and biodiversity, and to ensure the sustainable socio-economic development of the nation.
 - The Law on Water and Water Resources (2017)
 - The Law on Water Supply (2009)
 - Wildlife and Aquatic Law (2008)
 - Land Law (2003)
 - Ministerial Instruction No. 8029
 - Drinking Water Quality Standards
 - Decree #84 on Compensation and Resettlement of People Affected by Development Projects (2016)
 - Technical Guidelines on Compensation and Resettlement of People Affected by Development Project (2005)
 - Decree on the Preservation of Cultural, Historical and Natural Heritage (1997)
 - Guideline on Consultation with Ethnic Groups (2013)

9. Screening of the investment project can be conducted by the project proponent by applying the list of Investment Projects and Activities issued by the Natural Resource and Environment authorities as per the Ministerial Instruction No. 8029 of MONRE. The Provincial Department of Natural Resource and Environment (PONRE) who has joined the site visit in early state of project implementation, issued an official letter, advising that Initial Environmental Examination (IEE) (normal regulations) is not required for the WSS but the PMU/PIU should submit the ESMP to PONRE for approval and monitoring.

2.3 World Bank Safeguards Policies

2.3.1 World Bank Safeguard Policies Triggered

10. The Project triggers the World Bank safeguard policies presented in table below:**Error! Reference source not found..**

Table 2-1 List of WB safeguard policies triggered for the Project.

| | WB Safeguard Policies | Triggered | Safeguard instruments |
|----|---|-----------|--|
| 1 | Environmental Assessment OP/BP 4.01 | Yes | ESMF/ESMP/ESCOP |
| 2 | Natural Habitats OP/BP 4.04 | No | |
| 3 | Forests OP/BP 4.36 | No | |
| 4 | Pest Management OP 4.09 | No | |
| 5 | Physical Cultural Resources OP/BP 4.11 | Yes | Chance Finds in ESMP/ESCOP |
| 6 | Indigenous Peoples OP/BP 4.10 | Yes | EGDF/EGDP |
| 7 | Involuntary Resettlement OP/BP4.12 | Yes | RPF/RP/ARP |
| 8 | Safety of Dams OP/BP 4.37 | No | |
| 9 | Projects on International Waterways OP/BP7.50 | Yes | The World Bank, on behalf of, and at the request of the Lao PDR government has notified the Mekong riparian counties including China, Vietnam, Myanmar, Thailand and Cambodia. |
| 10 | Projects in Disputed Areas OP/BP 7.60 | No | |

11. Impacts on land and assets contained within are considered **minimal** to warrant production of the full RP as sufficient mitigation measures are included in the ESMP.

Ethnic minority groups do exist in project areas as majority beneficiaries, ethnic group consultation has been carried out, thus an Ethnic Minority Development Framework is sufficient and an EGDP is not required.

12. The Moutun cluster, Namo District water supply system sub-project:

- **Impact on land use:** The intake will be constructed in Houay Phang located in the village land area, so there will be no impact on privately owned land. The raw water pipeline from the intake to the WTP will be laid out underground at a depth of 0.7 to 1.2 meters depth from community land and will be laid at the edge of the agricultural land area of 3 households which will incur temporary impact during the construction phase. As mentioned before, extra precautions will be applied while laying out the pipelines by placing the sand layers surrounding the pipes which protect the pipelines from the any possible external impact from machinery. Farmers have been informed about the future potential impacts during the maintenance of the pipelines.
- As mentioned above the pipelines have been designed for 25 years longevity and will be laid out underground which will require negligible maintenance. However, if there is any minor maintenance requirement, the Landowners has been informed about the future potential troubles that may occurred during the maintenance of pipelines.
- Affected households have been consulted and agreed to allow the passing of the pipeline beside their agricultural/cultivated land. The landowners will not have any impact on land use, they can cultivate crops as they have done before. Affected households of residential land have been consulted and agreed to allow the passing of the pipeline at the edge of their residential land.
- The Akha Ethnic people have been consulted. The consultation has been done with both male and female groups and the Akha ethnic leaders. The positive and negative effects of the project and mitigation and prevention measures have been identified and discussed with the ethnic people.
- **The Water Treatment Plant** will be constructed on the village land in an area of 3,200 m² area and will not impact the private land property.
- **Impact of pipeline on infrastructure:** The main distribution pipeline is 5.8 km long from WTP to Moutun village will pass through the village land. The main pipeline will not pass through houses, house extensions, and any structures of the villagers.
- **Impact on water source:** According to the meeting with the villagers on the water uses no major agricultural activity along the water intake for the WS system will not have any significant impact on water uses downstream - particularly during the dry season because amount of water withdraw from the Houay Pheng Brook of Moutun cluster is 135M³ /day which is only 7.5% of the total amount of water available in this brook during the dry season. This is small brook and there is no significant presence of biodiversity. Details information about site specific condition provided in Table-4.4 of Moutun cluster of Namo district.

13. The Phonxay cluster, La District water supply system sub-project:

- **Impact on Land Use:** The raw water intake will be constructed nearby the old community water supply schemes (Namlin) intake, so it does not have any impact on the private land property of the people. For the road access to the intake, we will use the existing rural road of the village from the village to the old intake of the existing Namlin of the community. Affected households have been consulted and agreed to allow the passing of the pipeline at the edge of their agricultural land. As mentioned above, pipelines will be laid out at a depth of 1.2 meters with extra precaution to cover the pipes with layer of sand which can last until 25 years longevity and will be laid underground with a sand layer surrounding the pipeline which minimize the requirement of maintenance. However, to minimize the potential impact at the time of maintenance, the maintenance will be done when there is no crop in the field. Farmers have been informed about the future potential impacts during the maintenance of the pipelines.
- The Khmu Ethnic people have been consulted. The consultation has been done with male and female groups and the Khmu ethnic leaders. The positive and negative impact of the project and mitigation and prevention measures have been discussed.
- **Water Treatment Plant (WTP):** WTP will be constructed in the village common land¹ area of 2,500 m² and it will not impact the private land and individual property. The access road from road No.2E to the WTP is 5 meters wide and 150 meters long and will also pass through the community land area and it will not impact private land property. The electricity poles will be placed along the right of way of the access road to the WTP that will not it will not impact on private land.
- **Impact on crops or trees and rice storage huts:** The construction phase will have no impact on the crops and trees of the community. As mentioned above, the pipeline will pass through at the edge of the agricultural land of 6 HH. Pipeline laying out work will be conducted during the dry season when there are no crops in the field, the bushes are observed on the agricultural land. After laying out the pipeline underground, affected area will be levelled to the original condition by the contractor. The Rice storage huts of 6 HHs will be temporarily affected by the project. The rice storage huts will be moved to a nearby place by contractors and if there is any damage to the rice storage huts, will be repaired by the contractor to their original condition. The owners of the rice storage huts are agreed for the relocation of rice storage huts². Rice storage huts will be rebuilt in nearby areas near the access road to WTP.
- **Impact of pipeline on infrastructure:** The main distribution pipeline is 4.82 km long from WTP to Phonxay village will pass through the village land. The construction phase will have no impact on structures.
- **Impact on water source:** According to the meeting with the villagers on the water uses no major agricultural activity along the water intake for the WS system will not have any significant impact on water uses downstream and will not impact aquatic biodiversity within the stream - particularly during the dry season because amount of water withdraw from the Houay Lea Brook is which is only 2.6% of the total amount of water available in this brook during the dry season. This is small brook and there is

1 The land title is given at appendix-2

2 Agreement minute for relocation of rice huts given at annex-4

no significant presence of biodiversity. Details information about site specific condition provided in Table-4.7 of Phonxay cluster of La district.

Table 3: List of households for Rice Storage Huts in Samakkhixay village, Phonxay cluster of La district, Oudomxay province

| No | Name | Ethnic | Type of structures | Area (m ²) |
|----|----------------------|--------|--------------------|------------------------|
| 1 | Mr.Kham+Ms.Chanpheng | Khmu | Rice storage hut | 12 |
| 2 | Mr.Xiengkeo+Ms.Vandy | Khmu | Rice storage hut | 12 |
| 3 | Mr. Long+Ms.Thong | Khmu | Rice storage hut | 12 |
| 4 | Mr.Khrean+Ms.Bouahom | Khmu | Rice storage hut | 12 |
| 5 | Mr. Savath+Ms.Sone | Khmu | Rice storage hut | 12 |
| 6 | Mr. On+Ms.Huck | Khmu | Rice storage hut | 12 |

2.3.2 Environmental, Health, and Safety (EHS) Guidelines

The World Bank Group’s Environmental, Health, and Safety Guidelines (EHSG) and industry-specific Good International Industry Practice will also be applicable to the proposed investments where relevant. These guidelines can be accessed from the following links:

http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines

<https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf>

3 Descriptions of the Proposed Investments

14. Two Water supply systems (WSSs) have been proposed for Oudomxay Province, the Moutun cluster in Namor District and the Phonxay Cluster in La District. The Location maps of the two systems are shown in the Figure 3-1 below.



Figure 3-1 Location map of Oudomxay Province and two WSSs

3.1 Serviced Areas and General System Lay out

15. The Moutun cluster WSS in Namor district will provide safe water to the households and to a school in Moutun village which is located 43.6 km northeast of Namor district center. It has 1,080 people in 156 households (HH) in 2021. The layout of core service area and the system's general layout are shown in Figure 3-2.

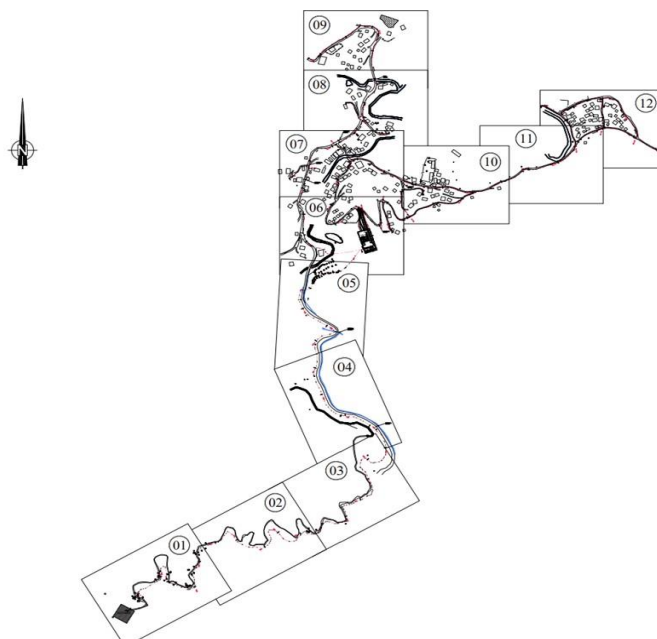


Figure 3-2 General Layout of Moutun WSS in Namor District

16. The Phonxay cluster WSS in La district will supply the safe water to the households of Phonxay and Samakkixay villages, the health center and the schools located in these 2 villages.

Combined population of these 2 villages is 1,152 people in 383 HH in the year 2021. The core project area is situated along National Road No. 2E, which is 13 km southeast of Xay district center and 12 km northwest of the Lar district center. The layout of the core service area and the system's general layout are shown in Figure 3.3 below.



Figure 3-3 General Layout of Phonxay WSS in Lar District

17. There are existing rural supply schemes (Nam Lin) in these villages. They are gravity fed water supply schemes without any water treatment. The existing water supply is insufficient to meet the water demand for the full year due to the small sizes of the existing pipeline system, leakages issues, and low water quantity at source during the dry season.

18. **Connection Policy.** Households that apply to connect during the construction period will not be required to pay any up-front connection charges for the metered connection. This measure will assist poor and low-income groups to get the benefit of the piped water supply system, encourage new connections. Marketing and awareness campaigns will inform communities about the Project's connections policies and the benefits of connecting to piped water supply. The expected numbers of new domestic service connections during construction phase of WSS of Moutun clusters are 156 HHs and in WSS of Phonxay cluster are 383 HHs.

3.2 Descriptions of the WSSs and their Elements

19. Each WSS comprises of the following key elements:
- i. A Water Intake, to be built on the brook of the proposed water source;
 - ii. Transmission pipelines, to transmit raw water from the water intake to the water treatment plant;
 - iii. A Water Treatment Plant (WTP) with treatment units, office and laboratory;
 - iv. Distribution pipelines, to transmit clean water from the WTP to the head points in the serviced villages;
 - v. Household connection pipes, to connect households with the head points;
 - vi. Ancillary work items, such as access roads and power supply.
20. The key parameters of each system are listed and described below.

Table 3-1 Key parameters of the proposed WSS

| Element (from source to taps) | Namor District | La District |
|--|---|---|
| i. Water Sources | Houay Pheng Brook, | Houay Lea Brook |
| ii. Water Intakes | Elevation: 1,020 amsl. X= 790605; Y = 2347267; | Elevation: 730 amsl. X= 191692; Y = 2301355; |
| iii. Raw water pipes (HDPE) from intake to WTP | 2.67 km DN90-HDPE | 3.38 Km, DN90-HDPE |
| iv. Water Treatment Plant (WTP) (m2) | 2,500 | 2,500 |
| Capacity (m ³ /d) | 135 | 150 |
| Ground levelling at the WTP required? | Yes | Yes |
| Treatment Units (static mixer, steel clarifier tank, steel filter tank, steel reservoir, valve, pipe, and fitting) | Yes | Yes |
| Chemical dosing system (tanks, dosing pumps, mixers, valves, check valves, pipes, and fittings) | Yes | Yes |
| clear water reservoir | 45 m ³ | 50 m ³ |
| a power supply system, and a control cabinet | 50kVA transformer | 50kVA transformer |
| Drainage system | Yes | Yes |
| Inlet and outlet pipes and fittings | Yes | Yes |
| Back wash water tank | Yes | Yes |
| v. Distribution pipes (HDPE) element (from source to taps) | 3.18 km DN110, DN90, DN 75 DN63 | 2.05 km to Samakhixay village and 4.44 km to Phonxay villages DN110, DN90, DN 75 |
| vi. Household Connection Pipes | 4.4km DN40 DN25. (156 HH connections) | 2.88 Km in Samakhixay village NS 1.55 km in Phonxay village DN50, DN40, DN25 (383HHs Connection) |
| vii. Office with separate rooms for storage, chemicals and operators | Yes | Yes |
| viii. Basic laboratory equipment | Yes | Yes |
| ix. Ancillary Items | | |
| Access Road | New access road Length: 80m and width: 5m | New access road Length:150m and width: 5m |
| Power Supply | Yes, 50kVA transformer | Yes, 50kVA transformer |
| Serviced Areas and Serviced Population | Ban Moutun, <u>Population:1,080</u> | Ban Phonxay and Samakhysay <u>Population: 1,152</u> |

21. More detailed descriptions are provided below in following sections.

3.3 Water Sources

3.3.1 Moutun WSS in Namor District

22. Among the 3 water streams (Houay Pheng Brook, Houay Saideng and Houay Phar stream) originated from the mountain and flown together throughout Moutun village, the Houay Pheng Brook was selected as the raw water sources for the of Moutun cluster WSS in Namor District. The Brook is approximately 9.3 km long, has a catchment area of 8.92 km². Upstream of this brook has many small channels that receive the rainfall runoff water from the mountain. The map showing the catchment of the Houay Pheng brook is shown in the Figure 3-4 below. The Houay Pheng stream location allows transmission of raw water to the WTP by gravity feed.

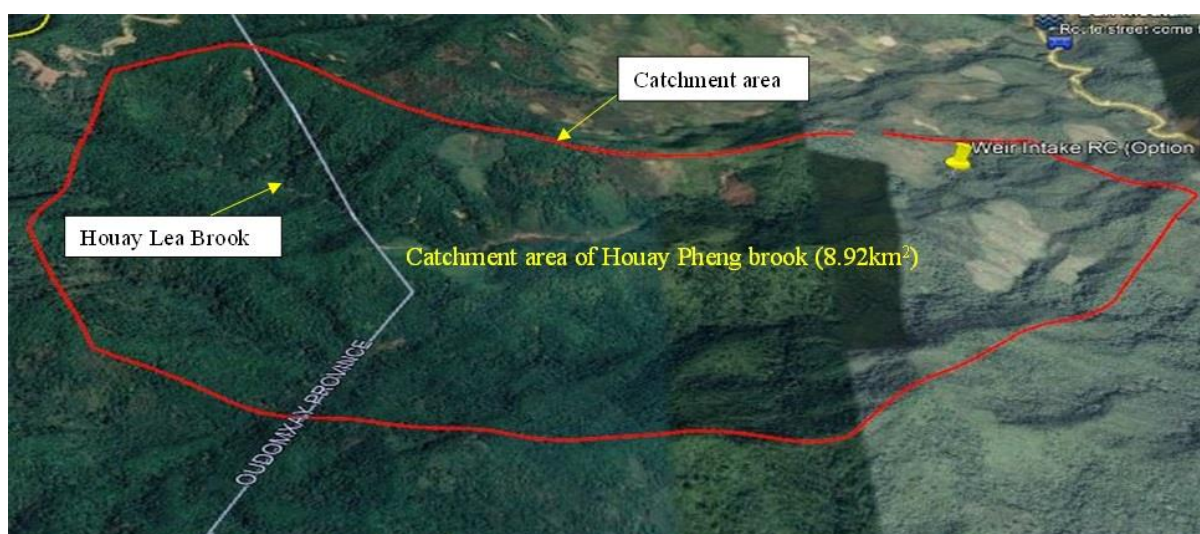


Figure 3-4 A view of the catchment area of Houay Pheng

23. The flow rate in Houay Pheng Brook of Moutun cluster is low during the dry season especially from December to April. The measurement of the flow rate was conducted 2 times during the dry season on 2 February 2021 and 27 April 2022. Measured flow rates were 3,404 m³/day on 2 Feb 2021 and 1,803 m³/day on 27 April 2022. The amount of water withdrawn (designed capacity of the drinking water supply system 135 m³/day) is much lower than the amount of water available in this brook.

3.3.2 Phonxay in La District

24. The river network in the area consists of the Houay Lea, the Houay Lieng and the Nam Phak Rivers. The Houay Lea with abundant water quantity was selected as the source for the proposed Phonxay cluster WSS in La District. It is originated from the spring water in the mountain with the catchment area of about 6.22 km², there is no tributaries in the upstream but a channel. The map showing the catchment of the Houay Lea brook is shown in the Figure 3-5 below. The Houay Lea Brook water quantity and quality meets the demands, and the proposed location of the water intake allows gravitational feed to the WTP.

25. The flow rate in Houay Lea Brook of Phonxay cluster is low during the dry season especially from December to April. The measurement of the flow rate was conducted 2 times during the dry season on 2 February 2021 and 27 April 2022. Measured flow rates were 2,823 m³/day on 2 Feb 2021 and 5,670 m³/day on 26 April 2022. The amount of water withdrawn

(designed capacity of the drinking water supply system 135 m³/day) is much lower than the amount of water available in this brook.

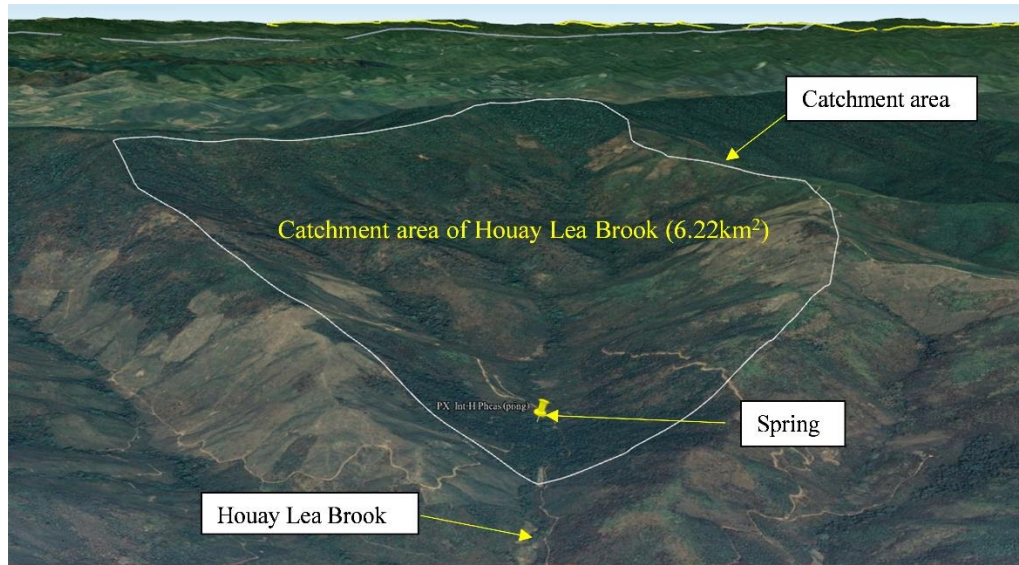


Figure 3-5 A View Catchment Area of Houay Lea

3.4 Water Intakes

26. The locations of the proposed water intakes were selected taking into account their proximity to the proposed Water Treatment Plan (WTP) and their suitability for weir construction.



(a) (b)

Figure 3-6 Aerial picture of water intake of Moutun (a) and Phonxay (b) WSS

27. There are no activities around the proposed water intake site.

3.4.1 Site Selection, Intake Locations

28. **Moutun WSS in Namor District:** The proposed water intake is located on the Houay Pheng on communal land in Ban Moutun at X:790618, Y: 2341257, south of the Moutun village. It is 2.2Km from intake to proposed WTP location. The ground elevation is 1020 amsl, 50m above the WTP.



Figure 3-7 The proposed location of water intake of Moutun WSS

29. **Phonxay WSS in La District:** the proposed water intake is located on the Houay Lea, on communal land at the coordinate of X= 191692; Y = 2301355 of the Samakkixay village. It is 3 km upstream of the village and is 3.5Km from intake to the proposed WPT location. The ground elevation is 725 amsl, 40m above the WTP.



Figure 3-8 The Proposed Location of water intake of the La WSS

3.4.2 Intake Structures

Namor WSS Intake

30. The proposed intake is a Tyrolean Weir, designed to collect raw water at rate of approximately 10m³/hr from the stream. Tyrolean weir is a water intake structure (3x5.2x2.1m) which diverts raw water (which also contain some of sediments) to a collection channel through a screen (for pre-filter, to prevent debris from entering the water collection pipe). The depth of the collection channel is 0.7 and 1.5m and the surface area is 0.8 x1.0m (in size). Rocks will

be laid at both sides of the weir for erosion protection. The drawings in Figure 3-9 below showing the design of the Weir.

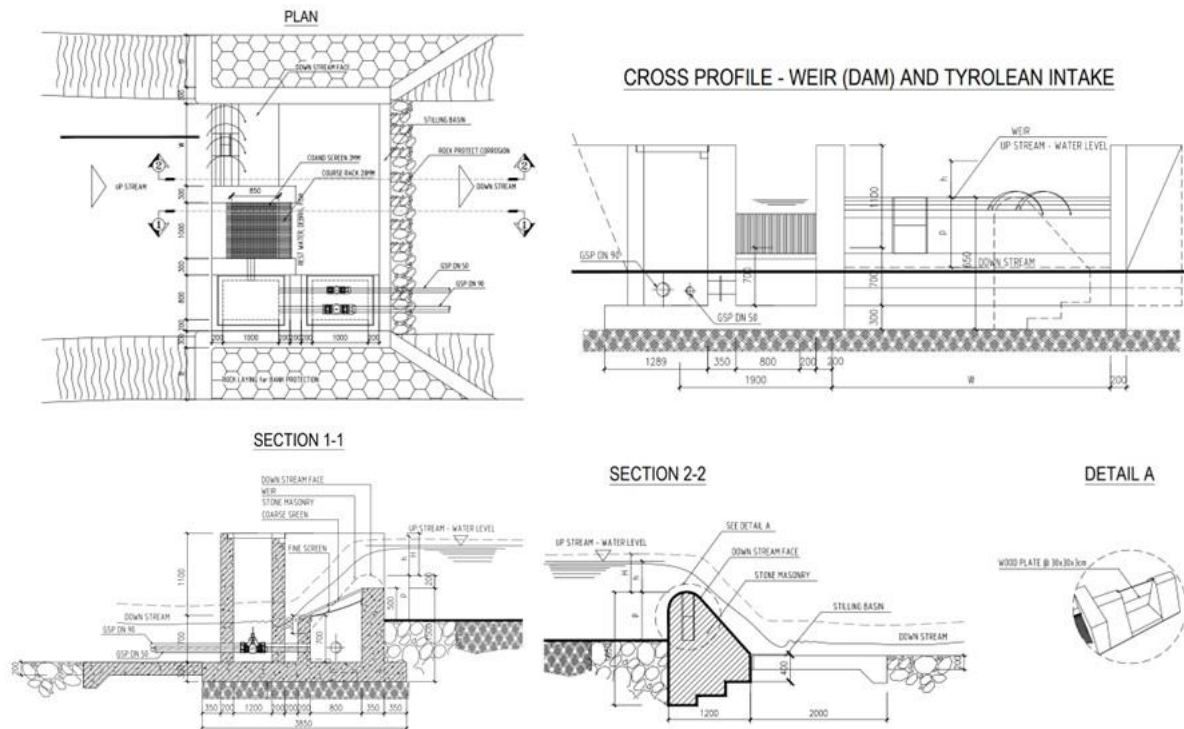


Figure 3-9 Tyrolean Weir Intake Design

La WSS Intake

31. The proposed reinforced concrete intake for collecting raw water $10\text{m}^3/\text{hr}$ from the stream comprises of three compartments, each compartment has cross section at $1.0 \times 1.0\text{m}$ and is 1.13m high. Each compartment will be filled with a layer of 0.65m thick using gravel $8\text{--}12\text{cm}$. This layer will help to pre-filter, prevent materials from entering the water collection pipe. Above these compartments are reinforced concrete slabs 80mm thick. This intake will replace the existing intake of the Namlin gravity water system at the same location.

32. Collect water through 12 holes, $\text{D}80$, velocity water velocity through the collection hole is 0.046m/s . When the water level in brook is shallow, using only the bottom row of holes, the water velocity through the collection hole is 0.14m/s . $\text{DN}50$ pipe and stop valve will be installed at the bottom of the water collection compartment to discharge the settled materials when necessary. The drawings in **Error! Reference source not found.** below show the design of the Water Intake.

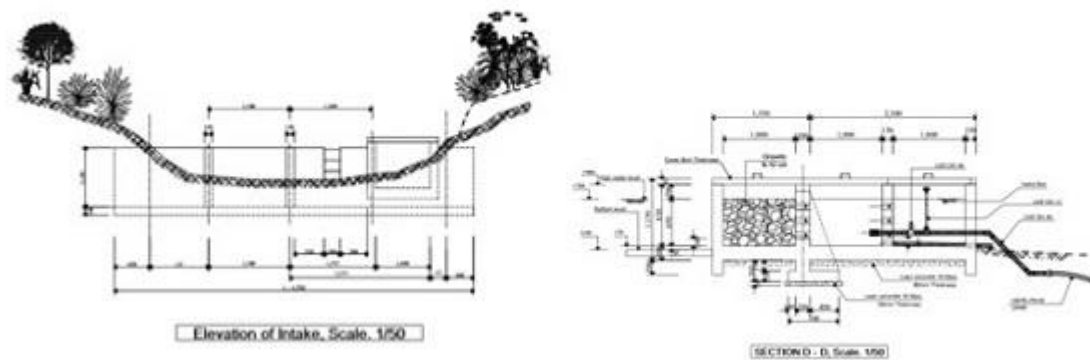


Figure 3-10 General Plan and Elevation of Intake at Houay Lea

3.5 Raw Water Transmission Pipelines

33. Raw water will flow from the intake to the WTP by DN90-HDPE gravity pipeline. Air release valve of DN25 will be installed at the highest points with air release valve chambers on the raw water pipeline. Blow-off valve will be placed at the lowest points of raw water pipeline. Stop valve will be installed to manage the operation of the pipeline with valve pressure management chambers on the route. The key parameters of transmission pipelines in each system are shown in the table below.

Table 3-2 Raw Water Transmission Pipelines

| No | WSS | Length (m) | Air release valves | Blow-off valves | Valve Management Chambers |
|----|---------|------------|--------------------|-----------------|---------------------------|
| 1 | NamThea | 2,537 | 9 | 7 | 4 |
| 2 | Phonxay | 3,218 | 8 | 7 | 3 |

3.6 Water Treatment Plants

34. Each Water Treatment Plant (WTP) consists of: (i) a mixing/flocculation and vertical sedimentation tank; (ii) filtration tank; (iii) clean water reservoir/clean water tank; (iv) office/operation building including chemical storage area; and a sludge lagoon. The WTPs will be located on the top of hills (at the elevation 445ams for Moutun WSS and 690 for Phonxay WSS) in the total land area of 2,500m² (50mx50m) for each WTP.

35. The proposed locations for the above facilities are in the fallow land owned by village (public land). These sites were chosen based on land availability and proximity to the proposed

water intakes. The layouts of the proposed WTPs are presented in



- 36. Figure 3-11 and
- 37. Figure 3-12.



Figure 3-11 Layout of Water Treatment Plan and Existing Land Use of Moutun WSS



Figure 3-12 Layout of Water Treatment Plan and Existing Land Use of Phonxay WSS

38. The WTPs of the 2 clusters have been designed with the objectives of meeting the drinking and domestic use of water demands. The design capacity of WTP Moutun cluster of Namor is $135\text{m}^3/\text{day}$, and that of the Phonxay cluster of La district is $150\text{m}^3/\text{d}$. These are very small-sized WTPs. Water treatment process of these two WTPs are the same as described below:

39. The treatment system at a water treatment plant (WTP) consists of: (i) a mixing and sedimentation tank; (ii) filtration tank; (iii) clean water reservoir. Office/operation building including chemical storage area, and a sludge lagoon are also parts of the WTPs.

40. **Water Treatment Processes.** Raw water flows into the clarifier at the top of the mixing and sedimentation tank. Depending on the raw water quality, flocculants and/or coagulants (alum dosage $Al_2(SO_4)_3 \cdot 18H_2O$ 10 – 30 mg/l or 5 – 10 mg/l PAC) are added to help settle down the solids at the bottom of the tank. Clearer water flows up through the plates to the filtration tank where water will flow through sand or other granular substances. Turbidity will be removed at this step. Then chlorine is added to the filtered water for disinfection to remove the bacteria and other harmful organisms. Clean water will be stored in a reservoir (clear water tank). The solids settled at the bottom of the clarifier will be drained into a sludge thickening tank for additional settling. Then the sludge typically gets thickened further in the sludge lagoon for final dewatering.

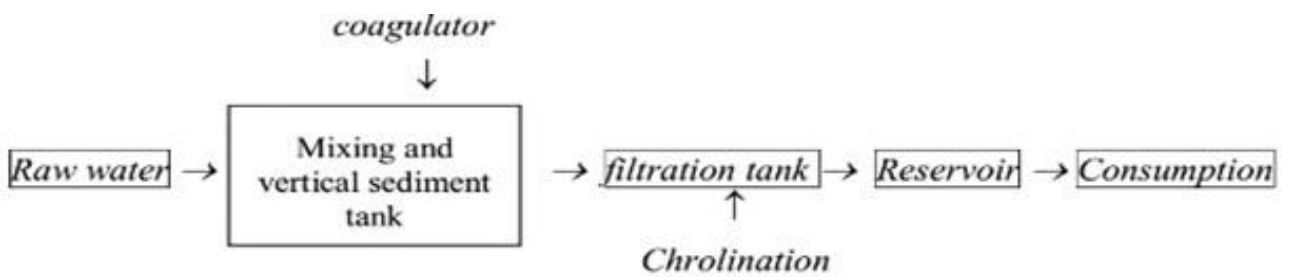
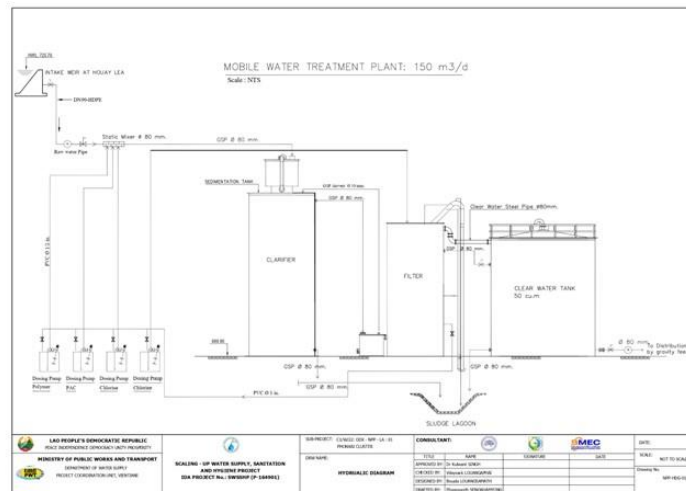


Figure 3-13 The process of water treatment plant



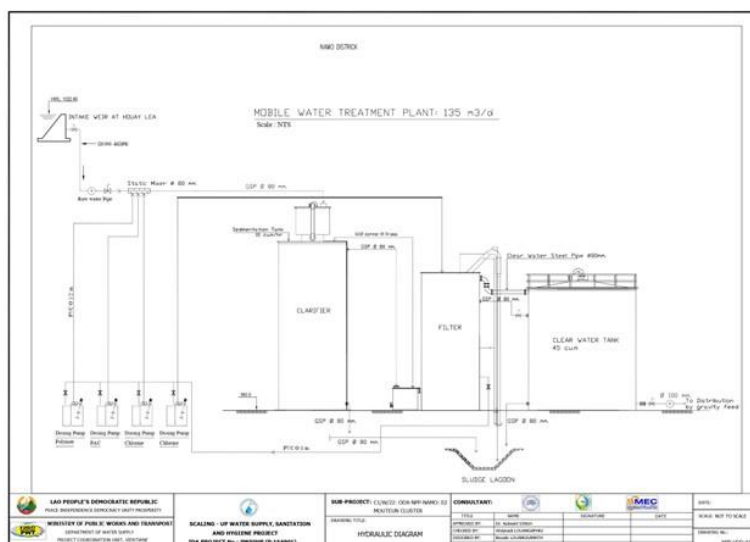


Figure 3-14 Hydraulic Diagram

41. The key technical features of water treatment process are summary in Table 3-3 below.

Table 3-3– Key Parameters of the WTPs

| Component | Functions | Design capacity |
|------------------------|---|--|
| Alum mixing | Rapid alum mixing with raw water | <ul style="list-style-type: none"> Alum dosage $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ 10 - 30 mg/l or 5 - 10 mg/l PAC Mixing method: Hydraulic Location: mixing equipment Mixing time: 1 - 2 minutes |
| Vertical sedimentation | <ul style="list-style-type: none"> Sedimentation of coagulant created in the flocculation tank. Turbidity < 30 NTU | <ul style="list-style-type: none"> Gravity Filter tank size (DxH): 1,200x4,500 mm. Velocity 0.3 - 0.72 m/minute |
| Rapid filter | Filter water discharged from sedimentation tanks. | <ul style="list-style-type: none"> Filter material: 1 layer, crystal sand, $d = 0.7 \text{ mm} - 1.6 \text{ mm}$ Thickness: 0.8 - 1.2 m Filter velocity: 6-9 m/h Backwash method: Water |
| Disinfection | Water disinfection | <ul style="list-style-type: none"> Dosage: Chlorine 1 - 2mg/l Contact time > 30 minutes |

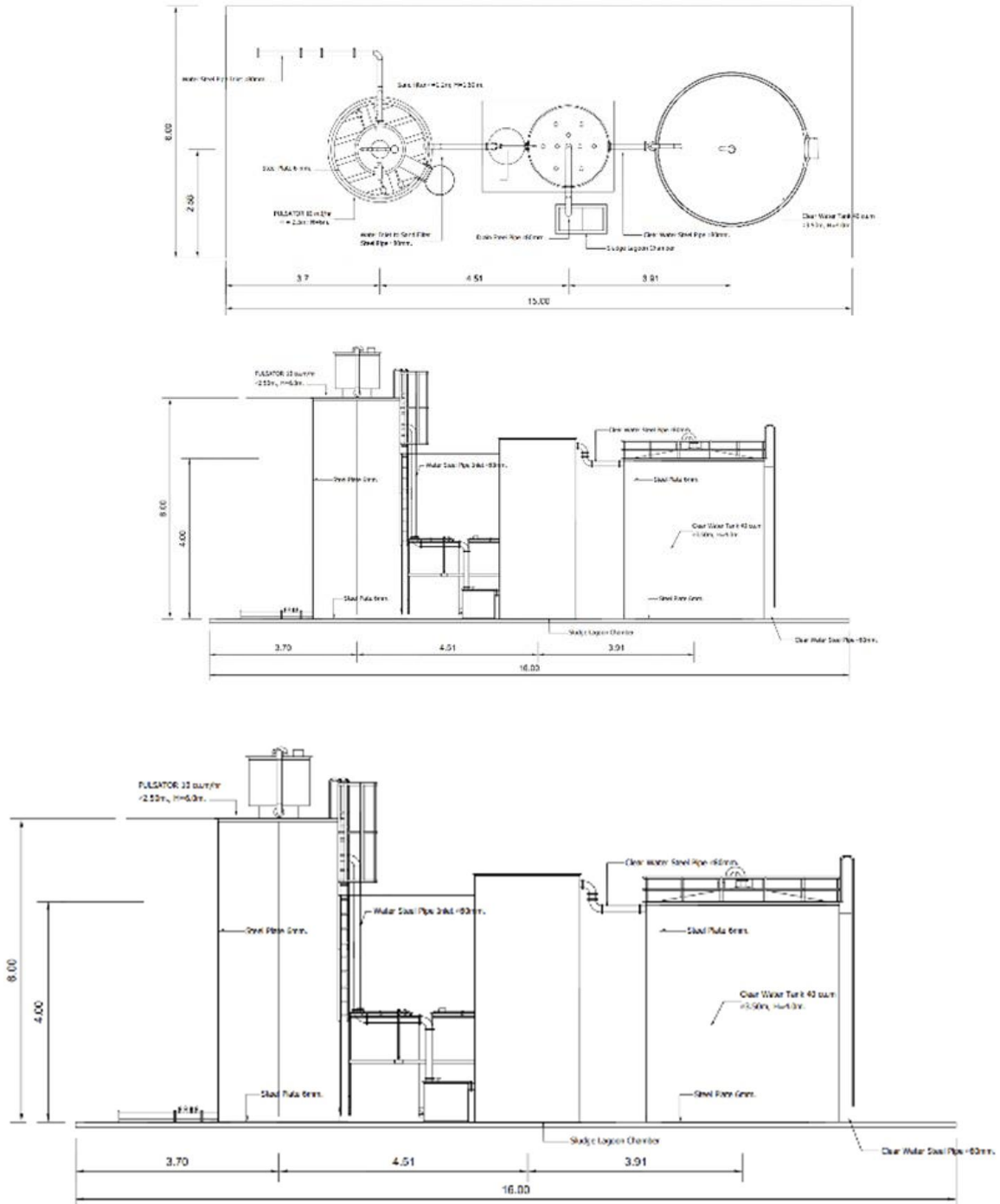


Figure 3-15 Water Treatment Plant Plan

42. **Clean Water Reservoir (Tanks).** The required total volumes of the clean water tank at each WTP are at 30% of the WTP capacity day. The clean water tank is pre-casted. On the ground clean water tank will be setup on slope of minimum of 1% towards the drainage outlet. The access to manholes shall have a concrete up-stand 200 mm high to prevent rainwater from entering into the reservoir. Access ladders or step irons of stainless steel to the reservoir wall shall be provided at each manhole. The diagram below shows the proposed design of the clean water tank.

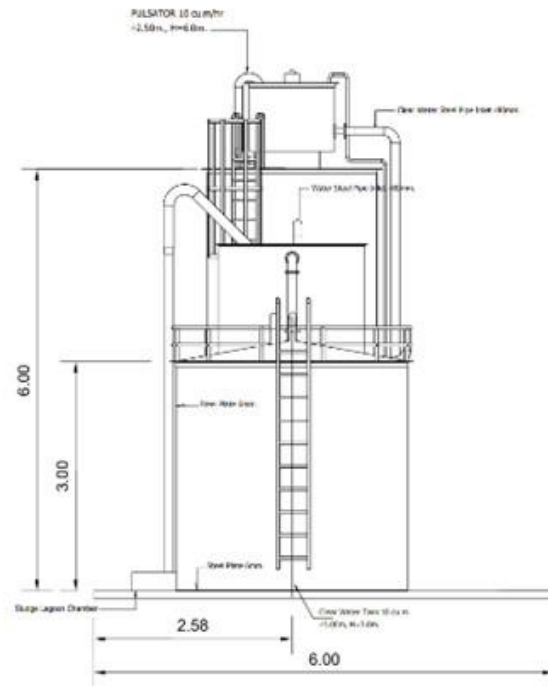


Figure 3-16 Clean water tank

43. **Operation Houses.** The Operation House at each, dimensions at 7.6 m x 12.9 m x 5.1m (BxLxH), is divided into 03 separate rooms (Chemical dispensing room; Chemical storage room and operation room). The diagram below shows the proposed design of the Operation House.

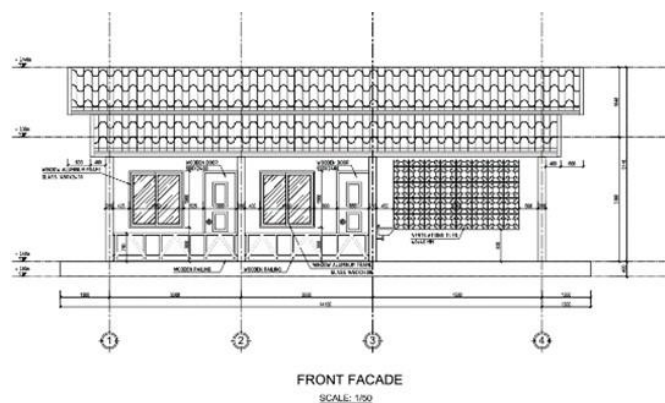


Figure 3-17 Figure of Chemical House

44. **Sludge lagoons.** Alum is a nontoxic mater, it is widely used as a coagulant and flocculating agent for water treatment, making the water easier to clean. Amount of sludge produce will be 14.85 kg/day (110mg/l), capacities of the sludge lagoon= 35m³ (4 months will be full). Sludge is a nontoxic residue of the water treatment process. The sludge accumulated at the sludge lagoon will be kept in the sludge lagoon and sucked up and transported to a disposal site at an interval of every 2-3 months. Accordingly the sludge lagoon is designed with the capacity of sludge lagoon of each WTP is 35m³ (5mx7mx1m). The volume of sludge generated from the treatment of surface water in both proposed WTPs are small. Therefore, a drying field was not proposed, instead, the sludge will be kept in the sludge lagoon and sucked up and transported to a disposal site every 2-3 months. Disposal sited for the disposal of Sludge

identified at the waste dumping site of the village. The sludge generated will be transported and disposed of at the waste dumping area. The locations of the disposal site will be selected based on consultation with local authority.

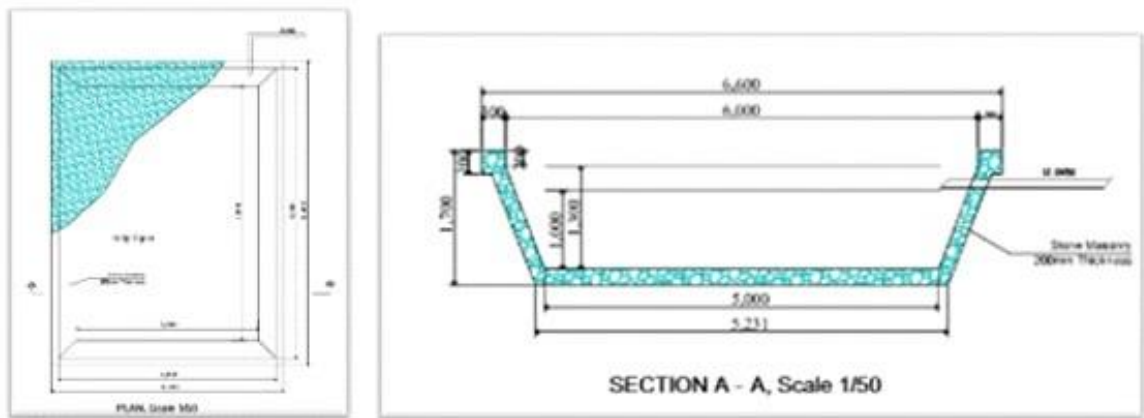
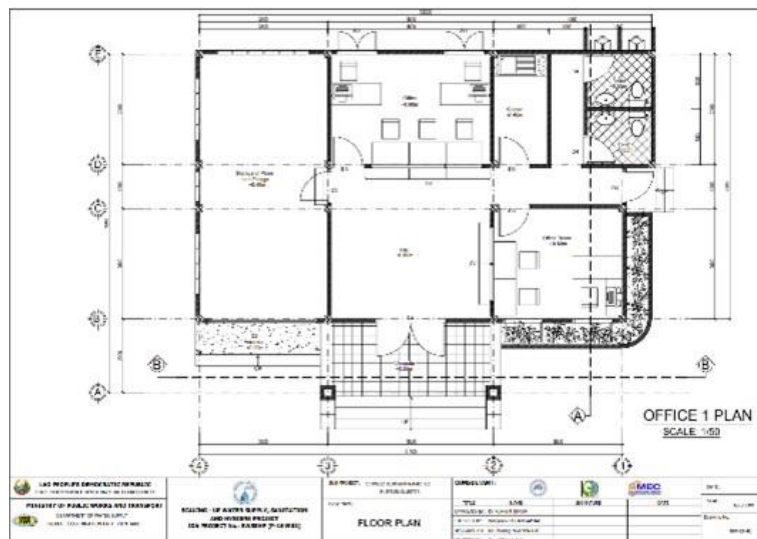


Figure 3-18 Sludge lagoon

45. **Water Supply Office.** The foundation is single reinforced concrete feet, which are combined with reinforced concrete bracing beams. The structure is a concrete frame and brick wall. The roof is designed with sheet metal which is supported by a steel truss system. The size of the water supply office is 9mx12mx7m ((BxLxH).



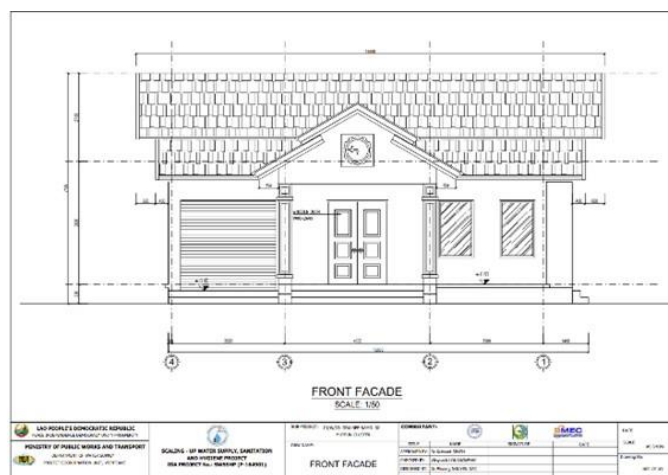


Figure 3-19 Water Supply Office

3.7 Distribution Network

46. The distribution network will be supplied by gravity flow from the proposed clean water reservoir located at WTP site to the serviced areas (Moutun Village in Namor District, and Samakhixay and Phonexay villages in La District). The capacity of the distribution network is designed to cater for the population of the service area up to year 2048. Service pipelines are calculated according to the volume distribution and the number of serviced households. The routing of service pipelines is based on the density of populations and distribution of residential areas.

47. The denoted diameters (DN) of the distribution pipelines are from 63 to 110 mm. Most of the pipes will be installed at depth of 0.5m underground, along the sidewalk, approximately 0.5 – 1.5m from the houses avoiding affecting the existing infrastructure. Appurtenances such as gate valves, district metering area (DMA) water meters, air valves, wash-out valves, etc. will be provided to facilitate the efficient operation and maintenance of the system.

Table 3-4 Type of and Length of Distribution Pipes

| Type of pipes | Unit | Namor WSS | La WSS |
|---------------|------|--|--|
| HDPE pipes | m | 8,140 m HDPE DN110: 680 HDPE DN90: 2,030 HDPE DN75: 475 HDPE DN63: 550 HDPE DN50: 2,075 | 10,908 m HDPE DN110: 525 HDPE DN90: 2,720 HDPE DN75: 1,994 HDPE DN63: 1,248 HDPE DN50: 330 HDPE DN40: 83 |
| HDPE pipes | m | 2,340m | 3,255 |
| HH Connection | Nos | 156HHs | 383HHs |



Figure 3-20: a mini truck carrying HDPE Pipes (in similar water supply project)

3.8 Laboratory

48. The result of water quality analysis given in table 4-2, shown that the heavy metals in raw water are lower than the minimum standard limit of MOH and WHO. therefore, the both water sources were selected. Hence the basic laboratory will be setup in the operation house with basic water quality analysis equipment such as turbidity and residual chlorine meter; multiparameter water quality meter for measuring pH, EC, TDS and temperature, HI-96727 color of water portable Photometer, four station Portable Flocc Tester, beaker 600ml, 1000ml and 2000ml, PP Cylinder 100, 250, 500, 1000ml, wash bottle LDPE LP 250ml and test tube brush. Consumables: pH combination buffer solution kit, pH Electrode storage solution, free Chlorine Reagent, DPD Method. There are 7 water quality parameters will be monitored every 4 hours include Turbidity, Chlorine, pH, EC, TDS, temperature and Color. Refer to O&M Guidelines of Nam Papa, the O&M staff of PNP test 7 parameters every 4 hours. CMU conducts the 6 monthly water quality analysis of 23 parameters for Water Supply System (Nam papa) as per the MOH standard.

3.9 Access Roads, Power supply to the WTPs

49. Gravel access road (5 m in width) to WTP will be constructed with necessary structures such as culverts, side drains, retaining walls etc. The estimated length of access road is approximately 80m of Moutun cluster of Namor district WSS and is 150m of Phonxay cluster of LA district WSS.

50. A Transformer of 50KVA from national grids electric will be installed to ensure the efficiency power supply to WTP and will not interfere with the existing power supply of the villagers. Length of length of power lines to connect the transformer with the main 22 kv power line in Moutun cluster is 85 meters and in Phonxay cluster is 200 meters. It will run along the side of the access road.

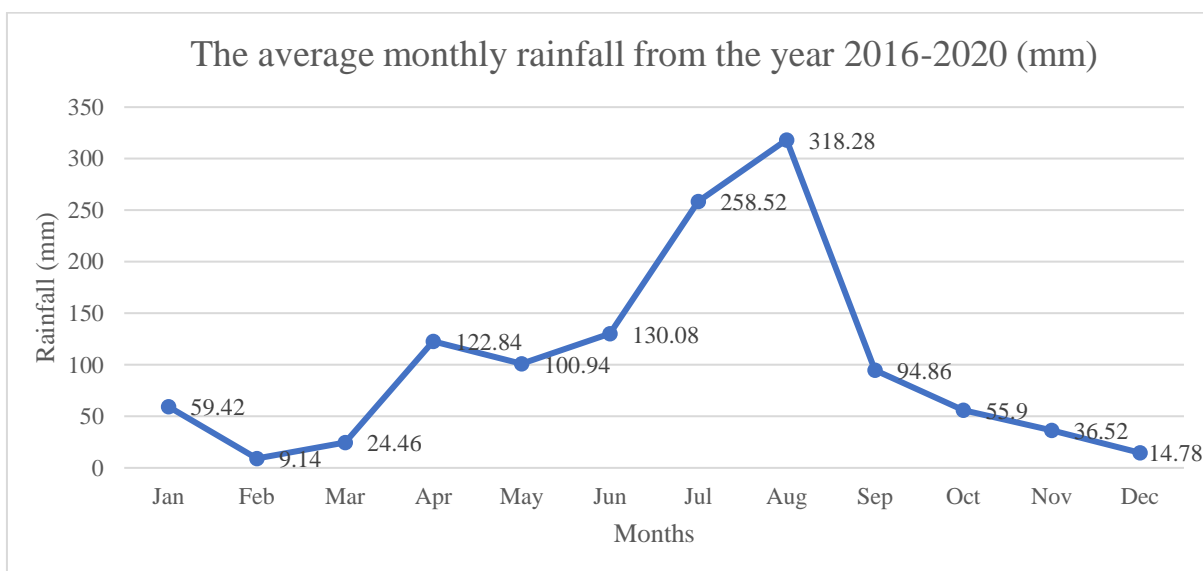
4 Environmental and Social Baseline Conditions

4.1 Topography

51. The topography of Lao PDR can be divided into four physiographic regions: the mountain range, the undulated plain, the plateau, and the low alluvial land along the Mekong River. Moutun Cluster is in the mountain range in the northeastern of Lao PDR, forming deep V-shaped valley, steep slope and some of the flat land, the elevation is above 900 m above mean sea level (AMSL). The Phonxay cluster is in the mountain range north of Lao PDR, forming a deep V-shaped valley, steep slope, and some flatlands. The elevation is above 600 m above mean sea level (AMSL).

4.2 Hydrology and Surface water quality

52. The Namor and La district area is part of several small rivers which are the tributaries of the Nam Ou River. The average annual rainfall of Oudomxay province (average of 5 years) was 1,225.74 mm. Highest average rainfall 318.28 mm recorded in month of August and the minimum rainfall 9.14 mm recorded in month of February as given in the graph below:



53. Based on consultation with the villagers at Moutun and Phonexay villages in Feb 2021 and April 2022, it was confirmed that the brooks have water all year round in the brooks. Proposed water intake locations are also situated near water springs and the brooks have never dried up. There is no need to define the water sources.

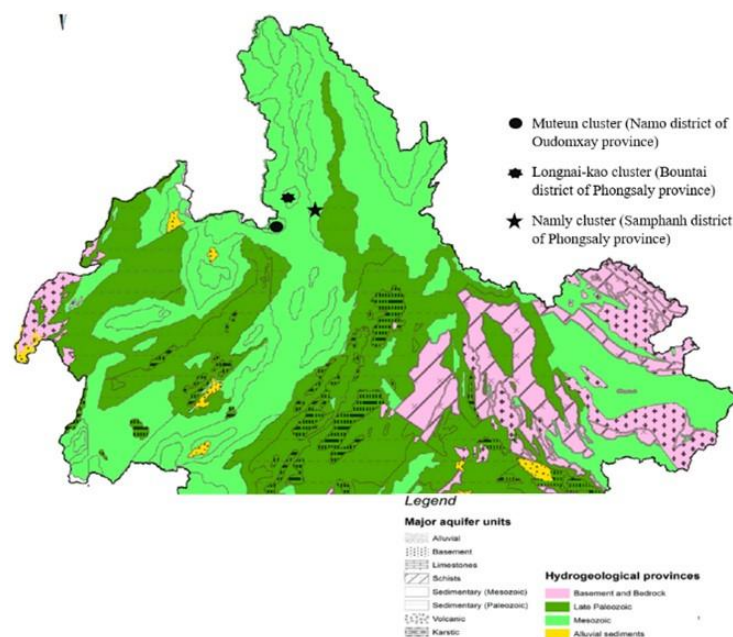


Figure 4-1 Synthetic map of Hydrogeological group and major of aquifer units (textures)

54. **Moutun WSS.** The flow rates of Houay Pheng measured on 27th April 2022 at three points near the proposed intake sites (Point No.1, Point No.2 and Point No.3, each monitoring site are located approximately 200-400m from each other. The flow rates measured at the 3 points of the Houay Pheng Brook were 1,891 m³/d, 1,577 m³/d, and 1,942 m³/d, respectively, averaged at 1,803 m³/d as shown in Table 4-1.

Table 4-1 summary of water flows in Houay Pheng on 27 April 2022

| # | Measurement Point | Flow rate | | |
|---|-------------------|-------------|---------------------|---------------------|
| | | (l/s) | (m ³ /h) | (m ³ /d) |
| 1 | Point No.1 | 21.9 | 78.8 | 1,891 |
| 2 | Point No.2 | 18.3 | 65.7 | 1,577 |
| 3 | Point No.3 | 22.5 | 80.9 | 1,942 |
| | Average | 20.9 | 75.1 | 1,803 |

55. **The La WSS.** The flow rates at Houay Lea measured on 26 April 2022 at two measurement points (Point No.1 and Point No.2). The average water flow rate was 5,670 m³/d.

56. Raw water samples were collected on 26/04/2022 at the proposed intake location by Phanthamit Analytical Lab Co., Ltd. The results of water quality analysis are summarized in Table 4-2 below.

Table 4-2 - Summary of Water Quality Analysis Result

| # | Parameters | Unit | Houay Pheng | Houay Lea | National Standard ³ | WHO Standard ⁴ |
|---|------------|-------------------------|-------------|-----------|--------------------------------|---------------------------|
| 1 | Chloride | mg/L as Cl ⁻ | ND | ND | < 250 | <700 |
| 2 | Color | Pt. Co | 5.15 | ND | < 5 | - |
| 3 | Fluoride | mg/L as F ⁻ | ND | ND | < 1.5 | <1.5 |

³ Ministry of Health of Government of Lao PDR Standards

⁴ WHO-Guidelines for Drinking-Water Quality Fourth Edition

| # | Parameters | Unit | Houay Pheng | Houay Lea | National Standard ³ | WHO Standard ⁴ |
|----|-------------------|---------------------------|-------------------|-------------------|--------------------------------|---------------------------|
| 4 | Hardness | mg/L as CaCO ₃ | 109 | 245 | < 300 | - |
| 5 | Iron | mg/L | ND | ND | < 0.3 | - |
| 6 | M-Alkalinity | mg/L | 90.2 | 266 | - | - |
| 7 | Nitrate | mg/L as NO ₃ | ND | 1.82 | < 50 | 3 |
| 8 | pH | | 8.3 | 8.2 | 6.5-8.5 | - |
| 9 | Sulfate | mg/L as SO ₄ | ND | 14.1 | <250 | <250 |
| 10 | Turbidity | NTU | 6.54 | 1.17 | <5 | - |
| 11 | Arsenic | mg/L | <0.0028 | <0.002 | <0.01 | 0.01 |
| 12 | Coliform Bacteria | MPN/100m L | 2.0 | ND | - | 0 |
| 13 | E. Coli | MPN/100m L | ND | ND | 0 | 0 |
| 14 | Total Bacteria | Colonies/cm | 1,400 | 360 | - | 0 |
| 15 | Taste | | Non-Objectionable | Non-Objectionable | Acceptable | Acceptable |
| 16 | Odor | | Odorless | Odorless | - | Odorless |

57. Data in the table above shows that the quality of raw water is good with almost all parameters are within the allowable limits, except Turbidity, Coliform Bacteria and Total Bacteria were higher than standard. The amount of heavy metals found in analysis were much lower than the acceptance Ministry of Health of Lao PDR standard limits at both raw water sources. In Houay Pheng, Turbidity was 6.54 NTU, slightly above standard (5 NTU). coliform bacteria were 2 MPN/100mL and Total Bacteria was 360 colonies/cm. In Houay Lea, turbidity was above standard and Total Bacteria is high (1,400 colonies/cm). These can be addressed with standard treatment of sedimentation, filtration and disinfection.

4.3 Geology

58. Geological of almost all the project area is in the Northern of the Lao PDR is divided into four water-bearing systems: Basement, Mesozoic aged sedimentary, Paleozoic aged sedimentary and Karstic system.

59. **Moutun WSS** in Namor District is on the line separate the Sukhothai folder belt and Loei fold belt structure, Mesozoic is the highest proportion compared to others group, the characteristics of them that are sandstone and siltstone and Late Paleozoic is a small proportion group in this area, the characteristic of this group is limestone with different rock content. In addition, there is a form of sedimentary rock, the characteristic of this group is medium-hard sandstones and shales.

60. **Phonxay WSS** in the La District area, the geological map illustrates that the Phonxay cluster is on the line separating the Sukhothai fold belt and the Loei fold belt structure. The Mesozoic aged sandstone and silt is most prominent, whilst the Late Paleozoic aged limestone accounts for a small proportion in this area. There are also other sandstones and shales; these are not very hard and decompose quickly. Rainfall is the main cause of landslides (soil erosion). Other factors include the slope of the soil and rock conditions and improper land use activities.

4.4 Air quality and Noise

61. There are no records on noise and air quality in the project area. Air quality in the project area is generally good since there are no industries producing discharges/emissions and emissions from vehicular exhaust are not significant (low traffic density). The main cause of air quality reduction is the dust from vehicles when passing unsealed roads during the dry season. This is an intermittent problem with a minor effect over a limited area of 5 to 10 meters either side of the road.

62. The project sites are relatively far from activities generating noise. There are no industries within the proposed project sites so the existing ambient noise levels can be considered very low. There are no sensitive receptors in the proximity of the proposed site of the WTP and water intake and other components.

4.5 Biological Resources

63. According to IBAT (Integrated Biological Assessment Tool), there are 35 natural protected areas in Laos. The proposed WSSs are not located in any protected areas, the nearest protected areas, Nam Ha in the west and Phou Hi Phi in the east, are far from the project area.

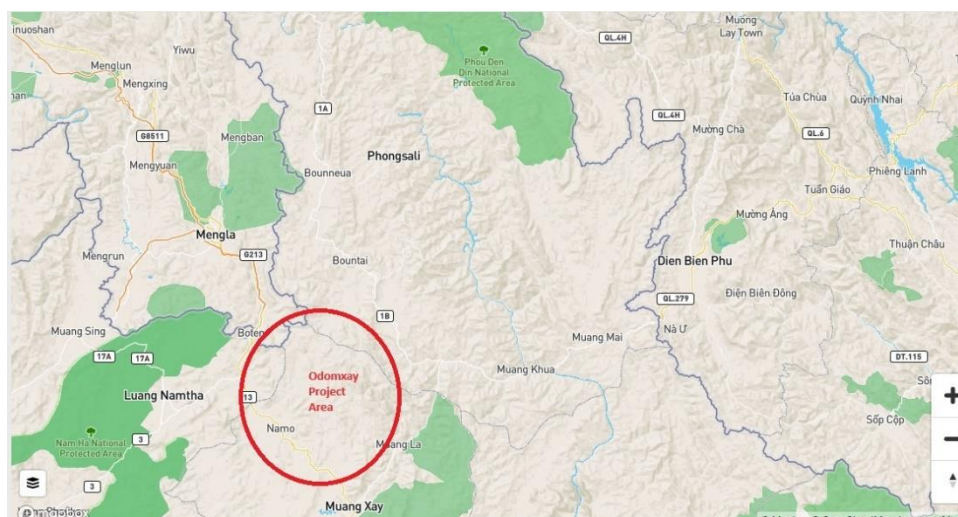


Figure 4-2 The project location in relation to the nearest protected areas

64. The forest at the upstream catchment area of the water sources (small stream) are naturally grown forest trees and community not conducting agricultural operations in the catchment areas with a view to ensure the availability of water. There is no information about the existence of any known biological important (rare/endangered/vulnerable) fauna and flora species in the proposed intake area and the WTP. The existing vegetation covers at these areas are mostly vines, shrubs, small trees with a diameter of about 3-20 cm, bamboo, wild banana. There are a few aquatic species in the water source such as frogs, crab, Dwarf snakehead fish (Pa Kung), and some small local freshwater fish species.



Figure 4-3 The proposed location of intake and WTP of Moutun WSS



Figure 4-4 The proposed location of intake and WTP of Phonxay WSS

65. The transmission and distribution pipelines will pass along the embankments of some agricultural land (mostly rice and corn fields), and garden land/plantations with economical values rather than biological values. The main flora species in such land are mainly bushes including grasses, vines, bamboo, shrubs and small trees. Along the pipeline there are fauna species like insects, ants, wasps, rats and other small natural creatures.

4.6 Physical Culture Resource

66. The proposed project sites contain no historical artefacts or significance, there are no known archaeologically significant sites. If there is a requirement for spiritual and cultural ceremonies the cost for such ceremonies should be included in the contract.

4.7 Infrastructure and Public Services

67. **Power Supply:** All households in both villages are connected to national electricity grid and sufficient for their power demand.

68. **Common Diseases and Health Care Service:** Common diseases in this subproject area include flu, diarrhea. Apart from that there is seasonal problem of dengue fever. The nearest health care center is located in Houaykhong village.

69. **Education Facilities/Schools:** In Moutun village, there is a primary school with 6 classrooms (8 teachers). About 77.1 % of adults are illiteracy. 10.5% of people completed primary school and 12.0 % of people completed higher secondary school.

70. Phonxay village has a primary school with six classrooms (5 teachers) and a secondary school with 6 classrooms (17 teachers). There are no illiterate people in this village.

71. Samakhixay village has a primary school with six classrooms (4 teachers). There are 17 illiterate people of which 8 are female.

72. **Sanitation, Waste and Wastewater Management:** Both WSS service areas are lacking of sanitation facilities. There is no existing wastewater collection system. Rainwater and wastewater are discharged to backyard gardens before entering water bodies.

4.8 Ethnic Groups

73. In Ban Moutun, all population is Akha. Ban Phonxay, all population is Khmou. Ban Phonexay, about 96.5% is Khmou and about 3.5% is Lao.

Table 4-3 Ethnic Groups in the Project Area

| No. | Village | Population | | Lao | | Khmu | | Akkha | |
|------------------------|-----------------|--------------|------------|-----------|----------|--------------|------------|------------|------------|
| | | T | F | T | F | T | F | T | F |
| Mouteun Cluster | | | | | | | | | |
| 1 | Mouteun village | 976 | 429 | 0 | 0 | 0 | 0 | 976 | 429 |
| | Total | 976 | 429 | 0 | 0 | 0 | 0 | 976 | 429 |
| Phonxay cluster | | | | | | | | | |
| 1 | Phonexay | 425 | 197 | 15 | 7 | 410 | 190 | 0 | 0 |
| 2 | Samakhixay | 663 | 316 | 0 | 0 | 663 | 347 | 0 | 0 |
| | Total | 1,088 | 513 | 15 | 7 | 1,073 | 537 | 0 | 0 |

4.9 Moutun WSS Specific Conditions

4.9.1 Land use

74. The information about land use in this village was obtained by interview village authority. Several land cover and distinct land use types occur in Moutun Village with the total area of 6,081 ha, including village protection forest, village production forest, shrub land and grassland, waterbodies, and modified built-up areas. Village protection forest cover largest area approximately 3,705.5 ha or 60.9%, follow by agricultural land approximately 1,242 ha or 20.4% and village restoration forest 651 ha. Or 10.7%. The industry plantation area is 135.8 ha or 2.2% while the residential land area is only 18 ha or 0.3%. The table and figure show the distinct land use types of type in Moutun Villages.

Table 4-4 Land use pattern in Moutun village (Moutun cluster)

| Total area of village (ha) | Residential land (ha) | Rice paddy (ha) | Upland paddy (ha) | Industrial tree plantation (ha) | Agriculture land (ha) | Protected forest of the village (ha) | Production forest of the village (ha) | Village forest restoration area (ha) |
|----------------------------|-----------------------|-----------------|-------------------|---------------------------------|-----------------------|--------------------------------------|---------------------------------------|--------------------------------------|
| 6,081.10 | 18 | 67.7 | 40 | 135.8 | 1,242.40 | 3,705.50 | 220.6 | 651.1 |

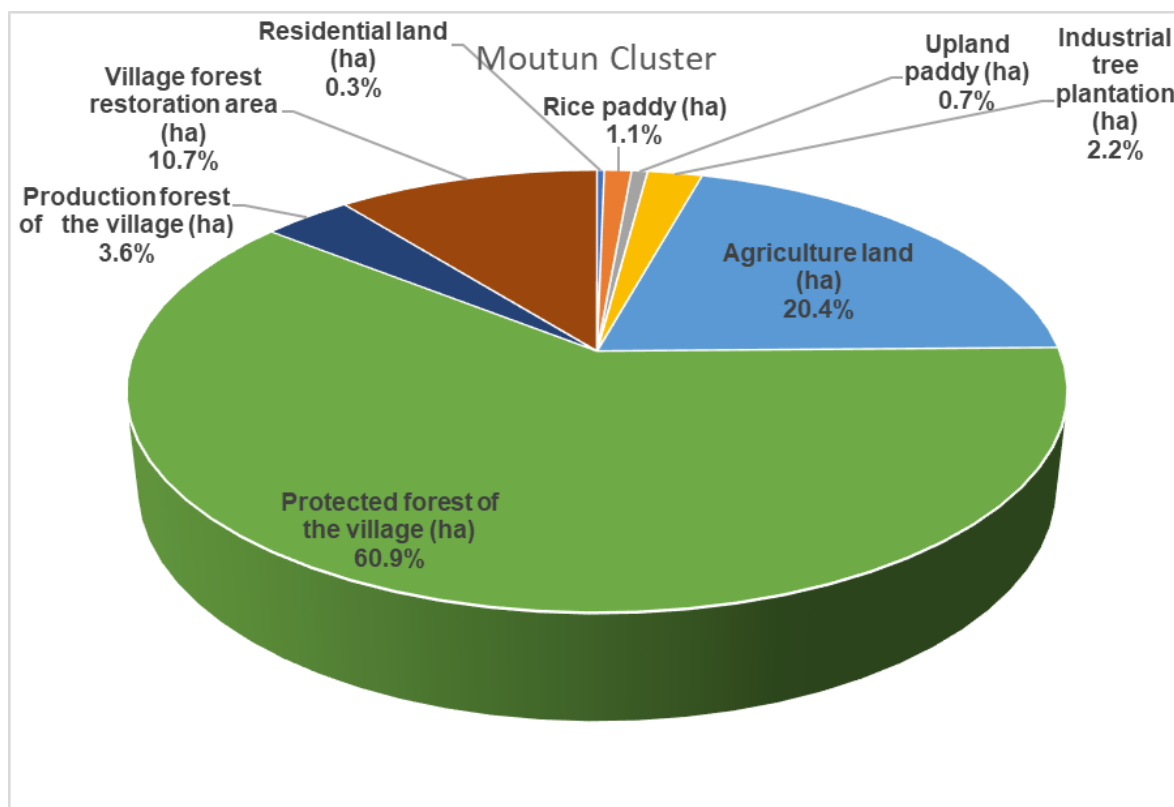


Figure 4-5 Land use type in Moutun Village of Moutun cluster (2023)

4.9.2 Demographic and Socio-economic conditions

75. Namor district has 63 villages and a total population of 42,697 people, of which, there are 21,101 women, 8,539 people living in the urban area and 34,158 people living in the rural area. Their source of livelihood are cultivation of rice crops, livestock, commerce, and services. The potential of economy: agriculture, livestock and commerce and Non-Timber Forestry Products (NTFPs) collection. The ratio of poverty is 16%, the total gross domestic product ratio (GDP) is 472,628.38 million Kips in the year 2019 and the GDP per capita is approximately 1,314 USD.




76. The core area covers the Moutun village which has 152 households with a total population of 1,080 people, including local authorities, students, and travelers (updated to Jan 2021). The annual population growth rate is 1.6% per annum for 2023-2038 (Namor District Office, 2021).



77. The local economy is based on agriculture and trade. The main income is from rice cropping, animal breeding (cows, pigs and poultry), NTFPs collection, state employee and trade.



78. The survey indicated that 7% of male and female as heads of households were district government officials, 5% were traders and the most of heads of households were farmers. The village is linguistically and ethnically homogeneous, with all heads of households being fluent in the national language. As in the investigation, 25% of the households are upper the poverty line and 75% of households are under the poverty line and most of them are ethnic group (Akha). It is estimated to 2038- the target year of the Project; the village will have 1,414 people.


4.9.3 Site Specific Conditions – Namu WSS

Table 4-4 – Site Specific Conditions in Namu WSS

| Work Item | Existing Conditions | Photos |
|--------------------------------|---|--|
| <p>Water Source and Intake</p> | <p>There are small bushes, vines, shrubs, small trees with a diameter of about 3-20 cm, bamboo, some rocks in stream bed. There are also barren spots between the bush which contractor can use to put construction materials.</p> <p>Water intake is located on Houay Pheng (nearby spring water).</p> |   <p>downstream of the intake</p>  <p>water intake location</p> |

| Work Item | Existing Conditions | Photos |
|---------------------------|--|--|
| <p>Raw water Pipeline</p> | <p>The length L =2.7Km</p> <p>Raw water pipelines will be laid along the brook, through the valley, crossing fallow land, agriculture land or running along the road side. Some sections are well covered with vines, bushes, banana and other trees etc.</p> <p>The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters. The width of pipe trenches ranges from 0.5 to 0.8 meters</p> |  |
| <p>Access road to WTP</p> | <p>The length L = 80 m, Width B=5m</p> <p>Currently the existing road is unsealed and narrow, dusty in the dry season and muddy in the wet season. There are mostly shrubs along road side. Only rice storage huts are located within 50 m from the access road center line, relocation is not required.</p> <p>The access road to WTP will be upgraded on the existing village road which is starting from main road.</p> <p>The existing ground elevation at the access road is from 670 amsl and 690 amsl. The slope gradient is 18%.</p> |  |

| Work Item | Existing Conditions | Photos |
|---|--|--|
| <p>Water Treatment Plant site</p> | <p>Land area S = 2500 square meters, dimensions: 50mx50m</p> <p>The WTP site is on communal land. The site and its surroundings are well covered with small trees, vines and shrubs. The WTP is border with natural creek in the north, village land in the south and with the villager house in the east, with village fallow land in the west</p> <p>The ground elevation is from 692 amsl to 696 amsl. the slope gradient is approximately 26%.</p> |  |
| <p>Distribution Pipes and Household Connections</p> | <p>The length L = 7,580m.</p> <p>The main pipeline will be laid along roadsides. The depth of the pipe trench is 0.7-1.2m and the width is 0.5-0.80m.</p> <p>There are houses along the roadside, the pipeline will be passing mostly in front of their houses. The system will also supply water to the school in the village.</p> <p>There are market, business, temples near the water connection pipelines which may also be affected temporarily during construction phase and get benefits from the WSS during operation phase.</p> <p>Project has supported construction of WASH facilities for Schools in Moutun cluster. Water connections will be provided to all public facilities including schools, health center (if exist).</p> |  |

| Work Item | Existing Conditions | Photos |
|------------------------|--|--|
| Powerlines for the WTP | <p>Length L = 85 meters</p> <p>The electrical poles will be located along the side way of the existing access road to the WTP.</p> |  |

4.10 La WSS Specific Conditions

4.10.1 Land use

79. The information of land use in Phonexay and Samikhyxay village was obtained by interview village authorities. Several land covers and distinct land use types occur in both villages.

80. Phonexay and Samikhyxay Village have a total land area of 2,720 ha and 3,340 ha, respectively, including forest, cemetery, forest and modified built-up areas. The table below is shown the distinct land use types and area of both villages.

Table 4-5 Land use in Phonexay and Samakhyxay Village

| No | Village | Total area (ha) | Residential land (ha) | Rice paddy (ha) | Upland paddy(ha) | Agriculture land (ha) | Village Protection Forest (ha) | Village Conservation Forest (ha) | Village production (ha) | Sacred forest | cemetery |
|----|--------------|-----------------|-----------------------|-----------------|------------------|-----------------------|--------------------------------|----------------------------------|-------------------------|---------------|----------|
| 1 | Phonexay | 2,720 | 4 | 37 | 29 | 1,847 | 18 | 24 | 763 | 0 | 0 |
| 2 | Samakhixay | 3,340 | 9 | 41 | 1,630 | 779 | 325 | 42 | 500 | 7 | 7 |
| | Total | 6,060 | 13 | 78 | 1,659 | 2,626 | 343 | 66 | 1,263 | 7 | 7 |

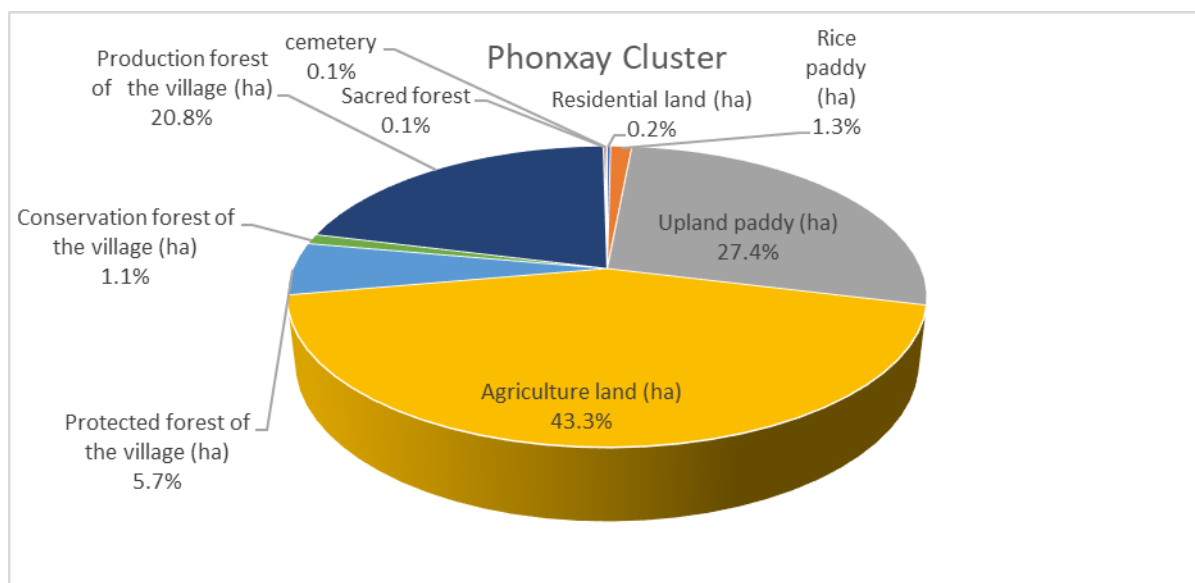


Figure 4-6 Land use type in 2 villages of Phonxay cluster (2023)

4.10.2 Water Use

81. Currently, Ban Samakkixay and Phonxay villages have had access to water supply from with pipes supply schemes (Nam Lin) without water treatment. Existing water supply schemes were installed in the year 2006 by CCL. Nevertheless, inadequate water during the dry season is due to insufficient supply and water supply is relatively less than the demand. Water resources in the area have been divided for agriculture activities on both sides of the brooks and the climate change problems. The communities, the health center, schools, and village office use the same water system. People use water for living life like cooking, bathing, washing clothes, feeding pets, etc. Nearly 70% of the HH in the villages drink water from bottled water (a plastic bottle of 20 liters), the rest of the HH drink water directly from taps supplied through water supply scheme (Nam Lin). Usually, villagers boil the water from Nam Lin before drinking.

82. Most people in the villages do agriculture for their livelihood, such as planting rice, corn, vegetables, cassava, rubber tree and other crops. The photographic features of this area are the mountain slopes and valleys. In the area, the brooks run along the valleys of relatively high slopes, potentially supporting local people irrigating the farms by gravity feed along both sides of the brooks in the wet season. There are small numbers of farmers also plant vegetables during the dry season.

4.10.3 Demographic and Socioeconomic Conditions

83. The Lar district has 45 villages with a total population of 18,155 people, of which, there are 8,957 women, 3,629 people living in the urban area, and 14,526 people living in the rural area. Careers: rice crops, livestock, commerce, and services. The potential of economic: agriculture, livestock and business, and NTFPs collection. The poverty ratio is 25.87%, the total gross domestic product ratio (GDP) is 248,367.62 million LAK, and the GDP per capita is approximately 1,686.26 USD.

84. The core area covers the B. Phonxay and B. Samakkixay villages which have 383 households with 1,088 PP. 1,152 people, including local authorities, students, and travelers

(updated to Jan 2021). Table 4-6 below show the number of household and population in Phonexay and Samakhixay Village.


Table 4-6 Population in core service area, Phonexay WSS.






| No. | Village | No. of HH | No. of Families | Total Population | Female | Male |
|--------------|------------|------------|-----------------|------------------|------------|------------|
| 1 | Phonexay | 85 | 113 | 425 | 197 | 228 |
| 2 | Samakhixay | 137 | 171 | 663 | 316 | 347 |
| Total | | 222 | 384 | 1,088 | 513 | 575 |


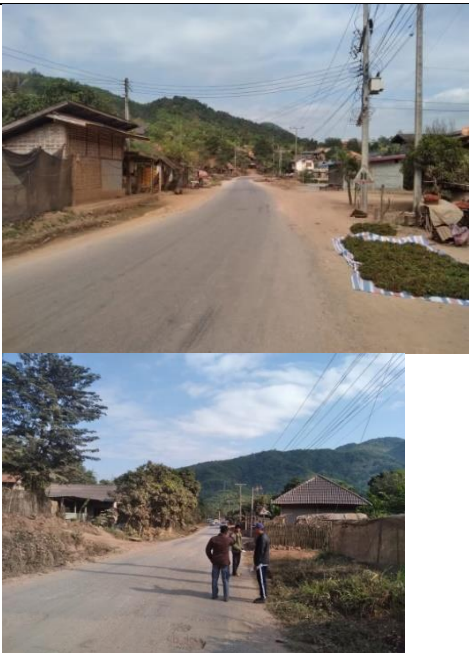
85. The local economy is based on agriculture and trade. The primary income is rice cropping, animal breeding (cows, pigs, and poultry), NTFPs collection, state employee, and business. The survey indicates the occupation in the two villages: 11% of male and female heads of households were districted government officials, traders were at 4% of total heads of households, workers were at 15% of whole heads of families and the most of heads of households were farmers. The two villages are linguistically and ethnically homogeneous, with all homes being fluent in the national language. According to the investigation, 35% of households are upper the poverty line, 65% are under the poverty line, and most are an ethnic group (Khmu).


4.10.4 Site Specific Conditions – La WSS

Table 4-7 – Site Specific Conditions in La WSS

| Work Item | Descriptions | Photos |
|--------------|--|--|
| Water Intake | There is an existing intake of (Namlin) for gravity water schemes. Existing structure will not be demolished. New Water intake for the WSS will be constructed nearby without disturbing the existing structure. |  |

| | | |
|-------------------------------------|--|---|
| <p>Raw water Pipeline Alignment</p> | <p>3.38 km of HDPE DN 90mm.</p> <p>The raw water transmission pipe from the intake to the water treatment plant will be laid downstream of Houay Lea Brook which passes the fallow land and along the road sides. Some sections of the roads run along hills at one side and valley at the other side.</p> <p>The depth of the raw water pipe trench excavation is 0.7-1.2m and the width is 0.5-0.8m.</p> |   |
| <p>Access road to WTP</p> | <p>Length:150meter, Width: 5meter.</p> <p>Along the access road is covered by shrubs, grass and bamboo.</p> <p>There are 6 Rice storage huts located within the Right of ways of the proposed access roads thus will be relocated.</p> <p>There are some houses along the proposed access road to WTP but not required to be relocated for road expansion.</p> |    |

| | | |
|---|---|---|
| <p>Water Treatment Plant site</p> | <p>Land Area = 2500 m², dimensions: 50mx50m</p> <p>The proposed Water Treatment Plant (WTP) is located in communal fallow land which is surrounded by private agriculture land. The existing land covered by vines, shrubs, bamboo and small trees with a diameter about 3-10 cm</p> <p>There is no residential building in surrounding of the WTP</p> <p>The existing ground elevation is from 692 amsl to 696 amsl. The slope gradient is approximately 11%.</p> |  |
| <p>Distribution Pipes and Household Connections</p> | <p>Length L = 2.05km Alignment maps in Annex 2</p> <p>The distribution network will be installed in Samakhixay and Phonexay villages, along roadside to the houses. Water will be supplied to the households and school.</p> |  |

| | | |
|-------------------------------|--|--|
| <p>Powerlines for the WTP</p> | <p>Length L = 200 meters</p> <p>The electrical poles of 22kV will be located along the side way of the access road to the WTP.</p> |  |
|-------------------------------|--|--|

5 Potential Environmental and Social Impacts and Risks

5.1 Positive Impacts and Benefits

86. The subprojects will provide direct and indirect benefits for all people living and working in the beneficiary villages. Principal benefits include a secure and continuous supply of safe and clean water. The WSSs will also provide stable drinking water that could contribute to improve community health, water supply is more reliable in both quality and quantity would meet the demands for processing food, cleaning, washing etc.

5.2 Environmental Impact During the Pre-construction and Construction Phase

87. Construction activities that may be undertaken for the proposed subprojects would include land clearing, setting up site offices and camps, mobilization of workers, machines and construction materials including the pipes to the sites, ground levelling, transportation of construction materials and wastes to and from the construction sites, excavation and grading, pipe installation and backfilling, disposal of excavated soil, road construction/rehabilitation, construction and installation, commissioning etc. During the construction phase, there will be common construction impacts and risks, and specific impacts and risks related to existing baseline conditions at the construction site and typical construction activities.

5.2.1 Pre-Construction and Construction impact and Risks

88. Pre-construction and Construction impacts and risks are listed below.

A. Pre-Construction Impacts and Risks

- (i) Impacts on land and objects on land due to site clearance, some structures may need to be relocated;
- (ii) Safety risks for the workers and machines during site clearance and excavation if unexploded objects (UXO) remain at the sites;

B. Construction Impacts and Risks

- (i) Generations of dust, noise, solid waste and wastewater;
- (ii) Increased Erosion/landslide and sedimentation risks
- (iii) Biological impacts associated with reduced vegetation cover and trees due to ground disturbance;
- (iv) Traffic disturbance and increased traffic safety risks;
- (v) Damages to existing infrastructures, such as existing roads
- (vi) Social disturbance due to construction;
- (vii) Community health and safety risks;
- (viii) Occupational health and safety risks
- (ix) Chance Find
- (x) Site-specific impacts and risks

The above impacts and risks are discussed in more detail below:

A. Pre-Construction Impacts and Risks

(i) Impacts on land and existing objects on land

89. Land and existing objects on land affected are summary:

Namo WSS

- No impact on the private land or property at the water intake.
- Agricultural land of 3 households will be marginally affected temporarily during the construction of the transmission pipes which will be laid along the embankments of agricultural land plots.
- The main distribution pipeline will be laid along the right side of the road without impacting private land. Pipeline alignments have been refined by the water supply engineer based on safeguard inputs, the pipelines alignment has been optimized to fully avoid existing houses/shop structures.
- The Water Treatment Plant will be constructed in the communal land area and will not any impact the private land property.

Table 5-1 Summary Impact on land and existing objects on land- Moutun WSSS

| No. | Number of AHs | Land Use type | Impacted area (m ²) | Impacted structure |
|-----|---|------------------|---------------------------------|--------------------|
| I | Raw water pipe | | | |
| | 3 | agriculture land | 116 (temporary impact) | None |
| II | Main clean water pipes and distribution pipes | | | |
| | None | Road's ROW | | None |
| III | Water Treatment Plan | | | |
| | None | Communal land | | None |
| IV | Intake | | | |
| | None | Water body | | None |
| V | Access Road to WTP | | | |
| | None | Communal land | | None |

La WSS

- The intake: no land acquisition required.
- The transmission water pipeline: impacts on agricultural land of 6 households.
- The Water Treatment Plant (WTP) will be constructed in the communal land with the total of 2,500 m².
- The new access road from the road No.2E to the WTP is 5 meters width and 150 meters long will also pass the communal land. 6 rice storage huts will be affected in Samakhixay village and required relocation.

The main distribution pipeline is 4.44 km long from WTP to Phonxay village. The pipeline alignment has been optimized to avoid impacts to existing houses/shop structures.

Table 5-2 Summary Impact on land and existing objects on land WSS Phonxay Cluster

| No. | Number of AHs | land Use type | Impacted area (m2) | Impacted structure |
|-----|--|-------------------|------------------------|---------------------|
| I | Transmission pipes | | | |
| | 3 | Corn field | 144 (temporary impact) | None |
| II | Main clean water pipes and distribution pipes | | | |
| | None | Construction Land | | None |
| III | Water Treatment Plan | | | |
| | None | Communal land | | None |
| IV | Intake | | | |
| | None | water body | | None |
| V | Access Road to WTP | | | |
| | 6 | Communal land | 72 | 6 rice storage huts |

Table 5-3 Summary Impact on land and existing objects on land WSS Moutun Cluster

| | <i>Agricultural land (m2) (temporary impact)</i> | <i>Residential land (meters)</i> | <i>Public land</i> | <i>Others (specify)</i> |
|---|---|----------------------------------|----------------------|-------------------------|
| Namo WSS | | | | |
| <i>Intake</i> | | | <i>Water body</i> | |
| <i>WTP</i> | | | <i>Communal land</i> | |
| <i>Transmission Pipes (Mountun Village)</i> | 116 | | | |
| <i>Distribution Pipelines</i> | | | <i>Road's ROW</i> | |
| <i>Ancillary sites (access roads, dumping sites etc.)</i> | Dumping site will be selected based on consultation with local authority | | | |
| La WSS | | | | |
| <i>Intake</i> | | | <i>Communal land</i> | |
| <i>WTP</i> | | | <i>Communal land</i> | |
| <i>Transmission Pipes Samakhixay village</i> | 144 | | | |
| <i>Distribution Pipelines</i> | | <i>None</i> | | |
| <i>Ancillary sites (access roads, dumping sites etc.)</i> | Disposal site will be selected based on consultation with local authority | | | |

Project policy on minimizing the impacts and compensations/supports to the Project affected Households and the plan to implement that policy:

- Rice storage huts of 6 HHs in Samakkhixay (La WSS), whose owners include a widow, will be shifted to nearby place near by the access road to WTP by the contractor before the construction of the access road to the WTP. During shifting if there is any wear and tear in the rice storage huts, contractor will repair these to the original condition. The rice storage hut owners agreed to allow the shifting of their rice storage huts to adjoining new location. The costs for relocation and repair of the huts were included in the BOQ of the construction bidding document (estimated at USD 200 for each hut).
- The designs of pipeline alignments are optimized to avoid crossing agricultural land also to facilitate pipeline protection and future maintenance. The pipelines will be laid along the embankments of the agricultural land plots rather than crossing them to the possible extent. Construction may affect farming-related activities, the contractor will be instructed to avoid, minimize disturbance to farming activities (avoid peak seedling/harvesting seasons) and ensure safety for the workers and the public during construction of the pipelines (including temporary loadings of the pipe, trench excavation, pipe installation, back filling, operations of machines etc.). .

(ii) Safety risks related to UXO

90. There will be safety risks for the workers and machines during site clearance and excavation if there are unexploded objects (UXO) remains at the sites. This risk is manageable. At the end of the detail design stage, the PMU recruited a contractor to carry out UXO clearance at project sites. UXO clearance will be completed before the start of the construction work. The construction sites will be handed over to the contractors only after the completion of the UXO clearance.

B. Construction Impacts and Risks

(i) Impacts on Air Quality

91. The potential sources of air pollution during the construction stage include dust from earthworks, it is concentrated mostly in areas within a 50 meter in radius of the disturbed ground, mostly from excavation activities. Fugitive emissions will be generated from the operation of construction equipment and machineries, vehicles working in the area (mainly at the WTP site, along the access road and the pipeline alignments) and along the transport routes; Most of the emissions will be in the form of coarse particulate matter and will settle down in close vicinity of the work sites. Dust generation will be the most during ground levelling and excavations at the WTP sites and along their access roads, however, the potential impacts are expected to be localized, short-term, and reversible. The workers at the sites and the small number of residents living near construction sites or the access roads would be most affected by dust. This impact can be mitigated by the use of personal protective equipment (PPE) and the application of other measures, such as carrying out construction in stages and covering the materials as part construction practices. These are specified in the Environmental and Social Codes of Practices (ESCOP) presented in the Environmental and Social Management Plan (ESMP) section of this report.

(ii) Increased level of Noise and Vibration.

92. Construction activities may cause noise and vibration impacts for a short duration. Noise and vibration are sourced from the operation of equipment such as jackhammer for the excavation of paved roads to create pipe trenches before installation, pile driving during for foundation construction at the water treatment plant sites. Ambient noise levels in these areas may reach 88dBA at about 15m away from the operating equipment. Along the haul roads, the average ambient noise level will also experience an acute increase because of increased vehicular traffic. The movement of vehicles also generate noise and vibrations along the road. Noise and vibrations mostly affect the workers. Noise and vibrations can be mitigated by the measures highlighted in ESCOP.

(iii) Generation of Solid wastes and Wastewater**Excavated Soil**

93. Earth work will include clearing of vegetation, grading of the access road, ground levelling at the WTPs, and excavation at pipe trenches along the transmission and distribution pipelines and other facilities. It is estimated that the total volume of excavated materials is 21,700m³ for Namor WSS and is 12,150 m³ for La WSS. It is anticipated that the topsoil, which will be stripped and removed, can be reused for garden land, and the subsoil could be utilized for backfilling or ground levelling.

Construction Waste

94. Other than excavated materials, the inert waste that will be generated during the works will consist mainly of scrap wood and metal, cement bags, aggregates, and concrete debris. These wastes are mostly generated at the WTP construction site and some at the water intake, representing no direct health impacts. They can be disposed of approval site; the scrap metal and wood can be collected for recycling.

Domestic Waste and wastewater

95. Domestic waste will be mostly generated at the worker's camp. Domestic waste is not anticipated to be a significant volume as only small temporary camps will be established at the sites near the WTPs. There will not be camps for the worksites for the intake, transmission and distribution pipelines. It is projected that the temporary camps will generate an estimated 0.4 to 0.5 kg/person/day or about 8 to 10 Kg/day (Max. 20 workers) and would mainly of consist plastic/ glass/paper food containers or packaging materials, residues from food processing wastes. Wastewater also will be generated from workers camps and offices. The volume is anticipated to be small.

96. If not properly managed, domestic waste and wastewater may cause nuisance to the public, attract vermined thus affect public health, leachate may cause air/soil/water pollution. Therefore, domestic waste and wastewater need to be collected and properly disposed of.

97. ESCOP and Workers Codes of Conducts includes the measures for domestic waste and wastewater management.

Hazardous materials

98. Oil, gas, paints, and some chemicals will be used during construction phase for the operations of machines and vehicles or construction of the water intakes, the WTPs, administration office, chemical house, fences etc. Hazardous wastes generated at the

construction sites may include containers of paint and solvents, used batteries, waste oil, rags and other materials contaminated with oil or chemicals. Although the volume is anticipated to be small, this type of waste is highly detrimental to the environment and public health. These materials must be segregated from the general solid waste, collected and disposed appropriately following ESCOP.

(iv) Increased Erosion/Landslide and Sedimentation Risks

99. Ground disturbance during the construction of facilities such as the intake, WTP, Office, access road, water pipelines, may result in erosion at disturbed ground areas. The causes of these risks include site clearance, excavation, earthworks and grading that turns covered surface to barren soil. Erosion potential is also enhanced by the heavy rains. Erosions would lead to the concentration of sediments and further siltation in rivers beds and water bodies. Erosions on slopes and steep areas may eventually lead to landslides, especially after durable rainfalls. Landslides may threaten the stability of existing infrastructure, they may collapse. Landslides may also lead to damages and even loss of properties and human lives down the slopes.

100. As the WTP site of the WSS in Namour is nearby a creek in the north, excavated soil and granular construction materials may enter the stream and cause sedimentation, the wet cross sections of these watercourses may be narrowed down, blockage may happen and leading to increased local water level and even flooding. On the other hand, water in the stream would become more turbid and may affect aquatic species. These impacts are transient, short-term and manageable.

101. The construction of water intakes would take place on and nearby waterways. The size of the water intake is small and construction duration is not long. Therefore, it is expected that the incremental sediment risks will be small.

102. Excavation will take place at the WTP and along the pipeline's alignment. There are some houses down slope of the WTP in La district, if landslide happens it may cause damages to household's properties and even loss of human lives. Therefore, construction must be taken with care and strictly follow the approved construction methods. Along the pipeline alignment, excavation would mostly be small scale, typically 0.5 to 1.5 m deep, 40 cm to 80cm wide, depending on the size of pipelines. Ground disturbance and loss of vegetation cover would also lead to increased erosion potentials at these sites. When construction is taking place close to existing structures such as houses or shops, soil subsidence may lead to damages to the existing structures. This risk can be prevented by proper construction methods, protect the excavated areas and new slopes by supports.

103. As the project areas have steep topography, landslide risk is high. Erosion and sedimentation risks can be mitigated by avoiding earthworks in rainy season, carrying out excavation in stages, and ground levelling as soon as possible. Engineering design and cost estimation should cover the measures to protect slopes and adequate drainage on slope recover the disturbed vegetation cover, avoid siting the heavy load work items (such as clear water reservoir) right on top of any slope, and catchment management as well as other measures listed in the ESCOP.

(v) Traffic disturbance and Increased traffic safety risks

104. Pipe laying will cause temporary disturbances to access from roads to properties. Construction activities implemented at roadside such as excavation of pipe trench, temporary loading of the pipes, construction materials and wastes, would disturb local traffics and caused increased traffic safety risks. Particularly the installation of the pipes at road crossings or construction activities along narrow roads may lead to a temporary blockage or closure of roads

and hamper movement of vehicles and people in the community. Currently traffic along the transportation route is low, disturbance to traffic is expected to be low. However, traffic safety risks would be higher during traffic peak time near schools, health care centers or other public centers. Similarly, there will also be increased traffic safety risks at the intersection between the main road and the access roads to the WTP. Traffic disturbance and safety risks would be temporary, in moderate term and manageable by appropriate construction schedules, methods and site management measures.

(vi) Biological Impacts and Risks

105. *Tree cutting, vegetation clearance.* The water intake is located in waterway near village production forest, the construction of the weir at the intake of two WSSs will not require cutting of the trees. Shrubs in limited areas may be removed. However, land clearance including tree cutting may be required for opening temporary access to the intake at some sections. The vegetation cover in those areas are small trees with a diameter less than 10cm and bush. Tree cutting and vegetation removal may also be required for the construction of the access road to the WTP, at the WTP sites and number of sections along the transmission and distribution pipelines. This impact is unavoidable but can be minimized through the siting of the pipeline alignment and limiting the disturbed areas to a minimum.

106. *Risks to wildlife.* There may be some wildlife in the project areas where bushes exist. During the construction phase, the workers may hunt or catch the birds, the fish or other wildlife. They may also cut or cause damage to the trees outside the boundary of construction sites. The workers may also be engaged in illegal trade or consumption of wildlife. Careless behaviors of the workers when handling or using flammable materials such as fuels may pose to forest fire risks. As the number of workers is very small and mostly are local laborers, it is expected that the risks to wildlife caused by construction activities are moderate.

107. *Bush fire risks.* As construction is likely to take place mostly in dry season meanwhile the project areas is quite well-vegetated, careless behaviors or workers or incidents from the use of fuels, gas, electricity may lead to bush fire risks. This risk is manageable through ESCOP and Codes of Conducts.

108. Impacts and risks to biological resources in general and wildlife in particular will be addressed through ESCOP, Workers Codes of Conducts and specific mitigation measures.

(vii) Social Disturbance

109. The proposed WSSs are of small size, not requiring large number of labor force. Therefore, the mobilization of the workers to the project site and their interactions with local communities are not expected to create competition for the local resources between the migrant labor force and local communities.

110. Pipe trench excavation, pipe laying, temporary loading of the pipes, construction materials and wastes will cause temporary disturbance to daily activities of local communities and accessibility to their properties, and some schools. Particularly at pipe road crossings, construction activities along narrow roads may lead to a temporary blockage or closure of roads and hamper movement of vehicles and people in the community.

111. On the other hand, dust, noise, pollution, traffic disturbance, safety risks caused by construction may lead to some tensions in communities at some levels.

112. The ESCOP and Workers Codes of Conducts will help to mitigate or address social disturbance. In addition, local labor will be given priority to be hired for manual works in the project during the construction phase. Since these are small construction project, so the workers will be hired locally except for the technical engineers and skilled workers. About 15-20 local labor will be hired for each site which can generate additional income for the local community.

(viii) Occupational Health and Safety Risks

113. During the construction phase, the implementation of the works may result in hazards to the health and safety of workers, such as

- Tripping, falling from height or slippery surfaces, while carrying heavy loads or moving from lower to higher areas and vice versa;
- Workers are attacked by harmful insects such as bees, snakes, etc. when working near the bush or forested land
- Accidents happen during operation of machines and equipment (including welding machines), handling of bulky work items including the pipes and pre-casted objects of the WTP, or caused by landslides;
- Electrical failures;
- Hazards caused by gas or oil spills lead to fires;
- Materials and equipment fall from high above;
- Exposure to extreme weather conditions in long duration: heat from sunlight, heavy rains etc.
- Working at risky conditions (narrow space, dark, near open space high above, etc.)
- Exposure to pollutions (dusts) or hazardous materials (gas, oils, paints etc.)
- Lack of access to clean water, safe food or adequate sanitation facilities when living in project area;
- Contract water-borne diseases (dengue fever, diarrhea etc.) or Sexual transmitted diseases if the works engage in “social evils” such as prostitutions;
- Social disorder if the workers quarrel, fight, or engage in gambling, drug addicts, prostitutions etc.

OHS risk is at moderate level and manageable through ESCOP, Codes of Conducts and site-management measures.

(ix) Community Health and Safety Risks

114. During construction phase, local communities may be exposed to health and safety risks, such as

- Falls in open holes or pipe trenches, especially at sections passing along roads, in front of houses, shops or schools;
- Exposure to the operation of construction plants (trucks, cranes, etc.) or vehicular movements in the area or heavy equipment, the handlings of the bulky construction materials such as the HDPE pipes, the power poles, the pre-casted tanks or other parts of the WTP;
- Expose to unsafe electrical wires, gas, hazardous materials stored or spilled at and surrounding the construction sites;
- Pollution by dust, waste and wastewater.

(x) Chance Find

115. There are no known historical or archaeological sites within the proposed two-cluster water supply subprojects footprint. However, there is a risk that artifacts may be exposed

during excavation. Chance Find Procedures specified in the ESCOP will be applied to address such circumstances.

5.2.2 Type and Site-specific Construction Impacts and Risks

116. The construction impacts and risks would be higher at some locations, depending on the types of typical construction activities (such as pile driving or welding) to be carried out, and the sensitiveness of project locations (whether it is in bush land, near school/health care centers or other public accessible sites, on the road, etc.).

117. Type-specific impacts and risks may include disruption of water flow during intake construction, traffic disturbance or disruptions due to excavation of trenches for pipeline installation, occupational health and safety risks during the installations of power poles and lines or bulky items at the WTPs, etc. These specific impacts and risks are listed in the ESMP (Section 6), together with the mitigation measures.

5.3 Environmental Impacts and Risks During the Operation Phase

5.3.1 Impacts on Hydrology and Water Usage

118. As mentioned in Section 3.3.1, the measured flow rates measured in dry season at the proposed intake on the Houay Pheng Brook was at 1,803 m³/day, much higher than the proposed capacity of the WPT, at 135 m³/day. Similarly, the design capacity of the WTP in Lay district is 150m³/day, accounts for 2.6% of the flow rate in water source measured in dry season of 2022, which was at 5,670 m³/day. Therefore, it is anticipated that the proposed WSS systems would not cause any noticeable changes in stream hydrology or downstream water usage.

5.3.2 Generation of backwash water and sludges at water treatment plants.

119. The WTP will produce inert silt and sediment as a by-product which may contain traces of water treatment chemicals (aluminum salt or alum). Sediments generated from the pre-sedimentation process is very small, average of 15.6kg/days at each WTP. While those from the filtration process are insignificant in volume. The WTP design included a sludge lagoon for temporary storage of sludge generated from water treatment process. Sediment volumes will be large during the wet season due to high suspended solids content in the river water, but low during the dry season. Aluminum is suspected to be the cause of Alzheimer disease. Hence sludge will be disposed in predetermined landfill sites to avoid health hazards and prevent it from entering the food chain. Warning should be made not to allow dumping of WTP sludge to crop/agricultural land. Loading such materials on timber plantation is fine.

5.3.3 Occupational Health and Safety of Workers

120. Water treatment will involve the use of PAC alum, Polyacrylamide (PAA) coagulant auxiliary agent, disinfection solution and chlorine. Therefore, the works will expose to hazards risks during chemical handling. The risk is particularly present during chlorination because chlorine is a reactive chemical that is hazardous to skin and eyes in case of accidental spill or leak.

121. These risks are manageable through detailed design by the provision of wash basins in the operation house, and a separate room for chemical storage.

5.3.4 Community Health and Safety

122. Accidents may happen if unauthorized community members, especially the children enter the water treatment plant and walk around the treatment units or in contact with water

treatment chemicals. Therefore, detailed design of the WTPs should include warning and protection measures. The WTPs should be properly fenced off and secured to restrict access and intrusion of unauthorized personnel. Watchmen/security personnel will be hired to secure the facilities on a 24-hour basis. This would minimize the safety risks to the community.

5.3.5 Landslide Risks

123. As the proposed WTPs are built on steep topography, rainfall in the project area is relatively high and durable. Under the impacts of rain and socio-economic activities along these sites, land slide risks do exist along the access road to the WTP, at the WTP and the slopes surrounding above the WTPs. The layout design of the WTPs should take into account these risks and apply necessary arrangements and measures to mitigate the risks. Monitoring of land slide risks during the operation phase would also be necessary.

5.3.6 System Failure Risks

124. The operation of the WTP requires electrical usage thus it may cause overload in the existing power supply system and lead to power failure. To avoid this risk, the design of the WSS included a 50 KVA transformer to supply power for the WTP operations.

125. Pollution due to chemical spills may also happen during the transportation, handling of chemicals or during the operation of the treatment units. This risk will be considered during the detail design and mitigation measures such as safe storage area, leakage detection systems should be proposed.

5.3.7 Raw Water Quality and Quantity Security

126. **Water quality:** Currently the water quality of both water sources is generally good (see section 4.2). The quality of the raw water may deteriorate if there are detrimental human activities such as farms, agricultural areas, use of pesticide/fertilizers/chemical substances in the upstream catchment area or upstream of intake locations. This may affect the efficiency of WTP and the resulting quality of the treated water. The PIU and PNP shall be continuously coordinate with the village authorities in the WSS service area regarding community activities in the catchment area to monitor catchment activities that may contribute to the contamination of raw water and advise them not to use any chemical which may potentially affect the water.

127. There is no proposed future development that could also have impacts on water quality in the area.

128. **Water quantity:** The water flow rate of Houay Pheng (Moutun WSS) and Houay Lea (Phonxay WSS) is 1,803m³/day and 5,670m³/day while the water demand for Moutun WSS and Phonxay WSS is 135m³/day or only 7.5% of water flow rate and 150 m³/day or 2.6% of stream water flow rate.

129. There are no other water usage activities around the Houay Pheng brook and Houay Lea brook that might have impacts on water usage. Note that the measurement of water supply shows that there is water supply is sufficient and water taken at water intake is only minor (based on above session).

6 Environmental and Social Management Plan

130. The Environmental and Social Management Plan (ESMP) include the following key contents

- Mitigation measures
- Monitoring requirements
- Monitoring program and reporting requirements
- Institutional Arrangements

6.1 Mitigation Measures

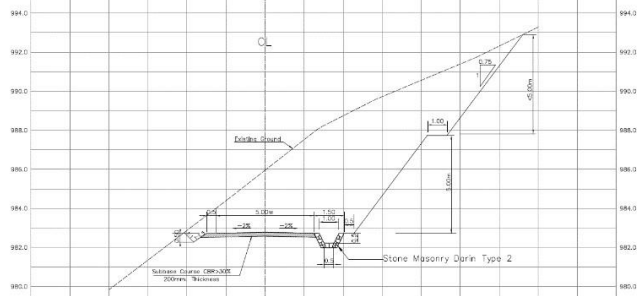
6.1.1 Detailed Design

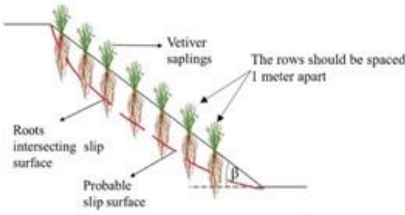
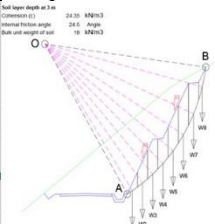
131. Environmental check list has been developed for the Project for the detail design consultants to use during detail design stage in order to avoid or minimize some impacts and risks of construction and operational phases. The application of that check list during engineering design and the preparation of cost estimations of the four WSSs are explained in Table 6-1 and

132. Table 6-2 below.

133. The roads affected by excavation of pipe trenches will be reinstated by the contractors. The construction bidding document/contract covers the costs for the reinstatements of the affected roads.

Table 6-1 Application of Environmental Checklist for Detail Design stage for Moutun WSS

| Risks, Impacts | Detail Design Mitigation Measures/Check Lists | Detail Design |
|---|---|---|
| Water Treatment Plants (WTP) | | |
| <p>Traffic Safety Risks along access road during construction and operation phases</p> | <ul style="list-style-type: none"> • Design of the access roads to the proposed WTP includes measures to ensure traffic safety along the road, especially at the curves, along steep slopes and at the junction between the existing main road and the access road to the WTP; • Side drainage along the road to ensure sufficient drainage capacity and avoid slope failure. | <ul style="list-style-type: none"> • The design: Class 5 of the STD of the road design, 5 m of wide, the length is 120m, and a side of the road have the drainage system. the radius of the curve is 20m, and the radius of junction curves is 5 m, • The drainage system has sufficient capacity to drain the water out of the water shade area, the section of canal (0.5 x 1 x 0.6m) As the figure below.  |
| <p>Land slide, erosion risks that affect the safety and stability of the treatment units and down slope communities</p> | <ul style="list-style-type: none"> • WTP plant lay out taking into considerations the land areas to be disturbed, areas loss of vegetation cover and trees, the volume of earth works/ground disturbance and stability of structures with high loads such as clean water storage reservoirs; • Plant lay out include greening and landscaping to minimize barren ground surface and erosion risks. • Design considers slopes stabilization measures at, surrounding the WTP and along the access roads; • Foundation design considers the static and dynamic loads (water required treatment, operational substance and etc.) to avoid failures from operation. | <ul style="list-style-type: none"> • The design, cutting a hill and creating a slope to protect against landslides for the construction of the road, according to the geotechnical survey team is conducted to assess the soil type, slope stability, and potential risks of landslides. Based on the survey results, the slope design is created to ensure stability and safety. The site is then cleared of vegetation, rocks, and debris before excavation begins. Heavy machinery and proper excavation techniques are used to excavate the hill, the slope will plant the vetiver grass along the roadway to stabilize the hillside. Drainage systems such as culverts or ditches will be installed to divert water away from |

| Risks, Impacts | Detail Design Mitigation Measures/Check Lists | Detail Design |
|--------------------------------|---|--|
| | | <p>the road and prevent erosion. After the slope is constructed, it is regularly monitored to ensure stability and safety.</p>  <ul style="list-style-type: none"> • The cutting slope are safety and stability, the bearing capacity of soil is 3.3 kg/cm² (the average of 3 Drilling holes) <ol style="list-style-type: none"> 1. Analyze the stability of soil for the access road, No potential of the land slide 2. Analyze the stability of soil for WTP, No potential of the land slide  |
| Safety for the workers | <ul style="list-style-type: none"> • Ensure deep and high locations are protected with hand rails; • Ensure the design of working bridges, ladders, handrails are convenience and safe for the workers. | <ul style="list-style-type: none"> • The structures design is considered on occupation health and safety. • The design of ladders should be safe for the users especially for the workers during the construction phase. |
| Occupational Health and Safety | <ul style="list-style-type: none"> • Chemical storage area is separated from other operations, in roofed areas and with warning signs; • There are wash basins and septic tank toilets for the operators; | <ul style="list-style-type: none"> • Chemical storage area is separated from other operations, have sign boards for warning and a sink for washing of the hand when contact with the chemicals |


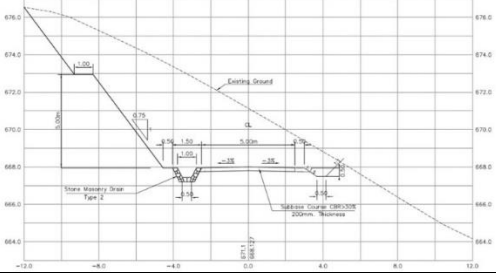
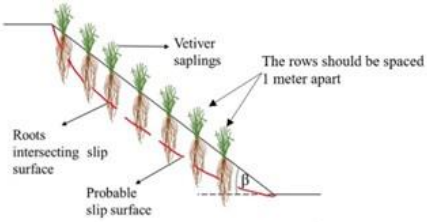
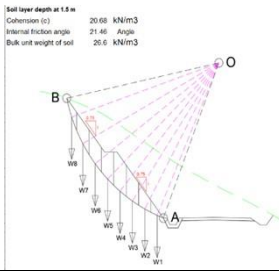

| Risks, Impacts | Detail Design Mitigation Measures/Check Lists | Detail Design |
|--------------------------|--|--|
| | <ul style="list-style-type: none"> The chlorine storage area/disinfection unit Include leakage detection equipment and auto spray; OM include evacuation plan Plan to manage/store/dispose the excavated soils during the site preparation and construction phase. |  |
| Safety during operation | <ul style="list-style-type: none"> Fences, warnings to restrict access to the WTP sites during both construction and operation phases | <ul style="list-style-type: none"> Fence and warning signs are designed for installing during the construction and operation for community health and safety purpose. |
| Pollution Control | <ul style="list-style-type: none"> The size of sludge Lagoon is adequate to prevent spills downslopes. Allocate drying yard/designated areas for sludge drying before transportation out of the WTP; Do not allow reuse of sludge for filling food crop land (as it contains Al – a heavy metal that was considered to cause Alzheimer’s disease). | <ul style="list-style-type: none"> Size of sludge lagoon is 35m³ (5mx7mx1m), it is designed to store sludge approx. 1752Kg or for a period of four months. The sludge will be transported and disposed of at the approval site. The spoil disposal area could not be identified during the design. The selected contractor shall be work with the PMU/PIA and relevant local authorities to identify disposal sites for the topsoil and unused excavated materials |
| Pipelines, Power systems | <ul style="list-style-type: none"> Refine, optimize alignments to avoid, minimize impacts and risks on residential land, disturbance to existing housing structures and private properties as much as possible | |

Table 6-2 Application of Environmental Checklist for Detail Design stage for Phonxay WSS.

| Potential Risks, Impacts, Issues | Detail Design Mitigation Measures/Check Lists | |
|--|--|---|
| Water Treatment Plants (WTP) | | |
| Traffic Safety Risks along access road during construction and operation phases | <ul style="list-style-type: none"> Design of the access roads to the proposed WTP includes measures to ensure traffic safety along the road, especially at the curves, along steep slopes and at the junction between the existing main road and the access road to the WTP; Side drainage along the road to ensure sufficient drainage capacity and avoid slope failure. | <ul style="list-style-type: none"> The design: The class 5 of the STD of the road design, 5 m of wide, the length is 150m, and a side of the road have the drainage system. the radius of the curve is 20m, and the radius of junction curves is 5 m, The drainage system has sufficient capacity to drain the water out of the water shade area, the section of canal (0.5 x 1 x 0.6m) As the figure below.  |
| Land slide, erosion risks that affect the safety and stability of the treatment units and down slope communities | <ul style="list-style-type: none"> WTP plant lay out taking into considerations the land areas to be disturbed, areas loss of vegetation cover and trees, the volume of earth works/ground disturbance and stability of structures with high loads such as clean water storage reservoirs; Plant lay out include greening and landscaping to minimize barren ground surface and erosion risks. Design considers slopes stabilization measures at, surrounding the WTP and along the access roads; | <ul style="list-style-type: none"> The design, cutting a hill and creating a slope to protect against landslides for the construction of the road, according to the geotechnical survey team is conducted to assess the soil type, slope stability, and potential risks of landslides. Based on the survey results, the slope design is created to ensure stability and safety. The site is then cleared of vegetation, rocks, and debris before excavation begins. Heavy machinery and proper excavation techniques are used to excavate the hill, the slope will plant the vetiver grass along the roadway to stabilize the hillside. Drainage systems such as culverts or ditches will be installed to divert water away from the road and prevent erosion. After the slope is constructed, it is regularly monitored to ensure stability and safety. |

| Potential Risks, Impacts, Issues | Detail Design Mitigation Measures/Check Lists | |
|----------------------------------|--|---|
| | <ul style="list-style-type: none"> Foundation design considers the static and dynamic loads (water required treatment, operational substance and etc.) to avoid failures from operation. |  <ul style="list-style-type: none"> The cutting slope safety and stability, the bearing capacity of soil is 2.4 kg/cm² (the average of 3 Drilling holes) <ol style="list-style-type: none"> Analyze the stability of soil for the access road, No potential of the land slide Analyze the stability of soil for WTP, No potential of the land slide  |
| Safety for the workers | <ul style="list-style-type: none"> Ensure deep and high locations are protected with hand rails; Ensure the design of working bridges, ladders, handrails are convenience and safe for the workers. | <ul style="list-style-type: none"> The design is considered convenience and safety for worker. |
| Occupational Health and Safety | <ul style="list-style-type: none"> There are washing basins and septic tank toilets for the operators; The chlorine storage area/ disinfection unit Include leakage detection equipment and auto spray; O&M include evacuation plan | <ul style="list-style-type: none"> Yes, washing basins and septic tank toilets is already in BOQ for construction (see detail in the Bidding document and snapshot below) Chemical storage area is separated from other operations, have sign boards for warning and a sink for washing the hand when contract with the chemicals. Soil disposal plan is already prepared see table above and in the ESMP |

| Potential Risks, Impacts, Issues | Detail Design Mitigation Measures/Check Lists | |
|---|--|--|
| | <ul style="list-style-type: none"> Plan to manage/store/dispose the excavated soils during the site preparation and construction phase. |  |
| Safety for the workers and community during operation | <ul style="list-style-type: none"> Fences, warnings to restrict access to the WTP sites during both construction and operation phases | <ul style="list-style-type: none"> Fences and warning signs already designed and will be installed/constructed during construction. |
| Pollution Control | <ul style="list-style-type: none"> The size of sludge Lagoon is adequate to prevent spills downslopes. Allocate drying yard/designated areas for sludge drying before transportation out of the WTP; Do not allow reuse of sludge for filling food crop land (as it contains Al – a heavy metal that was considered to cause Alzheimer’s disease). | <ul style="list-style-type: none"> The sludge amount will be kept in the sludge lagoon and sucked up and transported to a disposal site every 2-3 months. The sludge will be transported and disposed of at approval site. The selected contractor shall work with the PMU/PIA and relevant local authorities to identify disposal sites for the topsoil and unused excavated materials. |
| Pipelines and Power systems | <ul style="list-style-type: none"> Refine alignments to avoid, minimize impacts and risks on residential land, disturbance to existing housing structures and private properties as much as possible | |

6.1.2 Environmental and Social Codes of Practices (ESCOP) and specific construction requirements

134. The mitigation measures specified in this section are applicable to construction phase and included in the construction bidding documents.

135. The construction contractors are required to implement or comply with all mitigation measures presented in this subsection during the execution of the contract. After contract signing, the successful bidder (the contractor) is required to prepare a Contractor's Environmental Management Plan (C-ESMP) to submit to PMU for review and clearance prior to construction commencement. The C-ESMP shall:

- Include statements to comply with the Project's safeguard requirements;
- detail the ESCOP and Codes of Conduct;
- Detail other mitigation measures (including the preparation of site-specific mitigation measures such as camp and site office arrangements, drainage, erosion control and land slide prevention measures, vegetation management, fire preventions, safety for the workers and the publics etc.) to ensure that all construction impacts and risks are managed or addressed properly during construction phase.
- - include copy on the license of the equipment and construction plants that the contractors plan to use during contract execution.
- be updated to address the issues arisen during construction phase, if any.

136. After contract signing, the contractors would be required to coordinate with the construction supervisors and the PMUs to conduct additional consultation with local authorities, get their advice on the disposal sites of topsoil and excavated materials from earth works. Application of appropriate mitigation measures at the disposal sites and along the access would also be required. These need to be specified in the Contractor's Environmental and Social Management Plans (C-ESMP).

Table 6-3 Environmental and Social Codes of Practices

| Impacts/Risks | Mitigation Measures | Responsibility | |
|--|---|----------------|---|
| | | Implementation | Supervisor/approval |
| 1. Soil Erosion and Sedimentation | <ul style="list-style-type: none"> Excavation works shall be scheduled during the dry season to the extent practical to avoid carrying out excavation works during heavy rainfall periods. Construction activities shall be carefully planned to minimize disturbed areas and to preserve existing vegetation, which minimizes the potential of removing of existing trees that protect soil from erosion. Diversion structures, such as earth dikes and drainage swales, shall be installed along paved surfaces, the top of slopes and below areas where runoff starts to concentrate, to divert off-site water runoff during construction and limit the exposure of disturbed sediments to moving water. Silt traps/sedimentation basins/settlement pond to capture and detain construction site runoff shall be installed. Slope failure protection should be considered during construction and after construction (operation). All work at or near the river must be rehabilitated immediately, to minimize risk of bank erosion and soil being washed into the river. The contractor will be prohibited from quarrying materials directly from any river. Construction materials will be procured from Government-permitted sources/ suppliers only. Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. | Contractor | PMISC-Environment Specialist; PMU and PIU |
| 2. Air Quality reduction, dust generation | <ul style="list-style-type: none"> Spray water on access road and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. Impose speed limits on construction vehicles. Excavation work will be avoided in periods of high wind. The contractor will comply with a 10 km/h speed limit when in the community area. Transport of materials that may generate dust shall be covered with canvass or similar. Install temporary fens or barriers around the subproject facility construction site. The burning of site clearance debris (trees, undergrowth) or construction waste material is prohibited. Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. | Contractor | PMISC-Environment Specialist; PMU and PIU |

| Impacts/Risks | Mitigation Measures | Responsibility | |
|--|--|----------------|---|
| | | Implementation | Supervisor/approval |
| | <ul style="list-style-type: none"> Regularly maintain the construction machines to ensure they are in good condition. | | |
| 3. Noise and Vibration | <ul style="list-style-type: none"> Limit construction activities, particularly operation of noise/vibration generating equipment at night. Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. Install temporary fens or barriers around the subproject facility construction site especially near schools, healthcare stations and houses. Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community area. Provide information to community on schedule of construction activities through billboard/signs. Avoid using equipment that may result in high levels of vibrations | Contractor | PMISC-Environment Specialist; PMU and PIU |
| 4. Impacts and risks to biodiversity | <ul style="list-style-type: none"> The contractors will prohibit activities such as cutting wood for cooking, harvesting and hunting, or wildlife trade. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid the cutting of trees as much as possible and minimize damage to native vegetation. The width of roads and paths to the intakes and the WTPs, will be kept to a minimum, only to accommodate the construction. The use of vehicles/equipment will be kept to a minimum to reduce the land acquisition required. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion. Implement landscaping and planting of trees/vegetation, using native plant species for greening at the WTP site | Contractor | PMISC-Environment Specialist; PMU and PIU |
| | | Contractor | PMISC-Environment Specialist; PMU and PIU |
| 5. Impact and Risks on Private and community assets | <ul style="list-style-type: none"> Build access roads to minimum necessary width. installation of pipelines within the Right-of-Way when feasible. Protect slops where excavation potentially affect existing housing/shop structures | Contractor | PMISC-Environment Specialist; PMU and PIU |

| Impacts/Risks | Mitigation Measures | Responsibility | |
|---|---|----------------|---|
| | | Implementation | Supervisor/approval |
| 6. Disruption to traffic and pedestrians' access to properties | <ul style="list-style-type: none"> Prepare and implement measures for temporary traffic management prior to construction to ensure road safety. The plan should include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours. Walking access will be maintained to affected properties and access routes will be temporarily lined with suitable material. Particular attention will be given to ensuring safety along roads and paths used by pedestrians, including school children. Side street parking of construction vehicles on prolonged basis will not be allowed. Install barriers and safety warning signs on road sections and, if necessary, deploy traffic aides/ flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works, and the traffic-rerouting plan. Ensure the contractor immediately rehabilitates excavated or disturbed areas and any damaged road and path sections or any other existing infrastructure and the related services. | Contractor | PMISC-Environment Specialist; PMU and PIU |
| 7. Risks on Relics and artifacts exposure Chance Find Procedures | <ul style="list-style-type: none"> The Contractor will ensure that the workforce is briefed that in the event of accidental finds relics they should immediately cease any works in the area and promptly report the find to their supervisor. If the contractor discovers archeological sites, historical site, remains and objects, including graveyards, and/or individual graves during excavation or construction, the Contractor will carry out the following steps⁵: <ul style="list-style-type: none"> Stop the construction activities in the area of the chance find; Delineate the discovered site or area; Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over; Notify the project engineer, supervisor (CSC), and/or PSC who in turn will notify the responsible local authorities and the provincial Culture Department immediately (within 24 hours or less); Responsible local authorities and the provincial Culture Department would be in charge of protecting and preserving the site before deciding on subsequent appropriate | Contractor | PMISC-Environment Specialist; PMU and PIU |

⁵ Refer to the Table 6-3 Environmental and Social Codes of Practices is based on ESMP

| Impacts/Risks | Mitigation Measures | Responsibility | |
|----------------------------------|--|----------------|---|
| | | Implementation | Supervisor/approval |
| | <p>procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of</p> <ul style="list-style-type: none"> ▪ National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values. ▪ Decisions on how to handle the finding shall be taken by the responsible authorities and the provincial Culture Department. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage; ▪ Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and <ul style="list-style-type: none"> • Construction work could resume only after permission is given from the responsible local authorities or the provincial Culture Department concerning safeguard of the heritage. | | |
| 8. Generation Solid Waste | <ul style="list-style-type: none"> • Excavated material will be utilized to backfill the trench and/or ground leveling at the construction sites such as the WTP, access roads and pipe trenches. The contractor is required to properly reinstate the excavated trench after completion of pipe laying. • Surplus excavated material/cut soil from construction of the WTP will be used as backfill material for low-lying areas that have been identified by the village authority.⁶ • Non-hazardous construction waste shall be disposed of at a designated disposal site with the necessary environmental compliance certificate, as agreed with District Authorities. • The contractor will segregate solid waste into hazardous and non-hazardous waste on a daily basis, and then further segregate into recyclable and non-recyclable waste. Recyclable waste includes plastic bottles, cans, and metal. Non-recyclable waste is likely to include wrappings, packaging, and construction waste. The waste fractions will be stored temporarily in bins or in fenced-off and covered enclosures. • The contractor will bring recyclable waste to the local recycling dealer or shop - if there is one. If there is no local recycling dealer, the recyclables (still segregated) shall be brought to the waste disposal site as specified by the District Authorities for possible recycling by dealers operating there or disposed together with non-recyclable waste at that site. | Contractor | PMISC-Environment Specialist; PMU and PIU |

⁶ Refer to table 6-3 Environmental and Social Codes of Practices is based on ESMP

| Impacts/Risks | Mitigation Measures | Responsibility | |
|--|---|----------------|---|
| | | Implementation | Supervisor/approval |
| | <ul style="list-style-type: none"> Disposal of waste (that is not recycled) is only allowed at the solid waste disposal site specified by the District Authorities. Open burning or burial of any form of waste or materials is strictly prohibited both onsite and offsite. Littering of waste is strictly prohibited | | |
| 9. Occupational Health and Safety | <p>The Contractor will appoint a Site Manager or his/her representative with the appropriate qualifications in environmental and occupational health and safety associated with the implementation of the ECOP, the Labor Management Plan and Environmental, Health and Safety of IFC (http://www.ifc.org/ehsguidelines).</p> <p>Site sanitation</p> <ul style="list-style-type: none"> The contractor will install the Worker Camp in an area far enough from water sources, houses and sensitive areas and in consultation with the community; The contractor will be responsible for reinstatements of temporary disturbed areas by camp and site offices work completion. Provide an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained to a hygienic standard; The contractor should make separate arrangements for men and women workers. Provide garbage receptacles at the construction site and camps, which will be periodically cleared to prevent the outbreak of diseases and maintain hygiene; and Collect, treat camp wastewater before discharge into the environment. There is no existing wastewater treatment in this area, but it is proposed to make the septic tank system at worker camp to collect, treat camp wastewater before discharge. <p>Occupational Safety</p> <ul style="list-style-type: none"> Provision of first-aid facilities readily accessible by workers. Contractor should include an emergency management plan in case of an accident, and safety drills. Workers must be made aware of the emergency management plan. Provisions of personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations for workers. All workers must be trained in the use of the required equipment. | Contractor | PMISC-Environment Specialist; PMU and PIU |

| Impacts/Risks | Mitigation Measures | Responsibility | |
|---------------|---|----------------|---------------------|
| | | Implementation | Supervisor/approval |
| | <ul style="list-style-type: none"> Wearing of PPEs while working on-site will be a mandatory requirement for workers. Posting of safety signs/reminders in strategic areas within the construction area. Installation of sufficient lighting at night. Contractor should provide training to the workers for awareness and measures to prevent the sexually transmitted diseases (STD). <p>Food Safety</p> <ul style="list-style-type: none"> Provide a clean and sufficient supply of fresh water. Inspect and supervise food hygiene in canteens on site regularly. Canteen workers must have valid health permits. If food poisoning is discovered, implement effective control measures immediately to prevent it from spreading. <p>Disease prevention and safety awareness</p> <ul style="list-style-type: none"> Construction workers must have a physical examination before starting work on site. If an infectious disease is found, the patient must be isolated for treatment to prevent the disease from spreading. Provide induction and training by local health departments on the prevention and management of communicable diseases. Implement STIs/HIV/AIDS and other communicable diseases awareness and prevention programs. Provide training on the specific hazards associated with the works, as well as training on basic sanitation and health care issues, and general health and safety. <p>Security:</p> <ul style="list-style-type: none"> Regular attendance and a controlled time keeping of all employees; Restriction of un-authorized persons to the residential and work areas; Restriction of carrying weapons and control hunting by employees; and Provision of boundary walls/fence with proper exits to the camp | | |

| Impacts/Risks | Mitigation Measures | Responsibility | |
|--|--|----------------|---|
| | | Implementation | Supervisor/approval |
| 10. Community Health and Safety | <ul style="list-style-type: none"> • Install barricades/barriers and sturdy plate covers in open excavations during non-working time. • The contractor must install the physical barrier to limit access to the construction site. • Install signs at construction sites warning people of potential dangers. • Erect construction billboards, which include construction contents, schedule, responsible person and complaint phone number, at the entry to each construction site and construction staging area. • Construction works with noise and dust will be prohibited during the nighttime. • Liaise with PIU to inform the community about the upcoming construction work and important precautions to protect the community. • Coordinate with Village Authority Committee and share the work plans and number of workers who will stay in the camp. | Contractors | PMISC-Environment Specialist; PMU and PIU |
| 11. Disposal of Sludge generated from sludge lagoon | <ul style="list-style-type: none"> • The selected contractor shall work with the PMU/PIA and relevant local authorities to identify disposal sites for the sludges and get approval/agreement with land owner before dumping. • The disposal site should be empty and lower land that need to fill up and it shall be located far enough from water sources, residential area and sensitive area. • Do not located in forest area, cultivation area and other sensitive area. • Do not allow reuse of sludge for filling food crop land. • Do not dump the sludge in the natural water sources/natural drainage courses. • Do not located within the • Install barrier and safety waring sings around the disposal area. • Land levelling shall be completed before handover to land owner. | PNP staff | DPWT |

137. In addition to the ESCOP above, the Contractors will be required to follow strictly the EHS rules below:

Site EHS Rules:

- EHS orientation session before starting work;
- Wearing of personal protective equipment (gloves, helmets, safety shoes, dungarees, goggles, etc.);
- Follow the message and instruction displayed on EHS notice boards installed on site;
- Promptly reporting all accidents to the concerned authority;
- Maintain appropriate barricades as required;
- Vehicles must be driven at a safe speed, observing speed limits of 30km/h and designated routes as mentioned in Contractor's Mobility Map;
- Drivers must have a valid driving license for the class of vehicle they are operating;
- Vehicles shall only be parked in designated parking area; and
- Mine clearance of the project investment area.

Health and Hygiene:

- Provision of adequate medical facilities to the staff;
- Provision of cooling and heating facilities to the staff; and
- Provision of drainage, sewerage and septic tanks in camp area.

Security:

- Regular attendance and a controlled time keeping of all employees;
- Restriction of un-authorized persons to the residential and work areas;
- Restriction of carrying weapons and control hunting by employees; and
- Provision of boundary walls/fence with proper exits to the camp.

WORKERS CODES OF CONDUCTS

138. Each employee shall be informed of the Code of Conduct and bound by it while in the employment of the Client or its Contractors. The Code of Conduct shall be available to local communities at the project information centers or other places easily accessible to the communities.

139. The Contractor is responsible for providing appropriate training to all staff according to their level of responsibility for environmental, health and safety matters.

The Code of Conduct shall address the following measures (but not limited to them):

- All of the workforces shall abide by the laws and regulations of the Lao PDR;
- Illegal substances, weapons and firearms shall be prohibited;
- Pornographic material and gambling shall be prohibited;
- Fighting (physical or verbal) shall be prohibited;
- Creating nuisances and disturbances in or near communities shall be prohibited;
- Disrespecting local customs and traditions shall be prohibited;
- Smoking shall only be allowed in designated areas;
- Maintenance of appropriate standards of dress and personal hygiene;
- Maintenance of appropriate standards hygiene in their accommodation quarters;

- Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and
- Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

Security. Some security measures shall be put into place to ensure the safe and secure running of the camp and its residents. Some of these security measures include:

- The list of workers must be registered to local authorities in accordance with existing regulations of Lao PDR;
- Children under 14 years of age will not be hired under the Project;
- Adequate, day-time night-time lighting shall be provided;
- Control of camp access. Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes;
- Prior approval from the construction camp manager for visitor's access to the construction camp;
- A perimeter security fence at least 2m in height constructed from appropriate materials;
- Provision and installation in all buildings of firefighting equipment and portable fires extinguishers.

140. Any construction worker, office staff, Contractor's employees or any other person related to the project found violating these prohibitions will be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

Prohibitions:

The following activities are prohibited on or near the subproject sites:

- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection.
- Buying of wild animals for food;
- Having caged wild animals (especially birds) in camps;
- Poaching of any description;
- Explosive and chemical fishing;
- Disturbance to anything with architectural or historical values;
- Building of fires;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.; Use of firearms (except authorized security guards);
- Use of alcohol by workers in office hours;
- Driving in an unsafe manner in local roads;
- Washing cars or machinery in streams or creeks;
- Maintenance (change of oils and filters) of cars and equipment outside authorized areas;
- Creating nuisances and disturbances in or near communities;
- Disposing garbage in unauthorized places;
- Indiscriminate disposal of rubbish or construction wastes; Littering the site;
- Spillage of potential pollutants, such as petroleum products;
- Collection of firewood;
- Urinating or defecating outside the designated facilities; and

- Burning of wastes and/or cleared vegetation.

MANAGEMENT REQUIREMENTS OF CONSTRUCTION SITES AND WORKERS CAMPS

141. The contractor will be responsible to comply with, but not limited to the following:
- Temporary workers' camps will be required to accommodate 5-6 engineers and skilled workers at each site.
 - Camp will be installed at the site of allocated land for the WTP.
 - After the construction is completed, the temporary camp will be unfabricated and the sites will be cleaned.
 - The contractor shall install the Worker Camp in an area far enough from water points, house and sensitive area in consultation with the community. Good quality sanitary equipment should be installed in the Worker Camp.
 - The contractor shall manage all activities in compliance with laws, rules and other permits related to site construction regulations and will protect public properties. Degradation and demolition of private properties will be avoided. Paying compensation to damage to the public facilities and/or private property will be required.
 - The contractor is responsible for the protection of local environment against dust, air, noise, vibration, exhaust fuels and oils and other solid residues generated from the work site. The contractor shall manage waste properly and do not burn them on site and will also provide proper storage for construction materials, organize parking and displacement of the machines in the site. Used oil and construction waste materials must be appropriately disposed and adequate waste disposal and sanitation services will be provided at the construction site next to the generated area. In order to protect soil, surface and ground water the Contractor must avoid any wastewater discharge, oil spill and discharge of any type of pollutants on soils, in surface or ground water, in sewers and drainage ditches.
 - The contractor shall be responsible for maintaining good hygiene, safety, and security of the work sites, including protection of health and safety of staff and workers. The contractor will prevent standing water in open construction pits to avoid potential contamination of the water table and the development of a habitat for disease-carrying vectors and insects.
 - The contractor shall be prohibited for quarrying material directly from the river.
 - The contractors shall procure construction materials from government-permitted source/suppliers only.
 - During construction, the contractor must be taking serious action to control dust by using water or through other means and the construction site will be cleaned on a daily basis.
 - The Contractor will work with local authority and management local traffic effectively and ensure traffic access of road safety of local residents and road users during the works. Speed limits at work sites and community area will be applied to all vehicles and cars. All vehicles and their drivers must be identified and registered and the drivers are properly trained.
 - Install barriers and safety warning signs on road sections and if necessary, deploy traffic aids/flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan.

- The contractor should install signaling of work, ensure no blockage of access to households during construction and/or provide alternative access.
- The contractor must be immediately rehabilitating the excavated areas and any damaged road and path sections.

House Keeping

142. The Contractor will follow a ‘good housekeeping’ policy at all times. This will include, but not necessarily be limited to the following:

- Ensure considerate site behavior of the Contractor’s staff;
- Open fires will be prohibited at all times;
- Ensure that appropriate provisions for dust control and road cleanliness are implemented;
- All site areas will be kept in clean and tidy condition, rubbish and food waste will be removed frequently;
- Wheel washing facilities will be brushed or sprayed clean frequently;
- Storage sites, fixed plant and machinery, equipment and temporary buildings will be located to limit adverse environmental effects
- Frequently inspect, repair and re-paint as necessary all site hoardings to comply with the local conditions and local regulations, all flying post/board is to be removed as soon as reasonably practicable and within 24 hours of notice;
- Adequate toilet facilities will be provided for all site staff;

Working Hours

143. Core working hours will be from 08:00 to 16:00 on weekdays and 0800 to 1300 on weekend. Individual site requirements which differ from the above will be considered on a site by site basis. Noisy operations shall not take place outside these hours without prior approval from delegated agencies and local authorities.

144. In the case of work required in response to an emergency (or which if not completed would be damaging and unsafe), the relevant local authority will be advised as soon as is reasonably practicable of the reasons for and likely duration of such works.

Workers Camps

145. *Workers’ Camp and Site Installation Requirement.* Potential sites of workers’ camps must be discussed with and proposed by local communities and authorities during consultations and prior to their establishment. If additional camps and ancillary construction sites are selected, for following criteria must be used:

- minimize the land occupation;
- Site offices shall be located at least 200 meters from any existing residential settlements
- Camp facilities should not be located in steep slopes;
- Site offices, camps be located at least 100 meters from any watercourses, and be operated so that no pollutants enter watercourses. Camp areas shall be located to allow effective natural drainage;
- The workforce shall be provided with safe, suitable and comfortable accommodations. They have to be maintained in clean and sanitary conditions;

- In every site adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein;
- Potable water for human consumption shall be provided for at camps, site offices.
- Adequate sanitation facilities (toilets and washing areas) shall be provided for workers to use. Toilet should be provided with adequate supplies running water, soap, and toilet paper. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions;
- At every construction camp, there must be at least one septic tank. The wastewater from the tank shall not be discharged into any watercourses. The wastewater shall be periodically transported away by a water tank to the nearest treatment plant;
- *Medical Facilities.* A medical and first aid kit shall be provided at each camp area. All consumables in the first aid kit should be checked and recharged regularly.

Concrete mixing

- Concrete mixing stations will minimize the land occupation.
- Concrete mixing must be done on impermeable ground, waste and wastewater containing cement must be collected through drains with slurry sump on-site before being discharged into the receiving source.
- The concrete mixing station must be at least 200 meters away from residential houses or other sensitive buildings such as Buddhist pagodas, churches, temples, school gates, medical facilities and public agencies.

Earthworks, Cuts and Fill Slopes Management

146. Earthworks, cuts and fill slopes shall be carefully managed to minimize negative impacts on the environment.

- All earthworks shall be properly controlled, especially during the rainy season.
- The Contractor shall always maintain stable cut and fill slopes and cause the least possible disturbance to areas outside the prescribed limits of the works.
- The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
- In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
- The Contractor shall use the excavated material from for filling unless the CSC consider the material unsuitable for filling;
- Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the CSC;

SITE-SPECIFIC MITIGATION MEASURES

Spoil Disposal Sites

147. If the Contractor proposes any disposal site during the construction phase, they have to be approved by PIA and relevant local authorities. The contractor should ensure that these sites are:

- a) not located within designated forest or cultivated areas, or any other properties;
- b) do not impact natural drainage courses;
- c) where there is no future landslide,
- d) do not impact endangered/rare flora.

148. Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas. The final use of the disposal site shall be approved by the local government.

149. Besides the requirements for the location of spoil disposal sites, the following actions shall be put into place:

- Post a speed limit sign at the entrance of the disposal site;
- Provide a notice stating, “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site;
- Topsoil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site.
- If the disposal site is located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water;
- A drainage ditch shall be built around the disposal site to control surface runoff to ensure that no localized flooding would happen in the areas surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enter any water bodies.
- After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks;
- Disposal sites close to patches of agricultural land will be limited in size to avoid damages to crops;

150. Minimize potential impacts along pipelines

ESCOP will be applied to pipeline installation contracts. Additional measures will be applicable at specific locations are listed in the table below:

Table 6-4 Site-Specific mitigation measure for pipe installation

| No. | Site Characters | Issues/Risks | Mitigation measures |
|-----|---|---|--|
| 1 | <ul style="list-style-type: none"> ▪ Construction takes place near an existing house | <ul style="list-style-type: none"> ▪ Block or disrupt access to house ▪ Damages to the house structure (land slide at foundation) | <ul style="list-style-type: none"> ▪ Provide temporary access to the house ▪ Install support in the pipe trenches at sections near the house foundation ▪ Back fill the pipe trenches as soon as possible |
| 2 | <ul style="list-style-type: none"> ▪ Construction takes place within 50 m from a school or health care centers | <ul style="list-style-type: none"> ▪ Safety for the school students, patients and medical staff | <ul style="list-style-type: none"> ▪ Avoid loading construction materials and waste within 20m from school gate and health centers; |

| | | | |
|---|--|--|---|
| | | <ul style="list-style-type: none"> ▪ Health impacts due to dust and noise | <ul style="list-style-type: none"> ▪ Remove the waste from the site in parallel with excavation/pipe installation; ▪ Place warning signs and speed limit at 10 km/h at this section ▪ Create safe temporary path if access is disrupted ▪ Backfill as soon as the pipe installation is completed ▪ Clean up the road at end of working shifts ▪ water the road section passing the school and health care center if the weather is hot and dry, windy ▪ Avoid parking trucks, loading and unloading materials and wastes during peak traffic hours |
| 3 | <ul style="list-style-type: none"> ▪ Construction at road crossing | <ul style="list-style-type: none"> ▪ Traffic disruptions, traffic safety risks | <ul style="list-style-type: none"> ▪ Carry out construction at night time, if possible, ensure adequate lighting ▪ Coordinate with local authorities to divert traffic flow if necessary ▪ Inform the public in advance if construction takes place at night time ▪ Backfill, reinstate the affected roads fully before traffic is resumed in day time |
| 4 | <ul style="list-style-type: none"> ▪ Construction takes place along roadside | <ul style="list-style-type: none"> ▪ Traffic disruptions, traffic safety risks | <ul style="list-style-type: none"> ▪ Avoid construction activities at peak hours ▪ Install speed limit signs at 10km/h at the two ends of construction section ▪ Minimize the volumes of materials and wastes loaded along roadside at each time ▪ Backfill, reinstate the affected roads fully as soon as possible (related costs have been included in the BOQ) ▪ Contractor must install speed limit sign, provision all safety insures before start of construction by the contractor as per the provision of the ESMP. |
| 5 | <ul style="list-style-type: none"> ▪ Construction take place on or passing private land | <ul style="list-style-type: none"> ▪ Disturbance to owner's daily activities ▪ Safety risks ▪ Dust, nuisance ▪ Damages to private properties and crops | <ul style="list-style-type: none"> ▪ Inform land owner and get agreement on construction schedule in advance ▪ Treat land owner with respects ▪ No construction at lunch and nighttime ▪ Minimize disturbed areas ▪ Do not load materials and wastes on vegetated areas, load on barren land ▪ Create safe temporary path if access is disrupted ▪ Clean up, reinstate the site completely before departure |

151. Safety during Power System Construction (poles, wires and transformers)

The following ESH guidelines for power distribution construction will be followed:

- Testing structures for integrity prior to undertaking work;
- Safety belts and Rope shall be used
- Implement fall protection measures in climbing protection measures.
- Provide adequate work-positioning device system for workers.
- When operating power tools at height, workers should use a backup safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

152. Minimize potential impacts and risks on vegetated land

- Contractors work with the PIA and supervising consultants as well as local authority to refine and confirm the pipeline alignment to avoid cutting trees when possible;
- Disturbance to the ground will be kept minimal. Establish the boundary of construction materials;
- Use suitable size transportation means and apply manual excavation method to avoid or minimize mass cutting of big trees along alignment during pipeline installation;
- Carry out manual excavation and pipe installation, if necessary, in order to avoid cutting or damage to the trees.
- The biomass to be cleared are collected and loaded tidily at or near the construction sites in ways that they can be of beneficial usage for community later on if appropriate;

The following activities are prohibited on or near the subproject sites:

- Cutting of trees for any reason outside the approved construction area;
- loadings of machines and materials on vegetated areas, causing damages to the trees
- Hunting, fishing, wildlife capture, or plant collection.
- Buying of wild animals for food;
- Having caged wild animals (especially birds) in camps;
- Poaching of any description;
- Explosive and chemical fishing;
- Building of fires if not authorized;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.;
- Collection of firewood;
- Urinating or defecating outside the designated facilities; and
- Burning of wastes and/or cleared vegetation.





Workers will be fully protected from harmful insects by the provision of adequate PPEs


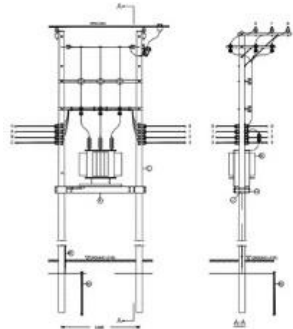
The contractor shall ensure that:


- Workers wear adequate protective clothing during vegetation clearance, trained to use equipment safely before executions;
- Reinstatement of vegetation cover according to the design as soon as possible

Encourage community monitoring on contractor's compliance.



Table 6-5 - **Site-specific Mitigation Measure****Moutun Water Supply System in Namor District**


| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|-------------------------------------|---|--|--|--|
| 1. Access to the WTP from main road |  | There is existing access road from village road to WTP. This road will be upgraded. L = 80m; W = 5m, on steep slopes, gradients 7.36% Maximum: 12.9% | Erosion and landslide risk on slopes | <ul style="list-style-type: none"> Place signs about Construction Site, speed limit and warning signs at the junction with village road Arrange flag man to guide traffic when project vehicle density is high or trucks carrying bulky items enter the project sites. Provide lighting at night at this spot Minimize disturbed area to minimize erosion risks, avoiding overcutting of trees or over-removal of vegetation cover; Shape the cut and fills to reduce land slide risks Establish vegetation cover on slopes according to design as soon as possible. Provide adequate PPEs to the workers, advise them be observant to harmful insects. No wildlife catching/hunting allowed |
| |  | There are grasses, vines, bushes, plants, trees, ant, butterflies, birds, mosquito observed along the alignment | Overcutting of trees or removal of vegetation cover Safety risks for the workers due to harmful insects | |
| |  | At the junction with the main road, traffic density is low. Traffic count in a day: 1 truck, 10 bicycles and motorcycles, 2 tractors. | Traffic safety risks at junction with the main road | |
| |  | Houses on the right-hand side of the proposed access road. No electricity and water networks along the road | Disturbance the access to the house along the roadsides Dust, noise and vibration impact to households. | <ul style="list-style-type: none"> Inform households about construction schedule at least two weeks in advance. Spray water along this section during dry weather. Impose speed limits at 20km/h on construction vehicles along this section. Excavation work will be avoided in periods of high wind. Cover trucks carrying granular materials with canvass or similar. |


| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|------------------------------------|--|---|-------------------------------------|--|
| |  | | | <ul style="list-style-type: none"> • Install temporary fences or barriers around the subproject facility construction site • Require drivers to minimize honking when driving in community area. • Provide information to community on schedule of construction activities through billboard/signs. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials placed along the access road • Provide adequate PPEs to the workers, advise them to be observant to harmful insects. • Minimize disturbed areas, avoid damaging trees and vegetation cover • Create safe connection between the access road and roadside house access paths; |
| <p>2. Power Supply for the WTP</p> |  | <p>150 m 22KV power lines will be built along the access road to connect to the grid network. A 50 KVA hanging transformer will be installed.</p> | <p>Safety risks for the workers</p> | <ul style="list-style-type: none"> • Testing structures for integrity prior to undertaking work; • Safety belts and Rope shall be used • Implement fall protection measures in climbing protection measures. • Provide adequate work-positioning device system for workers. • When operating power tools at height, workers should use a backup safety strap; • Signs and other obstructions should be removed from poles or structures prior to undertaking work; |


| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|--------------------|---|---|---|--|
| 3. At the WTP site |  | <p>Land area = 2500 m², The WTP site is on communal land. The WTP is border with natural creek in the north, village land in the south and with the villager house in the east, with village fallow land in the in the west. only bush and small trees, no big trees, there may be some snake, bees, ants, insects, small birds etc.). No invasive plant species identified.</p> | <p>Damage to existing trees and crop land surrounding the WTP site. Soil Erosion Dust, noise and vibration impact to households Safety risks for the workers if harmful insects attack them</p> | <ul style="list-style-type: none"> • An approved tool bag should be used for raising or lowering tools or materials to workers on structures • Provide information to community on schedule of construction activities through billboard/signs • Fence off the construction site with gate • Install barricades/barriers and sturdy plate covers in open excavations during non-working time. • Install barriers and signs to limit access to the construction site. • Limit construction activities, particularly operation of noise/vibration generating equipment at night. • Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials • Load materials and waste within the WTP boundary, prevent spills to garden land or nearby water sources. • Topsoil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site. • Provide adequate PPEs to the workers, advise them be observant to harmful insects. |

| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|---------|--------------|---|--|---|
| | | <p>Ground elevation is from 692 msl to 696 msl the slope gradient is approximately 26%.</p> | <p>Erosion and landslide risk due to steep topography</p> <p>Dust generation from earth works and during transportation of large volumes of granular materials</p> <p>Traffic safety risks during transportation</p> | <p>Monitor compliance to Codes of Conduct, especially with regards to fuel handling and fire setting</p> <ul style="list-style-type: none"> • Create, maintain temporary drainage channels and sedimentation traps within and surrounding the WTP boundaries; • Monitor erosion risks daily. Take appropriate actions with additional mitigation measures to prevent erosion/land slide when risks are identified; • Establish vegetation cover on slopes according to design as soon as possible • Excavation work will be avoided in periods of high wind and rainy weather. • Truck must be covered during transportation of excavated soil; • Workers must wear masks at the site • Drivers are requested to follow regulations on speed limit • Spray water on access road and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area • The burning of site clearance debris (trees, undergrowth) or construction waste material, unauthorized fire setting is prohibited. • Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. |


| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|---------------------------|--|--|---|---|
| | | | | <ul style="list-style-type: none"> Apply the measures specified for disposal sites |
| | | Water for construction will be taken from the nearby stream, drinking water will be purchased from local suppliers | Safety risks for the workers | Follow safety rules for construction of power system specified in this ESMP |
| 4. Transmission Pipelines |  | <p>The pipeline lays along the brook where people do cultivation activities, some of part are through the fallow land.</p> <p>The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters and the width of 0.5-1 meters.</p> | <p>Damages to existing trees and crop land surrounding the WTP site.</p> <p>Obstructions to cultivation activities</p> <p>Safety risks for the workers and the farmers</p> | <ul style="list-style-type: none"> Avoid, minimize ground disturbance during peak cultivation period; Support farmers to transport materials and products if construction affect accessibility to agricultural land; Disturbance to the ground will be kept minimal. Establish the boundary of construction materials Carry out manual excavation and pipe installation, if necessary, in order to avoid or minimize cutting or damages to the trees. Workers will be fully protected from harmful insects by the provision of adequate PPEs |
| 5. Distribution Pipelines |  | <p>The main pipeline will be laid along roadsides. The depth of the pipe trench is 0.7-1.2m and the width is 0.5-1.0m.</p> <p>The households who have a house along the roadsides have been consulted, all of them agreed to allow the pipeline passing in front of their houses</p> | <p>Block or disrupt access to house</p> <p>Health impacts due to dust and noise</p> <p>Traffic disruptions, traffic safety risks</p> <p>Damages to private properties and crops</p> <p>Safety risks for the workers and villagers</p> | <ul style="list-style-type: none"> Reinform community about construction schedules two days in advance; Request families to keep their children away from construction sites; Carry out construction in stages to minimize community exposure to open pipe trenches Provide temporary access to the roadside house where access are disturbed |

| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|---------|---|---------------------|----------------|---|
| |  | | | <ul style="list-style-type: none"> • Install support in the pipe trenches at sections near the house foundation • Back fill the pipe trenches as soon as possible • Avoid loading construction materials and waste within 20m from school gate and health centers, markets or any popular public accessible locations; • Remove the waste from the site in parallel with excavation/pipe installation; Top soil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site. • Place warning signs and speed limit at 10 km/h along road sections where construction is on-going • Create safe temporary path if access if disrupted • Backfill as soon as the pipe installation is completed • Clean up the road, watering dusty areas during working shifts • water the road section passing the school and health care center if the weather is hot and dry, windy • Avoid parking trucks, loading and unloading materials and wastes during peak traffic hours • Inform the public in advance if construction takes place at night time |

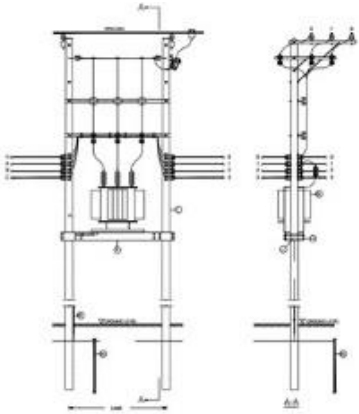

| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|--------------------------------|--|---|---|--|
| | | | | <ul style="list-style-type: none"> • Requires the workers strictly follow the Codes of Conducts • Protect temporary materials and waste loads to prevent spills; • place warning signs and reflective bands to restrict unauthorized access to construction areas; • Transport the excavated materials away within 24 hours since excavation; • Fully reinstate the excavated road as soon as possible. • Do not park vehicles or temporarily load materials in front of the market and shops unless construction is on-going at these sites. |
| 6. the proposed disposal Sites |  | <p>The proposed disposal site will be located about 200m of the WTP, this is the communal with total area available of 2 ha. However, the contractor has to get approval from village authority.</p> <p>it is border with natural creek in the north, WTP in the south, with the houses in the east and village fallow land in the west</p> | <p>dust, noise and erosion, local risks</p> <p>Spills of disposal materials into the creek or the houses nearby the construction site</p> | <ul style="list-style-type: none"> • Post a speed limit sign at the entrance of the disposal site; • Provide a notice stating “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site; • Top soil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site. • a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water; • A drainage ditch shall be built around the disposal site to control surface |


| Element | Photos, maps | Existing Conditions | Impacts, Risks | Specific Mitigation Measures |
|--------------------------|--|---|---|---|
| | | | | <p>runoff to ensure that no localized flooding would happen in the areas surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enter any water bodies.</p> <ul style="list-style-type: none"> • After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks; • Disposal sites close to patches of agricultural land will be limited in size to avoid damages to crops. |
| <p>Water Intake site</p> |  | <p>There are gravels along the intake sites</p> <p>Shrubs along the stream</p> <p>Water fairly clear</p> <p>Shrubs and barren soil along the stream</p> | <p>Temporary disrupt stream flow;</p> <p>Over disturbance to stream bed</p> <p>Water pollution risks</p> <p>Unnecessary disturbance to stream side vegetation</p> <p>Fish, wildlife caught by the workers</p> | <ul style="list-style-type: none"> • install a temporary culvert to maintain stream flow during intake construction; • Do not exploit construction materials (gravels from stream bed) on-site; • Carry out construction with care to minimize dropping of mortars into the stream • Load materials and equipment on barren soil, not on vegetated areas • No fish/wildlife catching, keeping allowed |

Phonxay Water Supply Systems.


| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|-------------------------------------|--|--|---|---|
| 1. Access to the WTP from main road |  | <p>L = 150m; W = 5m</p> <p>The existing ground elevation is from 652msl to 680msl. The slopes gradient is 16.52%</p> <p>The access road to WTP will be constructed from the main road. Six rice storage huts will be relocated from existing locations to a nearby location.</p> | <p>Erosion and landslide risk on slopes</p> | <ul style="list-style-type: none"> ▪ Inform households about construction schedule in advance. ▪ Place Construction Site, speed limit signs before the entrance to the access road ▪ Minimize disturbed area to minimize erosion risks, tree cutting and removal of vegetation cover; ▪ Shape the cut and fills to reduce land slide risks ▪ Establish vegetation cover on slopes according to design as soon as possible ▪ Provide adequate PPEs to the workers, advise them to be observant to harmful insects. ▪ No wildlife catching/hunting allowed ▪ Place warning signs at the junction with village road, provide lighting at night at this spot ▪ Spray water on access road and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. ▪ Impose speed limits on construction vehicles. ▪ Excavation work will be avoided in periods of high wind. |
| | | <p>There are grasses, vines, bushes, plants, trees, ant, butterflies, birds, mosquito observed along the alignment</p> | <p>Tree cutting, removal of vegetation cover</p> <p>Safety risks for the workers due to harmful insects</p> | |
| | | <p>At the junction with the main road, traffic density is low. Traffic count in a day: 8 buses, 5 trucks, 10 pickups, 28 bicycles and motorcycles, 4 tractors.</p> | <p>Traffic safety risks at junction with the main road</p> | |


| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|---------|--------------|--------------|----------------|--|
| | | | | <ul style="list-style-type: none"> ▪ The contractor will comply with a 10 km/h speed limit when in the community area. ▪ Transport of materials that may generate dust shall be covered with canvass or similar. ▪ Install temporary fens or barriers around the subproject facility construction site ▪ Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community area. ▪ Provide information to community on schedule of construction activities through billboard/signs. ▪ Avoid using equipment that may result in high levels of vibrations ▪ Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials ▪ Provide adequate PPEs to the workers, advise them be observant to harmful insects. ▪ Minimize disturbed areas, avoid damaging trees and vegetation cover |


| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|-----------------------------|--|--|---|--|
| 2. Power Supply for the WTP |  | <p>150 m 22KV power lines will be built along the access road to connect to the grid network. A 50 KVA hanging transformer will be installed.</p> | <p>Safety risks for the workers</p> | <ul style="list-style-type: none"> ▪ Testing structures for integrity prior to undertaking work; ▪ Safety belts and Rope shall be used ▪ Implement fall protection measures in climbing protection measures. ▪ Provide adequate work-positioning device system for workers. ▪ When operating power tools at height, workers should use a backup safety strap; ▪ Signs and other obstructions should be removed from poles or structures prior to undertaking work; ▪ An approved tool bag should be used for raising or lowering tools or materials to workers on structures. |
| 3. At the WTP site |  | <p>Land area = 2500 m², The Water Treatment Plant (WTP), will be located in fallow land of communal land which is surrounded by the private agriculture land. only bush and small trees, no big trees, there may be some snakes, bees, ants, insects, small birds etc.). No invasive plant species identified.</p> <p>Soil excavation volumes: 13,150 m³</p> | <p>Damage to existing trees and crop land surrounding the WTP site. Soil Erosion Dust, noise and vibration impact to households Safety risks for the workers if harmful insects attack them Over clearance of vegetation cover, bush fire risks</p> | <ul style="list-style-type: none"> ▪ Fence off the construction site with gates ▪ Install barricades/barriers and sturdy plate covers in open excavations during non-working time. ▪ Install the physical barrier to limit access to the construction site. ▪ Install signs at construction sites warning people of potential dangers. ▪ Limit construction activities, particularly operation of noise/vibration generating equipment at night. ▪ Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. |


| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|---------|---|--|--|---|
| |  | <p>The existing ground elevation is from 692 msl to 696msl. The slope gradient is approximately 11%.</p> | <p>Erosion and landslide risk due to steep topography</p> <p>Dust generation from earth works and during transportation of large volumes of granular materials</p> | <ul style="list-style-type: none"> ▪ Install temporary fences or barriers around the subproject facility construction site especially near schools, healthcare stations and houses. ▪ Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community area. ▪ Provide information to community on schedule of construction activities through billboard/signs ▪ Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials ▪ Load materials and wastes within the WTP boundary, prevent spills to garden land. ▪ Provide adequate PPEs to the workers, advise them be observant to harmful insects. ▪ Monitor compliance to Codes of conducts, especially the use of fuels, to prevent fire risks <ul style="list-style-type: none"> ▪ Establish vegetation cover on slopes according to design as soon as possible ▪ Excavation work will be avoided in periods of high wind. ▪ Truck must be covered during transportation of excavated soil; ▪ Workers must wear masks at the site |

| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|---------------------------|--------------|---|--|--|
| | | | Traffic safety risks during transportation | <ul style="list-style-type: none"> ▪ Drivers are requested to follow regulations on speed limit ▪ Spray water on access road and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area ▪ The burning of site clearance debris (trees, undergrowth) or construction waste material is prohibited. ▪ Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. ▪ Apply the measures specified for disposal sites |
| | | Water for construction will be taken from the nearby stream, drinking water will be purchased from local suppliers | Safety risks for the workers | Follow safety rules for construction of power system specified in this ESMP |
| 4. Transmission Pipelines | | The length L =3.38 km of HDPE DN 90mm raw water transmission pipe from the intake to the water treatment plant will be laid along the downstream of Houay Lea Brook which pass the fallow land and along the roadsides. | <p>Damages to existing trees and crop land surrounding the WTP site.</p> <p>Safety risks for the workers</p> | <ul style="list-style-type: none"> ▪ Work with the PIA, PMU and local authority to refine the pipeline alignment to avoid cutting trees when possible; ▪ Disturbance to the ground will be kept minimal. Establish the boundary of construction materials |

| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|----------------------------------|--|--|--|---|
| |  | <p>The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters and a width of 0.5-1 meters.</p> | | <ul style="list-style-type: none"> ▪ Carry out manual excavation and pipe installation, if necessary, in order to avoid cutting or damages to the trees. ▪ Strict compliance to all measures below (specified in the ESCOP and Codes of Conducts) are required ▪ + Prohibitions of cutting wood and tree for cooking ▪ + Wildlife catching, hunting, trading, harvesting is prohibited. ▪ + Do not set fire if not authorized. ▪ Workers will be fully protected from harmful insects by the provision of adequate PPEs |
| <p>5. Distribution Pipelines</p> | | <p>The length L = 3,218 meters.</p> <p>The main pipeline will be laid along roadsides. The depth of the pipe trench is 0.7-1.2m and the width is 0.5-1.0m. The</p> | <ul style="list-style-type: none"> • Block or disrupt access to house • Health impacts due to dust and noise | <ul style="list-style-type: none"> ▪ Inform land owner and get agreement on construction schedule in advance ▪ Provide temporary access to the house |

| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|---------|--|--|--|--|
| |  | <p>households who have a house along the roadsides have been consulted, all of them agreed to allow the pipeline passing in front of their houses. Pipelines will be laydown along the roadside.</p> | <ul style="list-style-type: none"> ● Traffic disruptions, traffic safety risks ● Damages to private properties and crops ● Safety risks for the workers and villagers | <ul style="list-style-type: none"> ▪ Install support in the pipe trenches at sections near the house foundation ▪ Back fill the pipe trenches as soon as possible ▪ Avoid loading construction materials and waste within 20m from school gate and health centers; ▪ Remove the waste from the site in parallel with excavation/pipe installation; ▪ Place warning signs and speed limit at 10 km/h at this section ▪ Create safe temporary path if access if disrupted ▪ Backfill as soon as the pipe installation is completed ▪ Clean up the road at end of working shifts ▪ water the road section passing the school and health care center if the weather is hot and dry, windy ▪ Avoid parking trucks, loading and unloading materials and wastes during peak traffic hours ▪ Inform the public in advance if construction takes place at night time |

| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|-------------------------------|---|--|--------------------------------------|--|
| 6. the proposed disposal Site |  | <p>The proposed disposal site will be located about 20m of the WTP, this is the private garden land.</p> <p>The contractor should consult and agreed with the landowner before dumping</p> <p>It is border with residential area in the north, with the corn warehouse in the south, with the National Road in the east and private garden land in the west.</p> | dust, noise and erosion, local risks | <ul style="list-style-type: none"> ▪ Post a speed limit sign at the entrance of the disposal site; ▪ Provide a notice stating “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site; ▪ Top soil will be reserved and loaded in separate areas for reuse at the end of the disposal operation. ▪ If the disposal site is located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water; ▪ A drainage ditch shall be built around the disposal site to control surface runoff to prevent flooding surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enter any water bodies. ▪ After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks; |

| Element | Photos, maps | Descriptions | Impacts, Risks | Specific Mitigation Measures |
|-------------------|---|---|---|---|
| Water Intake site |  | <p>There is existing Namlin water intake.</p> <p>There are gravels along the intake sites</p> <p>Shrubs along the stream</p> <p>Water fairly clear</p> <p>Shrubs and barren soil along the stream</p> | <p>Temporary disrupt stream flow;</p> <p>Over disturbance to stream bed</p> <p>Water pollution risks</p> <p>Unnecessary disturbance to stream side vegetation</p> <p>Fish, wildlife caught by the workers</p> | <ul style="list-style-type: none"> ▪ Disposal sites close to patches of agricultural land will be limited in size to avoid damages to crops. ▪ install a temporary culvert to maintain stream flow during intake construction; ▪ Do not exploit construction materials (gravels from stream bed) on-site; ▪ Carry out construction with care to minimize dropping of mortars into the stream ▪ Load materials and equipment on barren soil, not on vegetated areas ▪ No fish/wildlife catching, keeping allowed |

6.1.3 Mitigation Measures required During Operation Phase

The mitigation measures below will be implemented by the WTP operators

Table 6-6 the mitigation measure for the operation phase

| Operation Phase | | | | |
|----------------------------------|--|---|-----------|------------|
| Item | Issues | Mitigation measure | Implement | Supervisor |
| Generation of backwash water and | The moisture content of the sludge in sludge | 12. The sludge amount produced during the treatment of surface water in the WTP in this cluster is small. Therefore, a drying field is not anticipated within the WTP, instead, the sludge amount will be kept in the sludge lagoon and | PNP | |

| | | | | |
|---------------------------------------|--|---|-----|--|
| sediments at water treatment plants | lagoon is about 95%, the amount of sludge is:15.95 kg/day | sucked up and transported to a disposal site every 2-3 months. Sucking up and transporting the sludge by special vehicles need to be stipulated in a contract with a local sanitation company. The sludge shall be disposed of at a special area assigned for sludge in an allocated and agreed disposal site. | | |
| Flooding | Flooding around the WTP area and access roads from rainfalls | 13. Side drainage along the road to ensure sufficient drainage capacity and avoid flooding. Side drainage should be sufficient to drain generated surface runoff from rainfall to avoid flooding around the WTP area. | | |
| Occupational Health and Safety | | 14. Training of staff and allocation of responsibility to ensure that materials are properly handled. 15. The dose of chemicals applied to the water for treatment will be adjusted according to the actual operation of the water treatment plant | PNP | |
| Community health and safety | | 16. The facilities that will be constructed will be properly fenced off and secured to restrict access and intrusion of unauthorized personnel. Watchmen/security personnel will be hired to secure the facilities on a 24 hours basis. This would minimize the safety risks to the community | PNP | |
| Raw Water Quality | | 17. The PIU and PNP shall continuously coordinate with the village authorities regarding community activities in the catchment area to monitor watershed activities that may contribute to the contamination of raw water. 18. The PIU and PNP shall be continuously coordinate with the village authorities conduct and maintain communication campaigns on watershed protection, land use planning. 19. Laboratory testing equipment and training will also be provided to allow the PNP to conduct regular monitoring of raw and treated water quality parameters. | | |

In addition, local community should conduct and maintain communication campaigns on watershed protection and local authority for the land use planning and to protect raw water quality.

6.2 Institutional Arrangements

6.2.1 PMU Roles and Responsibilities

- PMU will be responsible for monitoring the overall subproject implementation, including environmental compliance of the subproject. Specifically, the PMU will:
 - closely coordinate with local authorities in the participation of the community during subproject preparation and implementation;
 - monitor and supervise ESMP implementation including incorporation of ESMP into the detailed technical designs and bidding and contractual documents;
 - ensure that an environmental management system is set up and functions properly;
 - be in charge of reporting on ESMP implementation to the relevant authorities

6.2.2 Construction Supervisors (CSC) Roles and Responsibilities

- On behalf of the PMU, the CSC will review and approve safeguard documents and reports submitted by the contractors
- Be responsible for the regular supervision and monitoring of all construction activities and to ensure that the Contractor complies with the requirements of the contract and ESCOP. Prepare monthly ESHS monitoring reports and submit to the PMU.

6.2.3 Contractors' Safeguard Responsibilities

153. The contractor shall comply with and implement the mitigation measures proposed in the Project's Social and Environmental Management Plan to prevent damage and nuisance to the environment and local communities. In particular, the Contractor is responsible for implementing or complying with the measures and requirements stated in the Environmental and Codes of Practices (ESCOP) and specific mitigation measures. The contractor is responsible for self-monitoring the implementation of these mitigation measures.

154. The contractor's responsibilities include, but not limited to the following:

- After contract signing, the successful bidder (the contractor) is required to prepare a Contractor's Environmental Management Plan (C-ESMP) to submit to PMU for review and clearance prior to construction commencement. The contents of C-ESMP should cover: (i) general information about the contractors and commitments on complying with safeguard requirements; (ii) ESCOP, Codes of conducts, other ESHS requirements, detail about specific measures and actions (including detail maps, diagrams) that the contractor plan to implement or comply with; (iii) proposals about ESHS training for their workers; (iv) Proposed staff assigned to ESHS responsibility. The C-ESMP will be updated to address the issues arisen during construction phase, if any.
- Throughout the construction period, the contractor of each package will submit monthly environmental, social, health, safety (ESHS) compliance progress reports to the PIU, copy furnished to the PMU. The contractor should highlight the summary of the progress of construction, ESHS activities undertaken within the reporting period to implement the measures outlined in the ESMP, record any community complaints received and how the complaint was resolved.
- Assign staff to be responsible for ESHS aspects at construction site and facilitate inspection missions.

- Conduct ESHS briefings for the workers including ESCOPs, Codes of Conducts, specific mitigation measures.
- Coordinate with PMU/PIA to inform local authorities and communities about construction schedules and impact mitigation requirements.
- Implement or comply with ESCOP, specific mitigation measures, Codes of Conducts and other relevant requirements on environmental, social, health and safety (ESHS) specified in the ESMP.
- Prepare monthly ESHS compliance monitoring report and submit it to construction supervisors.
- Implement additional mitigation or corrective measures as guided by the Construction Supervisors or PMU.
- Prepare Incident Report, if applicable.

6.3 Monitoring and Reporting Requirements

155. Contractors' ESHS performance at construction sites will be directly monitored and supervised by the Site Construction Supervision Engineer who will prepare monthly ESHS monitoring report for submission to PIU (Draft template provided in Annex 3 of this ESMP).

156. At subproject/provincial level, PIU/DPWT staff, together with district and village authorities will be responsible for monitoring the implementation of mitigation measures as approved in the ESMP. Monitoring information together with other information collected from various stakeholders together with observations of project activities will be reported monthly to the DPWT using standard reporting forms. Monthly monitoring reports from PIU/DPWT will be included.

- List of consultations held, including locations and dates, name of participants and occupations;
 - Main points arising from consultations including any agreements reached;
 - A record of grievance applications and grievance redress dealt with;
 - Number of construction supervision reports that include assessment of contractor's compliance with safeguards in accordance with ECOP;
 - Number of trainings of community groups in environmental and social issues (if any)
- Contractor's monitoring and reporting responsibilities.

157. The PIU will consolidate the results of the monthly environmental monitoring through a quarterly progress report that will be submitted to the PMU which is based at the Department of Water Supply of the MPWT. The quarterly report will summarize the significant findings and measures undertaken to address any adverse environmental impacts during construction and also present any unforeseen environmental impacts and suggested remedial actions for the next monitoring period. Copies of the relevant progress and ESHS reports will be shared with relevant authorities and the World Bank.

7 Consultation and Information Disclosure

7.1 Public Consultations

158. Consultation with the ethnic groups conducted in culturally appropriate way. Public consultation conducted with the ethnic groups. During the consultation, focus was given to ensure that all ethnic groups who benefit from or are adversely affected by the water supply sub project are fully engaged in a meaningful consultation process during the project orientation and engineering design. The consultation processes to carry out with, and obtain free, prior and informed consent of, all ethnic groups affected by water supply project in a culturally sensitive manner. The community reported that everyone has been equally treated by authority and will have the same access to water from the new water supply system. No constraints on active participation in public meetings. There is free access to any cultural, economic, social and political institution. No differences are made between households with regard to access and use of natural resources.

159. Public Consultation was held many times during the project feasibility study. The latest public consultation was held between 08 to 21 August 2023 at village level.

160. The objectives of consultation are to generate public awareness by providing information about a sub-project to all stakeholders, particularly the sub-projects affected persons (PAPs); cut-off-date; entitlements and provide opportunity to the stakeholders to voice their opinions and concerns on different aspects of the project.

161. Stakeholders who participated during the public consultation included villagers, local government officers and staff. The consultations were conducted to discuss with the stakeholders the proposed project and to elicit the environmental concerns/issues of the community on the proposed subproject. Table 7-1 presents a summary of the public consultations undertaken for the sub-project.

Table 7-1 Summary of the Public Consultations

| Date | Location | Participants | | | |
|-----------|-------------|---|-------|--------|------|
| | | Agency | Total | Female | Male |
| 08 Aug 23 | B. Samakxay | Village Authority, villager, PIU, PMISC staff | 34 | 19 | 15 |
| 09 Aug 23 | B. Phonxay | Village Authority, villager, PIU, PMISC staff | 31 | 14 | 17 |
| 21 Aug 23 | B. Mouteun | Village Authority, villager, PIU, PMISC staff | 16 | 5 | 9 |

162. The stakeholders/public consultation at District and Provincial level was held after the completion of the conceptual design, Stakeholders who participated during the public consultation included provincial and district grievance committee, PIU and PMU. The objective of the meeting is to review the preliminary Inventory of Loss (IoL) (conduct in May 2023) and agree on detail measurement survey plan that will be conducted in July 2023.

163. During the consultations with the provincial, district authorities and stakeholders of the village's suggestions, opinions and responses from the community on the subproject have been taken into account and feedback provided on how concerns and recommendations have been addressed. All comments received were considered within the final design of the new water supply system and drainage works upgrades. Table 10 summarizes the main comments that were raised during the village consultation meetings.

Table 7-2 Summary of Main Components raised during the Public Consultation

| Comments | Response |
|---|--|
| I. Water system design and Civil work | |
| The design should avoid the impact of existing structures | <p>The water system design will avoid as much as possible to on the existing structures in the village.</p> <p>The pipeline laying will depth enough when pass agricultural land area.</p> <p>The sensitive section along the residential area will be closely monitored during the civil works</p> |
| There must be close monitoring of civil works during the construction phase in order to avoid impacts on the structures especially the houses along the main water pipeline | <p>Implementation Support and Work Supervision Consultant will be hired to monitor environmental and social impacts and inspect the quality of the civil works.</p> <p style="text-align: center;">In addition, grievance committee will be set up at the village, district and provincial level to help with grievance redress procedures during the pre and construction phases.</p> |
| Training must be provided to the villagers on safety issues and signs | ECOP will be developed and it will cover occupational health and community health and road safety. The Contractor will be responsible in ensuring trainings/workshops to the workers as well as community members are being organized |
| II. Compensation | |
| Compensation for the affected assets must be fair | <p>Compensation will be calculated based on the unit costs and the inventory of loss of the assets of each affected household.</p> <p>Compensation payment will not be necessary as other mitigatory have been agreed.</p> <p>The contractor will be responsible for mitigation of any construction damage.</p> |

| | |
|---|--|
| Additional impacts on the structures during the construction period | The Contractor will be asked to use manual work in the sensitive areas and if there are additional impacts the APs will receive compensation according to their entitlements, especially house, shop and porches (if any). |
| Access constraints to houses during the civil works | The AHs will be provided with temporary access during the civil works and access to the hose will be restored after its completion. |
| The villagers are willing to contribute minor resettlement impacts because they want to have better access to clean water in their villages | Willingness in the voluntary contribution is highly appreciated but the project has a compensation approach that agreed by the government in the resettlement policy framework. This issue will be reported to the provincial and district grievance committees and consulted with relevant legal frameworks and the relevant standard of WB. |

In addition to public consultations, extensive discussions were held between the safeguard and technical teams during detail design stage to optimize site selection, minimizing impacts and risks on local communities, existing infrastructure and land use.

7.2 Information Disclosure

164. The final draft of the ESMP will be disclosed at the Bank website. The ESMP (in local language) will be disclosed in public accessible locations before construction is started.

8 Grievance Redress Mechanism

165. Part VI of Decree 84/GoL requires the Project to establish an effective mechanism for grievance resolution. A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. The objective of the grievance redress mechanism is to resolve complaints as quickly as possible and at the local level through a process of conciliation; and, if that is not possible, to provide clear and transparent procedures for appeal. All affected persons will be made fully aware of their rights, and detailed grievance redress procedures will be publicized through effective public information.

166. The grievance mechanism is based on key principles that will protect the rights and interest of project participants; ensure that their concerns are addressed in a prompt and timely manner, and that entitlements are provided in accordance with GoL and Bank safeguard policies. PIU/DPWT will ensure that communities directly affected by the Project have a full understanding of the GRM and ways to access it especially on (i) the concept of compensation for any involuntary acquisition of land and/or assets and (ii) ensuring environmental and social mitigation measures in the ESMP's are implemented as planned. APs are entitled to lodge complaints regarding any aspect of the environmental and social impacts associated with the

Project. The AP's complaints can be made verbally or in written form to the GRC or, alternatively, raise his/her voice in a public or individual meeting with project staff.

8.1 Type of GRM

167. Complainants are entitled to lodge complaints regarding any aspect of the project. Any affected person will be able to submit a grievance if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. Eligible grievances or complaints include.

- Negative impacts on a person or a community (e.g. financial loss such as from loss of water, loss of roadside trees, health and safety issues, nuisances, etc.).
- Dangers to health and safety or pollution of the environment.
- Hazards due to construction activities (e.g. noise, dust, disruption of access, etc.)
- Impacts on social infrastructure.
- Failure to comply with standards or legal obligations.
- Improper conduct or unethical behaviour of contractor leading to nuisance of affected person(s).
- Misuse of funds and other irregularities.
- Grievances due to land acquisition, resettlement, compensation, relocation and unaddressed losses.
- Complaints related to gender issues.

8.2 Grievance Resolution Process

168. Complaints can be made verbally or in written form. It is recognized that in many cases, complainants do not have the writing skills or ability to express their grievances verbally, however, complainants are encouraged to seek assistance from family members or village heads, to have their grievances recorded in writing and to ensure that where disputes do occur and all the details have been recorded accurately enabling all parties to be treated fairly. In the case of verbal complaints, a written record of the complaint will be made during the first meeting with the complainant. Complainants who present their complaints within the prescribed procedures will be exempt from all administrative fees incurred. In addition, complainants who lodge complaints and appeals to district courts will be provided with free legal representation. The procedures for the grievance resolution process for the subproject are detailed as below.

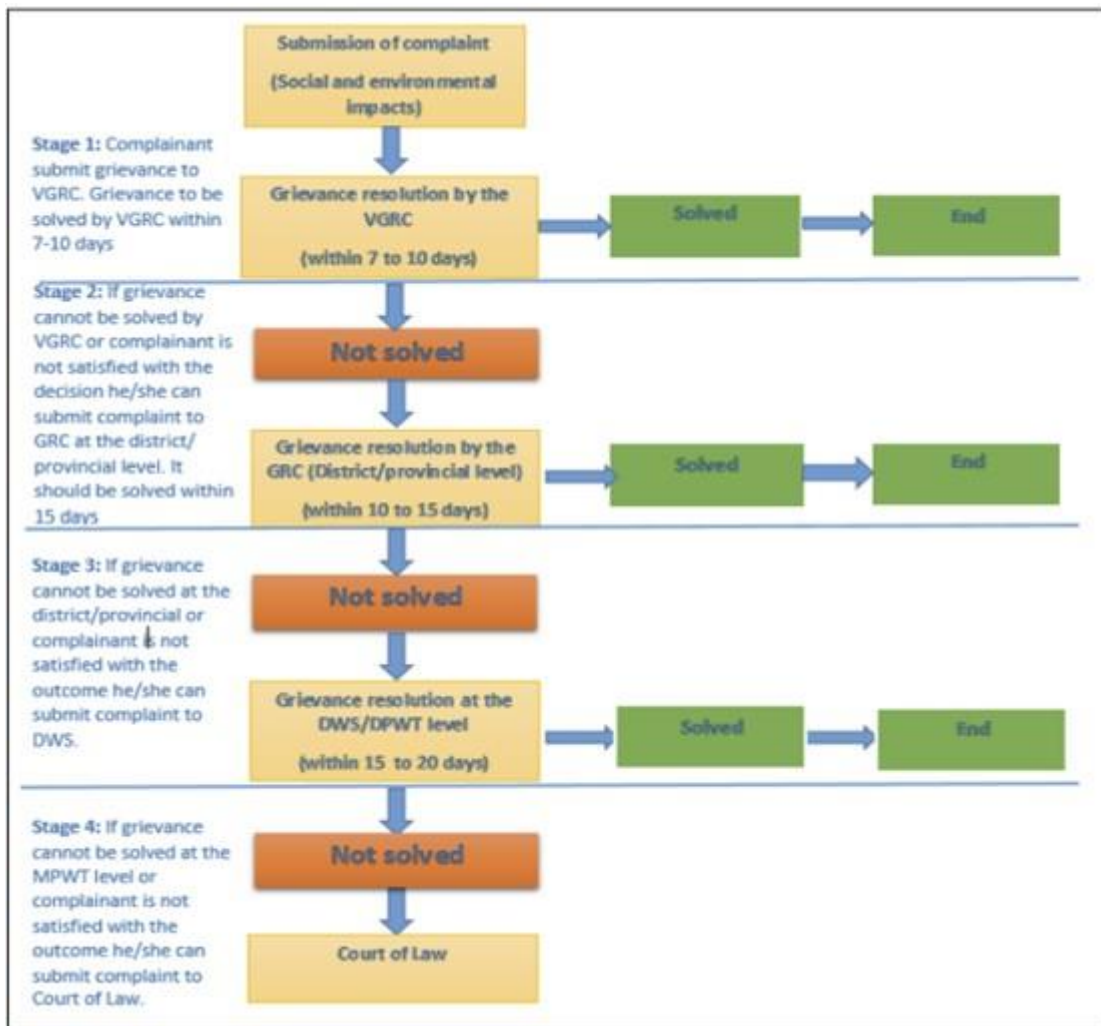
Stage 1: In the first instance, Aps will address complaints on any aspect of compensation, relocation or unaddressed losses to the Village Grievance Redress Committee (VGRC) or other designated village grievance officers. The VGRC will organize a meeting with the complainants to resolve the issue using its traditional methods of conciliation and negotiation; the meeting will be held in a public place and will be opened to other Aps and villagers to ensure transparency. The VGRC aims at clarification and amicable solution agreed with the subproject.

Stage 2: If after 10 days of lodging the complaint, no understanding or amicable solution can be reached or no response is received from the Village Grievance Redress Committee, the complainant can bring the complaint to the District/Provincial GRC. The District/Provincial GRC will be involved to meet with the complainant and VGRC to discuss the complaint and provide a decision at mutual arrangement within 15 days of receiving the appeal.

Stage 3: If the AP is still not satisfied with the decision of the PGRC, or in the absence of any response within the stipulated time, the complainant can submit his/her grievance to Department of Water Supply. The DWS will act on behalf of the MPWT. It may consider to seek external opinion on this matter and the appeal must be resolved within 20 days of receiving the appeal.

Stage 4: As a last resort, the AP may submit his/her case to the Court of Law. The complaint will be lodged with the Court of Law; the decision of the Court will be final.

Figure 8-1 GRM Procedure



169. The list of contact person for grievance procedures is summarized in the following Table

Table 8-1 List of contract persons at the provincial and district levels

| No. | Name | Position | Phone |
|-------------------|------|----------|-------|
| Oudomxay Province | | | |

| | | | |
|---|---------------------------|-------------------------|-------------|
| 1 | Mr. Bounchanh Thongsavath | Oudomxay DPWT | 02023967333 |
| 2 | Mr. Bounthan Inthavong | La district, PWT Office | 02055575675 |
| 3 | Mr. Vilaxay Songkhounmhan | Namor district Office | 02054481554 |

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

Annex 1 Environmental and Social Eligibility Screening .

Screening for Eligibility based on the Project’s Negative list

The project’s negative list—meaning activities that are prohibited from receiving financing—

- i. Water treatment, water supply, sewage treatment or other works with serious adverse effects on wetlands or natural waterways, through pollution or hydrological changes.
- ii. Significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses.
- iii. Use of pesticides on the World Health Organization's Hazardous Pesticides List.
- iv. Works which would adversely affect significant cultural property, including archaeological and historical sites.
- v. Purchase or lease of land which has unclear titles.
- vi. Trade in wildlife and wildlife products is prohibited under the CITES convention.
- vii. Release of genetically altered organisms into the natural environment.
- viii. Radioactive products
- ix. Purchase of asbestos-containing products.
- x. Purchase and or trade in weapons.
- xi. Activities likely to create adverse impacts on ethnic groups within the village and/or in neighboring villages or unacceptable to ethnic groups communities living in a village of mixed ethnic composition.

1. Screening for Moutun WSS

PIA/PIU ເປັນຜູ້ກວດກາແບບເປັນລະບົບໃນເວລາກຳນົດໂຄງການຍ່ອຍຕ່າງໆ. ຕ້ອງມີລາຍເຊັນຄະນະກຳມະການແລະພາສາສ່ວນກ່ຽວຂ້ອງ ໃນແບບເປັນລະບົບ ແລະ ຕ້ອງຄິດເດີມແບບເປັນລະບົບໃຫ້ມີສະໜັບສະໜູນໂຄງການຍ່ອຍ ເພື່ອໃຫ້ໂຄງການຖືກສອບຖອນໂຄງການເປັນຜູ້ທີ່ບໍ່ທວນ ແລະຮັບຮອງ.

ກິດຈະກຳຕ່າງໆຂອງໂຄງການທີ່ບໍ່ສິດໄດ້ຮັບທຶນສະໜັບສະໜູນ

| | | | |
|---|--|-------------------------------|---------|
| ແຂວງ: ອຸດົມໄຊ | ເມືອງ: ສາທິງ | ສະຖານທີ່ຕັ້ງ- ມີແຜນທີ່ທີ່ຕັ້ງ | |
| | | ມີ | ບໍ່ |
| ບ່າ: ຈຸນຕີ | | | |
| ລາຍການກິດຈະກຳຂອງຜູ້ຊຸມຊົນແມ່ນສ່ວນໃຫຍ່ ໃນໂຄງການນີ້ | | | |
| | ລາຍງານ | ມີ | ບໍ່ມີ |
| | | | ອະທິບາຍ |
| 1. | ມີການຍ້າຍຍ້າຍ ຫຼື ການຍ້າຍເຮືອນ ຫຼື ອາຄານທຸລະກິດຕາວອນ? | | ✓ |
| 2. | ມີການແລ່ນສິນຄ້າ ຫຼື ຕັດໄມ້ໃນພື້ນທີ່ກວມເນື້ອທີ່ກວ່າ 200 ຄົນ ຫຼື 20 ຄົວເຮືອນ? | | ✓ |
| 3. | ບໍ່ໄດ້ນຳໃຊ້ວິທີການ ທີ່ຄ່າອາຍ ຜະລິດຕະພັນ ຫຼື ສິນຄ້າອື່ນໆ ທີ່ອາດມີຜົນຕໍ່ສິນຍາສາກົນ ແຕ່ເປັນ ການອອກແຮງຕົວຂອງສິນຄ້າໃນປັດຈຸບັນ ແລະ ປ່ຽນແປງປູນລືມສິດ ທີ່ຊາວບ້ານໄດ້ ກຳນົດ ແລະ ໄດ້ຮັບຮອງອາດແລ້ວໃນກອງປະຊຸມຂຶ້ນກຸ່ມບ້ານ ໂດຍບໍ່ໄດ້ປຶກສາຫາລືກັນ ກັບຊາວບ້ານ? | | ✓ |
| 4. | ເກີດຜົນກະທົບຕໍ່ການລົບ ຕໍ່ບັນດາຊົນເຜົ່າ ທີ່ອາໄສຢູ່ໃນບ້ານຕ່າງໆ ຫຼື ໂຄງການບໍ່ຖືກ ຍອມ ຮັບຈາກຜູ້ຊົນເຜົ່າທີ່ຢູ່ໃນບ້ານ ທີ່ແມ່ນຊົນເຜົ່າດຽວກັນ ຫຼື ບ້ານທີ່ມີຫຼາຍໆ ຊົນເຜົ່າຢູ່ລວມກັນ? | | ✓ |
| 5. | ມີການຜະລິດ ຫຼື ຄຳຂາຍ ຜະລິດຕະພັນ ຫຼື ມີກິດຈະກຳ ທີ່ສິດຕໍ່ລະບຽບກົດໝາຍ ຂອງ ສປປ ລາວ ຫຼື ຂໍ້ຕົກລົງ ແລະ ສິນຄ້າສິນຍາສາກົນ, ຫຼື ຕົກທຳມາຈາກສາກົນເຊັ່ນ: ການໃຊ້ສານເຄມີ ເປັນຕົ້ນແມ່ນຢາປາບສັດຕູຕໍ່ຢາອຳຫວາ, ສານທຳລາຍຊີວິດໂອໂຊນ, ສັດປ່າທີ່ຢູ່ໃນລາຍການຄຸ້ມຄອງຂອງສິນຄ້າສິນຍາ ວ່າດ້ວຍການຄຳຂາຍສາກົນ ກ່ຽວກັບ ສັດປ່າທີ່ກ່ຽວຂ້ອງ (CITES)? | | ✓ |
| 6. | ມີການຜະລິດ ຫຼື ຄຳຂາຍ ຜະລິດຕະພັນທີ່ສ່ວນປະສົມຂອງສິນຄ້າເອເລວສາໄກ (asbestos fibers). ແຕ່ເຮົາກໍ່ມີຕົວບໍ່ໄດ້ນຳໃຊ້ສ່ວນປະສົມຜະລິດຕະພັນແຜ່ນຊີມິງ (ກະເມີຍງູງຫຼືຄາ) ທີ່ມີສານasbestos ຕໍ່າກວ່າ 20%? | | ✓ |
| 7. | ມີການຜະລິດ ຫຼື ກິດຈະກຳ ທີ່ກ່ຽວຂ້ອງທຸກການຂຸດຄົ້ນແຮງງານເປັນອັນຕະລາຍຕໍ່ ແຮງງານເດັກ? | | ✓ |
| 8. | ມີການຕັດໄມ້ໃນເຂດທີ່ບໍ່ຖືກຄວບຄູ່ມືເປັນເປົ້າໝາຍຂອງການຄຳ? | | ✓ |
| 9. | ມີການຜະລິດ ຫຼື ຄຳຂາຍ ໄມ້ ຫຼື ຜົນຜະລິດອື່ນໆ ຈາກໄມ້ອື່ນໆ ທີ່ບໍ່ແມ່ນປ່າ ທີ່ໄດ້ ຮັບການຄຸ້ມຄອງແບບຍືນຍົງ? | | ✓ |

| | | |
|---|----------------------------|--------------|
| 10. ການອິນສົ່ງສິ່ງສະເຫຼີຍສະຫຼົບໃນກົດໝາຍສາກົນ ຂໍ້ມູນຊາຍແດນ (Basel Convention)? | | ✓ |
| 11. ກິດຈະກຳທີ່ເກືອກຳມ ຢູ່ໃນລະບຽບກົດໝາຍ ຂອງ ສປປ ລາວ ຫຼື ໃນສິນຄ້າສິນຍາ ສາກົນ ກ່ຽວກັບການຢືນຢັນສະພາບອາວະກາດ ດ້ານຊີວະນາໆພັນ ຫຼື ມີລະດັບທາງ ວັດທະນະທຳ (ສິນຄ້າສິນຍາກຸງ Bonn, ຄົນບໍລິເວນນ້ຳ, ສິນຄ້າສິນຍາກ່ຽວກັບມໍລະດົກ ໄລາ ແລະ ສິນຄ້າສິນຍາກ່ຽວກັບຊີວະນາໆພັນ). | | ✓ |
| 12. ການອິນສົ່ງຖິ້ມມັນ ຫຼື ສານທີ່ເປັນອັນຕະລາຍ ທີ່ບໍ່ປະຕິບັດຕາມຂໍ້ຕົກລົງຂອງ ອົງການ International Maritime Organization (IMO) requirements (MARPOL, SOLAS and Paris MOU). | | ✓ |
| 13. ເຮັດໃຫ້ມີການປ່ຽນແປງ ຫຼື ເຮັດໃຫ້ເກີດຜົນກະທົບອາວະກາດທີ່ສຳຄັນເຊື່ອມ ໂຊມລົງ (OP.04) | | ✓ |
| 14. ເຮັດໃຫ້ເຂດປ່າໄມ້ທີ່ສຳຄັນ ມີການປ່ຽນແປງ ຫຼື ເຮັດໃຫ້ເສຍໄຊມລົງ (OP.36) | | ✓ |
| 15. ມີການນຳໃຊ້ຢາປາບສັດຕູພືດປະເທດໃດໜຶ່ງ (OP.09) | | ✓ |
| 16. ມີການແລ່ນສິນຄ້າທີ່ບໍ່ສ່ວນປະສົມ ໂດຍບໍ່ມີການກວາງເຖິງຂອງຂໍ້ຕົກລົງສາກົນ ຊຶ່ງເຊື່ອມສະເພາະ (OP.12) | | ✓ |
| 17. ມີຜົນກະທົບຕໍ່ຊັບພະຍາກອນດຳເນີນວັດທະນະທຳ (OP.11) | | ✓ |
| ຄະນະກຳມະການກຳນົດຄອງ | | |
| ພາກສ່ວນ | ສື່ແຈ້ງ ແລະ ລາຍເຊັນ | ວັນທີ |
| ສະພາກອານາຈັກ ແລະ ຂົນສົ່ງ ແຂວງ-PIU | <i>ໂອກາດ ສາທິງ</i> | 3/2/2023 |
| ສະພາກສາທາລະນະສູນແຂວງ | <i>ສາທິງ</i> | 3/2/2023 |
| ຫ້ອງການ ໂຍທາທິການ ແລະ ຂົນສົ່ງ ເມືອງ | <i>ອາທິດ ສາທິງ</i> | 3/2/2023 |
| ຫ້ອງການສາທາລະນະສູນເມືອງ | <i>ອາທິດ ສາທິງ</i> | 3/2/2023 |
| ຫ້ອງການສຶກສາ ແລະ ກິດຈະກຳເມືອງ | <i>ອາທິດ ສາທິງ</i> | 3/2/2023 |
| ຫ້ອງການ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ເມືອງ ເມືອງ | <i>ອາທິດ ສາທິງ</i> | 3.2.2023 |
| ຫ້ອງການກະສິກຳ ແລະ ປ່າໄມ້ເມືອງ | | |
| ພາກສ່ວນອື່ນໆ (ຂຽນໃສ່ຜູ້ມື) | | |

| ຜູ້ດຳເນີນການກຳນົດຕອງ (ທີ່ປຶກສາ PIA) | |
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| ຊື່ ແລະ ນາມສະກຸນ: | ໜ້າທີ່ຮັບຜິດຊອບ: |
| ລາຍເຊັນ: | ວັນທີ: |
| ຜູ້ດຳເນີນການກຳນົດຕອງ (ຫ້ອງການ ຍທຂ ເມືອງ PIU) | |
| ຊື່ ແລະ ນາມສະກຸນ: ບຸນລິນະໄຊ ຊຸມພອນລຸ້ນ | ໜ້າທີ່ຮັບຜິດຊອບ: ຮງ PIU |
| ລາຍເຊັນ: | ວັນທີ: 3/2/2023 |
| ຍິງຍິນໂດຍ | |
| ຊື່ ແລະ ນາມສະກຸນ: (ນາຍບ້ານ/ຮອງນາຍບ້ານ) | ໜ້າທີ່ຮັບຜິດຊອບ: |
| ລາຍເຊັນ: | ວັນທີ: 3/2/2023 |

ໝາຍເຫດ: ມາຍຫຼັງສຳເລັດການກຳນົດຕອງ ແລະ ເຊັນຄະນະກຳມະການທຸກທ່ານແລ້ວ ໃຫ້ສຳເນົາເອກະສານດັ່ງກ່າວ ໃຫ້ແກ່ PIU ເມືອງ ຈຳນວນ 1 ສະບັບ, ສ່ວນສະບັບຕົ້ນ ຈຳນວນ 2 ສະບັບ ແມ່ນນຳສົ່ງໃຫ້ PIU ແຂວງ ແລະ PMU ເປັນຜູ້ຮັບຜິດຊອບ ມາກສ່ວນລະ 1 ສະບັບ.

2. Screening for Phonxay WSS

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| 9. ມີການຜະລິດ ຫຼື ຕົກຂາຍ ໄມ້ ຫຼື ຜົນຜະລິດອື່ນໆ ຈາກປ່າໄມ້ອ້ອມຮອບ ທີ່ບໍ່ແມ່ນປ່າ ທີ່ໄດ້ຮັບການຄຸ້ມຄອງແບບຍືນຍົງ? | <input checked="" type="checkbox"/> |
| 10. ການຂົນສົ່ງສິ່ງເສດເຫຼືອອຸສະມິດທີ່ເກືອດຫ້າມໃນກົດໝາຍສາກົນ ຂ້າມຊາຍແດນ (Basel Convention)? | <input checked="" type="checkbox"/> |
| 11. ກິດຈະກຳທີ່ເກືອດຫ້າມ ຢູ່ໃນລະບຽບກົດໝາຍ ຂອງ ສປປ ລາວ ຫຼື ໃນສົນທິສັນຍາສາກົນ ກ່ຽວກັບການປ້ອງກັນຊັບພະຍາກອນ ດ້ານຊີວະນາໆພັນ ຫຼື ມໍລະດົກທາງວັດທະນະທຳ (ສົນທິສັນຍາກຸງ Bonn, ດິນບໍລິເວນນ້ຳ, ສົນທິສັນຍາກຸງວັດປັດມໍລະດົກໂລກ ແລະ ສົນທິສັນຍາກຸງວັດຊີວະນາໆພັນ). | <input checked="" type="checkbox"/> |
| 12. ການຂົນສົ່ງຖິ້ນໄມ້ ຫຼື ສານທີ່ເປັນອັນຕະລາຍ ທີ່ບໍ່ປະຕິບັດຕາມຂໍ້ຕົກລົງຂອງອົງການ International Maritime Organization (IMO) requirements (MARPOL, SOLAS and Paris MOU). | <input checked="" type="checkbox"/> |
| 13. ເຮັດໃຫ້ມີການປ່ຽນແປງ ຫຼື ເຮັດໃຫ້ຖິ້ນທີ່ຢູ່ອາໄສຕາມອຳນາດທີ່ສຳຄັນເຊື່ອມໂຊມລົງ (OP4.04) | <input checked="" type="checkbox"/> |
| 14. ເຮັດໃຫ້ເຂດປ່າໄມ້ທີ່ສຳຄັນ ມີການປ່ຽນແປງ ຫຼື ເຊື່ອມໂຊມລົງ (OP4.36) | <input checked="" type="checkbox"/> |
| 15. ມີການນຳໃຊ້ປາຍສິດສິດພິດປະເພດໃດໜຶ່ງ (OP4.09) | <input checked="" type="checkbox"/> |
| 16. ມີການເວນເຄີນທີ່ຕິດສ່ວນບຸກຄົນ ໂດຍບໍ່ມີການກະກຽມຜູ້ອາໄສຢູ່ນະໂຍບາຍການຊົດເຊີຍສະເພາະ (OP4.12) | <input checked="" type="checkbox"/> |
| 17. ມີຜົນກະທົບຕໍ່ຊັບພະຍາກອນດ້ານວັດທະນະທຳ (OP4.11) | <input checked="" type="checkbox"/> |

| ຄະນະກຳມະການການກຳນົດຕອງ | | |
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| ພາກສ່ວນ | ຊື່ແຈ້ງ ແລະ ລາຍເຊັນ | ວັນທີ |
| ພະແນກໂຍທາທິການ ແລະ ຂົນສົ່ງ ແຂວງ-PIU | | |
| ພະແນກສາທາລະນະສຸກແຂວງ | | |
| ຫ້ອງການ ໂຍທາທິການ ແລະ ຂົນສົ່ງ ເມືອງ | | |
| ຫ້ອງການສາທາລະນະສຸກເມືອງ | | |
| ຫ້ອງການສຶກສາ ແລະ ກິດຈະກຳເມືອງ | | |
| ຫ້ອງການ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ເມືອງ ເມືອງ | | |
| ຫ້ອງການກະສິກຳ ແລະ ປ່າໄມ້ເມືອງ | | |
| ພາກສ່ວນອື່ນໆ (ຂງນ ໃສ່ຊຸມນີ້) | | |

PIA/PIU ເປັນຜູ້ຕີນແບບຟອມນີ້ໃນເວລາກຳນົດໂຄງການຍອດຕາງໆ. ຕ້ອງມີລາຍເຊັນຄະນະກຳມະການແລະພາກສ່ວນກ່ຽວຂ້ອງໃນແບບຟອມນີ້ ແລະ ຕ້ອງຕິດຕັດແບບຟອມນີ້ໃສ່ໄມ້ຄະເທີໂຄງການຍອບ ເພື່ອໃຫ້ຫ້ອງການຄຸ້ມຄອງໂຄງການເປັນຜູ້ທົບທວນແລະຮັບຮອງ.

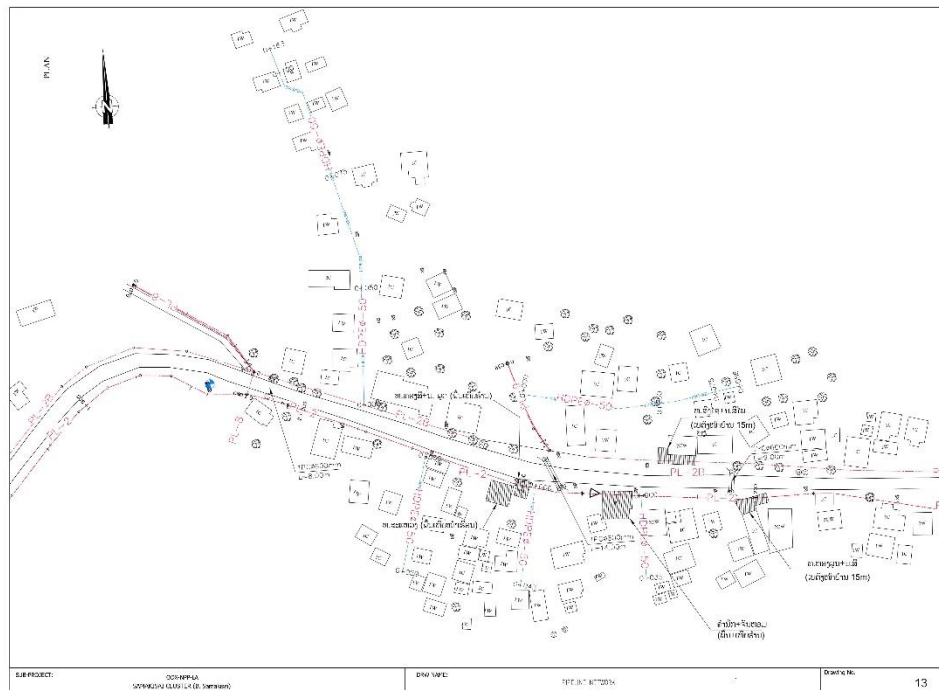
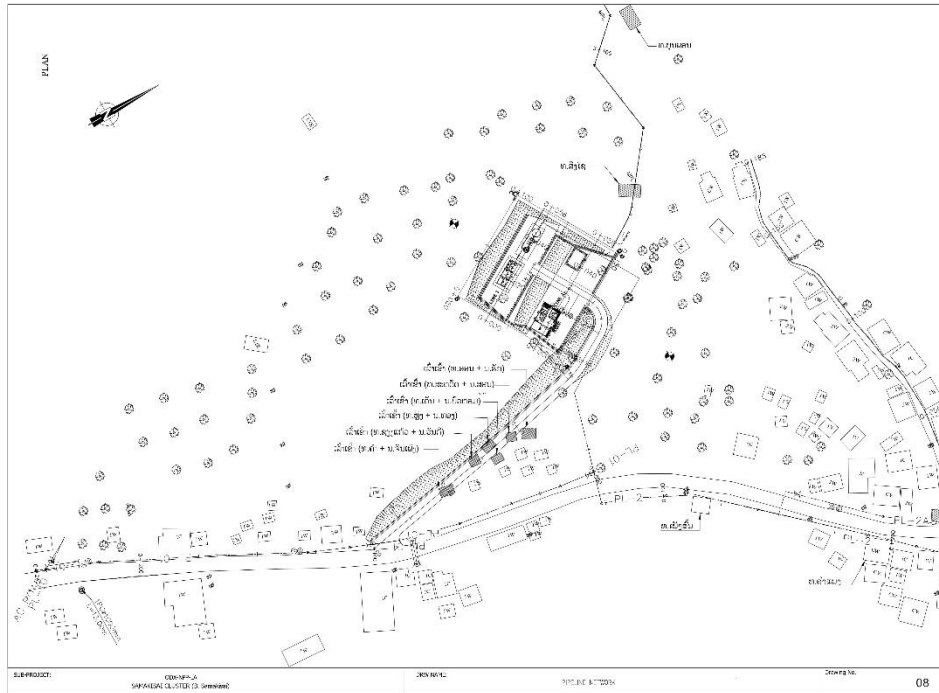
| ກິດຈະກຳຕ່າງໆຂອງໂຄງການທີ່ບໍ່ສິດໄດ້ຮັບທຶນສະໜັບສະໜູນ | | | |
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| ແຂວງ: | ເມືອງ: | ສະຖານທີ່ຕັ້ງ- ມີແລະບໍ່ມີຕິດຕັດ | |
| ອຸດົມໄຊ | ກຳໄພ | ມີ | ບໍ່ |
| ຜຳນ: ສາມັດຊີ | | | |
| ລາຍການກິດຈະກຳຂ່າງຊຸມນີ້ແມ່ນສຳຄັນທີ່ມີ ໃນໂຄງການນີ້ | | | |
| ລາຍການ | ມີ | ບໍ່ມີ | ອະທິບາຍ |
| 1. ມີການຍົບຍ້າຍ ຫຼື ການຫັ່ນມ້າງເສື່ອນ ຫຼື ອາດມີຊະນິດຕາວອນ? | | <input checked="" type="checkbox"/> | |
| 2. ມີການເວນເຄີນທີ່ຕິດ ເຮັດໃຫ້ບໍ່ມີຜົນກະທົບຕ້ອງໄດ້ຍົກຍ້າຍປະຊາຊົນຫຼາຍກວ່າ 200 ຕົນ ຫຼື 20 ຕິດເສື່ອນ? | | <input checked="" type="checkbox"/> | |
| 3. ບໍ່ໄດ້ນຳໃຊ້ວິທີການ ທີ່ຕອບສະໜອງຄວາມຕ້ອງການຂອງຊາວບ້ານ ແຕ່ເປັນການອຳນວດຕິດຂອງຂັ້ນເທິງໃຫ້ເຂົາເຈົ້າ ແລະ ປ່ຽນແປງເລີຍເຮັດ ທີ່ຊາວບ້ານໄດ້ກຳນົດ ແລະ ໄດ້ຮັບຮອງເອົາແລ້ວໃນອາຍຸປະຊຸມຊີວິດຍືນຍົງ ໂດຍບໍ່ໄດ້ປຶກສາຫາລືກັນກັບຊາວບ້ານ? | | <input checked="" type="checkbox"/> | |
| 4. ເກີດຜົນກະທົບດ້ານລົບ ຕໍ່ບັນດາຊົນຜູ້ທີ່ອາໄສຢູ່ໃນບ້ານຕາງໆ ຫຼື ໂຄງການບໍ່ຖືກຍອມ ຮັບຈາກຊົນຜູ້ທີ່ຢູ່ໃນບ້ານ ທີ່ແມ່ນຊົນເຜົ່າດຽວກັນ ຫຼື ບ້ານທີ່ມີຫຼາຍໆຊົນເຜົ່າຢູ່ຮ່ວມກັນ? | | <input checked="" type="checkbox"/> | |
| 5. ມີການຜະລິດ ຫຼື ຕົກຂາຍ ຜະລິດຕະພັນ ຫຼື ມີກິດຈະກຳ ທີ່ເຮັດໃຫ້ລະບຽບກົດໝາຍຂອງ ສປປ ລາວ ຫຼື ຂໍ້ຕົກລົງ ແລະ ສົນທິສັນຍາສາກົນ, ຫຼື ຖືກຫ້າມຈາກສາກົນເຊັ່ນ: ການໃຊ້ສາເຕລີ ເປັນຕົ້ນແມ່ນຢາປະສົດຜິດປ່າຂ້າຫຍັດ, ສານທໍາລາຍສິນເອໂອໂຊນ, ສິດທີ່ຢູ່ໃນລາຍການຄຸ້ມຄອງຂອງສົນທິສັນຍາ ວ່າດ້ວຍການຕົກຂາຍສາກົນ ກ່ຽວກັບສິດທີ່ກຳລັງຈະສູນພັນ (CITES)? | | <input checked="" type="checkbox"/> | |
| 6. ມີການຜະລິດ ຫຼື ຕົກຂາຍ ຜະລິດຕະພັນທີ່ສ່ວນປະສົມຂອງສິນເບໂອແອລສ໌ເບສ໌ (asbestos fibers). ແຕ່ຂໍ້ກຳນົດບໍ່ໄດ້ນຳໃຊ້ສິນເບສ໌ເປັນຜະລິດຕະພັນແຜ່ນຊີມັງ (ກະເບື້ອງຫຼັງກາ) ທີ່ມີສານasbestos ຕໍ່ກວ່າ 20%? | | <input checked="" type="checkbox"/> | |
| 7. ມີການຜະລິດ ຫຼື ກິດຈະກຳ ທີ່ກ່ຽວກັບສູນກຸມການອຸດສາຫະກຳເປັນອັນຕະລາຍ/ ຕໍ່ແຮງງານເດັກ? | | <input checked="" type="checkbox"/> | |
| 8. ມີການຕັດໄມ້ເຂດສິນເປົ່າຊຸມເຂດຄ້ອນຊຸມເພື່ອທາງການຕໍາ? | | <input checked="" type="checkbox"/> | |

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| ຜູ້ດໍາເນີນການກັ້ນຕອງ (ທີ່ປຶກສາ PIA) | |
| ຊື່ ແລະ ນາມສະກຸນ: | ໜ້າທີ່ຮັບຜິດຊອບ: |
| ລາຍເຊັນ: | ວັນທີ: |
| ຜູ້ດໍາເນີນການກັ້ນຕອງ (ຫ້ອງການ ບທຂ ເມືອງ PIU) | |
| ຊື່ ແລະ ນາມສະກຸນ: ນ. ງາວ ສົກ ຈິນ ຜົນ | ໜ້າທີ່ຮັບຜິດຊອບ: ຮຸ່ງ ປັນ ບຸນ |
| ລາຍເຊັນ:  | ວັນທີ: |
| ຢັ້ງຢືນໂດຍ | |
| ຊື່ ແລະ ນາມສະກຸນ: (ນາຍບ້ານ/ຮອງນາຍບ້ານ): ສຸກ ແສງຈັນ | ໜ້າທີ່ຮັບຜິດຊອບ: ຮຸ່ງ ມິວ ທິພົນ |
| ລາຍເຊັນ:  | ວັນທີ: |

ໝາຍເຫດ: ພາບຢັ້ງຢືນສໍາລັບການກັ້ນຕອງ ແລະ ເຊັນຕະນະກໍາມະການທຸກທ່ານແລ້ວ ໃຫ້ສໍາເນົາເອກະສານດັ່ງກ່າວ ໃຫ້ແກ່ PIU ເມືອງ ຈໍານວນ 1 ສະບັບ, ສ່ວນສະບັບຕົ້ນ ຈໍານວນ 2 ສະບັບ ແມ່ນນໍາສົ່ງໃຫ້ PIU ແຂວງ ແລະ PMU ເປັນຜູ້ເກັບມ້ຽນ ພາກສ່ວນລະ 1 ສະບັບ.

Annex 2 – Typical Pipeline Alignments

As the number of drawings are large, this annex only show samples of pipeline layout maps which proves that the alignment fully avoided existing structures, houses and shops.



Annex 3 - Draft Template for Monthly Environmental, Health and Safety (ESHS) Monitoring Report

(to be used by Construction Supervisors)

Project Name

Province

**ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY
(ESHS)
MONTHLY MONITORING REPORT**

Reporting Period: Month... Year...

Prepared by:

Date of Submission to PMU/PIA:

Reviewed/Approved by:

I STATUS OF C-ESMP**Table 1 – Status of Contract and C-ESMPs**

| Contract | Site | Name of Contractor | Start Date | End Date | Preparation, approval of C-ESMP and updates |
|----------|------|--------------------|------------|----------|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

II ESHS IMPLEMENTATION PROGRESS**2.1 Training on ESHS**

[list the ESHS training courses during the month, if any]

Table 2 – Training Courses conducted during the reporting month

| Contract/site | Date | Topic | Delivered by | Number of Participants |
|---------------|------|-------|--------------|------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

2.1 Documents Reviewed, cleared by the CSC during the reporting month**Table 3 – Documents Submitted by the Contractors and Reviewed by the CSC**

| | Name of Documents | Under Review?/Approved? |
|---|--|-------------------------|
| 1 | C-ESMP | |
| 2 | Agreements with local authority (e.g. on disposal site) | |
| 3 | Proof of raw legal construction material sources | |
| 4 | Proposed locations of ancillary construction sites (e.g. camps, site office, material storage areas, parking areas etc.) | |

| | | |
|--|---|--|
| | Driver's License | |
| | Contractor's monthly ESHS monitoring report | |
| | | |

3.3 . Construction Activities and Mitigation Measures Implemented

Table 4 – Key Construction Activities

| Contract /System | Site | Activity | Volume |
|------------------|------|----------|--------|
| | | | |
| | | | |
| | | | |
| | | | |

Table 5 – Mitigation Measures Implemented

Labor Management

| Contract /System | Site | Number of Workers and local labors hired | Use of PPEs Adequate? | Camps Conditions Adequate? (water/electricity supply, sanitation, safety for the workers) | Compliance to Codes of Conducts |
|------------------|------|--|-----------------------|--|---------------------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Mitigation Measures in Disturbed Areas

(One Table for each site/component)

| Contract: | Site/Component: | |
|--------------------------------|--|--------|
| ESCOP measures | Compliance (describe which measures implemented) | Photos |
| Main Construction Sites | | |
| - <i>Dust Control</i> | | |
| - <i>Traffic Control</i> | | |

| Contract: | Site/Component: | |
|---|---|---------------|
| ESCOP measures | Compliance (describe which measures implemented) | Photos |
| - <i>Erosion Control</i> | | |
| - <i>Drainage Management</i> | | |
| - <i>Occupational Health and Safety measures</i> | | |
| - <i>Community Health and Safety measures</i> | | |
| - <i>Social impacts management</i> | | |
| - <i>Waste Management</i> | | |
| - <i>Hazardous Materials Management</i> | | |
| ... (to be listed depending on the type of construction activities and site conditions) | | |
| | | |
| | | |
| <i>Site-specific Mitigation measures</i> | | |
| | | |
| | | |
| Ancillary Sites | | |
| Site Office | | |
| Disposal Sites | | |
| Parking Areas | | |
| ... | | |
| Issues Arisen during the month | | |

Inspections and meetings during the month

[list the inspections missions took place during the reporting month: who inspected, the locations visited, main conclusions, follow up actions required]

3.3.1 Grievance Redress Progress

List the complaints the CSC/Contractor received during the month and actions taken.

Table 6 – Complaints Received

| Issues | Date Received | Locations/ Contracts | Actions Taken | Follow up required? |
|--------|---------------|-------------------------|---------------|------------------------|
| | | | | |
| | | | | |

3.3.2 Comments on Contractors' compliance

- i. Licenses, agreements:**
- ii. ESMP, C-ESMP, ESCOP**
- iii. GBV/SEA**
- iv. Health and Safety**
- v. Summary of Pending Issues to be followed up**

Table 7 – Pending Issues

| | Pending Issues | Corrective Required | Actions | Timeframe | Responsible Entity |
|--|----------------|------------------------|---------|-----------|-----------------------|
| | | | | | |
| | | | | | |

Report on Incidents: reports should be prepared soonest possible after an incident happens and submitted to PIA who will submit to the World Bank Task Team. The Incident Report should provide the following information:

- Describe the incident: where and how it happened, who involved or affected;
- Specify if there any injury or fatality;
- Describe damages, if any, to existing structures or properties;
- Specify if pollution happened;
- Specify if it was Gender based violence, sexual harassment or other social cases (provide details);
- Mitigation/corrective measures implemented;
- Follow up actions required.

CONCLUSIONS AND RECOMMENDATIONS