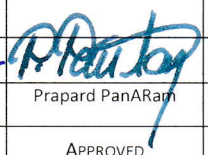
NAM NGIEP 1
POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

March 2016

					
A	28 April 2016	Viengkeo Phetnavongxay	Peter.G.Jensen	Prapard PanARam	
REV	DATE	AUTHOR	CHECKED	APPROVED	MODIFICATION DETAILS

Accessibility	
☑	Public
☐	Internal
☐	Confidential

Document No.

NNP1-C-J0904-RP-015-A

TABLE OF CONTENTS

BBREVIATIONS / ACRONYMS

ADB	Asian Development Bank
BBS	Biodiversity Baseline Survey
BOD	Biochemical Oxygen Demand
BOF	Biodiversity Offset Framework
BODM	Board of Directors Meeting
BRP	Biomass Removal Plan
CA	Concession Agreement between the NNP1PC and GOL,
CAP	Corrective Action Plan
COD	Commercial Operation Date
CVC	Conventional Concrete
CWC	Civil Works Contract
DAS	Document Approval Sheet
DCC	District Coordination Committees
DEQP	Department of Environmental Quality Promotion, MONRE
DESIA	Department of Environmental and Social Impact Assessment, MONRE
DFRM	Department of Forest Resources Management, MONRE
ECZ	Elephant Conservation Zone
EdL	Electricite du Laos
EIA	Environmental Impact Assessment
EMO	Environmental Management Office of ESD within NNP1PC
EMU	Environmental Monitoring Unit
EMWC	Electrical-Mechanical Works Contract
EPF	Environmental Protection Fund
ERIC	Environmental Research Institute of Chulalongkhorn University
ERM	Environmental Resource Management
ESD	Environmental and Social Division of NNP1PC
ESMMP	Environmental and Social Monitoring and Management Plan
GOL	Government of Lao PDR
GIS	Geographic Information Systems
IEE	Initial Environmental Examination
IMA	Independent Monitoring Agency
INRMP	Integrated Natural Resources Management Plan

ISP	Integrated Spatial Planning
LTA	Lender's Technical Advisor
MoM	Minutes of Meeting
MoNRE	Ministry of Natural Resource and Environment, Lao PDR
NCR	Non-Compliance Report
NNP1PC	Nam Ngiep 1 Power Company Limited
NPF	National Protection Forest
NTFP	Non-Timber Forest Products
NTP	Notice to Proceed (under each construction contract)
NVDI	Normalised Difference Vegetation Index
OC	Obayashi Corporation
ONC	Observation of Non-Compliances
PONRE	Provincial Department of Natural Resource and Environment, MONRE
PRLRC	Provincial Resettlement and Livelihood Restoration Committee
PvPA	Provincial Protection Area
RCC	Roller Compacted Concrete
ROW	Right of Way
SLBMP	Salvage Logging Biomass Management Plan
SMO	Social Management Office of ESD within NNP1PC
SS-ESMMP	Site Specific Environmental and Social Monitoring and Management Plan
TL	Transmission Line(s)
TLWC	Transmission Line Works Contract
ToR	Terms of Reference
TSS	Total Suspended Solids
USD	US Dollar
UXO	Unexploded Ordinance
WMC	Watershed Management Committee
WMF	Watershed Management Fund
WMP	Watershed Management Plan
WWTS	Waste Water Treatment System

EXECUTIVE SUMMARY

In March 2016, NNP1PC-EMO received five new SS-ESMMPs for review and approval in addition to another three SS-ESMMPs carried over from the previous month. Five out of eight SS-ESSMMPs were approved, one SS-ESMMP was returned for further improvements, and the remaining two are still under review and will be completed in April 2016.

The number of new ONCs increased from eight in February 2016 to 21 in March 2016. With the carry-over from February 2016, a total of 31 ONCs were active, out of which 19 ONCs were resolved and 12 ONCs will be carried over into April 2016. The highest number of issued ONCs was at the SECC Batching Plant (5 ONCs).

The procurement of a contractor to construct a small laboratory at the Owners' Site Office and Village was ongoing. The deadline for submitting the bids was 25 March 2016 and bid opening is planned to take place in the first week of April 2016. It is expected that the bid evaluation and negotiation will be concluded in the third week of April 2016 after the Lao New Year. Requests for quotations to supply the laboratory equipment were sent to key suppliers in Lao PDR during March 2016.

In March 2016, the levels of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammonia nitrogen (NH3-N) and total coliforms monitored in the effluents of all the camps were higher than the Effluent Standards specified in the Concession Agreement Annex C. Specifically, the level of total coliforms in the OC camp, Songda Camp#1 and #2 showed the highest amount of total coliforms (i.e. more than 160,000 MPN/100 ml). The EMO has several internal discussions within the key team members on the existing waste water treatment systems to assess their capacities against the total number of labour living in those camps prior to discussing with the Technical Department.

The effluents from the construction areas were for the most part in compliance with the Effluent Standards.

All water quality parameters monitored in March 2016 in Nam Ngiep both upstream and downstream the Construction Site were within the National Surface Water Quality Standards except with respect to COD and BOD in a few samples, which were slightly higher than the Standards; however, these were unrelated to the Project.

The ISP planning process is completed in Xaysomboun province. During March 2016, the planning work was finalized in three remaining districts (Hom, Anouvong and Longxane), and a draft report has been produced, which is now being finalized by DEQP (MONRE) and Xaysomboun ISP Technical Committee.

During March 2016, NNP1PC and Borikhamxay PONRE jointly organized a mission to Nam Mouane Watershed Area, the proposed Biodiversity offset Site with participation of the Deputy Head of Bolikhamxay PONRE, NNP1PC Senior Environment Specialist and the EMO Manager. The mission opened up for the first visit of the Biodiversity Advisory Committee (BAC) to the biodiversity offset site. In parallel with this, the Biodiversity Survey Team collected the first round of data from camera traps installed inside the offset site.

The progress of biomass clearance in the reservoir area is on track. To date, vegetation cutting has been completed in around 150 ha in blocks 1, 4 and 5. Some areas inside these blocks that are registered as land assets will be cleared after compensation has been done.

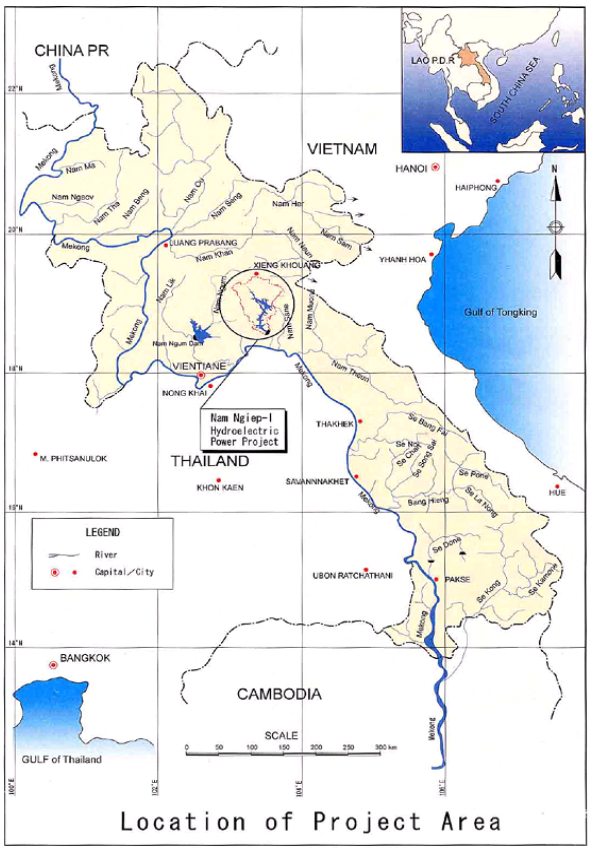
The EMO received for review the first sub-project proposal for the EPF/NNP1 financing.

The Independent Monitoring Agency (IMA) has been established by MONRE, and the first request for payment has been received and payment is being processed by NNP1PC.

1 INTRODUCTION

The Nam Ngiep originates in the mountains of Xieng Khouang Province, flowing through Khoun District into Thathom District of Xaysomboun Province, through Hom District and into Bolikhan District of Bolikhamxay Province. The Nam Ngiep meets the Mekong River just upstream from Pakxan in Bolikhamxay Province (Fig. 1).

Figure 1-1: Location Map



The project will consist of two dams. The main dam which is located 9.0 km upstream of Hat Gnuin Village in Bolikhan District, will create a 70-km-long, narrow reservoir that extends up the Ngiep Valley as far as Thathom District. At almost 150 m high, the main dam will be the second largest in Lao PDR. The Power Station at this dam will generate up to 272 MW of electricity for export to Thailand. With a combined capacity of 290 MW, Nam Ngiep 1 will generate around 1,620 GWh of electricity annually. Two transmission lines will be required to transport the electricity generated by the project. From the main power station a 230-kV line will run for 125 km to the Nabong outside Vientiane Capital. A 115-kV transmission line will be constructed by EDL from the Re-regulation Power Station to Pakxan substation over a distance of 40 km.

This Environmental Monthly Monitoring Report (EMMR) provides a summary of environmental monitoring activities and mitigation actions in February 2016. The EMMR was prepared by the Project's Environmental Management Office (EMO). It has been internally reviewed and cleared by EMO senior technical staff and management prior to submitting the report to the Government of Lao PDR (GoL) related agencies.

The EMMR and other related reports including related construction Site Specific Environmental and Social Monitoring and Management Plans (SS-ESMMPs) are publically disclosed on the Project website in line with the ADB and GoL Public Disclosure Policies. Hard copies of the final reports will also be available upon requests at the Project's main office in Vientiane Capital and field office in Pakxan, Bolikhamxay Province.

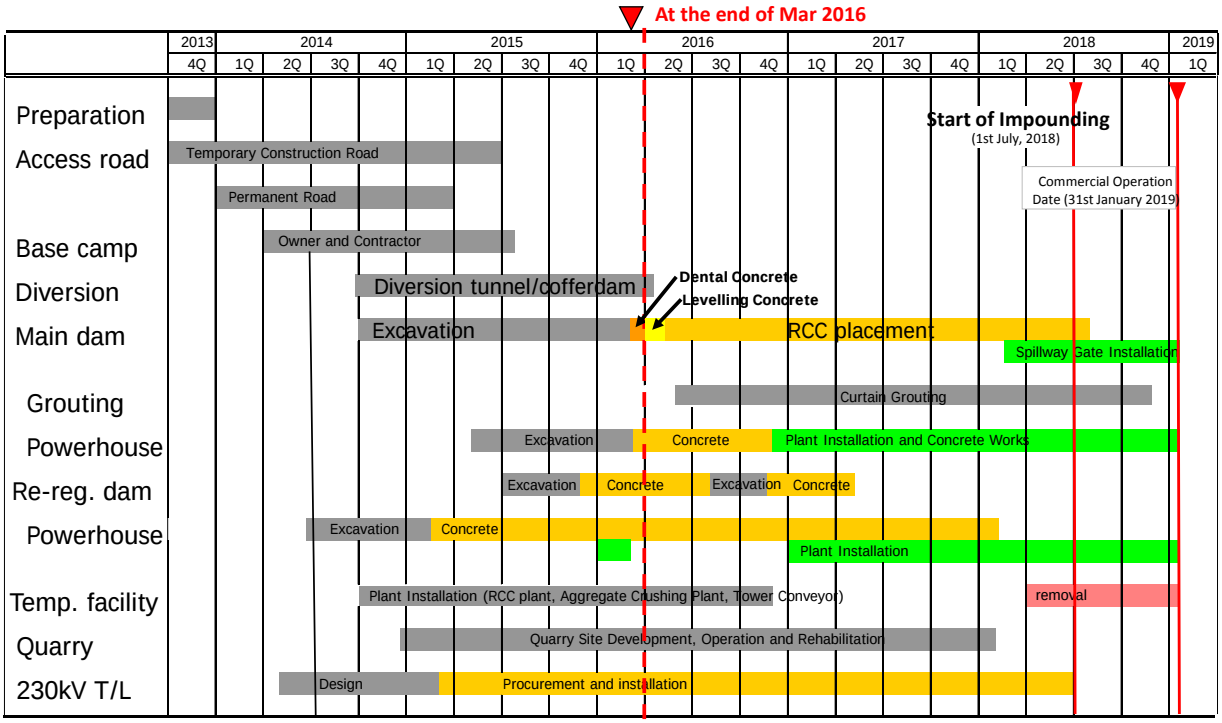
2 WORK PROGRESS OF PRINCIPAL CONTRACTORS

Construction Works for the Project are being carried out through four separate main construction contracts under the supervision of the Technical Division of NNP1PC. The four contracts are the Civil Works, the Electrical and Mechanical Works, the Hydraulic Metal or Hydro-mechanical Works and the 230kV Transmission Line Works. Actual overall cumulative work

progress until the end of March 2016 was 38.0%[1] (compared to planned progress of 38.5%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments. In terms of the value of actual work done the percentage is slightly understated since work completed, but not paid, is not included.

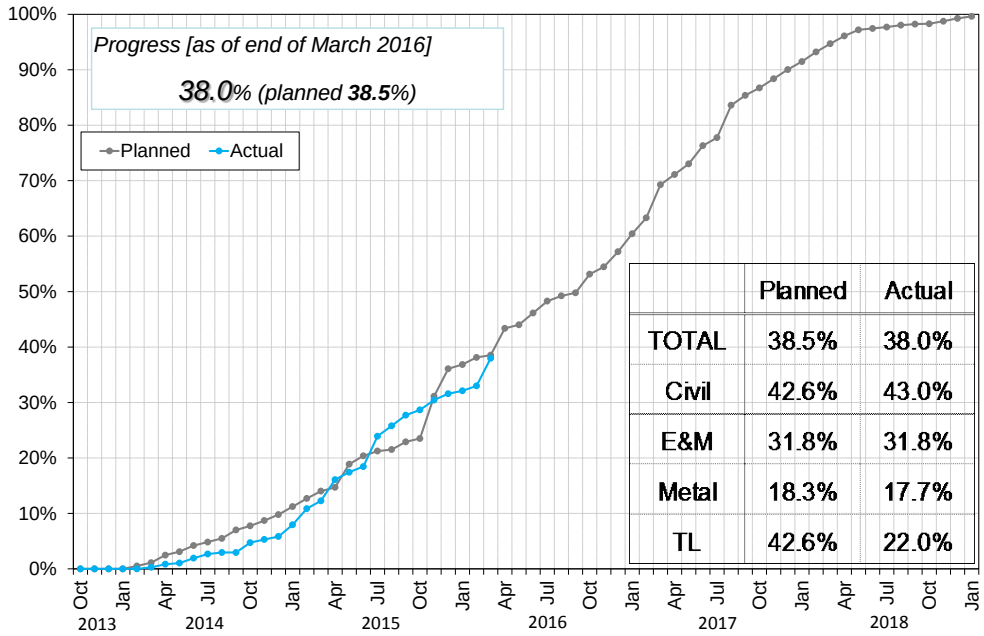
The overall construction schedule and progress curve (by achieved Milestone Payments) are shown in Figure 2-1 and Figure 2-2 respectively.

Figure 2-1: Overall Construction Schedule



[1] The progress to-date is calculated as (Cumulative Amount of Achieved Interim Milestone Payments) / (Total Agreed Price of Construction Contracts) and expressed as a percentage.

Figure 2-2: Progress Curve (All Construction Works)



	Planned	Actual
TOTAL	38.5%	38.0%
Civil	42.6%	43.0%
E&M	31.8%	31.8%
Metal	18.3%	17.7%
TL	42.6%	22.0%

2.1 Civil Work

The Civil Works Contract was executed between Obayashi Corporation and the Nam Ngiep 1 Power Company on 30 September 2013 and the NTP was issued on 03 October 2014. Excavation works of the main dam, the diversion tunnel and the re-regulation dam were commenced in October 2014 and completed in February 2016. Accordingly, the concreting work was mainly commenced. The cumulative work progress of the Civil Works until the end of March 2016 was 43.0% (compared to planned progress of 42.6%) calculated in the same manner as described above for the value of achieved Interim Milestone Payments excluding advance payment.

2.1.1 Main dam and power house

After starting the main dam excavation works in October 2014 on the left bank, the works were well advanced until diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes are now known to be 20% greater than expected and part of this additional work is needed to construct a 'shear key' structure due to the weak layers of rock encountered in the dam foundation. Following the efforts on Site, the additional excavation work was completed at the end of February 2016. The cost of the additional excavation and RCC concrete will necessitate use of contingency amounts provided for such eventualities. The dental and levelling concreting works was commenced in March 2016, and conventional RCC placement for the main dam structure will follow in April 2016.

Powerhouse excavation works was completed in January 2016 and levelling concreting works was started in coordination with installation of the grounding system accordingly. Progress of the concreting works is proceeding well and is shown in Table 2-1 below

Table 2-1: Progress of Main Powerhouse structural Concrete Works to 31 March 2016.

Total Anticipated Volume (m3)	Completed (m3)	Progress (%)
36,700	5,300	14.4

2.1.2 Re-regulation dam and powerhouse

The re-regulation powerhouse excavation and cofferdam works for river diversion were commenced in early October 2014. The excavation works for the powerhouse on the left bank were fully completed down to El. 146.7 m at the end of February 2015.

Structural concrete works were commenced in March 2015, in coordination with installation of the grounding system. The progress of structural concrete works is shown in Table 1-2 below

Table 2-2: Progress of Re-regulation Dam Structural Concrete Works to 31 March 2016

	Concrete (m^3) placed as at the end of March 2016					
Structure	Intake	Powerhouse	Tailrace	Spillway	Left Bank RCC	Total
Anticipated Qty.	24,000			23,500	13,200	60,700
Completed Qty.	11,098	7,682	1,676	3,758	13,228	37,442
Progress	**85%**			**16%**	**100%**	**62%**

The concrete volume placed already for both powerhouse and dam is 37,442m^3 being 62% of the revised total estimate of 60,700m^3 for both structures. The powerhouse concreting has advanced well and secondary concrete embedment for the draft tube liner was partially completed at the end of March 2016. The left bank structure was redesigned as roller compacted concrete (RCC) and was completed on 18 March 2016.

The Dyke (saddle dam) embankment works on the right bank near the Houay Soup Resettlement Area were also started in November 2015 and will be completed in the early April 2016.

2.1.3 Temporary work facility

2.1.3.1 DIVERSION TUNNEL INLET AND OUTLET

The diversion tunnel works which is over 600 m in length and 10 m in diameter were commenced in October 2014 by drill and blast techniques and completed in late September 2015. The river diversion took place on 31 October 2015 together with construction of earth-fill cofferdams upstream and downstream.

2.1.3.2 SECONDARY UPSTREAM COFFERDAM

The concrete placement works in both conventional and roller compacted concrete (CVC and RCC respectively) for the secondary upstream cofferdam were started in November 2015 and completed ahead of construction schedule in the middle of February 2016. The grout curtain works are on-going and will be completed in April 2016.

2.1.3.3 TEMPORARY BRIDGE

The temporary bridge works for the main river crossing were completed and the bridge opened for traffic from 16 January 2015.

2.1.3.4 PLANT YARDS

These comprise the Aggregate Crushing Plant, the CVC Batching Plant and the RCC Batching Plant.

Foundation work and installation of equipment were completed at all the plant yards and the belt conveyor system from the RCC plant to the main dam is virtually complete at 31 March 2016.

Accordingly, through the RCC trial mix and trial embankment in October and November 2015, RCC placement in the permanent structure at the re-regulation dam followed on, starting in November 2015 and finishing during March 2016.

2.1.3.5 QUARRY

After removal of overburden the excavation of raw materials for aggregate crushing were started in July 2015. The nature and type of the rock being exploited is acceptable though unsuitable soil layers are removed to spoil, and quarry management continues to improve.

2.1.3.6 DISPOSAL AREAS

The disposal area on the right bank has been available for operation since January 2015, as was the adjacent waste disposal area. The new disposal area along Road P1 near the entrance of Road T5 started operation in April 2015. Unsuitable material from the quarry continues to be hauled to Disposal area No.6 and Disposal Area No.9 is being developed by the E&M Contractor as stated above.

2.2 Electrical and Mechanical Works

The EMWC was executed between Hitachi-Mitsubishi Hydro Corporation and NNP1PC on 13 June 2014 and the NTP was issued on 03 October 2014. The cumulative work progress of the Electrical and Mechanical Works progress until the end of March 2016 was 31.8% (compared to planned progress of 31.8%).

The main activities carried out during this month are described below:

a) The following documents were submitted:
   - For the main power station, List of accessories, spare parts 230kV substation equipment(GIS), List of each packing for generator, Schematic diagram for regulator cubicle, Shop Inspection Procedure of Stator Frame, Shop Inspection and Test Procedure for Turbine Shaft for Hydro-turbine
   - For the re-regulation power station, Installation Record of Draft Tube Liner, Shop inspection procedure for runner blade, Schematic diagram for regulator cubicle, Shop test procedure of electrical overhead travelling crane.

b) The installation work of embedded piping for the main powerhouse commenced on 17 February 2016 and it is under way in coordination with concrete casting work. The status of embedded pipe installation is shown in Figure 2-3.
c) The grounding works for the main powerhouse and re-regulation power house are under way in coordination with concrete casting work.

Figure 2-3: Embedded piping installation (Main powerhouse)

2.3 Hydro-Mechanical Works

The HMWC was executed between IHI Infrastructure Systems (IIS) and NNP1PC on 18 April 2014 and the NTP was issued to the Contractor on 03 October 2014. The cumulative work progress of the Hydraulic Metal Works until the end of March 2016 was 17.7% (compared to planned progress of 18.3%). The main activities carried out during this month are described below:

a) Main dam

- Steel materials for Upper Penstock were procured and transported to Workshop.
- Cutting and Bending of Lower Inclined Penstock were completed.
- Curved pipes for Lower Penstock were transported to Field Shop.
- Material procurement of Draft Gate and Riparian Release Conduit will be started in April 2016.

b) Re-regulation dam

- Guide frame for Re-regulation Gate, Stoplog, Intake Gate and Draft Gate were delivered to Site.

2.4 230kV Transmission Line Works

The TLW Contract was executed between Loxley-Sri Consortium and NNP1PC on 11 July 2014 and the NTP was issued to the 230 kV TL Contractor on 03 October 2014. The cumulative work progress of the Transmission Line Works until the end of March 2016 was 22.0% (compared to planned progress of 42.6%). The difference is chiefly as a result of delay to commencement of construction works by approximately 7 months while awaiting compensation matters to be resolved by NNP1PC. The Contractor agreed to accelerate its Works and is on target to get back onto the original schedule for tower foundation excavation by May 2016, within 8 months from starting. During the rainy season and with further delays due to compensation virtually full

access to most sections of alignment was achieved in 2015 following resolution of remaining environmental and social matters.

The main activities already completed or carried out during this month are described below:

a) All the line route survey works from the main power station to Nabong Substation have been substantially completed and the final alignment of the 230 kV Transmission Line route is now confirmed. The route survey for the final change of alignment, a straight-line offset of the TL over a 2.8 km distance from Tower 31 to Tower 38 to avoid encroachment into the protected forest is finished, while the revision plan and profile design of this section is approved by the Owner's Engineer.

b) Plan and profile drawings, re-adjust of tower spotting and soil tests in the approved section (PI 14 – PI 22) other than the section near a private plantation area (Tower 54 to Tower 86) and between T31 and T38 are completed.

c) Preparation and revision of the design documents have been progressed including:

- Basic design of the 230 kV transmission line was approved by the Department of Energy Management in accordance with LEPTS on 22 January 2015, while the approval certificate of the 230 kV transmission line route had already issued and provided to NNP1 by DEPP for reference.
- Adjustment of tower design and calculation according to approved basic design;
- Remaining sections of revised plan and profile drawings;
- Fabrication drawings of Tower type LDC are not submitted yet, while foundation design for all Tower types have already been approved, except for Tower Types LDC.
- The first 75 Towers (Lot 1) of steel for Tower Type DA has already been delivered to Site, while the construction of tower foundations has reached 139 out of an expected total of 293 and the tower erection is 73 towers completed by the end of March, 2016. The progress in this month is a little behind schedule due to the delay of importation of some construction materials such as the stub angle of the tension towers and because preparatory work for construction in the mountainous areas is a more protracted process.
- The first delivery of Conductor and OHGW (Overhead Ground Wire) for 30km or 25% of the line has already been imported on 28 March 2016 after the test report has already approved by the TLW Owner's Engineer.

d) The bush clearance works were started in May 2015 and progress was made between Tower 54 and Tower 38, while others sections (PI 18 – PI 22) were started in September 2015 after the compensation works has been completed. Almost 62 km out of a total of approximately 120 km for 139 No. towers has been finished by the end of March, 2016 and the work continues in the section between PI 1 and PI 18 currently.

In respect of the delay to commencement of most works the Contractor is studying its programme to ensure that sufficient resources are committed as the works progress to ensure that completion is achieved on time

3 ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 Site Specific Environmental and Social Management and Monitoring Plans

In March 2016, NNP1PC-EMO received five new SS-ESMMPs for review and approval in addition to another three SS-ESMMPs carried over from the previous month. Five out of eight SS-ESSMMPs were approved, one SS-ESMMP was returned for further improvement, and the remaining two are still under review and will be completed in April 2016.

Table 3-1 SS-ESMMPs reviewed in March 2016

Title/Contractor	Date Received	Status	Comments
SS-ESMMP for Biomass Clearance in the Reservoir	22 February 2016	Approved with comments on 03 March 2016	- Provide descriptions on the technical methods for biomass clearance, environmental mitigation plans and sub-plans for biomass clearance
SS-ESMMP for IHI Sub-Contractor Camp	23 February 2016 (3rd submission)	Approved with comments on 09 March 2016	- Provide detailed design and drawings of drainage line systems including cut-off drains, sediment ponds, grey water from washing/bathing, canteen or kitchen and also sewage water from septic tank in the camp; - Provide detailed design and drawings for the wastewater treatment system
SS-ESMMP for 38 ha Paddy Field Development at the HSRA	11 March 2016 (3rd submission)	Approved with no comments on 11 March 2016	- The EMO's comments have been addressed and reflected in the revised document
SS-ESMMP for Construction of Main Dam Body	15 March 2016	Approved with Comments on 29 March 2016	- Estimate volume of rock/spoil, and other construction waste to dispose at disposal area #6; - Provide information and drawing of workshop at spoil disposal area #2; - Provide proposed management plans for hazardous materials at the workshop including the storage location, bunded area, spill response kits, etc.
SS-ESMMP for the Construction of the House and Pre-school Buildings Lot1 at HSRA	15 March 2016	Approved with comments on 29 March 2016	- No attached building design and drawing-layout; - Brief description of a temporary toilet facility for worker camp; - Estimate construction area;

			- Water supply information for temporary camp and each house for PAPs; - Provide site decommission and site closure plan.
SS-ESMMP for the Construction of Houses, a Pre-School, and Accommodation Buildings Lot3 at HSRA	15 March 2016	Returned for improvement on 30 March 2016	- Key information is still missing including the estimated total construction area and general lay-out, maps and a Detailed Work Programme. - Provide more information and drawings of the drainage system for the worker's camp; - Attach drawings for the septic tank systems that will be built for houses and pre-school building for EMO reviews
SS-ESMMP for Improvement of the Internal Road in 2UR	18 March 2016	Under review	
SS-ESMMP for the Construction of the Main Road on HSRA	31 March 2016	Under review	

3.1.2 Compliance Report

The results of the environmental compliance inspections undertaken in March 2016 are summarized in Table 3-2 and the inspected sites are indicated on the maps in Figure 3-1 Dam Construction and Common Facilities Sites and Figure 3-2 230 kV Transmission Line Construction Monitoring.

Table 3-2 Results of environmental compliance inspections in March 2016

Site Name and ID	Findings	Reporting	Actions
RT Camp (RT-C)	Used engine oil spill at the workshop (ON-OC-0202); Stagnant grey water in the toilet area (ON-OC-0203);	3 ONCs	Clean-up and dispose the contaminated soil, no maintenance work is allowed outside the workshop area without a drip tray by 14/03/2016; Drain the grey water into the sediment pond and install a concrete ditch by 22/03/2016; Clean up the area and separate non-hazardous

Site Name and ID	Findings	Reporting	Actions
	Poor house-keeping at the recycle waste storage area (ON-OC-0204).		from hazardous wastes by 22/03/16.
Songda5 Camp#1 (SDa-C#1)	Leaked effluent from the septic tank (ON-OC-0201).	1 ONC	Completely seal the cover of the septic tank by 22/03/2016.
V&K Camp (V&K-C)	The last grey water treatment pond is 95% full and can overflow into the environment without prior treatment (ON-OC-0205).	1 ONC	Reduce the depth of the outlet and ensure that the pond has sufficient capacity to retain and treat wastewater prior to discharging to the environment by 14/3/16.
Earth dyke construction area (ED)	Improper waste segregation and housekeeping at the workshop area and temporary camp (ON-OC-0206); No clean-up of oil spill and oily rags. Also the existing spill protection facilities were not adequate at the storage area (ON-OC-0207).	2 ONCs	Properly segregate non-hazardous from hazardous waste by 5/4/2016. Clean up the contaminated soil and rags. Store all hazardous materials in the bunded area by 5/4/16.
SECC Camp (SECC-C)	Improper solid waste segregation at the waste collection centre (ON-SECC-0016); The septic tank was full and over-flow into the environment (ON-SECC-0020);	3 ONCs	Separate recyclables from other wastes before disposal at the centre by 15/3/16; Empty and dispose of the septic waste at an authorized area. It also needs to regularly check the septic tank by 18/3/16.

Site Name and ID	Findings	Reporting	Actions
	Turbid water was directly discharged into Nam Ngiep and the sediment pond capacity was not sufficient (ON-SECC-0022).		Remove the sediment in both ponds to increase the capacity and install rip raps at the inlet and outlet to reduce erosion into Nam Ngiep River by 29/3/16.
SECC Workshop	Some Non-Timber Forest Products (NTFPs) were found behind the sub-contractor's workers camp (ON-SECC-0015)	1 ONC	Provide environmental awareness training to SECC workers regarding biodiversity conservation, waste management and other relevant topics if not previously provided by 15/03/2016.
SECC batching plant yard	The new generator storage area does not have a roof, concrete floor, bunded area (ON-SECC-0023). Inadequate bund/earth dyke at the rock and sand stockpile yard (ON-SECC-0018). No clean-up of contaminated sand/soil at the generator area (ON-SECC-0021). The left embankment of the Nam Ngiep River at the batching plant does not have a sediment pond and sufficient erosion and sediment control (ON-SECC-0024); The sediment and concrete waste in the sediment pond located at the Batching plant is nearly full. It has a high potential to overflow and release into the Nam Ngiep River (ON-SECC-0025).	5 ONCs	Install appropriate roof and bunded area by 12 April 2016. Increase the size of the existing bund/dyke to at least 1 m high around the stockpile area by 15/3/16; Regularly clean-up the contaminated sand/soil and store in a designated area for further disposal by 18/3/16; The Contractor shall take appropriate action to control and protect the left embankment from erosion. Proposed mitigation measures will need to be discussed and consulted with EMO prior to the implementation by 12/4/16. The concrete waste shall be removed when it is nearly 80% full and disposed of at the designated disposal area by 12/4/16.

Site Name and ID	Findings	Reporting	Actions
SECC PC Bridge Construction Site	There were not enough sand bags being installed around the temporary bridge's foundations to control soil erosion causing erosion into the Nam Ngiep (ON-SECC-0019). Turbid water was directly discharged into the Nam Ngiep (ON-SECC-0022).	2 ONCs	Install more sand bags that are sufficient to protect both sides of the temporary bridge foundation areas from erosion into Nam Ngiep by 5/3/16. Remove the sediment in both ponds to increase their capacities in retaining and settling sediments, install rip-rap at the inlet and outlet to prevent erosion, and use geotextiles for slopes to minimize the sediment load being washed into the Nam Ngiep downstream (29/03/2016).
230 kV Transmission line	Improper concrete waste disposal of about 0.5 m^3 next to the Tower #157 and other nearby areas (ON-LS-0012). No plastic bags/bins provided to store waste at the temporary mobile camp (Tower 109-110) (ON-LS-0011).	2 ONCs	The concrete waste shall be cleaned up by April 2016 and disposed of in a sediment pond. When the work is completed, the pond shall be backfilled with clay. More bins/plastic bags shall be provided to separate recyclable from non-recyclables wastes.
Spoil disposal area#3 (SD#3)	The Spoil Disposal Area is situated on the seasonal stream and receives a large volume of water from the upper catchment area. Inadequate erosion and sediment control was installed (ON-OC-0208).	1 ONC	Install earth/stone dike along the side of the open channel in order to minimise the washout of the stockpile area for the incoming wet season.

Figure 3-1: Dam and Common Facilities Construction Area

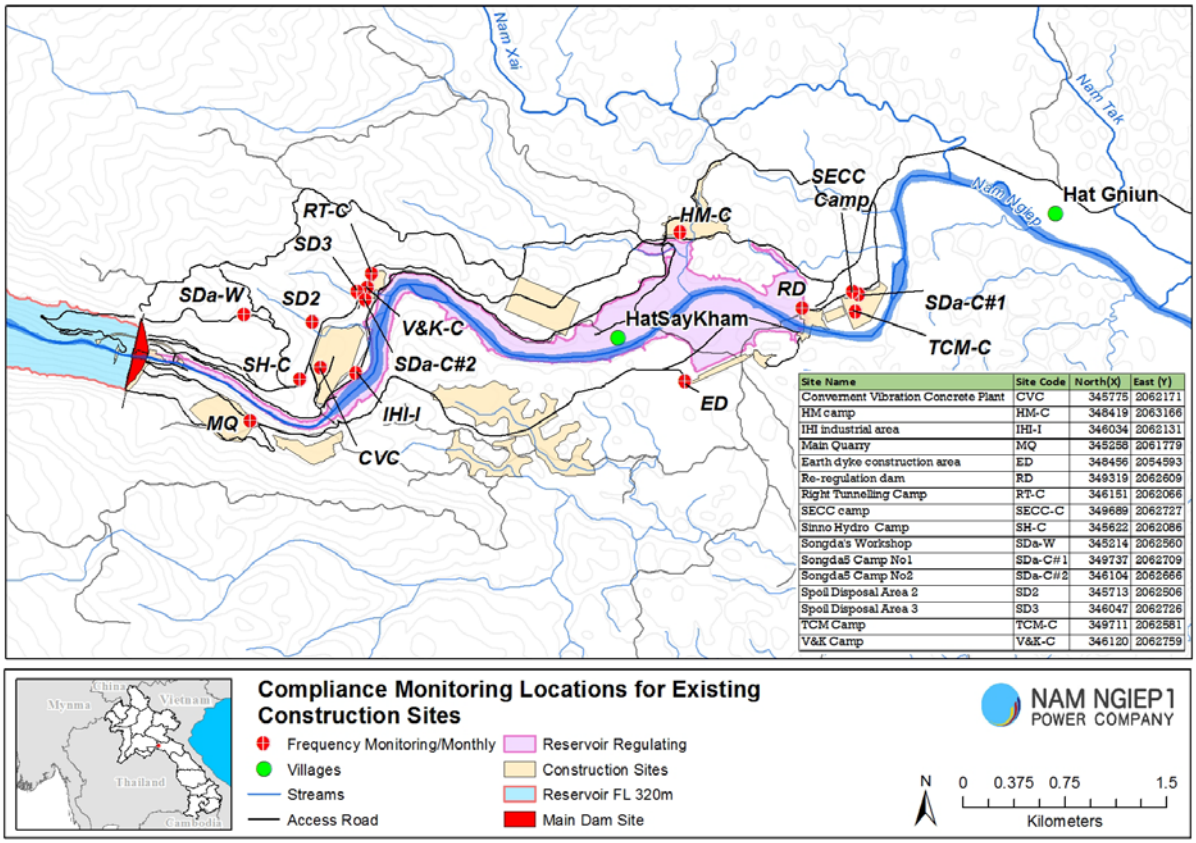
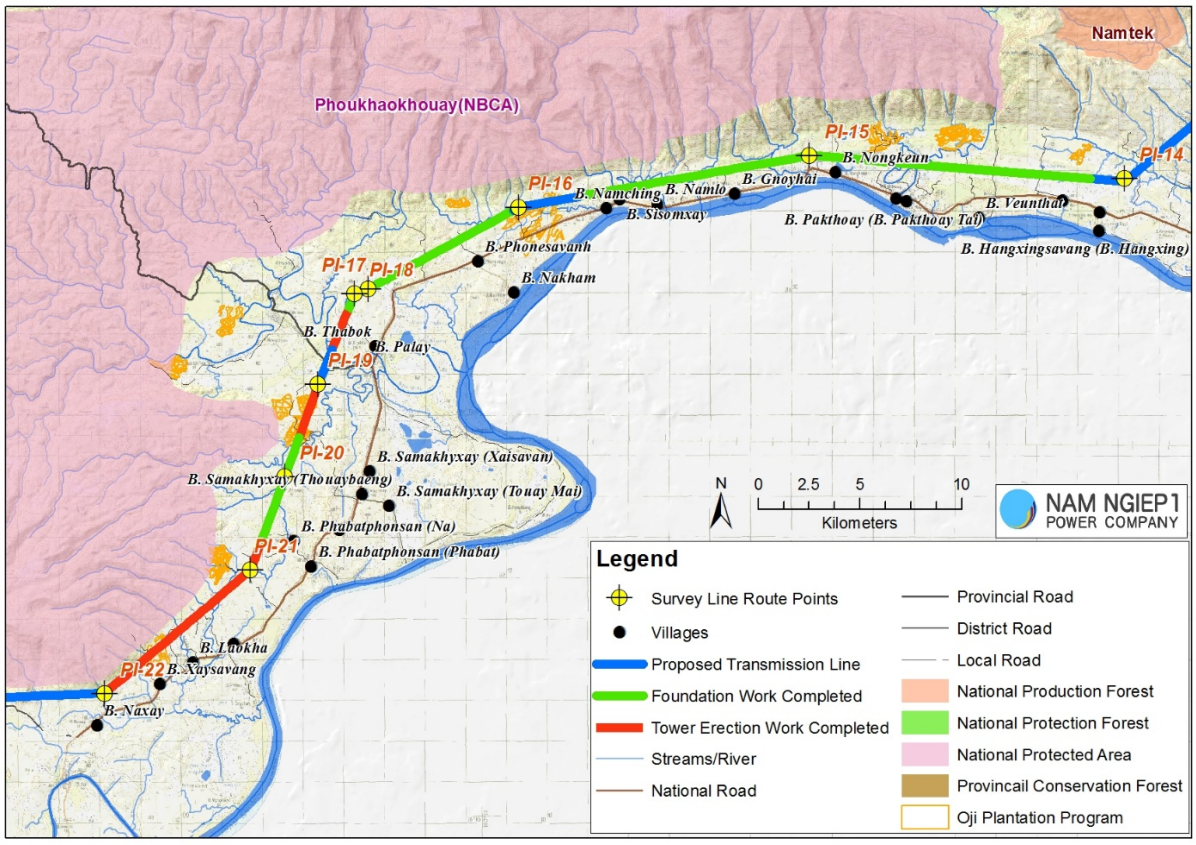


Figure 3-2: 230 kV Transmission Line Construction Monitoring

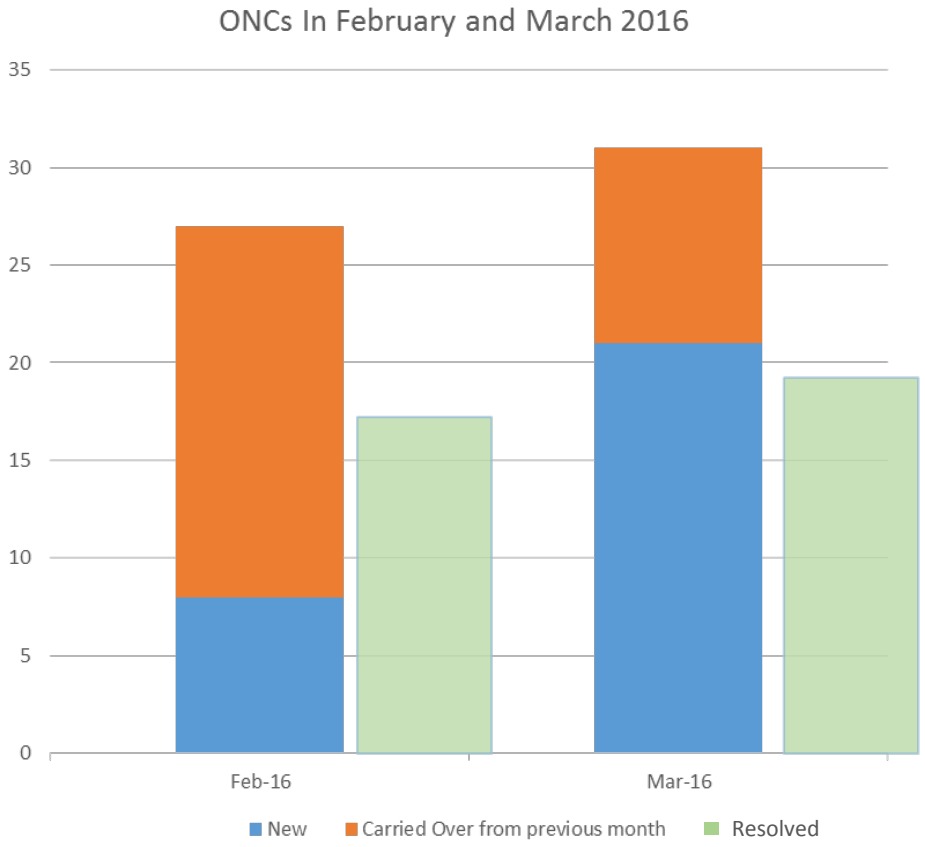


The number and status of observations of non-compliances (ONCs) and non-compliance reports (NCRs) are summarized in Table 3-3.

Table 3-3: Summary of ONCs and NCRs

Reporting Period (1-31 March 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from February 2016	10	0	0	0
New issues in this month	21	0	0	0
Resolved this month	19	0	0	0
Carried forward into April 2016	12	0	0	0

Figure 3-3: ONCs this month compared with previous month



As shown in Table 3-3 and Figure 3-3, the number of new ONCs increased from 8 to 21 in March 2016. With a carry-over from February 2016, a total of 31 ONCs were active. Out of which, 19 ONCs were resolved and a total of 12 ONCs will be carried over into April 2016. The highest number of issued ONCs was at SECC Batching Plant (5 ONCs).

3.1.3 Monitoring by the Environmental Monitoring Unit of the Government

No Environmental Monitoring Unit (EMU) visits were scheduled in March 2016.

3.2 Environmental Quality Monitoring

The environmental quality monitoring undertaken during March 2016 has followed the recommended environmental quality monitoring programme presented in the ESMMP-CP Volume III. The recommended programme consists of the following components:

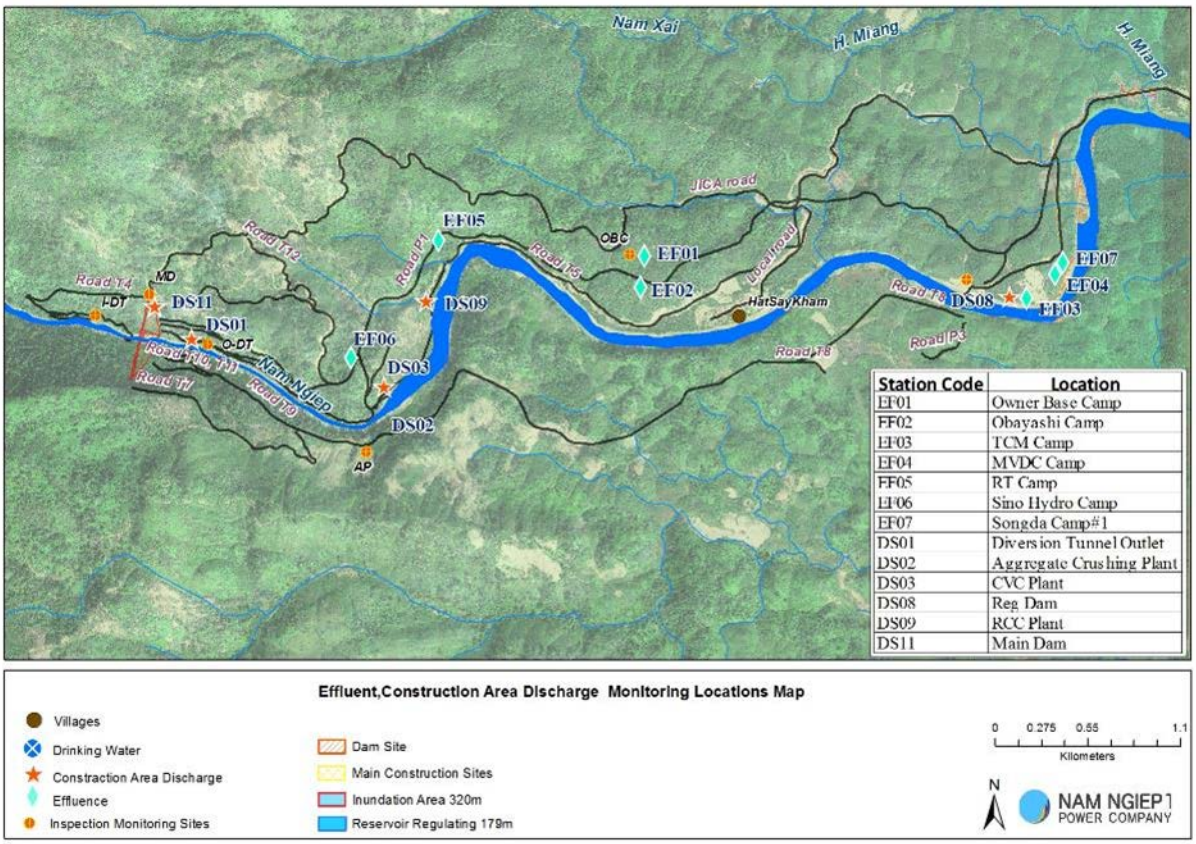
a) Effluent discharge from camps and construction sites
b) Ambient surface water quality monitoring
c) Ambient air quality monitoring (particulate matter of less than 10 PM)
d) Ambient noise and noise emission monitoring

The monitoring of villages' groundwater and gravity fed water supplies has commenced in 2015 at the impacted villages of Ban Hat Guin, Ban Hatsaykham and Ban Thaheau). It is aimed to ensure that these water supplies meet the National Standards for villagers' uses. A budget was approved in December 2015 to construct a small water quality laboratory at the Owner's Site Office and Village. Procurement of a contractor to construct this small lab was ongoing. The deadline for submitting the bids was 25 March 2016 and bid opening is planned to take place in the first week of April. It is expected that the bid evaluation and negotiation will be concluded in the third week of April after the Lao New Year. Requests for quotations for supplying the lab equipment was sent to key suppliers in Lao PDR in March 2016.

3.2.1 Effluent Discharge from Camps and Construction Sites

The monitoring of the effluents from the camps and construction sites is presented in *Table 3-4* and the monitoring points and the related sites are displayed on the map in Figure 3-4.

Figure 3-4: Map of Effluent Discharge Monitoring Locations



All parameters were assessed with reference to the Effluent Standards specified in the Project's Concession Agreement Annex C, Appendix 2 Clause 1.13. The assessment of compliance is presented in Table 3-4 and the data is included in Annex A.

Table 3-4: Compliance assessment of the effluent discharge from the camps and construction sites in March 2016

Site	Sampling ID	Non-Compliance	Corrective Actions
Owner's Site Office and Village (NNP1PC)	EF01	Total coliforms were above the Standard at 3,300 MPN/100 ml	The grey water treatment ponds at this camp are being reviewed by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with TD for implementation by May 2016 before issuing ONCs/NCR.
OC Camp	EF02	Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD), Ammonia nitrogen (NH_3-N), and total coliforms were higher than the Standard measured at 120, 208 and 37 mg/l and >160,000 MPN/100 ml respectively	The grey water treatment ponds at this camp are being reviewed by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with TD for Contractor's implementation by May 2016 before issuing an ONC/a NCR.
TCM Camp	EF03	Total coliforms were over the Standard at 7,900 MPN/100 ml	The grey water treatment ponds at this camp are being reviewed by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with TD for Contractor's implementation before issuing an ONC/a NCR.
Right Tunnelling Camp (RT Camp)	EF05	pH and total coliforms were above the Standard measured at 9.15 and >160,000 MPN/100 ml respectively. However, the pH result in following week was 7.38 which was below the Standard	The EMO is reviewing the WWTS installed at this camp as well as visiting the camp to observe and assess the current system to come up with recommendations for discussion with TD for Contractor's implementation by May 2016 before issuing an ONC/a NCR.
Sino Hydro Camp	EF06	NH_3-N, total iron and total coliforms were slightly above the Standard at 10	The EMO will continue to monitor the camp's effluent discharge to observe any significant changes next month

Site	Sampling ID	Non-Compliance	Corrective Actions
		mg/l, 2.2 mg/l and 540 MPN/100 ml	
Song Da 5 Camp No. 1	EF07	BOD5, NH_3-N, and total coliforms were not complied with the Standard. Total coliforms were >160,000 MPN/l	The grey water treatment ponds at this camp are being reviewed by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with the Contractor through TD by May 2016 before issuing an ONC/a NCR.
Song Da 5 Camp No. 2	EF08	Total Suspended Solid (TSS), BOD5, COD, NH_3-N, and total coliforms were much higher than the Standard	The grey water treatment ponds at this camp are being reviewed by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with the Contractor through TD by May 2016 before issuing an ONC/a NCR.
HM Camp	EF09	TSS, total iron and total coliforms were above the Standard	The camp has been recently operated. No discharge to the environment was observed during the sampling. The EMO will continue to monitor the site's discharge.
Main Dam Construction Area	DS11	The TSS was slightly higher than the Standard with a value of 50 MPN/100 ml compared to a Standard of LESS than 50 MPN/100 ml	No action is needed by the Contractor. The EMO team will continue to monitor the construction areas' turbid water treatment systems installed at various places
Re-regulating Dam	DS08	All parameters were complied with the Standards	

At the time of sampling, no discharge was observed from any of these camps and construction sites. Thus, the samples were collected from the last pond. Note that the monitoring at the MVDC Camp (EF04) and the diversion tunnel outlet (DS01) have been stopped since the camp was demolished in 2014 and the tunnel was completed in October 2014. Also, no samplings were conducted in March 2016 at the aggregate crushing plant (DS02), CVC plant (DS03) and RCC plant (DS09) since no wastewater was discharged from their sediment ponds.

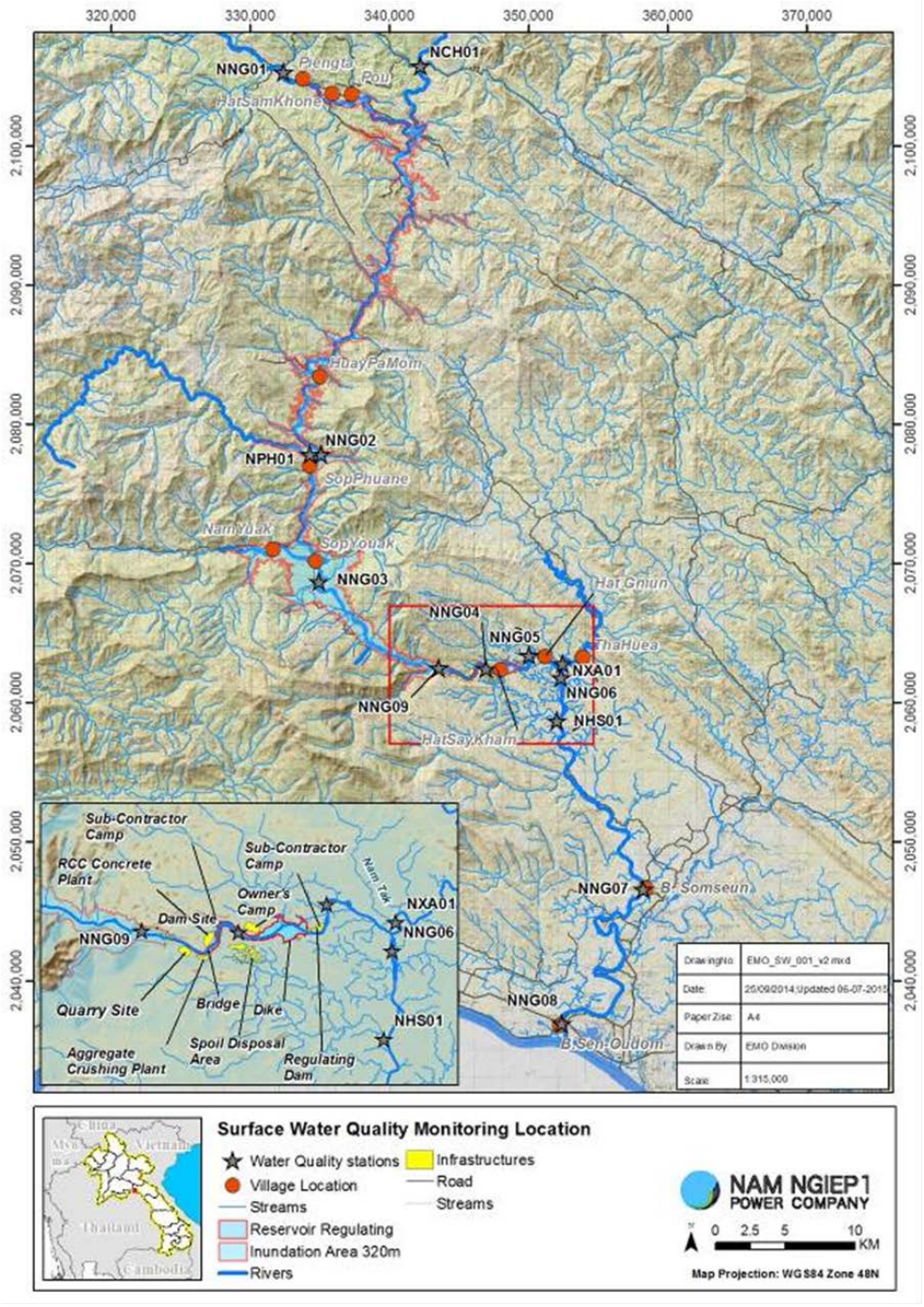
3.2.2 Surface (Ambient) Water Quality Monitoring

Surface water samples are collected and analysed twice a month[2] from nine stations in Nam Ngiep and four stations in the main tributaries including the lower Nam Chian, Nam Phouane, Nam Xao and Houay Soup (total 13 stations). The stations are indicated on the maps in Figure 3-5 and Figure 3-6.

All ambient water quality data are routinely reported to the Ministry of Natural Resources and Environment (MONRE) through the monthly Environmental Management and Monitoring Reports (EMMR) and to the Asian Development Bank in Quarterly Reports.

[2] Monthly for chemical parameters and fortnightly for physical parameters

Figure 3-5: Surface Water Quality Monitoring Stations



Key findings for surface water quality monitoring in March 2016 are shown in Table 3-5, Table 3-6, Table 3-7 and Table 3-8.

Nam Ngiep

All parameters monitored in March 2016 for Nam Ngiep both upstream and downstream of the Project Construction Site were within the National Surface Water Quality Standards except with respect to COD which was slightly higher than the Standard set at less than 5 mg/l for the stations of Nam Ngiep downstream of Ban Sop Yuak (NNG03 – located about 13 Km upstream of Project construction site) and Nam Ngiep downstream of Nam Xao confluence (NNG06 – located about 4 Km downstream of Project construction site) with values recorded of 7.60 mg/l and 8.80 mg/l respectively. In addition, the BOD was slightly higher than the Standard set at less than 1.5 mg/l for the station of Nam Ngiep upstream Ban

Phiengta (NNG01) which is located approximately 73 km upstream of the project construction site. Thus, where these values have been higher than National Standard they are not related to the NNP1 Project activities.

Table 3-5: Physical and Chemical Parameters of Nam Ngiep Surface Water Quality Monitoring in March 2016

	Site Name	Nam Ngiep								
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	1/3/16	2/3/16	2/3/16	3/3/16	3/3/16	3/3/16	3/3/16	3/3/16	3/3/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.64	7.6	7.64	7.42	8.37	7.19	7.73	7.77	7.95
DO (%)		68.8	99.9	105.8	105.9	109.1	106	107.6	107.3	108.4
DO (mg/l)	>6.0	6.32	9.12	9.65	9.26	9.51	8.98	9.22	8.78	8.91
Conductivity (µs/cm)		107	102.9	104.3	100.6	99.3	101.5	94.1	97.2	99.3
TDS (mg/l)		53	51	52	50.3	48.5	51	47	46	47.1
Temperature (°C)		17.71	18.5	19	21.1	21.3	22.9	22.2	24.4	24.2
Turbidity (NTU)		6.76	9.3	5.67	8.86	6.36	7.08	5.72	7.39	9.75
TSS (mg/l)		12.3	11.0	8.6	7.6	5.9	8.1	6.9	12.0	8.8
BOD_5 (mg/l)	<1.5	1.6	ND[13]	ND[13]	1.2	ND[13]	ND[13]	1.3	1.0	ND[13]
COD (mg/l)	<5.0	ND[16]	ND[16]	7.6	ND[16]	ND[16]	ND[16]	8.8	ND[16]	ND[16]
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.07	0.06	0.04	0.04	0.05	0.03	0.03	0.03	0.02
Total Kjeldahl Nitrogen (mg/l)		ND[17]	ND[17]	ND[17]	ND[17]	ND[17]	ND[17]	ND[17]	ND[17]	ND[17]
Chloride (mg/l)		ND[6]	ND[6]	ND[6]	ND[6]	ND[6]	ND[6]	ND[6]	ND[6]	ND[6]
Sulphate (mg/l)	<500	2.1	3.6	2.1	2.9	3.5	3.2	3.0	2.8	2.8
Alkalinity (mg/l)		59.3	60.4	56.2	68.2	61.6	71.8	62.0	58.9	62.4
Lead (mg/l)	<0.05	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]
Arsenic (mg/l)	<0.01	0.0006	ND[2]	0.0003	0.0003	ND[2]	ND[2]	ND[2]	ND[2]	0.0003
Total Iron (mg/l)		0.428	0.460	0.409	0.328	0.328	0.398	0.319	0.415	0.328
Manganese (mg/l)	<1	0.042	0.026	ND[4]	ND[4]	ND[4]	0.026	ND[4]	0.032	ND[4]
Mercury (mg/l)	<0.002	0.0003	0.0003	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]
Calcium (mg/l)		9.80	8.68	8.51	8.89	8.51	8.59	8.01	9.99	7.69
Magnesium (mg/l)		2.17	1.90	1.82	1.81	1.81	1.86	1.72	2.18	1.71
Potassium (mg/l)		1.06	0.832	0.844	0.895	0.873	0.901	0.817	1.04	0.816
Sodium (mg/l)		2.02	1.91	2.01	2.08	2.02	2.02	1.88	2.48	1.91
Total coliform (MPN/100 ml)	<5,000		350	110	79	540	49	170	350	79
Faecal coliform (MPN/100 ml)	<1,000		46	110	49	130	49	170	21	49

ND[1] (<0.0005 mg/L) ND[2] (<0.0003 mg/L) ND[3] (<0.0002 mg/L) ND[4] (<0.005 mg/L) ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L) ND[7] (<0.07 mg/L) ND[8] (<0.04 mg/L) ND[9] (<0.02 mg/L) ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L) ND[12] (<0.2 mg/L) ND[13] (<1.0 mg/L) ND[14] (<1.5 mg/L) ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L) ND[17] (<2.7 mg/L)

Table 3-6: Physical Parameter Results of Nam Ngiep Surface Water Quality (Fortnightly Measured) in March 2016

	Site Name	Nam Ngiep River								
	Station code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	14/3/16	15/3/16	15/3/16	16/3/16	16/3/16	16/3/16	16/3/16	16/3/16	16/3/1
Parameters	Guideline									
pH	5.0 - 9.0	7.58	7.56	7.38	7.39	7.27	7.41	8.05	7.35	7.99
DO (%)		102.6	101.2	105.1	104.7	106.4	106	105.3	102.8	106
DO (mg/l)	>6.0	8.19	8.06	8.23	8.36	8.38	8.17	8.06	7.68	8.06
Conductivity (µs/cm)		93.6	92.9	98.3	89.2	91.9	88.8	89.3	89.9	93.5
TDS (mg/l)		46	46	54	45	45	44	45	45	46
Temperature (°C)		24.6	25.3	26.3	25.5	26.2	26.6	26.8	28.0	28.1
Turbidity (NTU)		28.7	25.1	42.8	17.3	16.8	15.3	15.8	17.7	13.1

Tributaries upstream the main dam: Nam Chiane (NCH01), Nam Phouan (NPH01)

Nam Chiane (NCH01) is located about 66 km upstream of the NNP1 Project construction site. The BOD_5 slightly exceeded the National Surface Water Quality Standard set at less than 1.5 mg/l with a value recorded as 2.4 mg/l.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The BOD_5 was higher than the Standard with a value recorded as 11.2 mg/l.

Tributaries downstream the main dam: Nam Xao (NXA01), Nam Houay Soup (NHS01)

Nam Xao has a confluence with Nam Ngiep River downstream of NNP1 Project construction footprint. All parameters monitored at the Nam Xao station (NXA01) complied with the National Surface Water Quality Standards.

Nam Houay Soup has a confluence with Nam Ngiep River downstream of NNP1 Project construction footprint. All parameters monitored for Nam Houay Soup station (NHS01) were within the National Surface Water Quality Standards. There were no construction activity at Houay Soup resettlement area located upstream of the monitoring station during this period. Therefore, the water quality of this site presents the ambient conditions.

Table 3-7: Results of Physical and Chemical Parameters of Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup in March 2016

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	01/03/16	02/03/16	03/03/16	03/03/16
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.49	7.56	7.81	8.25
DO (%)		78.6	103.8	107.6	99.4
DO (mg/l)	>6.0	7.65	9.78	8.87	8.84
Conductivity (µs/cm)		51	72.1	158.4	73.7
TDS (mg/l)		26	36	80	38
Temperature (°C)		14.78	17.3	24.2	20.3
Turbidity (NTU)		30.7	1.98	2.26	3.23
TSS (mg/l)		46.0	ND[16]	ND[16]	ND[16]
BOD_5 (mg/l)	<1.5	2.4	ND[13]	1.2	ND[13]
COD (mg/l)	<5.0	ND[16]	11.2	ND[16]	ND[16]
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.08	0.03	ND[9]	ND[9]

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	01/03/16	02/03/16	03/03/16	03/03/16
Parameters (Unit)	**Guideline**				
Total Kjeldahl Nitrogen (mg/l)		ND[17]	ND[17]	ND[17]	ND[17]
Chloride (mg/l)		ND[6]	ND[6]	6.4	4.9
Sulphate (mg/l)	<500	2.0	2.0	4.2	3.7
Alkalinity (mg/l)		33.9	57.3	83.1	46.8
Lead (mg/l)	<0.05	ND[10]	ND[10]	ND[10]	ND[10]
Arsenic (mg/l)	<0.01	0.0006	0.0003	ND[2]	ND[2]
Total Iron (mg/l)		1.52	0.132	0.258	0.510
Manganese (mg/l)	<1	0.044	ND[4]	0.04	0.029
Mercury (mg/l)	<0.002	ND[3]	0.0004	ND[3]	ND[3]
Magnesium (mg/l)		1.24	1.12	3.14	1.12
Calcium (mg/l)		4.20	7.60	12.3	6.40
Potassium (mg/l)		1.40	0.891	0.51	0.228
Sodium (mg/l)		2.09	2.16	4.26	2.07
Total coliform (MPN/100 ml)	<5,000	-	110	22	49
Faecal coliform (MPN/100 ml)	<1,000	-	46	6.8	13

ND[1] (<0.0005 mg/L) ND[2] (<0.0003 mg/L) ND[3] (<0.0002 mg/L) ND[4] (<0.005 mg/L) ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L) ND[7] (<0.07 mg/L) ND[8] (<0.04 mg/L) ND[9] (<0.02 mg/L) ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L) ND[12] (<0.2 mg/L) ND[13] (<1.0 mg/L) ND[14] (<1.5 mg/L) ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)

Table 3-8: Physical Parameters Results of Surface Water Quality – Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup (fortnightly measured) for March 2016

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	14/03/16	15/03/16	16/03/16	16/03/16
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.3	7.83	7.86	8.28
DO (%)		106.2	107.2	100.7	98.0
DO (mg/l	>6.0	8.58	8.68	7.52	7.57
Conductivity (µs/cm)		71.7	68.9	164.4	78
TDS (mg/l)		35	34	82	39
Temperature (°C)		23.9	24.4	29.2	27.2
Turbidity (NTU)		23.1	2.59	2.63	6.45

3.2.3 Groundwater Quality Monitoring

In March 2016, NNP1PC sampled and analysed the groundwater quality in 4 boreholes. Three are community boreholes at Ban Hatsaykham and one is a private well at Ban Hat Gniun (see Figure 3-6).

The results are presented in Table 3-9. The water from the boreholes in Ban Hatsaykham is used by 42 households for drinking, bathing, washing and domestic use purposes. The water from the well in Ban Hat Gnuin is used by 6 households for bathing and washing purposes.

All groundwater quality data are routinely reported to the Social Management Office who regularly communicate the results to the key NNP1 Project Villages' authorities and the local health centres as part of the Project's health programme.

Ban Hatsaykham

The pH levels for all three boreholes (GHSK01, GHSK02 & GHSK03) were 6.39, 6.26 and 6.11 respectively which were slightly lower than the National Groundwater Standard range of between 6.50 and 9.2. The instance of low pH will continue to be monitored. However, the levels recorded do not pose any risks to health. All of other parameters monitored complied with the standards.

Ban Hat Gnuin

The pH level was 5.86 which was slightly lower than the National Standard range of between 6.50 and 9.20. This does not pose any risks to health. All of other parameters monitored complied with the standards.

Figure 3-6: Groundwater Quality Monitoring Locations

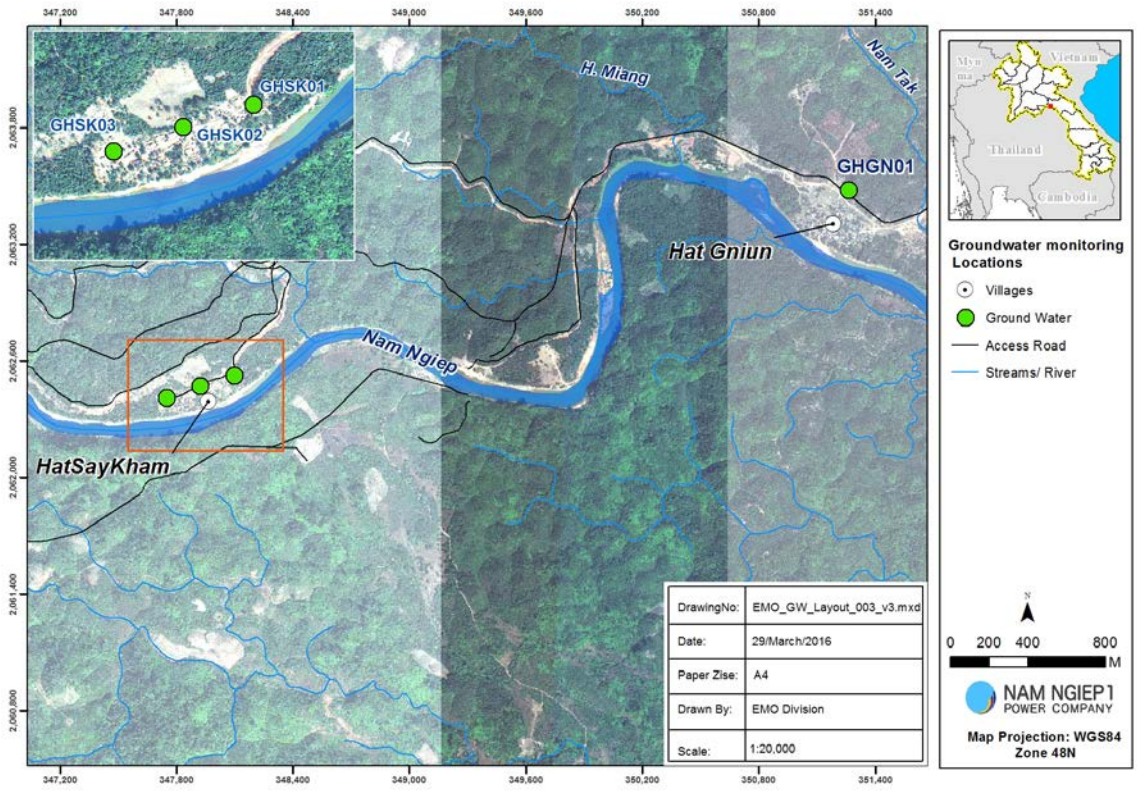


Table 3-9: Groundwater Quality Monitoring Results in March 2016

	Site Name	Ban Hatsaykham			Ban Hat Gnuin
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	01/03/16	01/03/16	01/03/16	01/03/16
Parameter (Unit)	Guideline				
pH	6.5-9.2	6.39	6.26	6.11	5.86
Sat. DO (%)		55.3	62.4	44.7	40.3
DO (mg/l)		4.48	4.98	3.58	3.3
Conductivity (µs/cm)		79.9	96.4	87.8	29.4
TDS (mg/l)	<1,200	39.95	48.2	43.9	14.7
Temperature (°C)		25	26.2	26	24.6
Turbidity (NTU)	<20	0.23	0.58	0.71	1.8
Total Hardness (mg/l)	<500	40.6	32.6	42.4	4.0

	Site Name	Ban Hatsaykham			Ban Hat Gnuin
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	01/03/16	01/03/16	01/03/16	01/03/16
Parameter (Unit)	Guideline				
Nitrite (mg/l)	<3	ND[6]	ND[6]	ND[6]	ND[6]
Nitrate (mg/l)	<45	2.51	4.06	1.19	3.53
Fluoride (mg/l)	<1	0.18	0.15	0.23	0.18
Sodium (mg/l)		0.561	0.409	0.435	1.89
Calcium (mg/l)		10.8	8.86	10.8	1.16
Magnesium (mg/l)		1.08	0.870	0.961	0.521
Potassium (mg/l)		0.175	0.271	0.295	1.09
Cadmium (mg/l)	<0.01	ND[4]	ND[4]	ND[4]	ND[4]
Manganese (mg/l)	<0.5	ND[4]	ND[4]	ND[4]	0.156
Arsenic (mg/l)	<0.05	ND[2]	ND[2]	ND[2]	ND[2]
Iron (mg/l)	<1	ND[10]	ND[10]	ND[10]	0.204
Faecal coliform (MPN/100 ml)	0	0	0	0	0
E.coli Bacteria (MPN/100 ml)	0	0	0	0	0

ND[1] (<0.0005 mg/L) ND[2] (<0.0003 mg/L) ND[3] (<0.0002 mg/L) ND[4] (<0.005 mg/L) ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L) ND[7] (<0.07 mg/L) ND[8] (<0.04 mg/L) ND[9] (<0.02 mg/L) ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L) ND[12] (<0.2 mg/L) ND[13] (<1.0 mg/L) ND[14] (<1.5 mg/L) ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L) ND[17] (<2.7 mg/L)

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring for GFWS system was conducted on a monthly basis with the aim to provide necessary recommendations to the users of possible impacts caused by bathing and washing. During March 2016, water samples were taken from water taps at Ban Hat Gnuin and Ban Thaheua.

Results of the assessment for GFWS of Ban Hat Gnuin and Ban Thaheua are shown in Table 3-10 and summarised as the following:

Ban Thahuea (WTHH02): All parameters complied with the National Drinking Water Standards.

Ban Hat Gnuin (WHGN02): All parameters complied with the National Drinking Water Standards.

Table 3-10: Results of the Gravity Fed Water Supply Quality Monitoring in March 2016

	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	01/03/16	01/03/16
Parameter (Unit)	Guideline		
pH	6.5-8.5	7.21	7.41
Sat. DO (%)		104.0	118.8
DO (mg/l)		8.44	9.89
Conductivity (µs/cm)	<1,000	63.9	148.5
TDS (mg/l)	<600	31.95	74.25
Temperature (°C)	<35	25.0	23.9
Turbidity (NTU)	<10	0.53	2.81
Color (Pt-Co)	<5	ND[16]	ND[16]
Nitrate (mg/l)	<50	0.22	0.17
Total Hardness (mg/l)	<300	35.2	45.0

	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	01/03/16	01/03/16
Parameter (Unit)	**Guideline**		
Nitrite (mg/l)	<3	ND[6]	ND[6]
Fluoride (mg/l)	<1.5	0.16	0.18
Magnesium (mg/l)		1.61	1.92
Arsenic (mg/l)	<0.05	ND[2]	ND[2]
Manganese (mg/l)	<0.5	ND[4]	ND[4]
Mercury (mg/l)	<0.001	ND[3]	ND[3]
Selenium (mg/l)	<0.01	ND[1]	ND[1]
Cadmium (mg/l)	<0.003	ND[5]	ND[5]
Lead (mg/l)	<0.01	ND[10]	ND[10]
Iron (mg/l)	<1	ND[10]	0.02
Faecal coliform	0	0	0
E. coli Bacteria	0	0	0

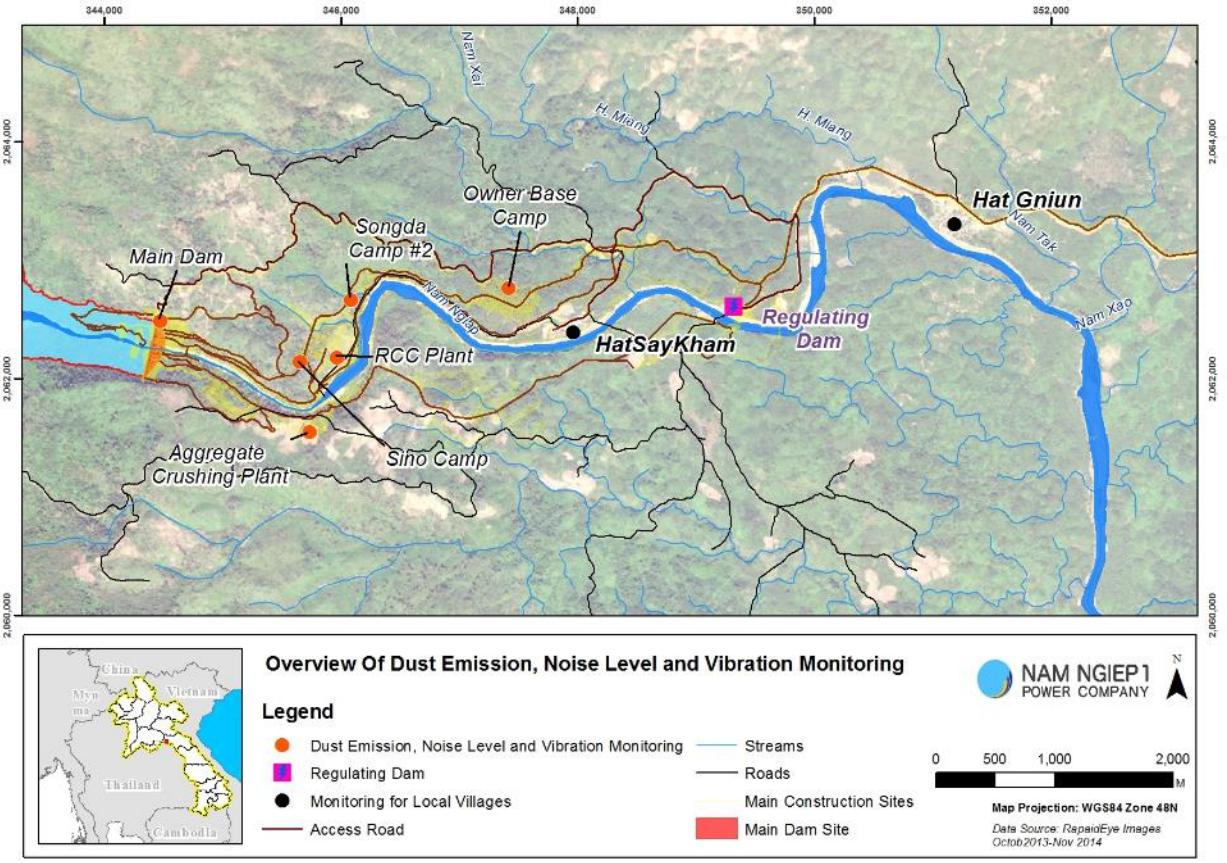
ND[1] (<0.0005 mg/L) ND[2] (<0.0003 mg/L) ND[3] (<0.0002 mg/L) ND[4] (<0.005 mg/L) ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L) ND[7] (<0.07 mg/L) ND[8] (<0.04 mg/L) ND[9] (<0.02 mg/L) ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L) ND[12] (<0.2 mg/L) ND[13] (<1.0 mg/L) ND[14] (<1.5 mg/L) ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L) ND[17] (<2.7 mg/L)

3.2.5 Dust Monitoring

During March 2016, the monitoring of particulate matter (PM10) was conducted over a period of 72 consecutive hours in Ban Hat Gnuin and Ban Hatsaykham. In addition, dust monitoring was conducted for 24 consecutive hours at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No.2 (to assess possible impact on worker's health) and Owner's Site Office and Village (to monitor the ambient dust levels).

The monitoring points are indicated on the map in Figure 3-7. All average dust emission results during the monitored period complied with the National Standard. These results are presented in Annex B.

Figure 3-7: Noise and Dust Emission Monitoring Locations



3.2.6 Noise Monitoring

During March 2016, noise monitoring was conducted in Ban Hatsaykham and Ban Hat Gnuin for at least 72 consecutive hours in each village. Noise monitoring was also conducted at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No.2 (to assess possible impact on worker's health) and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 of consecutive hours.

The recorded noise level data indicates full compliance with the National Standard for the period of 06:01-22:00 for all stations monitored. However, the noise level recorded during the period of 22:01-06:00 at Ban Hatsaykham (6-7 March 2016), the Aggregate Crushing Plant, Sino Hydro Camp and the Main Dam were slightly higher than the National Standard. With reference to the investigation on this matter conducted in February 2016, the key causes of high noise level is most likely the windy conditions during the night time period.

Results of the noise monitoring for March 2016 are shown in Annex C.

3.3 Construction Site Waste Management

3.3.1 Solid Waste Management at the Construction Site

In March 2016, NNP1PC signed the contract for the construction of the Project Landfill. The Detailed Works Programme (DWP) and Site Specific Environmental and Social Management and Monitoring Plan (SS-ESMMP) for the construction of the landfill were submitted to NNP1PC and are being reviewed by the NNP1PC. It is expected that the landfill construction will start in May 2016.

Uncompressed waste is still being stored in the temporary pits. A total of six temporary waste pits have been excavated at the proposed landfill site. Out of these, four have already been closed and back-filled

and two are still in use. One of the two active pits is designated for NNP1PC and another pit is for Contractors and Sub-contractors.

A consultation was held with the village chief and villagers to discuss the expansion of the food waste collection programme to other villagers. It was agreed that two more families will participate in the programme and collected food waste at the OBC, IHI and Obayashi Camps.

3.3.2 Hazardous Materials and Waste Management

On 04 March 2016, a hazardous waste and materials inventory was jointly undertaken at the main construction sites and sub-contractor camps including the TCM camps 1 and 2, Song Da 5 camps, Right Tunnelling workshop, Song Da 5 workshops, V&K camps, CVC plant, Sino-hydro camp and Song Da 5 CVC Plant, the latter now under decommissioning.

A hazardous material management audit was also conducted on 04 March 2016. It was observed that the conditions for the hazardous material management at RT Workshop, Song Da 5 workshop and Song Da 5 CVC Plant were not improved in terms of the facility condition and waste management. These issues will be followed up during the site inspection in April 2016. If the same issues are found, ONCs will be issued to the Contractor to improve the site condition. The EMO will continue to conduct the Hazardous Material Management Audit scheduled in the last week of April 2016.

3.4 Community Waste Management Support

3.4.1 Community Recycling Programme

Since July 2016, NNP1PC has provided administrative and management support to the operations of the Community Recycle Bank at Ban Hat Gnuin. By the end of March 2016, a total of 6,278 kg of recyclables have been sold to the Community Recycle Bank (see the table below). In addition, the number of villagers participating in this programme has increased constantly. By the end of March 2016, a total of 180 people (136 adults and 53 students) are holding accounts at the Recycle Bank. The percentages of household participation in the programme for each village are: Ban Hat Gniun 80%, Ban Hatsaykham 64% and Ban Thahuea 63%.

The types and amounts of waste recycled in March 2016 and in total are presented in Table 3-9.

Table 3-11: Types and amounts of waste traded in March 2016 and in total

Types of Waste	Unit	Amount Recycled In March 2016	Amount Recycled in total
Recyclable waste			
Glass	Kg	140	1,828
Scrap metal	Kg	357	1,976
Plastic bottle	Kg	77	1,048.5
Paper/cardboard	Kg	62	972.0
Aluminium/tin cans	Kg	123	453.2
Total	Kg	759	6,278
Hazardous waste			
Hydraulic/oil containers	Kg	0	11.5
Used batteries	Am	0	9

Photograph 1: Buying of recyclable waste from villagers Ban Thahuea

Photo 2: Buying of recyclable waste from villagers Ban Hatsaykham

The 5th waste management training was held during 15-17 March 2016 at three villages including Ban Hat Gniun, Ban Hatsaykham and Ban Thaheua. The purpose of this training is to explain about waste separation, the Community Recycle Bank operation, how to reduce the quantity of waste (reduce, reuse and recycle) and how to dispose of waste, types of waste that the community waste bank programme purchases and how to clean waste prior to selling it to the Community Recycle Bank. The amount of participants are presented in Table 3-10.

Table 3-12 Summary of the participants during the Waste Management Training

Date	Location	Total	Female
15 March 2016	Ban Hatsaykham	24	18
16 Machr 2016	Ban Thaheua	22	20
17 March 2016	Ban Hat Gniun	27	24
	Grand total	73	61

Picture 3: Waste management training at Ban ThahueaB

Picture 4: Waste management training at Ban Hatsaykham

3.4.2 Houay Soup Waste Management

In March 2016, the Houay Soup landfill design was finalised. The construction works is currently out to tender, and on 31 March 2016, NNP1PC arranged a site visit for the contractors bidding for the works. The deadline for submission of bids is 07 April 2016. It is expected that the landfill construction will start in May. EMO will follow up and support the Resettlement Infrastructure Team as required to complete the landfill construction.

3.5 Watershed Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations	Status by Mach 2016
Prepare a draft Watershed Management Plan by 31 July 2016	30% completed The outline and objectives of the WMP were discussed during the planning workshop with WMC-WMO in the third week of March 2016 Progress was made on data and information collection and analysis, particularly for baseline profiling including GIS layers and maps, and displays of socio economic and environmental data
Prepare draft Watershed Management Regulations by 31 July 2016	
Final Watershed Management Plan by 31 October 2016	
Final Watershed Management Regulations by 31 January 2017	

Activities in March 2016	Results
Planning workshop lead by NNP1 WMC-WMO in the third week of March 2016	• The draft WMP outline was discussed and agreed. • The objectives of the WMP shall be in line with National Socio-economic Development Plan , Project CA, MONRE Vision and strategy, Provincial Socio-economic Development Plans of Xaysomboun and Bolikhamxay Provinces and the Xaysomboun ISP • WMO and NNP1PC will initiate the formulation of the five year and first year annual plan together with engagement of a GOL consultant and NNP1PC Watershed Team Leader expected in April 2016
Data and information collection and analysis	• Progressing with baseline profiling based on the existing information including GIS layers and maps, and displays of socioeconomic and environmental data.

GOL Consultant procurement	• MONRE DFRM could not find any suitable candidates for GOL consultant through single source procurement so the open advertisement was made in late March 2016.
Watershed boundary survey	• Xaysomboun WMO completed the activities in Thathom Districts totalling 12 Villages and Bolikhamxay WMO completed the activity in 4 remaining villages at Bolikhan District. • GPS marking and agreement with concerned villages (close to the boundary) were documented to avoid any practices related to forest encroachment or further land conversion
Land use planning activity	• Xaysomboun WMO is in progress with land use planning in 2 villages of Thathom District and Bolikhamxay WMO is in progress the same exercise in the 5 villages of Bolikhan District. • Land zoning map highlighting agriculture, residential, forest, cultural, military, transport/route, and water resource are were produced through community mapping • The concerns on current land use and proposed area for future management were discussed and agreed with villages
WMO Office Construction • **1 WMO Office in XSB with the dimension of 12.20 m x 25 m** • **1 WMO Office in BLX with the dimension of 15 m x 20 m and repair of the coordination office in Pakxan District with the dimension of 8 m x 38.5 m**	• The committee for building construction in Xaysomboun conducted an evaluation of the contractor construction progress. It was estimated that the construction is 70% complete. • Bolikhamxay WMO office construction is estimated to be 80% complete while the repair of the coordination office is 50% complete.
WMC-WMO workshop	• Lessons learned from February progress reporting, concerned on timing and overall structure should be further improved for next reporting. • The next financial reporting should be based on the guideline of the Ministry of Finance No. 3518, dated 14 October 2014
Xaysomboun ISP	• The planning for Hom, Anouvong and Longxane Districts was completed in early March 2016 with key outcomes: - Compilation of existing environmental and social information at District level and the spatial identification of the potential and future District and Provincial Development Plans; - Rapid environmental and social assessment; - Working draft of a District ISP report. The working draft will be further developed by MONRE DEQP and Xaysomboun ISP technical committee

3.5.2 Biodiversity Offset Management

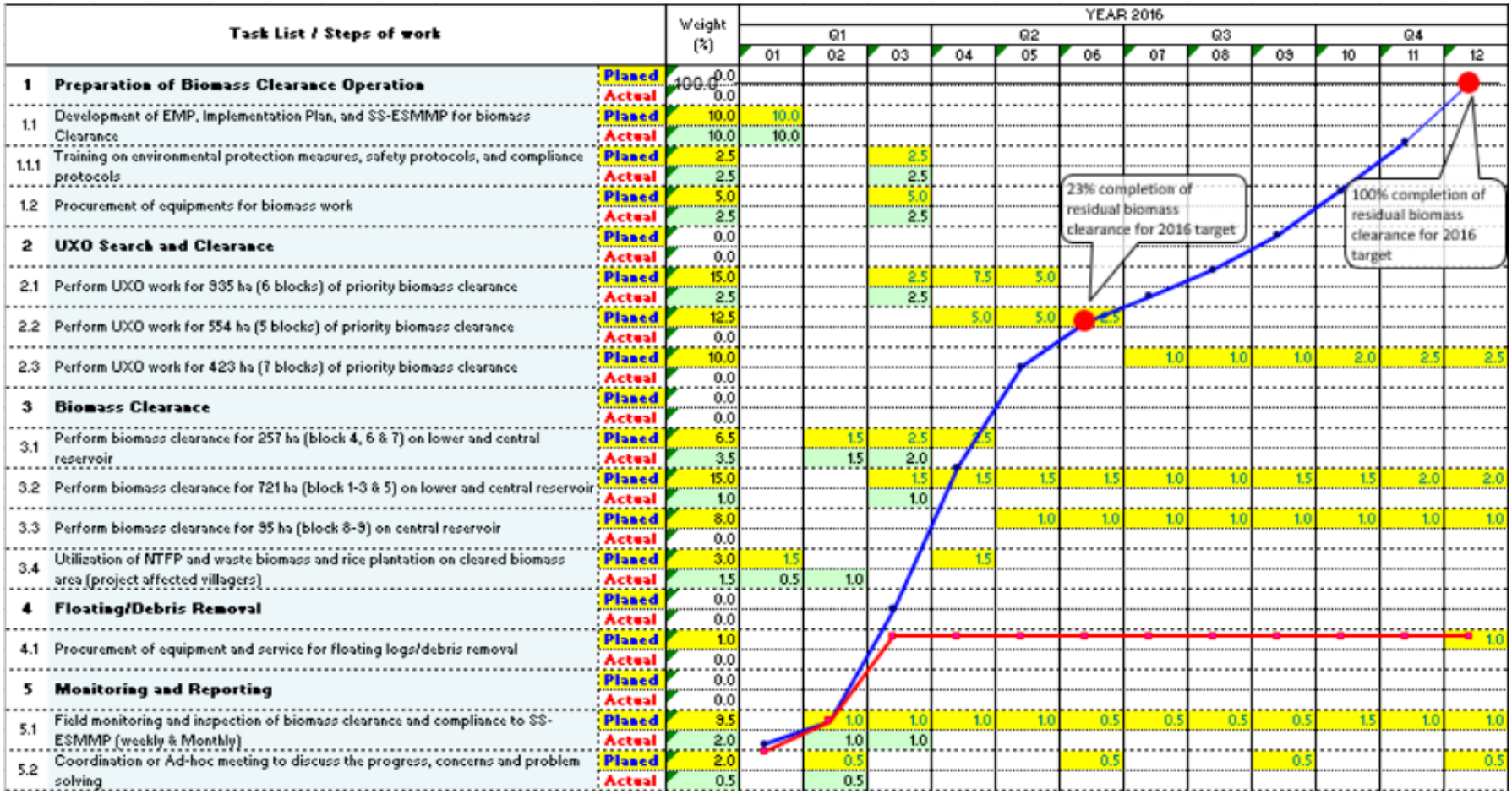
Obligations	Status by March 2016
Final Biodiversity Offset Survey Report by 30 June 2016	50% completed The field work for the ground truth survey at Nam Mouane Watershed area was commenced on 24 February 2016 and has been ongoing throughout March 2016. The inception report was submitted to NNP1PC in the third week of March 2016
Draft Offset Options Paper for the Biodiversity Offset Sites by 31 July 2016	
Consensus building and workshops among stakeholders for the offset site selection by 15 September 2016	
Final Offset Options Paper for the Biodiversity Offset Sites by 31 October 2016	

Activities in March 2016	Results
Ground truth survey	• The field work was completed on 07 March 2016 and comprised village interviews, reconnaissance walks and camera trap installations. The total of 96 cameras were installed in 2 priority camera trap blocks. • The inception report indicates that the area holds high biodiversity value such as the existing of certain endangered and vulnerable wildlife. • The first camera trap data retrieval is scheduled for 28 March – 6 April 2016 and this will be elaborated into the survey report

3.5.3 Biomass Clearance

The overall progress of biomass clearance programme is demonstrated in Figure 3-8 below.

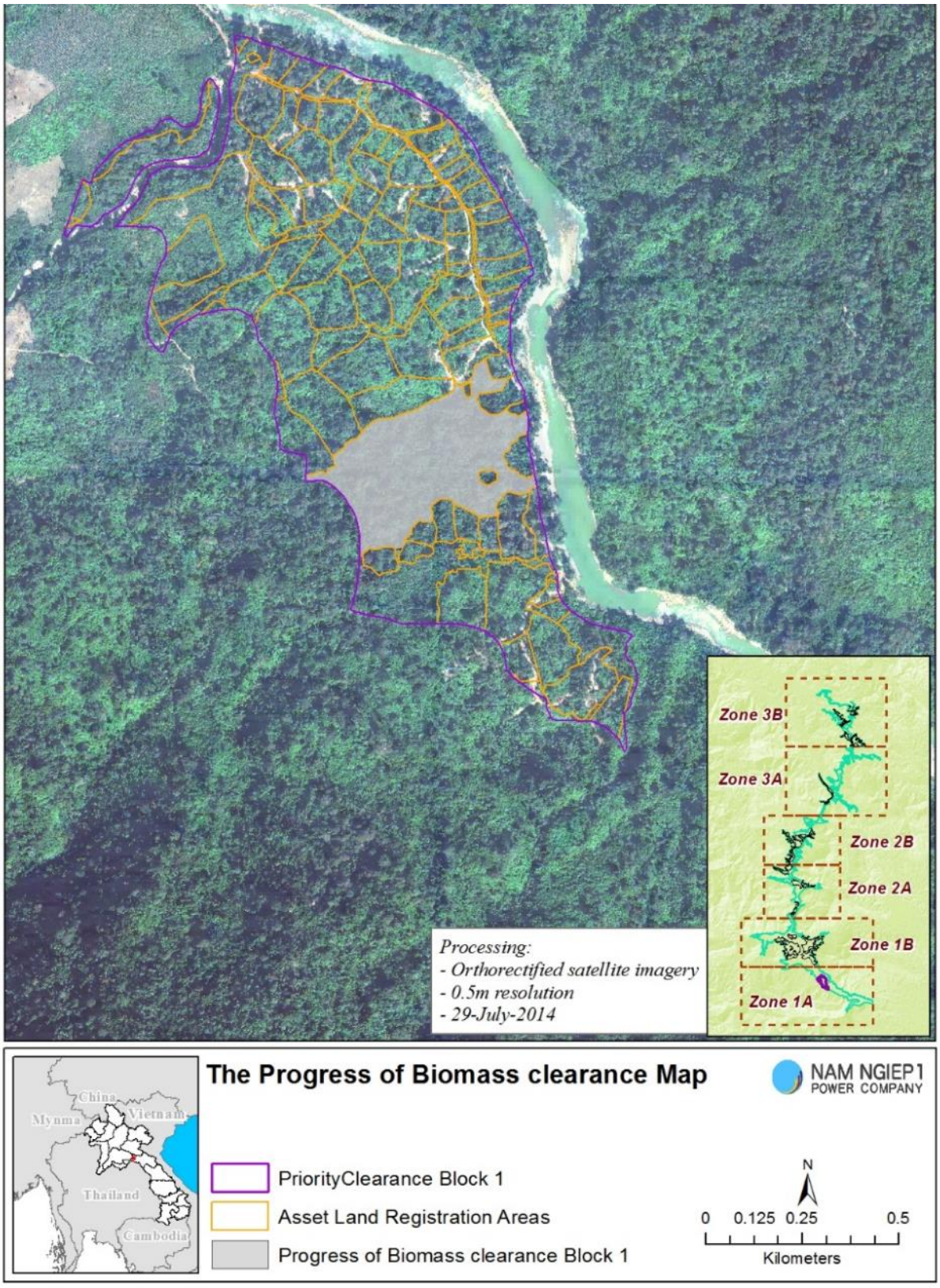
Figure 3-8: Gantt Chart of Biomass Clearance Programme in 2016



The blue graph and yellow highlight represent the planned activity, the red graph and green highlight represent the actual progress.

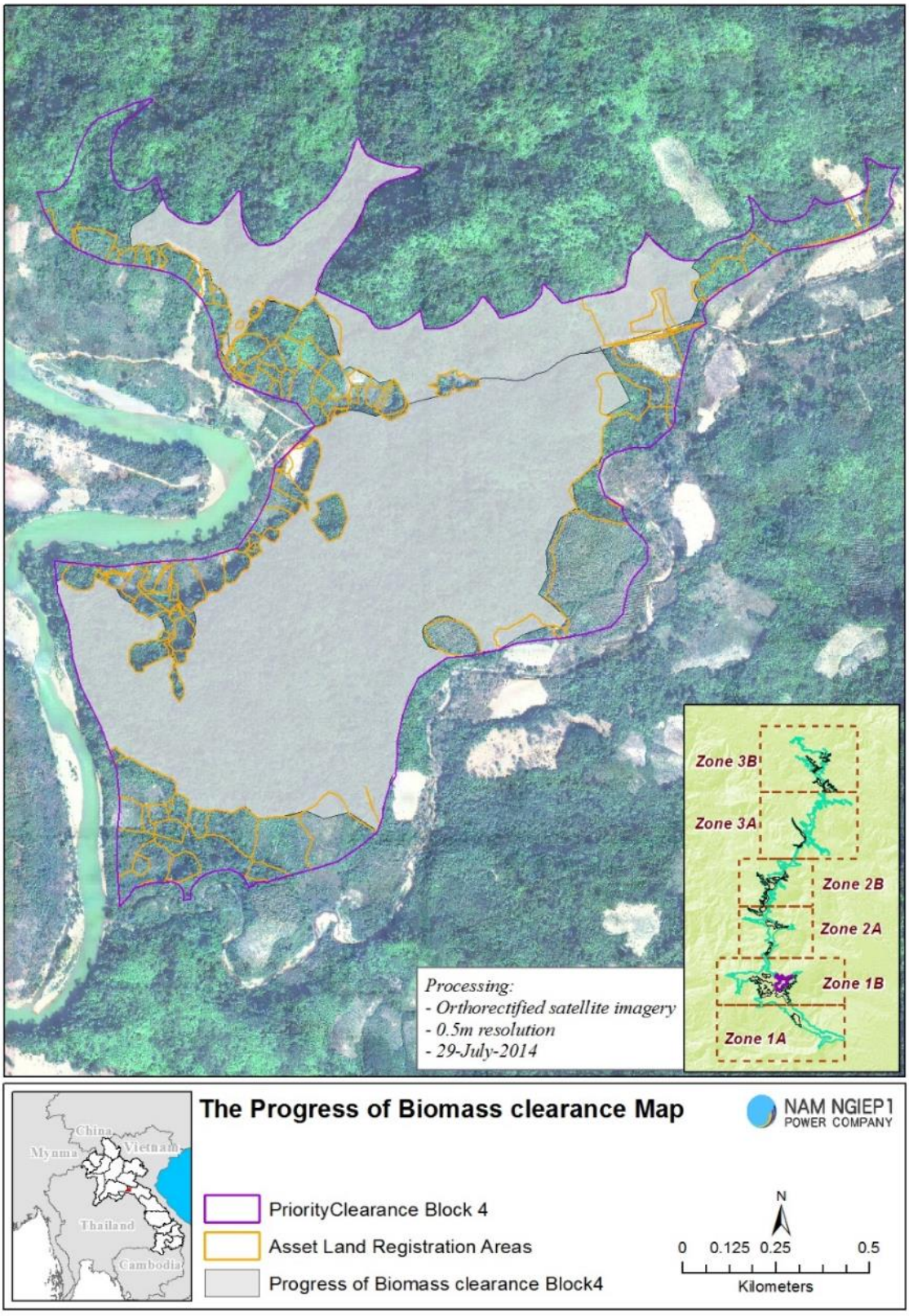
Activities in March 2016	Results
Labour recruitment	• Biomass Clearance Contractor-LAUNC has completed local labour recruitment in early March 2016 having labour agreement signed with 75 households totalling more than 100 people mostly from Ban Sop Youak in Hom District of Xaysomboun Province.
Induction/orientation on NNP1 Safety Procedure	• NNP1-EMO and NNP1-TD organized an induction/orientation on NNP1 Safety Procedures, Biomass Clearance Safety and NCR/ONC Protocols. • The participants in the event included two representatives from NNP1 EMU and WMO XSB, and 28 key staff and workers (including 21 villagers) of the Contractor.
Ground survey and demarcation of priority biomass clearance area	• Contractor has completed the ground surveys and demarcations in several target biomass clearance areas including Bocks 1, 4, 5, 6 and 7. • The survey in the remaining target areas (Blocks 2, 8 and 9) will be completed in April 2016.
Vegetation cutting and UXO search and clearance	• In order to avoid the complications with the compensation process, vegetation cutting was carried out and prioritized for Blocks 1, 4 and 5 totalling the area of around 633.78 ha. To date, vegetation cutting has been completed of in around 150 ha. The progress maps could be seen below. • In parallel with vegetation clearance, the UXO search and clearance has been carried out in Blocks 1 and 4. The first 100 ha is in process of QA/QC for issuance of certification.
Opportunity in the cleared biomass area	• To date, 75 households of Ban Sop Youak have stated their interest in doing crop cultivation in the areas cleared of biomass. It is expected that more households will state the same in coming weeks. • Further agreements on doing crop cultivation in the cleared biomass areas was reached with the Village Chief and will be communicated to the interested households. It is expected that the agreement could be signed by the household in April 2016.

Figure 3-9: Map showing the progress of biomass clearance in priority Block 1



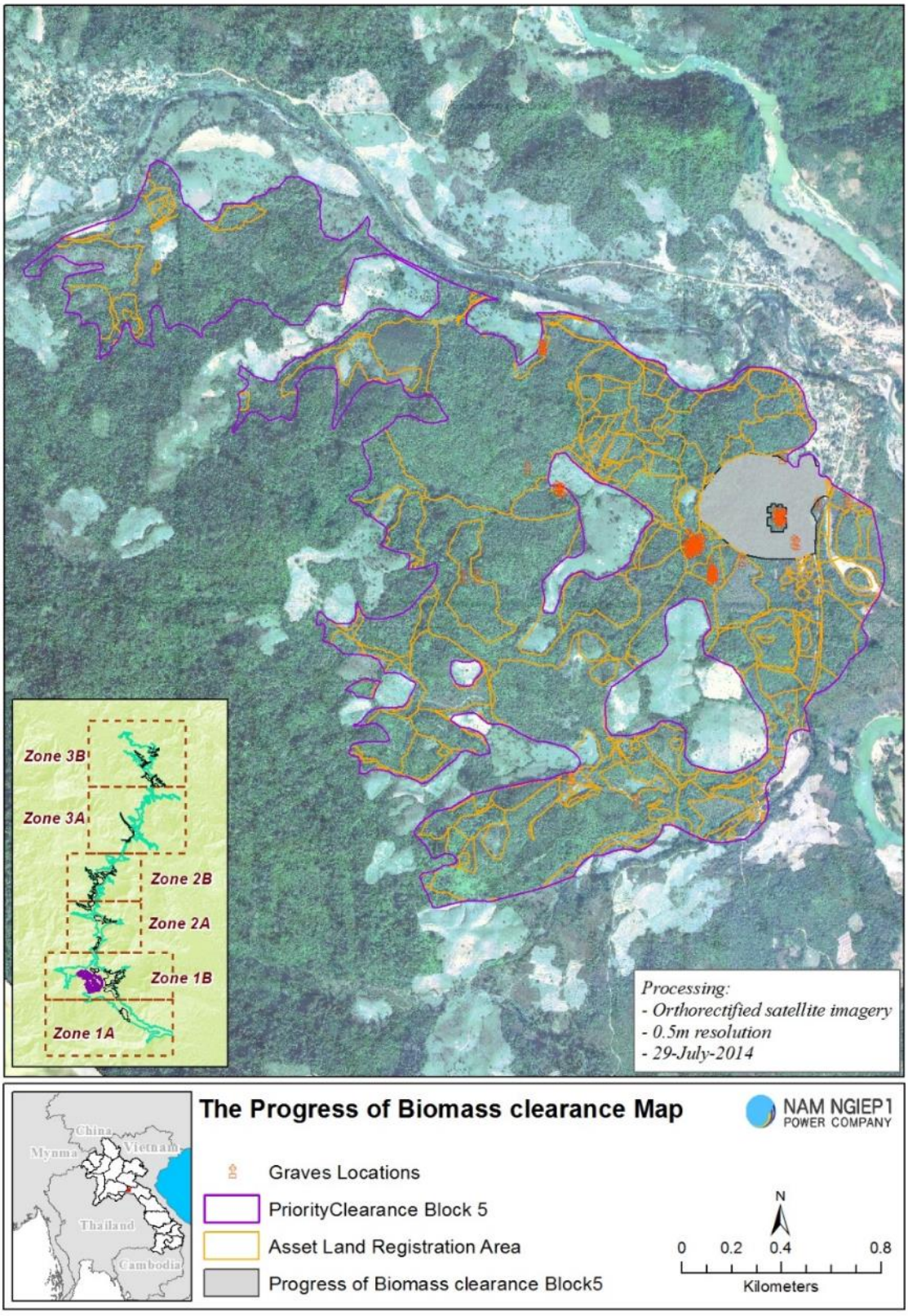
As of March 2016, the cleared area in Block 1 is around 30 ha out of target clearing of 115 ha.

Figure 3-10: Map showing the progress of biomass clearance in priority Block 4



As of March 2016, the cleared area in Block 4 is around 120 ha out of target clearing of 168 ha.

Figure 3-11: Map showing the progress of biomass clearance in priority Block 5



As of March 2016, the cleared area in Block 5 is around 20 ha out of target clearing of 351 ha.

3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

NNP1PC/EMO received for review the first sub-project proposal for EPF/NNP1 financing. It is to support the management of Houay Ngoua Provincial Protected Area. Another two proposals are expected from the Xaysomboun and Xieng Khuang Provinces.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

The meeting between EDL and NNP1PC held in February 2016 confirmed that Dongfang Company will complete the IEE in the third week of March 2016 and will provide NNP1PC with a copy in early April 2016. The DDA will be commenced once NNP1PC has received the IEE.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

EMO has a good progress on the Nabong sub-station DDA, a report is being finalized and will be submitted to ADB by the end of April 2016.

3.7 External Monitoring

3.7.1 Independent Monitoring Agency

The Independent Monitoring Agency (IMA) has been established in March 2016 by DESIA/MONRE, the first request for payment has been received and payment is being processed by NNP1PC.

3.7.2 Biodiversity Advisory Committee

BAC planned to conduct their third visit to proposed biodiversity offset area. The visit will be conducted during the first week of April to confirm and finding and report of the ground-truth survey.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

Table A- 1: Results of Camp Effluent in March 2016

	Site Name	Owner Site Office and Village	Obayashi Camp	TCM Camp	RT Camp	Sino Hydro Camp	Songda 5 Camp#1	Songda 5 Camp#2	HM Camp
	Station code	EF01	EF02	EF03	EF05	EF06	EF07	EF08	EF09
	Date	11/3/16	11/3/16	11/3/16	11/3/16	11/3/16	11/3/16	11/3/16	11/3/16
Parameters (Unit)	**Guideline**								
pH	6.0 - 9.0	7.19	7.95	8.6	9.15	7.06	6.79	7.9	7.78
Sat. DO (%)	-	26.3	29.1	137.8	22.9	35.5	27.4	20.3	94.5
DO (mg/L)	-	2.14	2.34	10.87	1.96	3.17	2.26	1.76	6.94
Conductivity (µs/cm)	-	475	980	207.8	252	589	671	851	463
TDS (mg/L)	-	237	490	104	127	294.5	336	426	232
Temperature (°C)	-	24.5	25.7	26.4	22.6	20.6	23.9	22.8	30.4
Turbidity (NTU)	-	0.72	19.6	4.85	28.9	19.9	13.2	38.2	49
TSS (mg/L)	<50	ND[16]	29.4	6.3	36	13.6	17.6	89.8	114
BOD5 (mg/L)	<30	6.6	120	5.6	25.2	7.7	40	256	28.2
COD (mg/L)	<125	15.6	208	16.7	91.5	31.7	114	329	99.6
NH_3-N (mg/L)	<10.0	9	37	ND[12]	3	10	10	35	3
Oil & Grease (mg/L)	<10.0	ND[13]	5	ND[13]	1	ND[13]	1	3	1
Manganese (mg/L)		0.428	ND[4]	ND[4]	0.176	0.114	0.14	0.12	0.133
Total Iron (mg/L)	<2.0	0.165	0.163	0.342	0.694	2.2	1.28	0.268	2.67
Total coliform (MPN/100ml)	<400	3,300	>160,000	7,900	35,000	540	>160,000	>160,000	1,400
Faecal Coliform (MPN/100ml)		2,400	>160,000	4,900	4,900	79	160,000	160,000	490
Discharge Volume (m3/day)		43	0	0	0	0	0	0	0

Table A- 2: Results of Construction Area Discharge in March 2016

	Site Name	Regulating Dam		Main Dam	
	Station Code	DS08		DS11	
	Date	04/03/16	16/03/16	04/03/16	16/03/16
Parameter (Unit)	**Guideline**				
pH	6.0 - 9.0	8.18	8.02	6.94	8.0
Sat. DO (%)		107.6	105.2	104.4	104.8
DO (mg/L)		8.63	8.30	8.81	8.49
Conductivity (µs/cm)		222	224	257	224
TDS (mg/L)		111	112	128	112
Temperature (°C)		25.4	26.2	22.5	24.7
Turbidity (NTU)		0.26	6.49	17.8	13.6
TSS (mg/L)	<50	ND[16]	ND[16]	50.0	32.9
Oil & Grease (mg/L)	<10	ND[13]	ND[13]	ND[13]	ND[13]
Discharge Volume (m^3/day)		100	172	6,000	6,000

ANNEX B: AMBIENT AIR QUALITY DATA

Table B- 1: 24 hour average dust concentrations measured in Ban Hat Gniun

Ban Hat Gniun - 24 Hour Average Particulate Matter (PM10) Concentrations			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	24/03/2016 12:35	25/03/2016 12:35	26/03/2016 12:35
End Time	25/03/2016 12:35	26/03/2016 12:35	27/03/2016 12:35
Average Data Recorded in 24h (mg/m^3)	0.07	0.03	0.05
Guideline Average in 24h (mg/m^3)	***0.12***	***0.12***	***0.12***

Figure B- 1: Dust Monitoring Results at Ban Hat Gnuin in March 2016

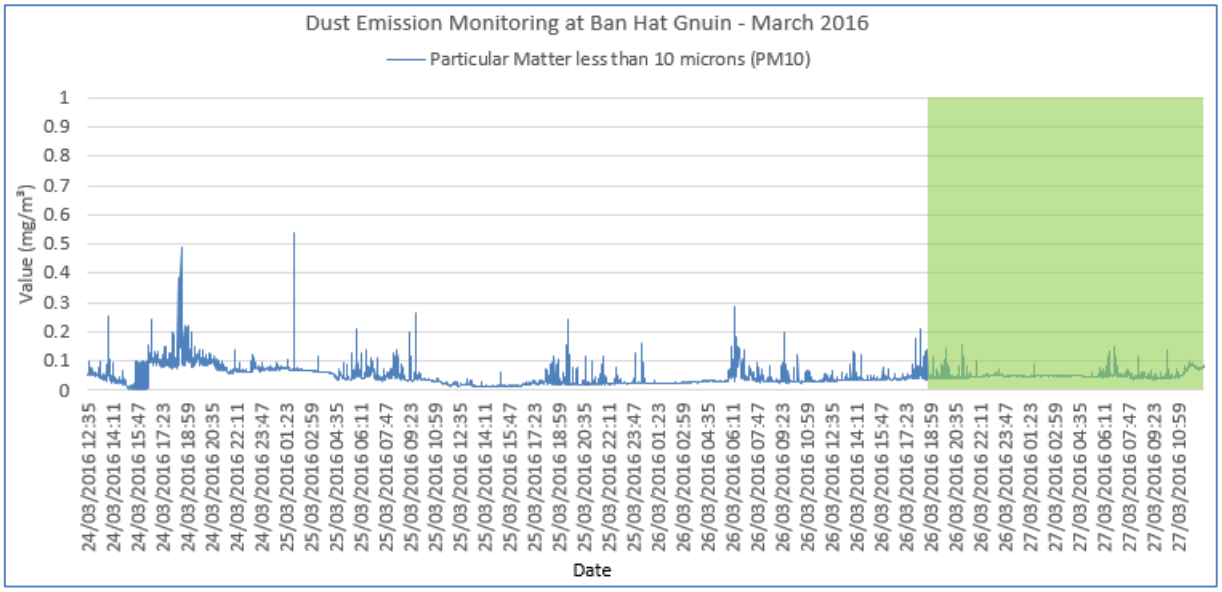


Table B- 2: 24 hour average dust concentration measured in Ban Hatsaykham

Ban Hatsaykham – 24 Hour Average Ambient Air Dust Concentrations			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	05/03/2016 10:39	06/03/2016 10:39	07/03/2016 10:39
End Time	06/03/2016 10:39	07/03/2016 10:39	08/03/2016 10:38
Average Data Recorded in 24h (mg/m^3)	0.05	0.07	0.09
Guideline Average in 24h (mg/m^3)	**0.12**	**0.12**	**0.12**

Figure B- 2: Dust Monitoring Results at Ban Hatsaykham March 2016

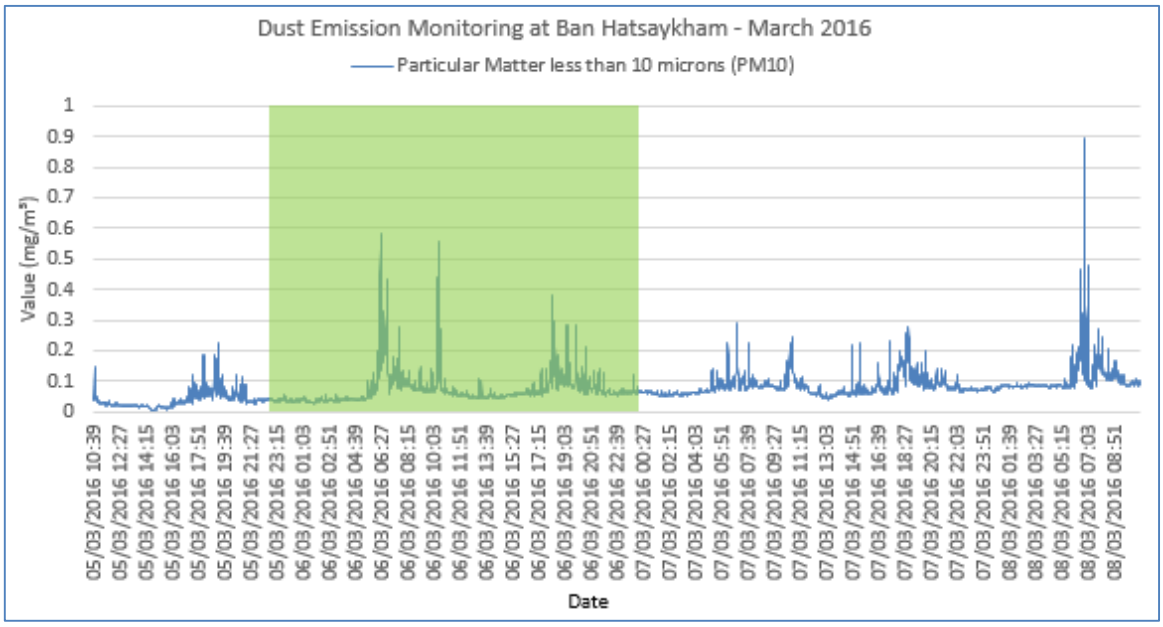


Figure B- 3: Dust Monitoring Results at Aggregate Crushing Plant in March 2016

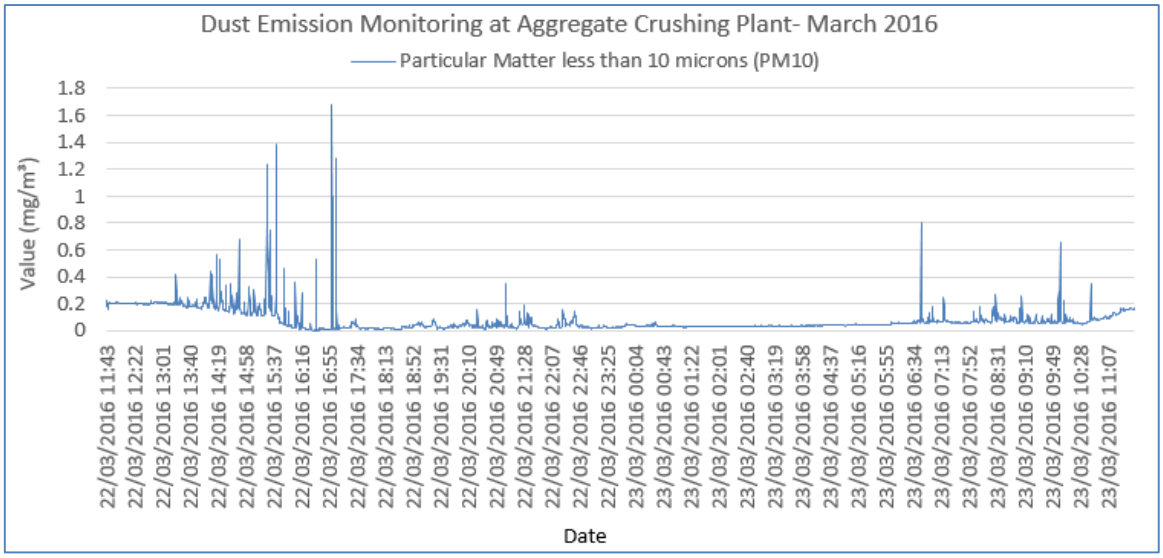


Figure B- 4: Dust Monitoring Results at RCC Plant in March 2016

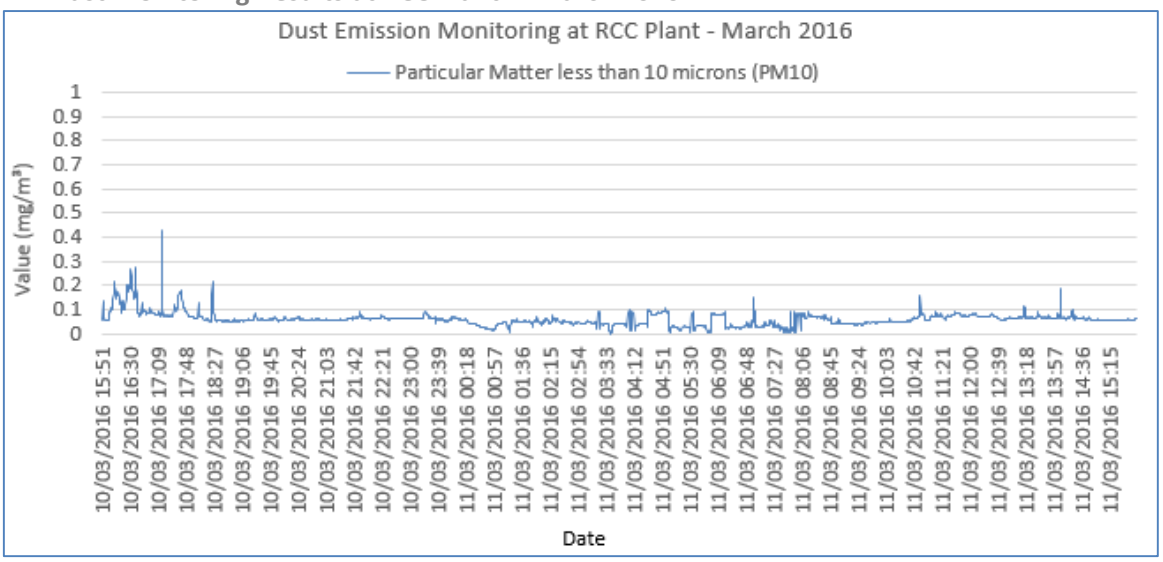


Figure B- 5: Dust Monitoring Results at Songda5 Camp#2 in March 2016

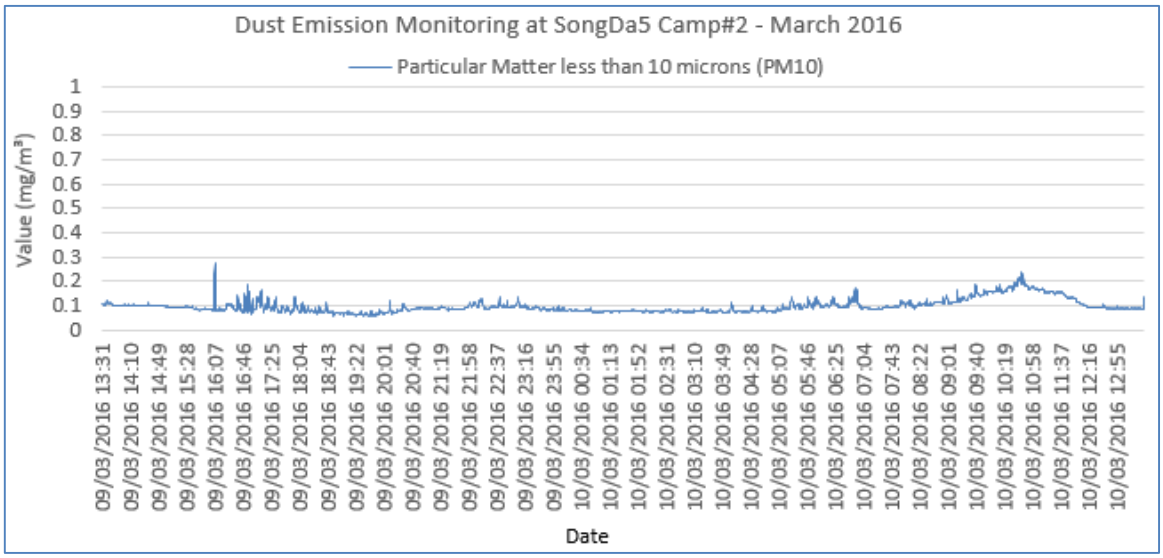


Figure B- 6: Dust Monitoring Results at Sino Hydro Camp in March 2016

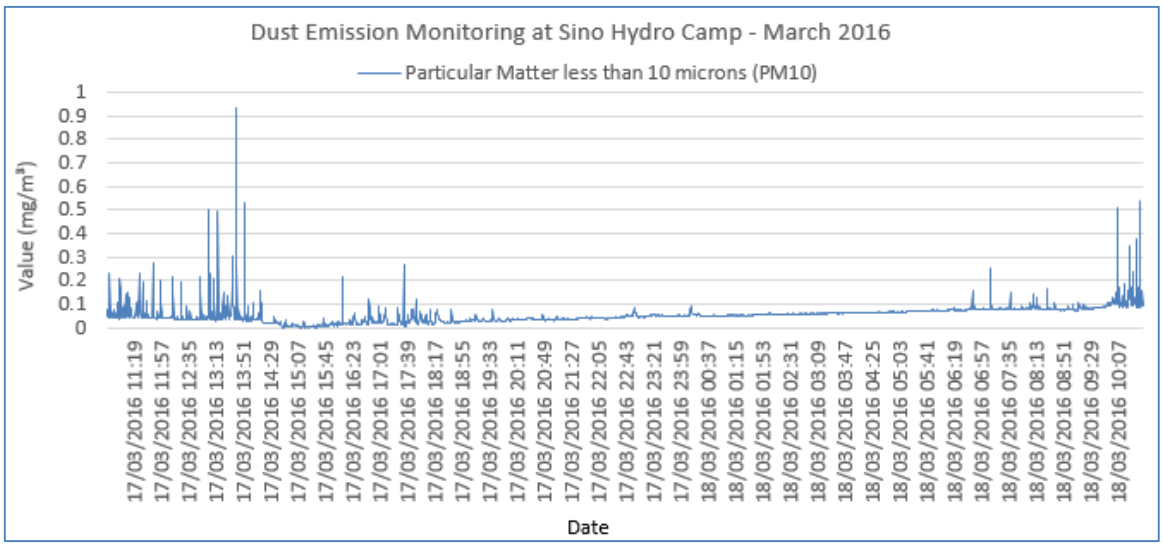


Figure B- 7: Dust Monitoring Results at Owner's Site Office and Village in March 2016

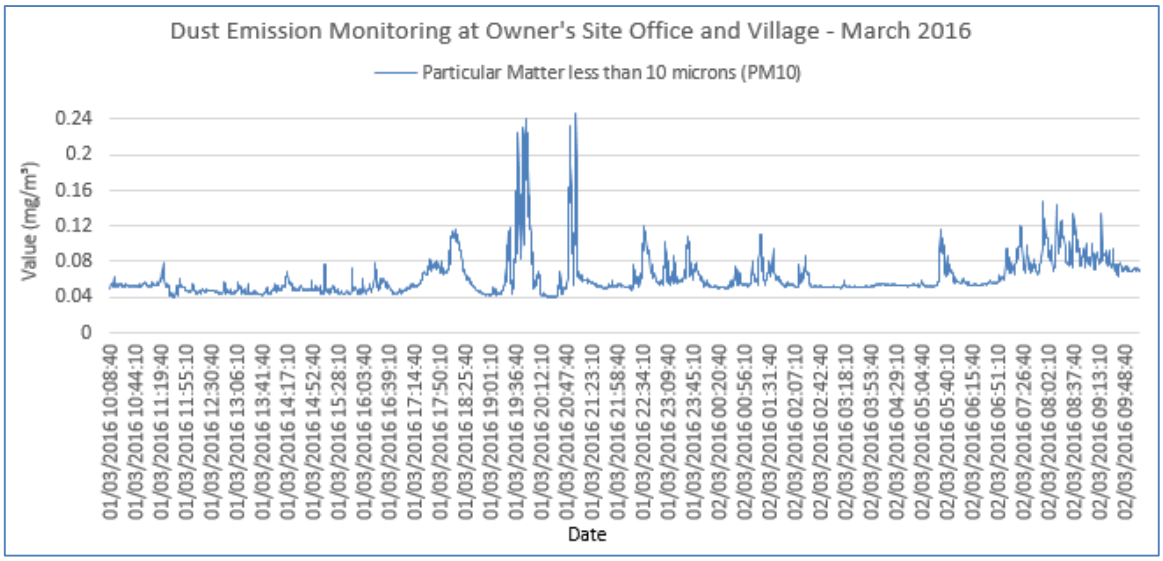
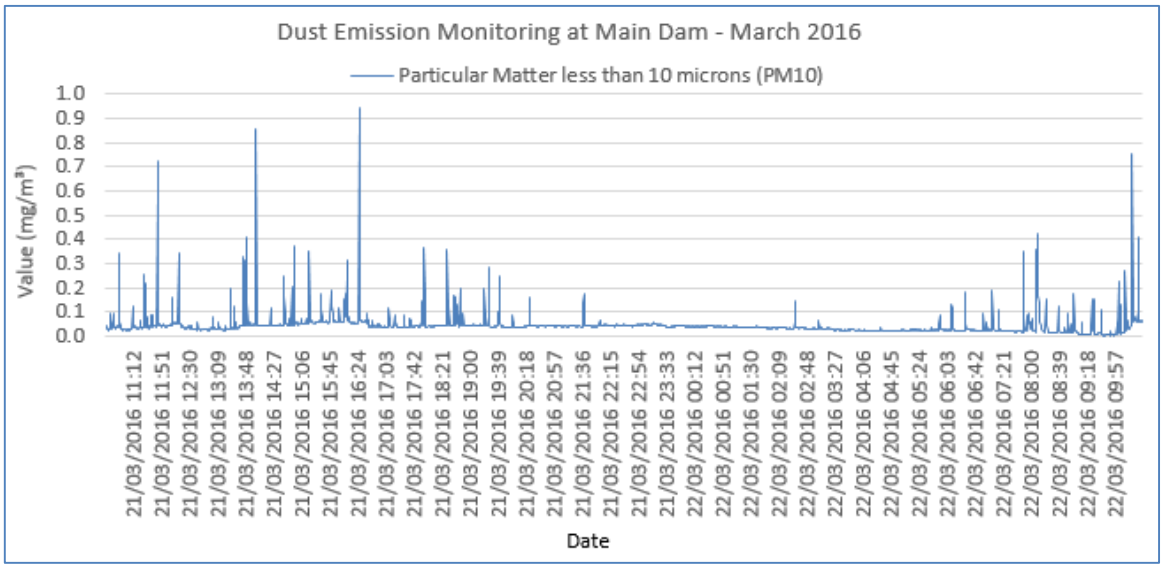


Figure B- 8*: *Dust Monitoring Results at Main Dam in March 2016



ANNEX C: AMBIENT NOISE DATA

Table C- 1: Average Results of Noise Monitoring at Ban Hat Gnuin in March 2016

Noise Level (dB)	24-25/03/2016			25-26/03/2016			26-27/03/2016			27/03/2016
	12:49-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 12:49
Data Record Max	75.3	73	71.3	84	73.2	74.9	75.7	75.3	64.2	71.8
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Data Record Average	47.40	47.11	42.48	54.75	53.00	41.44	48.43	49.45	42.35	48.14
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

Figure C- 1: Results of Noise Level Monitoring at Ban Gnuin in March 2016

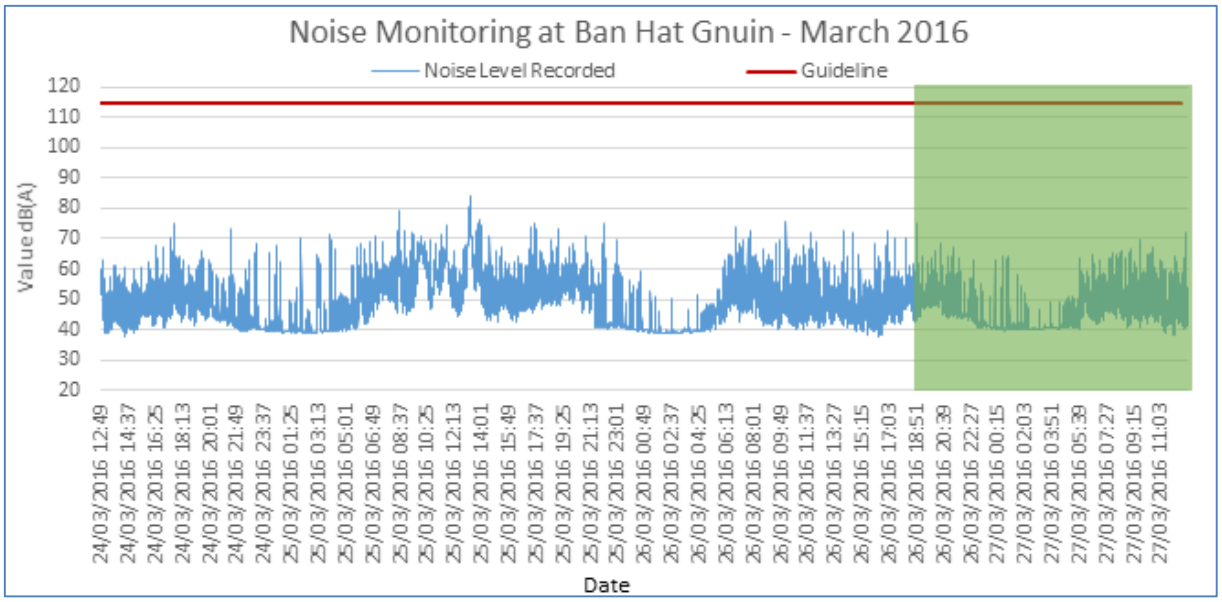


Table C- 2: Noise Monitoring Average Results at Ban Hatsaykham in March 2016

Noise Level (dB)	05-06/03/2016			06-07/03/2016			07-08/03/2016			08/03/2016
	10:50-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 10:50
Data Record Max	74.4	68.5	57.7	90	77.2	74.1	73.4	64	80.8	67.5
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Data Record Average	41.83	46.43	43.86	45.34	45.89	45.22	44.53	45.22	44.57	46.83
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

Figure C- 2: Results of Noise Level Monitoring at Ban Hatsaykham in March 2016

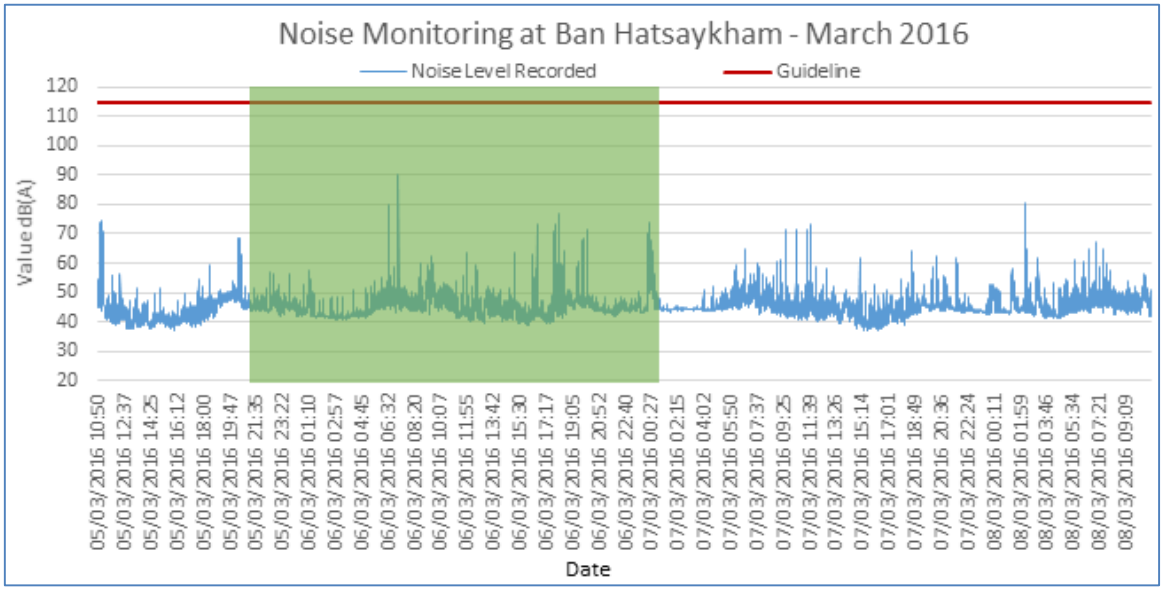


Table C- 3 and *Table C- 4*: *Average Results of Noise Monitoring at Aggregate Crushing Plant and RCC Plant in March 2016*

Aggregate Crushing Plant

Noise Level (dB)	22-23/03/2016		23/03/2016
	11:53 – 22:00	22:01 – 06:00	06:01-11:53
Data Record Max	85.8	67.8	79.1
Guideline Max	***115***	***115***	***115***
Data Record Average	58.37	52.54	55.26
Guideline Averaged	***70***	***50***	***70***

RCC Plant

Noise Level (dB)	10-11/03/2016		11/03/2016
	16:06 – 22:00	22:01 – 06:00	06:01-16:02
Data Record Max	67.7	62.1	76.3
Guideline Max	***115***	***115***	***115***
Data Record Average	49.49	48.39	58.74
Guideline Averaged	***70***	***50***	***70***

Figure C- 3: *Results of Noise Level Monitoring at Aggregate Crushing Plant in March 2016*

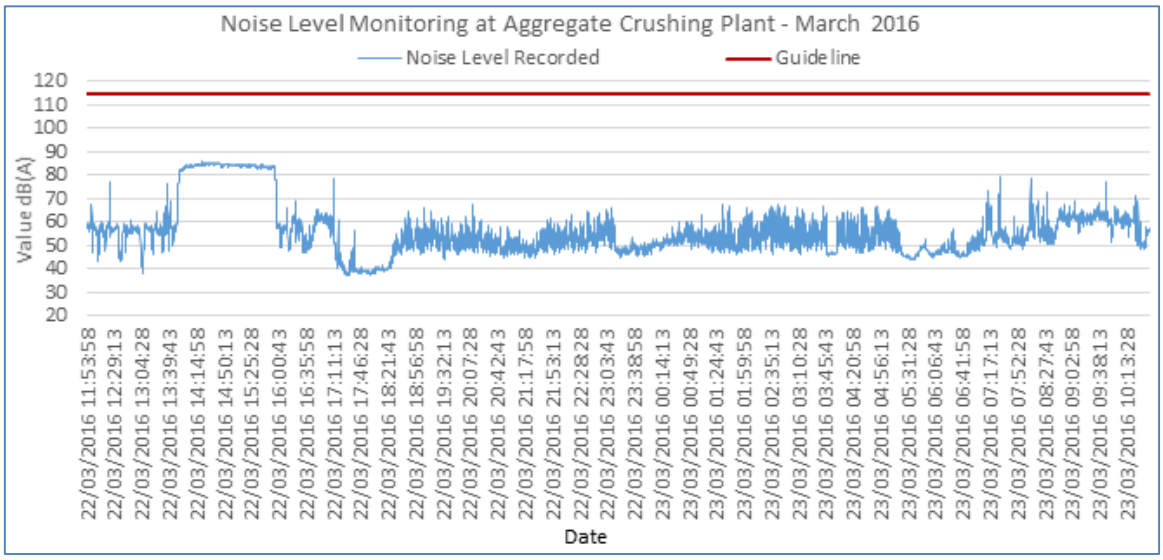


Figure C- 4: *Results of Noise Level Monitoring at RCC Plant in March 2016*

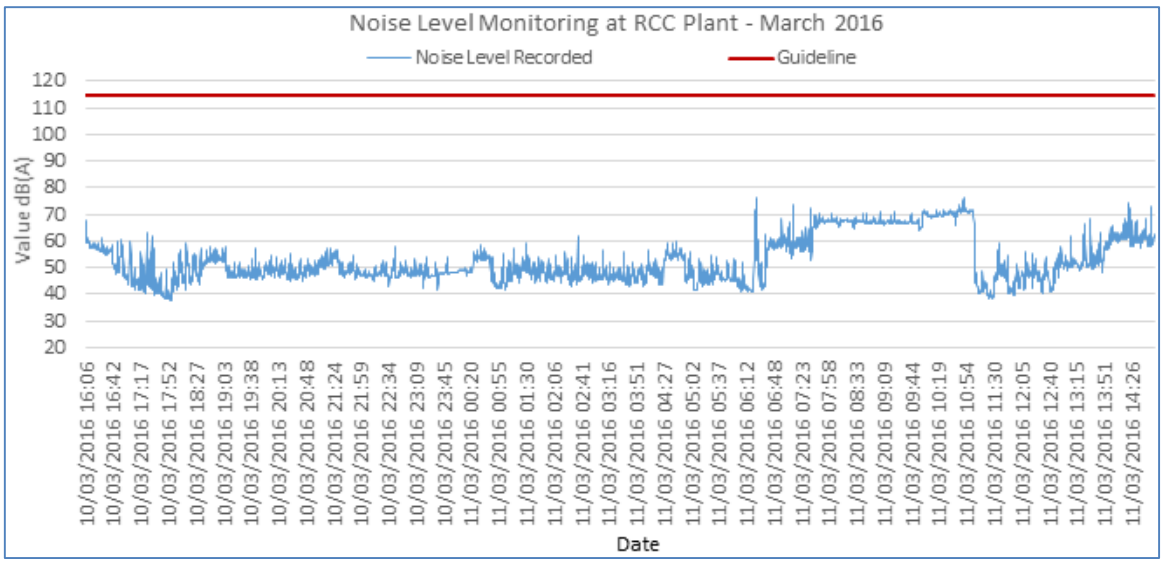


Table C- 5 and *Table C- 6*: *Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in March 2016*

Song Da 5 Camp No.2

Noise Level (dB)	09-10/03/2016		10/03/2016
	13:50 – 22:00	22:01 – 06:00	06:01-13:50
Data Record Max	67.6	70.8	70.2
Guideline Max	***115***	***115***	***115***
Data Record Average	49.57	48.85	49.35
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Camp

Noise Level (dB)	17-18/03/2016		18/03/2016
	10:50 – 22:00	22:01 – 06:00	06:01-10:50
Data Record Max	69.9	73.6	76.9
Guideline Max	***115***	***115***	***115***
Data Record Average	48.98	55.25	59.52
Guideline Averaged	***70***	***50***	***70***

Figure C- 5: *Results of Noise Level Monitoring at Song Da 5 Camp No.2 in March 2016*

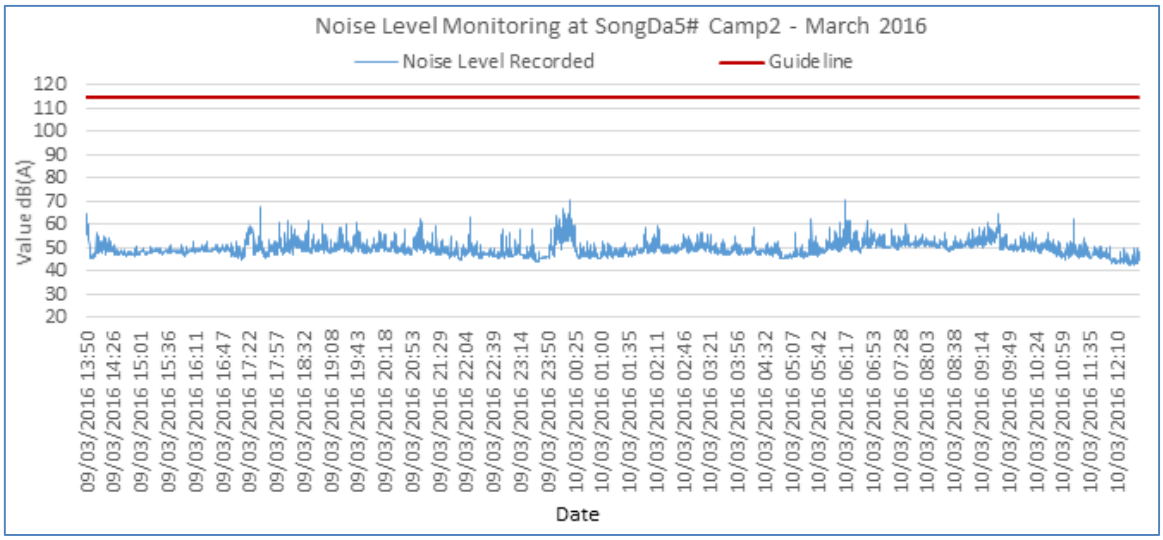


Figure C- 6: *Results of Noise Level Monitoring at Sino Hydro Camp in March 2016*

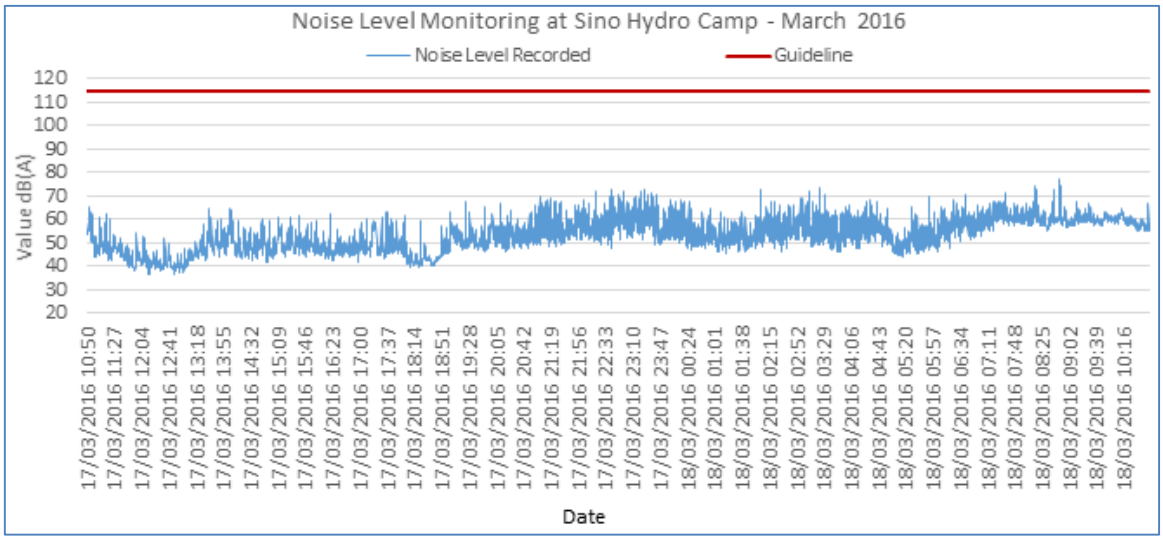


Table C- 7 and *Table C- 8*: Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in March 2016

Owner's Site Office and Village

Noise Level (dB)	01-02/03/2016		02/03/2016
	10:09 – 22:00	22:01 – 06:00	06:01-10:09
Data Record Max	67.7	46	74.9
Guideline Max	***115***	***115***	***115***
Data Record Average	39.04	41.85	41.77
Guideline Averaged	***70***	***50***	***70***

Main Dam

Noise Level (dB)	21-22/03/2016		22/03/2016
	10:35 – 22:00	22:01 – 06:00	06:01-10:35
Data Record Max	63.3	68.7	65.7
Guideline Max	***115***	***115***	***115***
Data Record Average	45.50	52.02	51.08
Guideline Averaged	***70***	***50***	***70***

Figure C- 7: *Results of Noise Level Monitoring at Owner's Site Office and Village in March 2016*

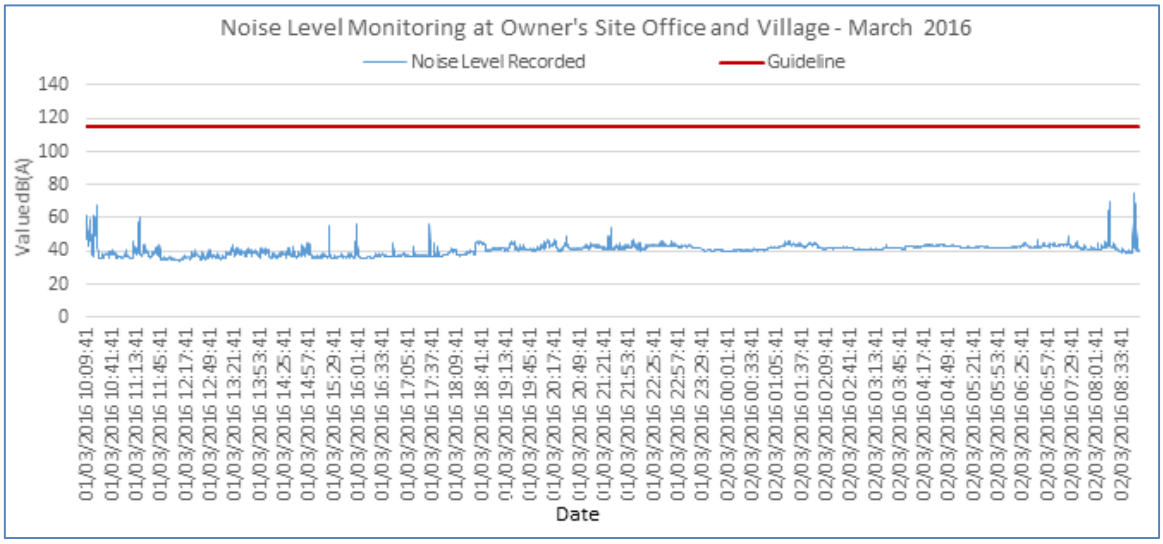
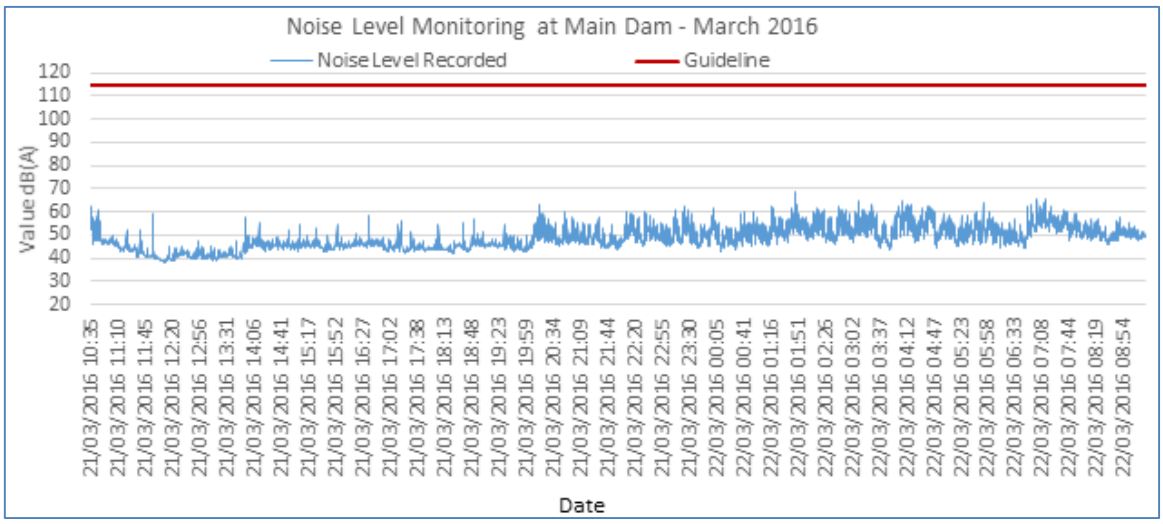


Figure C- 8: *Results of Noise Level Monitoring at Main Dam in March 2016*



ANNEX D: MAPS FOR WATERSHED BOUNDARY DEMARCATION ACTIVITY IN XAYSOMBOUN PROVINCE

Figure D- 1: Maps showing the surveyed villages (in circle) and target location for watershed boundary demarcation in Hom District, Xaysomboun Province

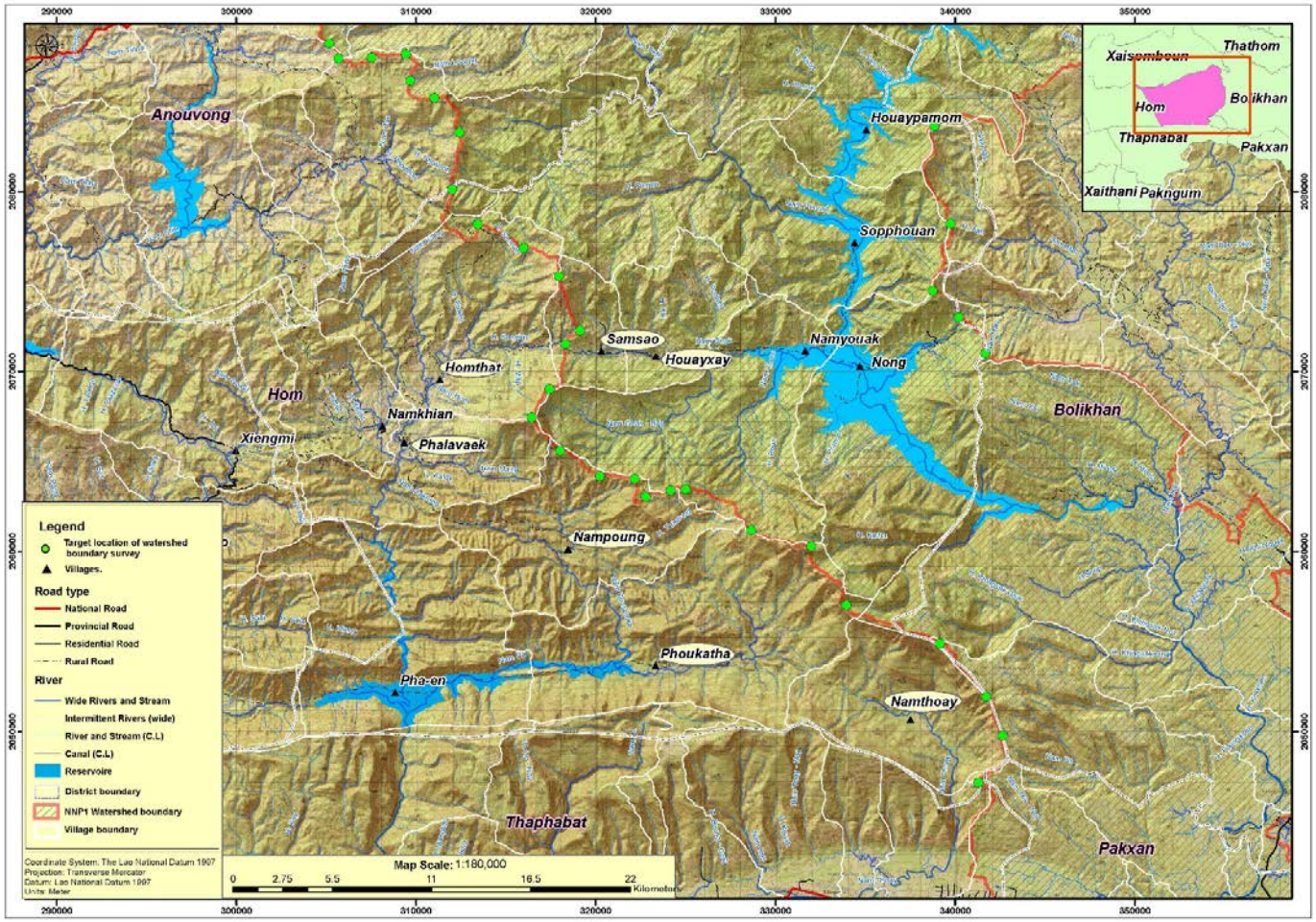


Figure D- 2: Map showing the surveyed villages (in circle) and target location for watershed boundary demarcation at Anouvong District, Xaysomboun Province

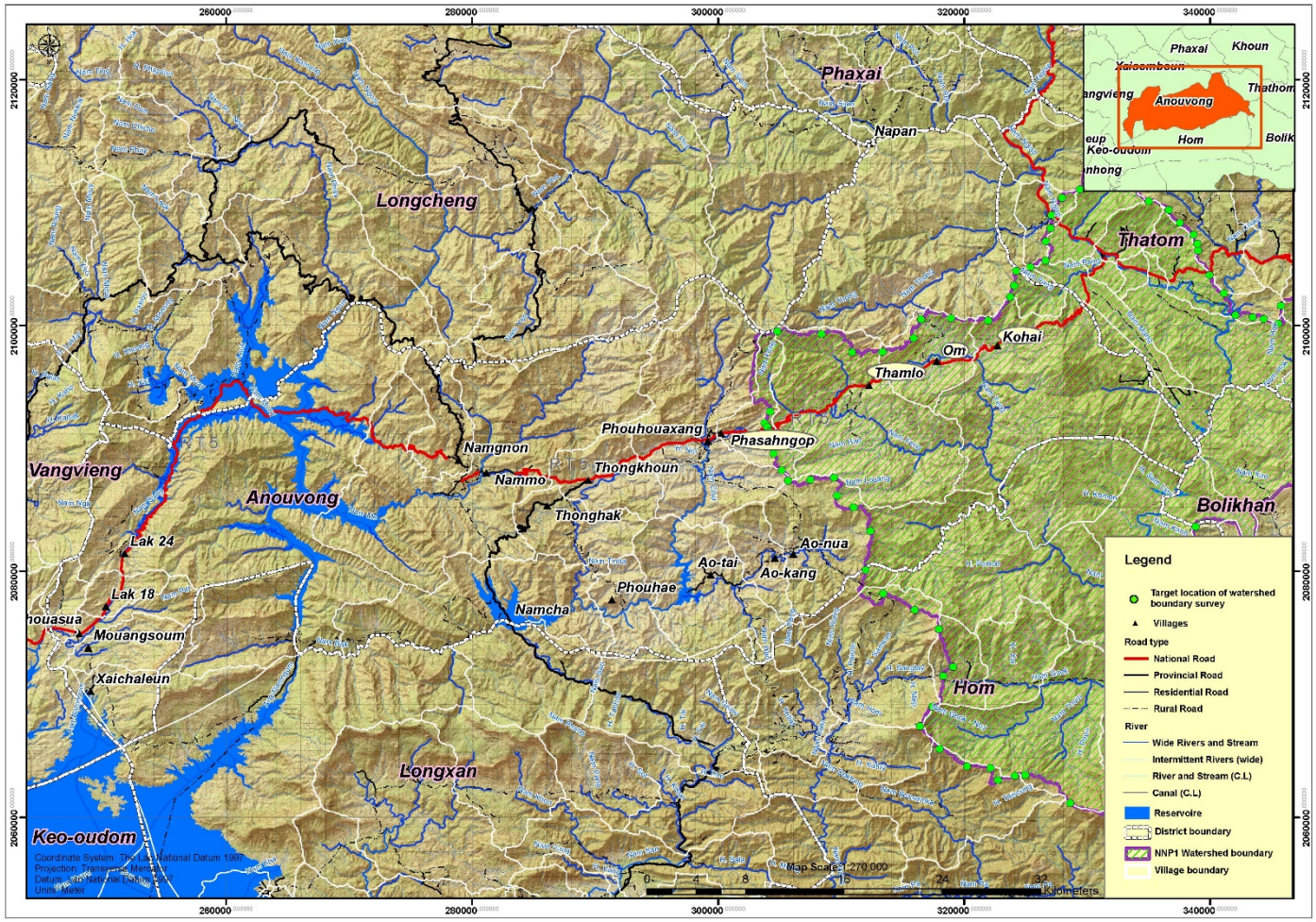


Figure D- 3: Map showing the surveyed villages (in circle) and target location for watershed boundary demarcation at Thathom District, Xaysomboun Province