

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

January 2017

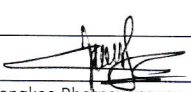
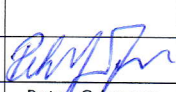
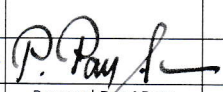
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TABLE OF CONTENTS

EXECUTIVE SUMMARY	- 7 -
1. INTRODUCTION	- 9 -
2. WORK PROGRESS OF PRINCIPAL CONTRACTORS	- 9 -
2.1 Civil Work	- 10 -
2.1.1 Main dam and power house	- 10 -
2.1.2 Re-regulation dam and powerhouse	- 11 -
2.1.3 Temporary work facility	- 12 -
2.2 Electrical and Mechanical Works	- 13 -
2.3 Hydro-Mechanical Works	- 13 -
2.4 230kV Transmission Line Works	- 13 -
3. ENVIRONMENTAL MANAGEMENT MONITORING	- 15 -
3.1 Compliance Management	- 15 -
3.1.1 ESMMP-CP Update 2016	- 15 -
3.1.2 Site Specific Environmental and Social Management and Monitoring Plans	- 15 -
3.1.3 Compliance Report	- 17 -
3.1.4 Inspection by Environmental Monitoring Units	- 27 -
3.2 Environmental Quality Monitoring	- 28 -
3.2.1 Effluent Discharge from Camps and Construction Sites	- 28 -
3.2.2 Ambient Surface Water Quality Monitoring	- 32 -
3.2.3 Groundwater Quality Monitoring	- 37 -
3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring	- 39 -
3.2.5 Landfill Leachate Monitoring	- 40 -
3.2.6 Dust Monitoring	- 41 -
3.2.7 Noise Monitoring	- 41 -
3.3 PROJECT WASTE MANAGEMENT	- 42 -
3.3.1 Solid Waste Management	- 42 -
3.3.2 Hazardous Materials and Waste Management	- 43 -
3.4 Community Waste Management	- 46 -
3.4.1 Community Recycling Programme	- 46 -
3.4.2 Houay Soup Resettlement Area Waste Management	- 47 -
3.5 Watershed and Biodiversity Management	- 48 -
3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan	- 48 -

3.5.2	Biodiversity Offset Management	- 50 -
3.5.3	Biomass Clearance	- 51 -
3.5.4	Fishery Monitoring	- 58 -
3.6	Other Obligations and Support Programmes	- 61 -
3.6.1	Environmental Protection Fund (EPF)	- 61 -
3.6.2	115 kV Transmission Line IEE Due Diligence Assessment	- 62 -
3.6.3	Nabong Substation Upgrade Due Diligence Assessment	- 62 -
3.7	External Monitoring	- 62 -
3.7.1	Independent Monitoring Agency	- 62 -
3.7.2	Biodiversity Advisory Committee	- 62 -
ANNEX A: RESULTS OF EFFLUENT ANALYSES		- 64 -
ANNEX B: AMBIENT DUST QUALITY		- 68 -
ANNEX C: AMBIENT NOISE DATA		- 71 -

BBREVIATIONS / ACRONYMS

AIP	Annual Implementation Plan
ADB	Asian Development Bank
BBS	Biodiversity Baseline Survey
BAC	Biodiversity Advisory Committee
BOF	Biodiversity Offset Framework
BOMC	Biodiversity Offset Management Committee
BOMP	Biodiversity Offset Management Plan
CA	Concession Agreement between the NNP1PC and GOL,
CAP	Corrective Action Plan
COD	Commercial Operation Date
CVC	Conventional Vibrated Concrete
CWC	Civil Works Contract
CTA	Common Terms Agreement
DEB	Department of Energy Business, MEM
DEPP	Department of Energy Policy and Planning, MEM
DEQP	Department of Environment and Quality Promotion, MONRE
DESIA	Department of Environmental and Social Impact Assessment, MONRE
DFRM	Department of Forest Resources Management, MONRE
DLA	Department of Land Administration, MONRE
DSRP	Dam Safety Review Panel
EC	Electrolytic Conductivity
EOCD	EGAT Construction Obligation Commencement Date
EDL	Electricite du Laos
EDL PPA	Power Purchase Agreement between NNP1PC and EDL
EGAT	Electricity Generating Authority of Thailand
EGATi	EGAT International Company Limited
EIA	Environmental Impact Assessment
EMMR	Environmental Management and Monitoring Reports
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 Chulalongkhorn University
ERM	Environmental Resource Management
ESD	Environmental and Social Division of NNP1PC

ESMMP	Environmental and Social Monitoring and Management Plan
FY	Fiscal Year
GOL	Government of Lao PDR
GIS	Geographic Information Systems
HH	Household
HMWC	Hydraulic Metal Works Contract
HR	Human Resources
IEE	Initial Environmental Examination
IMA	Independent Monitoring Agency
INRMP	Integrated Natural Resources Management Plan
ISP	Intergraded Spatial Planning
km	kilometre
kV	kilo-Volt
LEPTS	Lao Electric Power Technical Standard
LHSE	Lao Holding State Enterprise
LTA	Lender's Technical Advisor
M	million
m	metre
MAF	Ministry of Agriculture and Forestry
MEM	Ministry of Energy and Mines, Lao PDR
MOF	Ministry of Finance, Lao PDR
MOM	Minutes of Meeting
MONRE	Ministry of Natural Resource and Environment, Lao PDR
MOU	Memorandum of Understanding
NBCA	National Biodiversity Conservation Area
NCI	Non-Compliance Issue
NCR	Non-Compliance Report
NN2	Nam Ngum 2 Power Company Limited
NNP1PC	Nam Ngiep 1 Power Company Limited
NPF	National Protection Forest
NTFP	Non-Timber Forest Products
NT2	Nam Theun 2 Hydropower Project
OC	Obayashi Corporation
ONC	Observation of Non-Compliance
PAFO	Provincial Department of Agriculture and Forestry
PAP	Project Affected People
PD	Property Damage

PONRE	Provincial Department of Natural Resource and Environment, MONRE
PvPA	Provincial Protection Area
RCC	Roller Compacted Concrete
SIR	Site Inspection Report
SLBMP	Salvage Logging Biomass Management Plan
SOP	Standard Operating Procedure
SMO	Social Management Office of ESD within NNP1PC
SS-ESMMP	Site Specific Environmental and Social Monitoring and Management Plan
TD	Technical Division of NNP1PC
TOR	Terms of Reference
TSS	Total Suspended Solids
UAE	United Analysis and Engineering Consultant Company Ltd.
UXO	Unexploded Ordinance
WMF	Watershed Management Fund
WMP	Watershed Management Plan
WRPC	Watershed and Reservoir Protection Committee
WRPO	Watershed and Reservoir Protection Office
WWTS	Waste Water Treatment System

EXECUTIVE SUMMARY

The finalisation of the Environmental and Social Management and Monitoring Plan for the Construction Phase (ESMMP-CP) is in progress, the final draft will be translated into Lao language before submission to the Ministry of Natural Resources and Environment (MONRE) by the end of February 2017 for their approval.

During January 2017, the Environmental Management Office (EMO) of NNP1PC received a total of three SS-ESMMPs and one Site Decommissioning Plan for review and clearance. With eight SS-ESMMPs carried over from December 2016, there were a total of 10 SS-ESMMPs and one Site Decommissioning Plan for EMO review during January 2017. Out of these, four SS-ESMMPs were cleared with conditions, and the remaining seven SS-ESMMPs and one Site Decommissioning Plan will be reviewed in February 2017.

NNP1PC-EMO issued five new Observations of Non-Compliances (ONCs), one Non-Compliance level 1 (NCR-1) and three Non-Compliance level 2 (NCR-2). Out of these, three ONCs were resolved and none of NCRs was resolved. With carrying over from December 2016, a total of 16 ONCs, two NCR-1 and four NCR-2 were active and will be carried over into February 2017. NNP1PC-EMO will follow up with the Contractors to resolve the remaining issues in February 2017.

During 17 to 19 January 2017, Provincial and District EMUs conducted a joint environmental monitoring mission together with NNP1PC covering the main construction sites and camps, Houay Soup Landfill and Houay Soup Resettlement Area (HSRA). On 19 January 2017, after the wrap-up meeting, the EMUs submitted their mission report to NNP1PC.

The construction of NNP1 Project Water Quality Laboratory was commenced in the third week of October 2016 with a progress of 75% by the end of January 2017 and is expected to be completed by 28 February 2017. Laboratory equipment was temporary installed, tested and operated at a warehouse located next to the laboratory in the Owner's Site Office and Village (OSOV). The NNP1 Project laboratory analysis validation with United Analysis and Engineering Consultant Company Ltd. (UAE) laboratory results for Total Suspended Solids (TSS) will be commenced in February 2017.

On 14 January 2017, the Civil Works Contractor completed the improvement of the sediment pond embankments for the Aggregate Crushing Plant by removing sediment, placing cement mortar surfacing as well as building an earth partition to divide the pond into two smaller ponds. The Waste Water Treatment System (WWTS) improvement was completed in December 2016 at the new Kenber Camp, IHI Camp, Song Da 5 Camp Nos. 1 and 2. The principal Contractors have agreed to try to complete the improvement of WWTS for the remaining camps by the end of February 2017.

Approximately 131.7 m³ of solid waste was disposed at the NNP1 Project Landfill during January 2017, a decrease of 126 m³ compared with December 2016. A total of 2,799 kg of recyclable waste from Hat Giun Recyclable Waste Bank was sold to a local vendor in Pakxan District, Bolikhamxay Province, and a total of 23 kg of clinical waste from the NNP1 Project site was transported and incinerated at the incinerator located within the Vientiane landfill.

The development of Nam Ngiep 1 Watershed Management Plan (WMP) continued to progress. The NNP1 Consultant and EMO held a meeting with Xaysomboun Province in the middle of January 2017 to ensure continuous collaboration with Xaysomboun officials and to ensure that the WMP is in line with the watershed management regulations and the Integrated Spatial Plan (ISP) for the Province. NNP1 hosted a meeting at the end of January 2017 chaired by the Head of Department of Forest Resources Management (DFRM), Ministry of Agriculture and Forestry (MAF) and with representatives from central and provincial government departments and from Nam Ngiep 2 (NN2) Power Company to discuss the boundary between Nam Ngiep 1 watershed management area and Nam Ngiep 2 watershed management area. The meeting concluded that NNP1 should continue with WMP finalization using the existing definition of NNP1 watershed area. Further discussions on

the division of management responsibilities in terms of the upper Nam Ngiep watershed will be held with other project developers under the supervision of DFRM.

NNP1 initiated an advertisement for Consultancy Services for the development of Biodiversity Offset Management Plan (BOMP) in the second week of January 2017 and received four expressions of interest. NNP1 will evaluate and shortlist qualified candidates, and request them to submit a full proposal.

In January 2017, BOMC issued an official request for fund disbursement for pre-BOMP implementation as well as a request for GOL involvement in the evaluation and selection of BOMP Consultant – as per discussion and agreement with the Vice Governor of Bolikhamxay Province during the IAP/ADB mission in December 2016.

As of 31 January 2017, biomass clearance was completed for around 258 ha or around 114% of the total target in January 2017. The overall biomass clearance is around 630 ha, representing around 40% of the target of 1,640 ha.

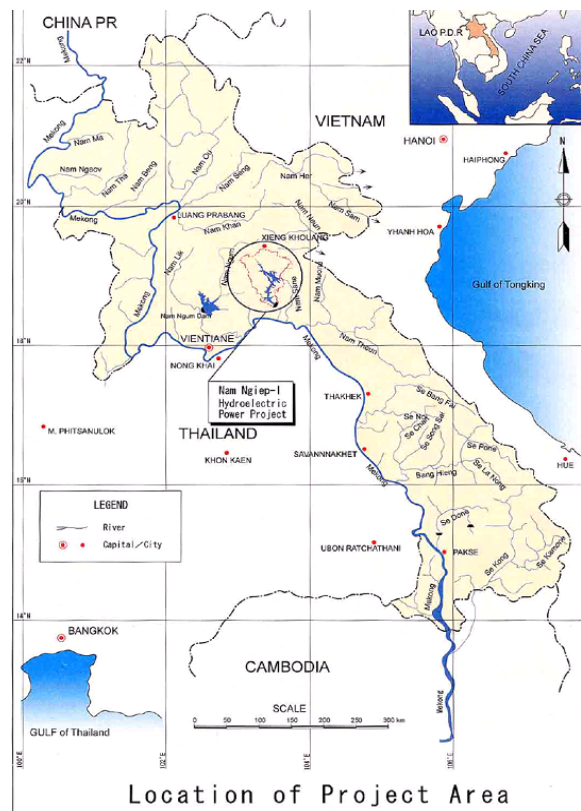
The fishery monitoring programme is progressing, and a database has been developed to support the future fish management programme as part of the in Nam Ngiep 1 Watershed Management Plan. Two types of surveys were conducted during December 2016 including daily fish catch logbook monitoring and community interviews. The gathered information is being put into the database. The data from the daily fish catch logbook monitoring indicates that the mean daily fish catch in the Nam Ngiep River was 2.4 kg/household/day in December 2016. The estimated total fish catch in the Nam Ngiep basin for December 2016 is 53,000 kg. Around 31% of the catch was sold, 59% was consumed fresh, 5% processed and approximately 5% was used for other purposes.

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 Bolikhamxay Province. The Nam Ngiep meets the Mekong River just upstream from Pakxan in Bolikhamxay Province (Fig. 1-1).

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 Bolikhamxay 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 January 2017. 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.

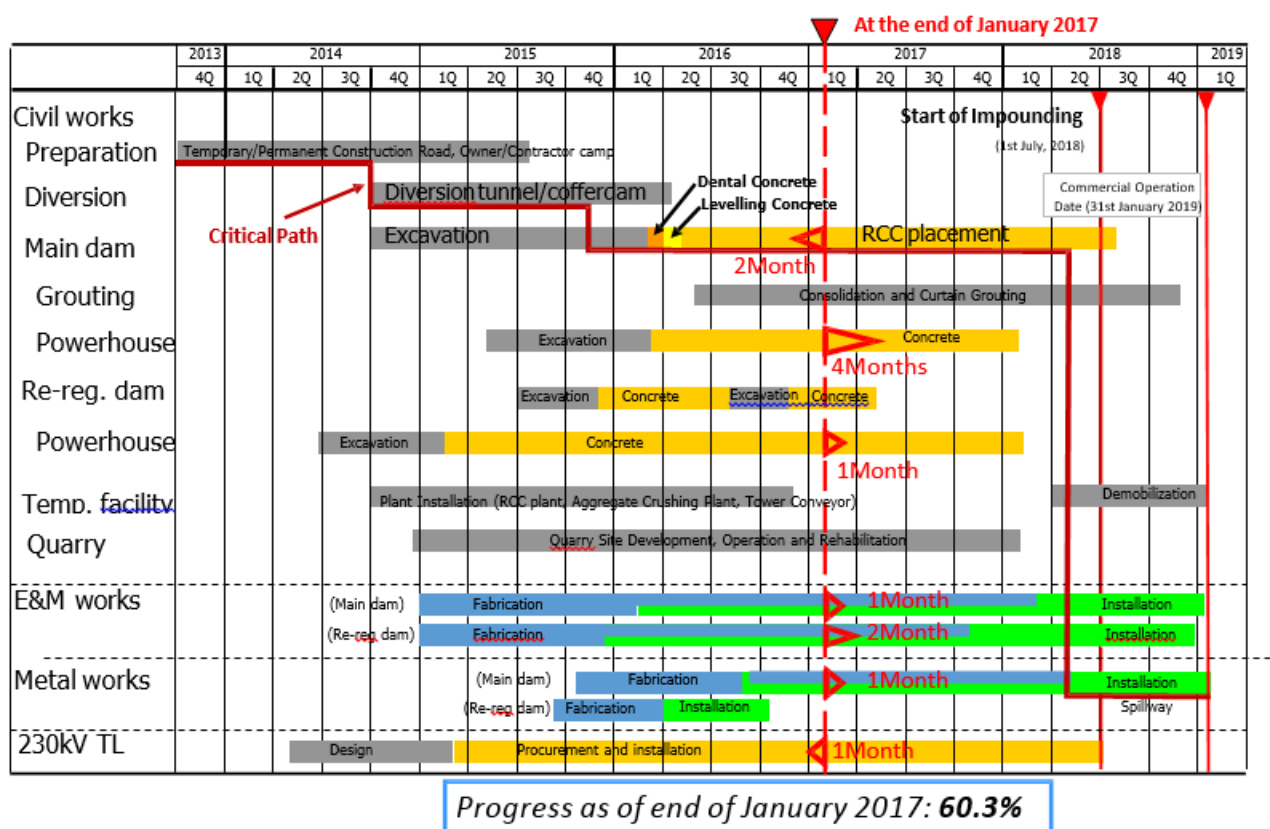
The EMMR and other related reports including related construction Site Specific Environmental and Social Monitoring and Management Plans (SS-ESMMPs) are publicly disclosed on the Project website in line with the ADB and GoL Public Disclosure Policies. Hard copies of the final reports will also be available 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 230 kV Transmission Line Works. Actual overall cumulative work progress until the end of December 2016 was 60.3% (compared to planned progress of 60.4%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments, varied works and other adjustments allowed under each Contract. 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.

Figure 2-1: Overall Construction Schedule



2.1 Civil Work

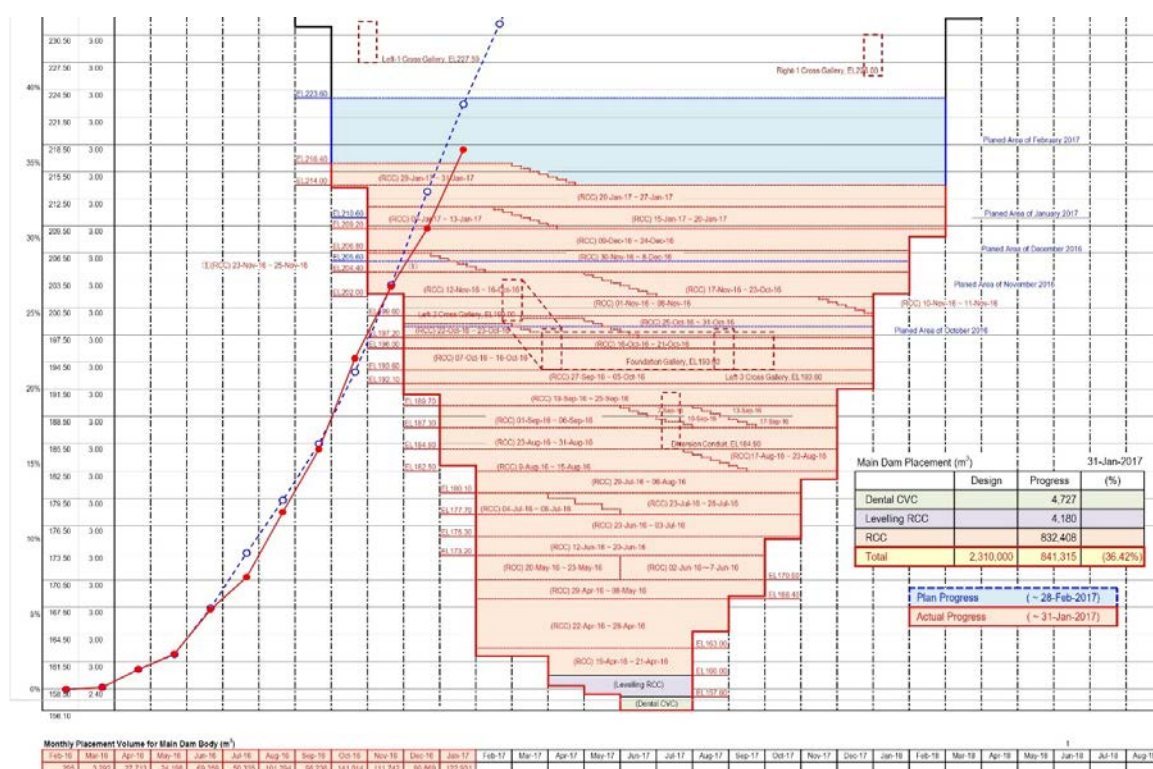
The Civil Works Contract was executed between Obayashi Corporation and the Nam Ngiep 1 Power Company on 30 September 2013 and the NTP was issued on 03 October 2014. Excavation works of the main dam, the diversion tunnel and the re-regulation dam were commenced in October 2014 and completed in February 2016, following which the concreting works were commenced.

The cumulative actual work progress of the Civil Works until the end of January 2017 was 61.6% (compared to planned progress of 61.7 %) 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 about one month advanced when diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes were 20% greater than expected and part of this additional work is necessary 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.

Figure 2-2: Progress of Main Dam RCC Works as of 27 January 2017



The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 70 % by achievement of total drilled length at the end of November 2016 as a proportion of the total expected drilling

Table 2-1: Progress of consolidation drilling and grouting as of 31 January 2017

Item	Total Anticipated Drilling (m)	Completed (m)	Progress (%)
Consolidation Grouting	16,845	11,734	70
Curtain Grouting	27,945	360	1

*The value of "Completed" includes grouting works

Main powerhouse sub-structure excavation works were completed in January 2016 and levelling concrete works were started in coordination with installation of the grounding system. Overhead travelling crane runway beam was installed in December 2016. Progress of the powerhouse concreting works is still proceeding well and is shown in Table 2-2 below

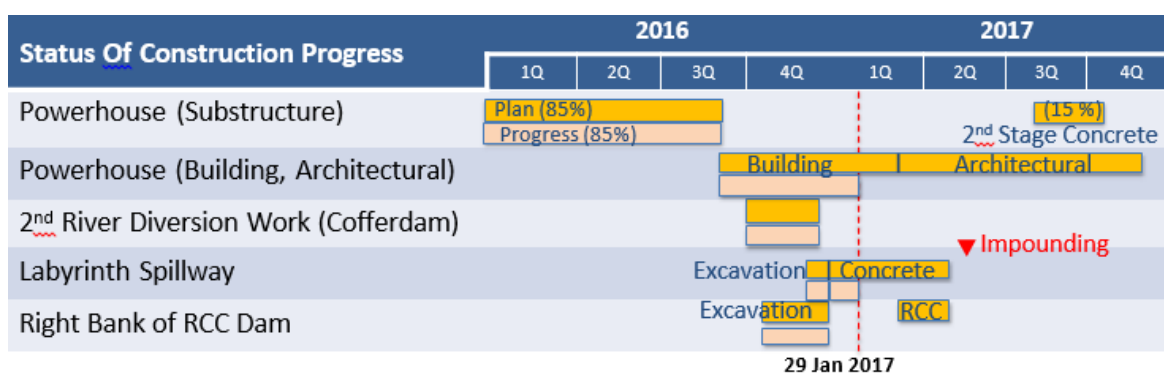
Table 2-2: Progress of Main Powerhouse Sub-Structure Concrete Works to 31 January 2017.

Location	Total Anticipated Volume (m³)	Completed (m³)	Progress (%)
Main Powerhouse	32,600	21,720	67
Penstock Embedment	10,117	5,907	58

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 2-3 below.

Figure 2-3: Progress of Re-regulation Dam Powerhouse Works to 29 January 2017

Structure	Civil Structure	Spillway			Building			Right Bank RCC Structure	Left Bank Backfill
	Intake + PH + Tailrace	Right bank side concrete	Concrete Apron	Downstream Riprap Stone	Roof Frame	Roof Sheet	Block Wall over El.177	RCC + CVC	Powerhouse and Switch Yard
	(m3)	(m3)	(m3)	(m3)	(ton)	(m2)	(m2)	(m3)	(m3)
Design	26,549	17,515	471	1,890	65.0	756	2,010	10,900	45,000
Completed	24,748	6,665	0	1,890	56.3	598	582	0	42,000
Progress %	93	38	0	100	87	79	30	0	93

The powerhouse concreting has advanced well and secondary concrete embedment for the draft tube liner was completed at the end of April 2016. The left bank structure was re-designed as roller compacted concrete (RCC) and was completed on 18 March 2016. Installation of the re-regulation waterway gate and stop log and re-regulation intake gate and structural concrete works for the retaining wall to support the substation yard were completed in October 2016. Building superstructure work continued for the powerhouse with the commencement of construction of concrete columns.

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 were completed on 02 April 2016.

2.1.3.3 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 was completed in early April 2016.

2.1.3.4 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 disposal areas, and good quarry management continues.

2.1.3.5 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 Disposal Area No.9 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 by value until the end of January 2017 was 60.8% (the same when compared to planned progress of 60.8 %).

Figure 2-4: Installation of Draft Tube at the Main Powerhouse



Figure 2-5: Installation of Draft Tube for Unit 2 at the 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 January 2017 was 30.1% (compared to planned progress of 30.1%).

The latest progress of penstock pipes fabrication at IHI field shop as of the end of December 2016 is shown in **Table 2-3** below

Table 2-3: Progress of the penstock pipe fabrication at the IHI field shop as at the end of January 2017

Item No.	Work Description	Work Progress (%)	Remarks
1.1	Assembly & Welding	58 %	Straight pipes
1.1	Painting	53 %	"
1.1	Delivery to Main Dam Laydown Area	23 %	"
1.1	Site Erection at Main Dam	23 %	Inclined part

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 January 2017 was 79.4% (compared to planned progress of 84.8%).

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 in good time. Onset of daily rains has made access to all areas difficult but the Contractor follows its revised acceleration schedule, after the progress for the construction of tower foundations slowed after April, 2016 (See Figure 2-6 below)

Figure 2-6: Cumulative Work Progress of Tower Foundation (Original Planned and Actual)

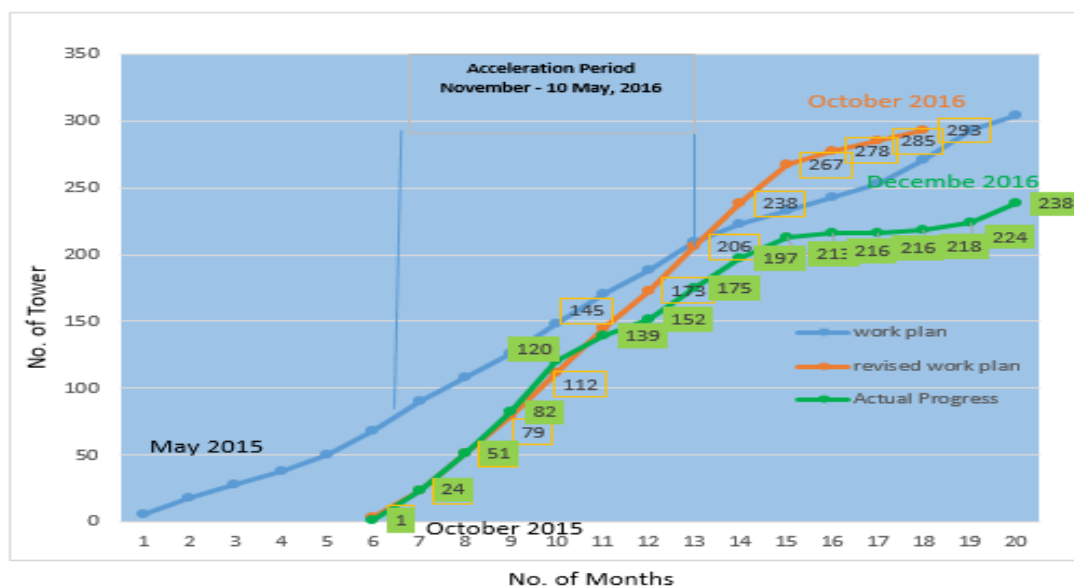


Figure 2-7: Cumulative Works Progress of tower foundation (Revised Planned & Actual)

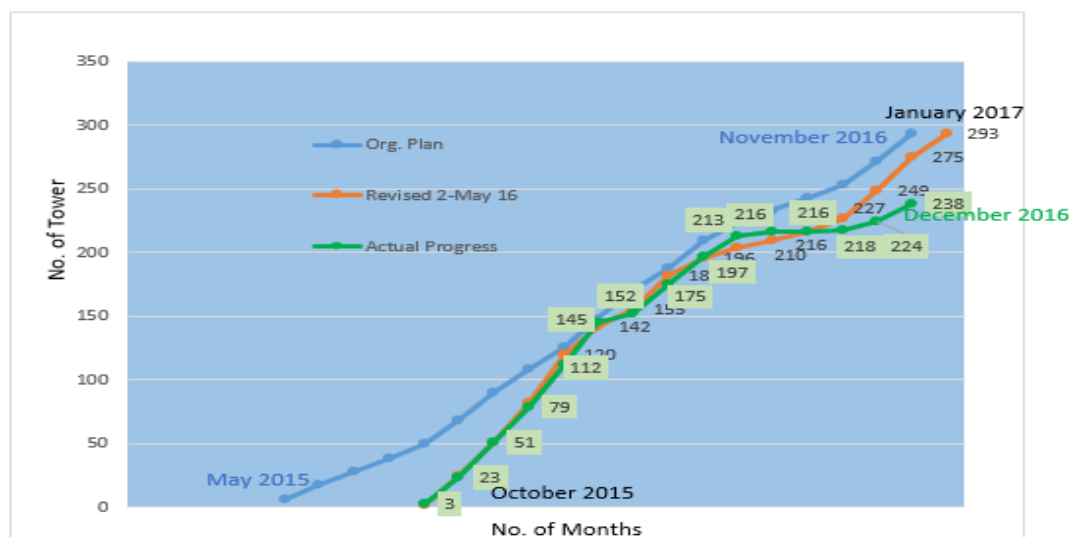
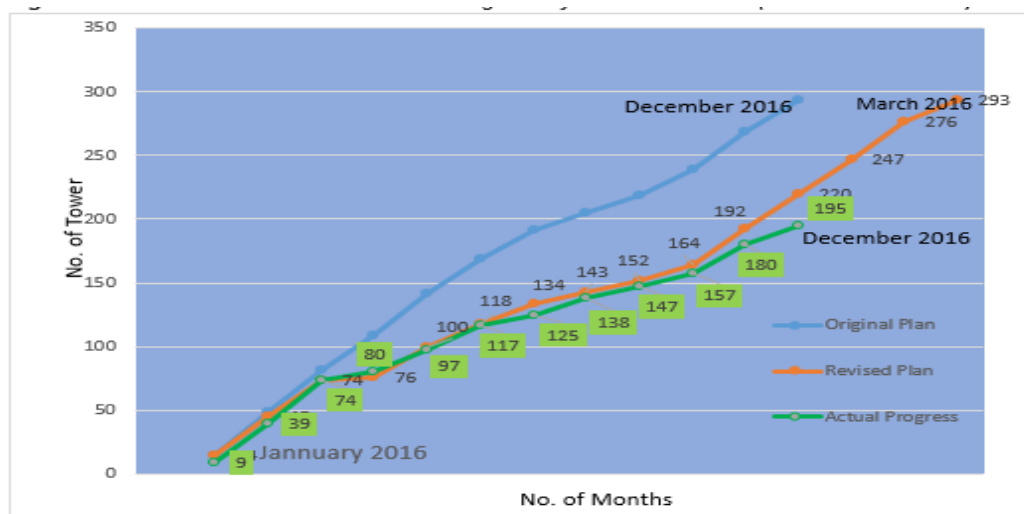


Figure 2-8: Revised Cumulative Works Progress of Tower Erection (Planned & Actual)



3. ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 ESMMP-CP Update 2016

The finalisation of the Environmental and Social Management and Monitoring Plan for the Construction Phase (ESMMP-CP) is in progress, the final draft will be translated into the Lao language before submission to the Ministry of Natural Resources and Environment (MONRE) by the end of February 2017 for their approval.

3.1.2 Site Specific Environmental and Social Management and Monitoring Plans

During January 2017, the Environmental Management Office (EMO) of NNP1PC received a total of two SS-ESMMPs and one Site Decommissioning Plan for review and clearance. With eight SS-ESMMPs carried over from previous months, there was a total of 10 SS-ESMMPs and one Site Decommissioning Plan for EMO review during January 2017. Out of these, four SS-ESMMPs were cleared with conditions, and the remaining six SS-ESMMPs and a Site Decommissioning Plan will be cleared in February 2017.

Table 3-1: SS-ESMMPs received and review status in January 2017

Title	Date Received	Response Status	Comments
SS-ESMMP for Installation Work of Embedded Piping for Main Power Station	16 November 2016 (2 nd submission)	Responded with 'No Objection with Conditions' on 12 January 2017	Revise to add environmental impact mitigation measures for construction of workers' camp (SP13) and sanitary facility (SP02)
SS-ESMMP for Closing of Borrow Pit Area at Corner of P1 & P1A	29 November 2016 (1 st submission)	Responded with 'No Objection with Conditions' on 12 January 2017	Provide more mitigation measures for borrow pit exploitation and its closure

Title	Date Received	Response Status	Comments
Road beside the Re-Regulation Dam			plan including erosion control and landscaping.
SS-ESMMP for Operation and Maintenance Works of RCC Plant	10 November 2016 (3 rd submission)	Responded with 'No Objection with Conditions' on 31 January 2017	<ul style="list-style-type: none"> - Provide information on turbid water generation from the RCC plant, including the water generated from industrial cleaning, washing of aggregate, and filter tank etc.; - Provide clear action on erosion and sediment control at the temporary disposal area; - Implement daily clean-up of sediment from all sediment ponds.
SS-ESMMP for HM Hydro Worker Camp No.2 (LILAMA10)	27 December 2016 (4 th submission)	Responded with 'No Objection with Conditions' on 11 January 2017	<ul style="list-style-type: none"> - The wastewater from Waste Water Treatment Plant shall be chlorinated using sodium hypochlorite (NaClO) liquid type in a Chlorine Contact Tank prior to discharging to outside environment as per the Owner's letter on the WWTS improvement (Document Ref. No.: NNP1/0130016/HMH/EPC/EC, dated 12 October 2016); - Complete the construction of the WWTS incorporating the NNP1PC-EMO comments for the 4th submission of the DWP and SS-ESMMP for LILAMA 10 Camp.
SS-ESMMP for Curtain Grouting Works at Main Dam	14 December 2016 (6 th submission)	Under Review	
SS-ESMMP for Construction of Re-Regulation Power Station Building (Super Structure), Re-Regulation Powerhouse Station (B1)	21 December 2016 (3 rd submission)	Under Review	

Title	Date Received	Response Status	Comments
SS-ESMMP for Adit Closure at Right Bank of Main Dam	28 December 2016 (1 st submission)	Under review	
SS-ESMMP for Building Construction at Main Powerhouse	30 November 2016 (2 nd submission)	Under review	
SS-ESMMP for Construction of Irrigation Dam, 1 Spillway & Outlet Pipe Culvert	27 January 2017 (2 nd submission)	Under review	
SS-ESMMP for installation work of Spiral Case and Stay Ring for Main Power Station	27 January 2017 (1 st submission)	Under review	
SECC Contractor's Site Decommissioning Plan	31 January 2017 (2 nd submission)	Under review	

3.1.3 Compliance Report

During January 2017, NNP1PC-EMO issued five new Observations of Non-Compliances (ONCs), one Non-Compliance level 1 (NCR-1) and three Non-Compliance level 2 (NCR-2). Out of these, three ONCs were resolved and none of NCRs was resolved. With carrying over from December 2016, a total of 16 ONCs, two NCR-1 and four NCR-2 were active and will be carried over into February 2017. NNP1PC-EMO will follow up with the Contractors to resolve the remaining issues in February 2017.

The carried-over ONC and NCR from January 2017 into February 2017 are summarized in Table 3-2 below.

Table 3-2: Carried-Over ONCs and NCRs from January 2017 into February 2017

Site ID	Issues	Reporting	Actions
Song Da 5 Camp No.2	The WWTS construction was not consistent with the proposed design (ON_OC-0085). 1 st inspection date: 02 June 2015 Latest follow up: 24 January 2017	ONC (Closure pending)	The Contractor completed the improvement of WWTS in December 2016. However, it was found during the site inspection that there was a minor issue and increasing the height of the berm of the last pond was needed. The Contractor was required to check the pipe lines connecting each wetland pond to ensure no overflowing of waste water prior to treatment by chlorine. The action should be completed before the Joint Site Inspection in February 2017

Site ID	Issues	Reporting	Actions
	<p>Stagnant grey water created unpleasant odour and attracted diseases vectors.</p> <p>Note: This observation of Non-Compliance (ONC) was raised during the previous two Government of Lao PDR (EMU) missions in October and November 2016 and various Bi-weekly joint site inspection (NCR-OC-0014)</p> <p>1st inspection date: 24 January 2017</p> <p>Latest follow up: N/A</p>	NCR-2 (New)	<p>The Contractor is strongly required to take the following corrective actions:</p> <ul style="list-style-type: none"> - Repair the grey water holding tanks to stop grey water overflowing to the open ditch, - Check grey water piping system to ensure that no grey water seepage into surrounding environment; - Pump stagnant grey water from the open ditch into the Waste Water Treatment (WWTS) Pond No. 1.
V&K Camp	<p>Insufficient capacity of waste water treatment ponds to handle the operation of the V&K camp (ON_OC-0087).</p> <p>1st inspection date: 02 June 2015</p> <p>Latest follow up: 26 January 2017</p>	ONC (Closure Pending)	The improvement of the WWTS shall follow the wastewater expert's recommendations and be completed by the end of February 2017.
HM Hydro Subcontract Worker Camp (LALIMA 10 Camp)	<p>The LILAMA 10 Camp is accommodating 11 workers, but the construction of the Waste Water Treatment System (WWTS) remained incomplete (NCR_HM-0001)</p> <p>1st inspection date: 28 September 2016</p> <p>Latest follow up: 24 January 2017</p>	NCR Level 1 (Closure Pending)	<p>The improvement of WWTS shall be in compliance with the NNP1's instruction letter Ref. No.: NNP1/0750-016/OBA/EPC-CE dated 12 October 2016; and NNP1PC-EMO comments for the 4th submission DWP and SSESMMMP for LILAMA 10 Camp should be fully addressed. The WWTS improvement shall be completed by 28 February 2017.</p>
RCC Plant	<p>Lack of proper sedimentation facilities to improve the turbid water quality generated from the site (ONC_OC-0217)</p> <p>1st inspection date: 28 June 2016</p> <p>Latest follow up: 24 January 2016</p>	ONC (Closure Pending)	<p>The Contractor has submitted drawings for improvement of the first 3 ponds. The construction of concrete partitions between these ponds to enable surface over flow was completed on 05 January 2017. The sediment from these ponds has been removed on a daily basis. Removal of sediment in the 3 further, lower ponds is done when required. EMO will continue to monitor the effluent quality before suggesting further improvement of the last 3 ponds; No Objection with Conditions has been provided to the third submission of SS-ESMMP for Operation and Maintenance of the RCC Plant on 31 January 2017;</p>

Site ID	Issues	Reporting	Actions
SECC Camp, Batching Plant and Workshop (Houay Soup Bridge Contractor)	<p>SECC Contractor finished its main construction activities at the end of November 2016. To ensure that SECC site demolition is done properly, the Contractor was instructed to prepare and submit a Site Decommissioning Plan to NNP1PC-EMO for review and approval at least 7 days prior to the commencement of decommissioning work (ONC_SECC-0039)</p> <p>1st inspection date: 06 September 2016 Latest follow up: 31 January 2017</p>	ONC (Closure Pending)	<ul style="list-style-type: none"> - On 30 November 2016, NNP1PC-EMO provided comments on the Preliminary Site Decommissioning Plan of Houay Soup Bridge Contractor-SECC camp and construction site installations. However, a revised Decommissioning Plan was not submitted, whilst the workshop, concrete batching plant and half of the workers' camp were removed; - This led to an escalation of ONC into the NCR level 1.
	<p>Some construction waste including broken tiles, water pipes, rubber and off-cut wood were left behind where the SECC worker camp was decommissioned (ON-SECC-0041)</p> <p>1st inspection date: 17 January 2017 Latest follow up: 31 January 2017</p>	ONC (New)	<ul style="list-style-type: none"> - The Contractor is required to segregate the waste based on the Waste Management guideline ('Reduce, Re-use, and Recycle') and the construction waste needs to be disposed at designated areas for construction waste at a Spoil Disposal Area No. 6. Corrective actions for this issue has to be completed by 28 February 2017.
	<p>Construction waste remained to be scattered on site as a result of incomplete camp decommissioning process. This issue was identified during the joint GOL-EMU mission and a Bi-Weekly Joint Site Inspection on 17 January 2017. NNP1PC- EMO provided a final warning to the SECC's representative to clean-up remaining construction waste and submit the revised Site Decommissioning Plan as soon as possible. However, there was no response to any EMO's attempts as mentioned above. As a result, NNP1PC-EMO issued a NCR level 1 to SECC Contractor (NCR-SECC-0002).</p>	NCR-1 (New)	<ul style="list-style-type: none"> - NNP1PC-EMO instructed the Contractor to submit a revised Site Decommissioning Plan by 01 February 2017. - The revised Site Decommissioning Plan shall include actions to be taken at all SECC's completed and current active sites (including Worker's Camp, Temporary Waste Pit, SECC's Workshop and Batching Plant). - Opened NCR-1 will be closed once a formal response by the Contractor is provided in the Part 2 of NCR-1 which indicates the completion of corrective actions.

Site ID	Issues	Reporting	Actions
	1 st inspection date: 27 January 2017 Latest follow up: 31 January 2017		
Re-Regulation Dam (Borrow Pit Area)	<p>The Contractor started operating a borrow pit with inadequate environmental management practices as indicated below:</p> <ul style="list-style-type: none"> - Topsoil was stockpiled at sensitive erosion area; - The cut slope area had no berm and cut-off drains; - Spoil was disposed and stockpiled on the access road to the SECC waste disposal pit. <p>No information and management measures on the excavation of this borrow pit was included in the two approved SS-ESMMPs for the Re-Regulation Dam (i.e. the Re-Regulation Dam Left Bank Excavation and Re-Regulation Dam Power Station (ON_OC-0232).</p> <p>1st inspection date: 30 August 2016 Latest follow up: 24 January 2017</p>	ONC (Closure Pending)	<p>The Contractor was required to take following actions:</p> <ul style="list-style-type: none"> - Stockpile topsoil in an appropriate location to be used for rehabilitation of the borrow pit after operation; - Install borrow pit berms, cut-off drains and sediment pond where feasible to prevent landslide and retain the sediment. - Revised SS-ESMMP for the re-regulation dam to include information on this borrow pit. - The latest inspection confirmed that the SS-ESMMP for the re-regulation dam was not revised as recommended and was not submitted. In addition, it was observed that there was no action taken by the Contractor, but instead informed the NNP1PC-EMO that there will be no closure activities for this borrow pit. - The corrective actions have to be completed by 28 February 2017.
Re-regulation dam (spoil disposal area)	<p>There was a land levelling activity for permanent spoil disposal from the excavation of left bank coffer-dam behind the SECC camp (ON_OC-0236).</p> <p>1st inspection date: 11 October 2016 Latest follow up: 24 January 2017</p>	ONC (Closure Pending)	<ul style="list-style-type: none"> - On 12 January 2017, EMO provided 'No Objection with Conditions' to the DWP & SS-ESMMP for re-regulation, closing of the borrow pit at the corner of P1 and P1A road beside the re-regulation dam. Indicating sufficient mitigation measures for borrow pit exploitation and closure including erosion control, landscaping and closure procedure of borrow pit. - The Contractor was required to manage the spoil disposal in accordance with the requirements stated in ESMMP-CP 2014 and the Updated ESMMP-CP 2016 Vol. III and IV, SP10 Spoil Disposal.
Area above CVC Plant Yard	<p>The slurry from the RCC plant was removed and placed at areas above the CVC plant for drying purposes (at the junction of Road P1 and P2).</p>	ONC (Closure Pending)	<ul style="list-style-type: none"> - The Contractor is required to clean-up the slurry from the temporary drying areas and

Site ID	Issues	Reporting	Actions
	<p>Some slurry has already been washed into the road side drainage which are connected directly to the Nam Ngiep River (ON_OC-0240).</p> <p>1st inspection date: 22 November 2016 Latest follow up: 24 January 2017</p>		<p>dispose it at Spoil Disposal Area No. 6;</p> <ul style="list-style-type: none"> - During the latest inspection, the Contractor informed that sand and some slurry would be rewashed and reused. However, the Contractor is still required to have proper mitigation measures for erosion and sediment control of the mentioned sand and slurry disposal. The latest bi-weekly joint site inspection on 24 January 2017 confirmed that there was no action taken by the Contractor. This issue was therefore escalated to NCR level 2 (see below NCR-OC-0014).
Aggregate Crushing Plant	<p>It was observed during this inspection that the Contractor did a good job of removing sediment from drainage lines and storing into heaps for easy drying ready for removal and disposal to Spoil Disposal Area No. 6. However, these sediment heaps along open ditches need to be removed to disposal regularly (ON_OC-0237).</p> <p>1st inspection date: 11 October 2016 Latest follow up: 24 January 2017</p>	ONC (Closure Pending)	<ul style="list-style-type: none"> - The Contractor is required to clean up the sediment removed from the open ditches and remove sediment heaps more frequently. In the meantime, sufficient sandbags are to be provided along the road to prevent sediments from being washed back into the ditches and create turbid water. - This issue has been addressed and will be closed during the next Bi-Weekly Joint Site Inspection on 07 February 2017.
	<ul style="list-style-type: none"> - Inadequate maintenance and implementation of agreed corrective actions on controlling the sediment pond at the Aggregate Plant below the Spoil Disposal Area No.7; - Improper monitoring and maintenance of the said sediment pond resulted in leakage of turbid water from the sediment pond into Nam Ngiep River. This is a serious non-compliance with CA annex C and ESMMP-CP 2014 (NCR_OC-0013) <p>1st inspection date: 08 November 2016 Latest follow up: 24 January 2017</p>	NCR Level 2 (Closure Pending)	<ul style="list-style-type: none"> - The Contractor completed the improvement of the pond embankments through concrete plastering as well as constructing an earth partition to divide the pond into 2 smaller ponds on 14 January 2017. However, leakage was still observed at the lower slope of the first pond during the last week of January 2017. - A meeting between NNP1PC (TD and EMO) and-the CWC (OC) at OVSO will be held on 01 February 2017 to discuss the outstanding non-compliance issues and deadlines for corrective action implementation.

Site ID	Issues	Reporting	Actions
	<p>The improvement of the Aggregate Crushing Plant's sediment pond below Spoil Disposal Area No.7 was not consistent with NNP1PC's recommendations stating in the NCR level 2 (Document No. NNP1-ESD-EMO-NCR-OC-0013, dated 08 November 2016) (ON_OC-0242). This pending ONC since in the NCR level 2 (Document No. NNP1-ESD-EMO-NCR-OC-0013, dated 08 November 2016)</p> <p>1st inspection date: 06 December 2016 Latest follow up: 24 January 2017</p>	ONC (Closure Pending)	See above. This issue was escalated to NCR2 and will be closed once the requirements of the issued NCR2 are closed.
	<p>During the improvement of the aggregate crushing plant's sediment pond below Spoil Disposal Area No.7, sand bags were installed in the drainage ditch to slow down the flow and create additional small sediment retention ponds. However, all the sediment retention ponds were 100% full of sediment and the wastewater which overflowed from these ponds, was diverted to Nam Ngiep River directly without sufficient settlement time (ON_OC-0241).</p> <p>1st inspection date: 06 December 2016 Latest follow up: 24 January 2017</p>	ONC (Closure Pending)	<ul style="list-style-type: none"> - The Contractor already cleaned up the sediment from the pond and along the drainage lines as well as other improvement measures as stipulated in the NCR-2 below; - This issue has been addressed and will be closed during the next Bi-Weekly Joint Site Inspection on 07 February 2017; - Issued NCR 2 is pending for closure until the Contractor provides a second response with a revised as-built drawing and closes the leakage at the first pond by 15 February 2017.
Spoil Disposal Area No. 8	<p>It was observed that slurry from the RCC Plant was disposed of at Spoil Disposal Area No. 8. This practice breached the agreed terms and conditions for the operation of the RCC Plant, which states that sediment shall be disposed at Spoil Disposal Area No. 6 (ON_OC-0245).</p> <p>1st inspection date: 06 December 2016 Latest follow up: 24 January 2017</p>	ONC (Closure pending)	On 24 January 2017, EMO conducted a Joint Site Inspection and observed that there no corrective action was taken by the Contractor. This issue was therefore escalated to NCR level 2 on 27 February 2017 (see below NCR-OC-0014 on the new corrective actions and deadline).
Slurry disposal at	No environmental remedial actions were implemented by the Contractor for the slurry disposal at	NCR-2 (New)	Revise DWP & SS-ESMMP for the RCC Plant Operation to include: (a) areas for all temporary stockpiles for sand

Site ID	Issues	Reporting	Actions
Area above CVC Plant Yard and Spoil Disposal Area No. 8	<p>areas above CVC Plant and a Spoil Disposal Area No. 8 as per recommendations provided in the Site Inspection Reports (Ref. No.: NNP1-ESD-EMO-SIR-OC-0053 dated 24 November 2016 and NNP1-ESD-EMO-SIR-OC-0054 dated 16 December 2016. This issue was therefore escalated to NCR level 2 (NCR-OC-0014 on 27 January 2017)</p> <p>1st inspection date: 24 January 2017 Latest follow up: N/A</p>		<p>and slurry that are being and will be removed from the sediment ponds; (b) Estimate volume of materials to be stockpiled; and (c) mitigation measures for erosion and sediment controls. As per requirements stated in the ESMMP-CP Updated in 2016 by 15 February 2017</p>
SongDa5 Camp No.1	<p>The improvement of the Waste Water Treatment System (WWTS) was completed in mid-December 2016 and laboratory testing for chlorine dosing is underway. However, there was a significant concern on the stability of the embankment of wetland ponds as the following:</p> <ul style="list-style-type: none"> - The elevation was not properly measured causing the waste water from the first and second wetland ponds not to flow to the subsequent ponds (3, 4 and 5). In addition, earth bunds of these ponds were relatively low and not compacted (as required based on the submitted drawings). This resulted in the grey water leakage from the ponds to an open ditch connected to the Nam Ngiep and has a potential risk of collapsing (see Photographs 1 and 2) <p>1st inspection date: 10 January 2017 Latest follow up: 24 January 2017</p>	ONC (New)	<p>The Contractor is required to take the following actions urgently to secure the embankment of wetland ponds for long-term operation:</p> <ul style="list-style-type: none"> - Increase and embankments of the wetland ponds No. 1 and No. 2 to ensure that no wastewater is overflowing during the rainy season and daily peak loads; - Lining the embankment of the wetland ponds No.1 and No. 2. <p>The Contractor agreed to complete the mentioned corrective actions by 15 February 2017.</p>
DLC Camp (ESD Contractor)	<p>A diesel oil container storage tank with 20,000 litres capacity was stored on the bare ground (no impermeable surface, concrete bund and proper roofing material).</p> <p>1st inspection date: 17 January 2017 Latest follow up: 31 January 2017</p>	ONC (New)	<p>The Contractor is required to construct related facilities, such as increase the height of existing bund to be able to contain a u120% of diesel oil storage capacity, build impermeable floor, bund, signage (no smoking, etc.), and proper roof by 31 January 2017. This issue would be followed up during the next Bi-Weekly Joint Site Inspection and a</p>

Site ID	Issues	Reporting	Actions
			second deadline will be given (by mid-February 2017). If no progress is observed, a NCR-1 will be issued.
HM Hydro Main Camp and Office	<p>Unauthorised pumping of a total of 119 m³ of sewage from the HM Hydro Main Camp and disposing at the villagers' rice fields in Paksan District on 14 January 2017. This is a breach of their own ESMMP and NNP1PC's policies on Sewage Sludge Disposal (NCR-HM-0002)</p> <p>1st inspection date: 18 January 2017 Latest follow up: 31 January 2017</p>	NCR-2 (New)	<p>The Contractor is required to act on the following:</p> <ul style="list-style-type: none"> - Obtain a written consent from the land owner where the sewage was disposed of as an evidence of agreement; - Check the level of the sewage tanks visually on a monthly basis during the dry season and weekly basis during the rainy season to better estimate the disposal period; - Consult with NNP1PC's staff and follow their Standard Operating Procedure (SOP) on the Sewage Sludge and Black Water Disposal Prior to pumping and disposing of sewage/black water. <p>The contractor then needs to provide response about the case and corrective action in part 2 of this NCR-2 by 15 February 2017.</p>
Temporary Camp at Tower 65 (230 kV TL)	<p>During this joint bi-weekly inspection, it was observed that the waste management at this site was inadequate. There was no proper waste pit and general waste was mixed and disposed on the ground at the RCR mobile camp at Tower number 65. (ON-LS-0018).</p> <p>1st inspection date: 19 January 2017 Latest follow up: Not available</p>	ONC (New)	<p>The Contractor is required to:</p> <ul style="list-style-type: none"> - Collect general waste around the RCR mobile camp and store in proper waste bins or plastic waste bags for proper waste disposal; - Provide sufficient waste bins/waste bags to separate the recycle waste, general waste and food waste.
Temporary Camp at Tower 61 (230 kV TL)	<p>Nets and other fishing gear was observed at a temporary mobile camp located at the Tower 61. This indicates a breach of NNP1PC's policies on Biodiversity Management SP09.12 stating that: "All project staff are prohibited from harvesting any forest products and hunting wildlife (terrestrial and aquatics)" and Contractor's ESMMP (ON-LS-0019).</p>	ONC (New)	<p>The Contractors is required to provide training and awareness raising to field staff related to biodiversity subject and prohibit staff from harvesting of any forest products and hunting wildlife (both terrestrial and aquatics).</p>

Site ID	Issues	Reporting	Actions
	1st inspection date: 19 January 2017 Latest follow up: Not available		

Photograph: 1 & 2: Grey water leakage from the ponds to an open ditch at Song Da5 Camp No. 1



Figure 3-1: Site Inspection Locations

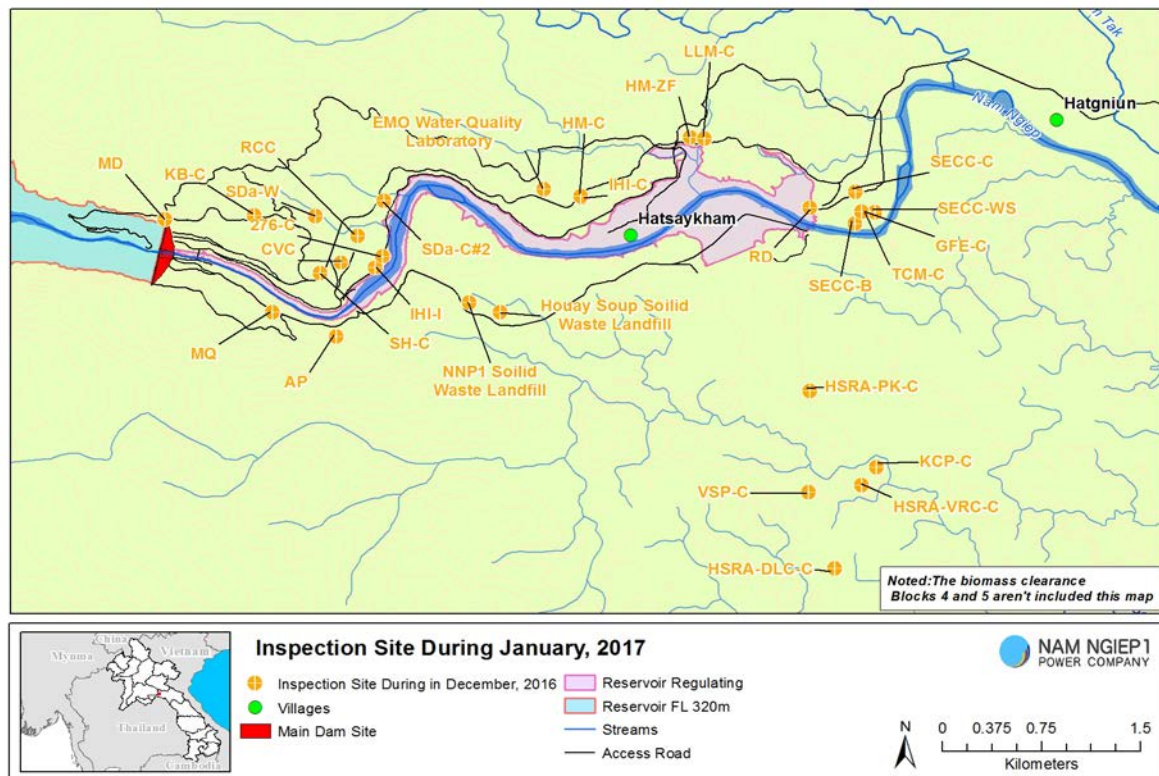


Figure 3-2: 230 kV Transmission Line Construction Monitoring

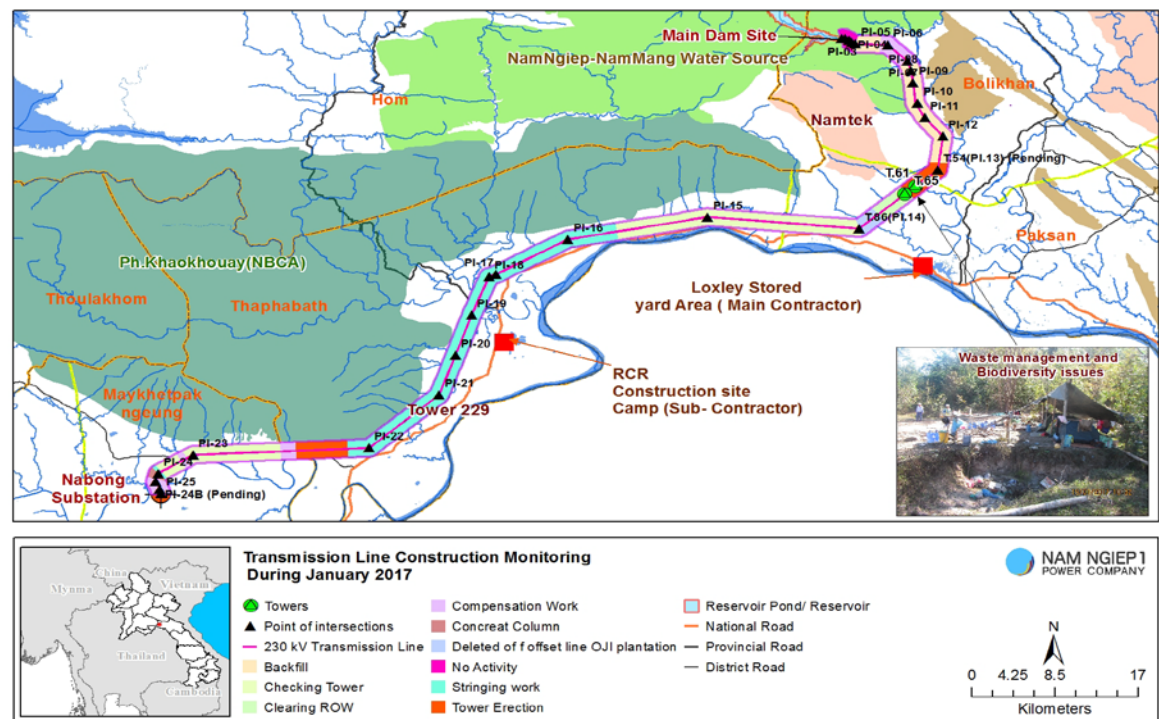
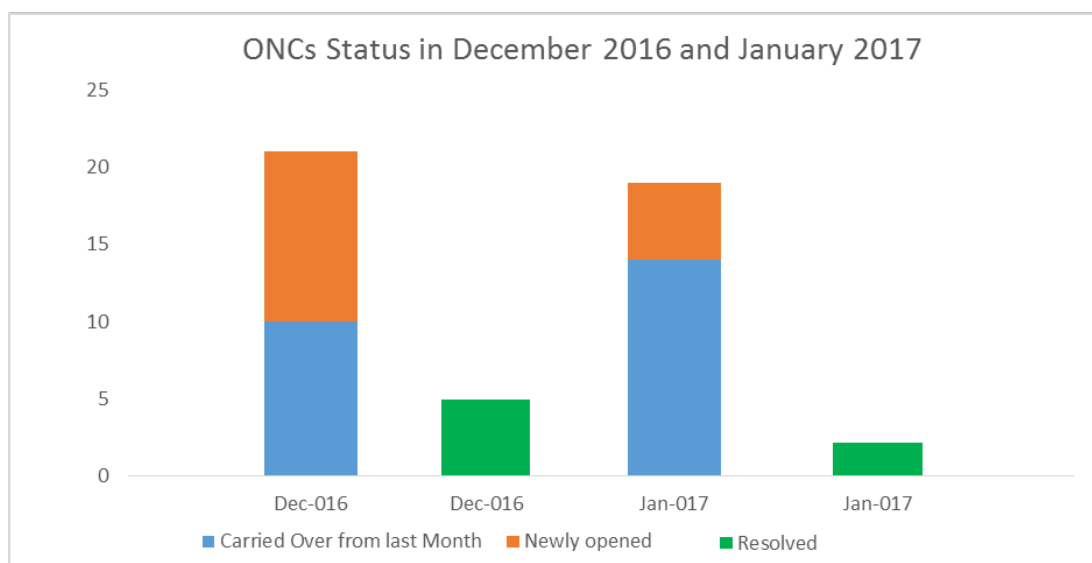


Table 3-3: Summary of ONCs and NCRs

Reporting Period (01-31 January 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from December 2016	14	1	1	0
New issues this month	5	1	3	0
Resolved this month	3	0	0	0
Carried forward into February 2017	16	2	4	0
Unresolved exceeding deadline	14	2	1	0

Figure 3-3: Observations of non-compliance (ONCs) in December 2016 Compared with January 2017



3.1.4 Inspection by Environmental Monitoring Units

In the period 17 to 19 January 2017, Provincial and District EMUs conducted a joint environmental monitoring mission together with NNP1PC covering the main construction sites and camps, Houay Soup landfill and Houay Soup Resettlement Area (HSRA). On 19 January 2017, after the wrap-up meeting, the EMUs submitted their mission report to NNP1PC. Main environmental issues identified by the EMUs are the following:

- Unstable embankment of a grey water pond at both Song Da 5 Camp No. 1 and Camp No. 2 which posed a risk of wastewater overflowing into the Nam Ngiep River;
- Turbid water discharge from the RCC Plant;
- Improper Site Decommissioning of the SECC Contractor;
- Incomplete construction of Waste Water Treatment Plant at LILAMA 10, and
- Stagnant grey water at Song Da 5 Camp No. 2.

NNP1PC will submit a response letter to the EMU Report in February 2017 describing the progress of solving the issues.

On 26 January 2017, NNP1PC submitted a progress report to the EMUs on the implementation of the corrective actions requested by the EMUs in their December 2016 mission report.

3.2 Environmental Quality Monitoring

The construction of NNP1 Project laboratory was commenced in the third week of October 2016 with a progress of 75% by the end of January 2017 and is expected to be completed by 28 February 2017 (see Photograph 3 and Photograph 4). Laboratory equipment was temporary installed, tested and operated at a warehouse located next to the laboratory in the Owner's Site Office and Village (OSOV). The NNP1 Project laboratory analysis validation with UAE laboratory results for TSS will be commenced in February 2017.

Photograph 3: Laboratory construction progress (external view).



Photograph 4: Laboratory construction progress (internal view)



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

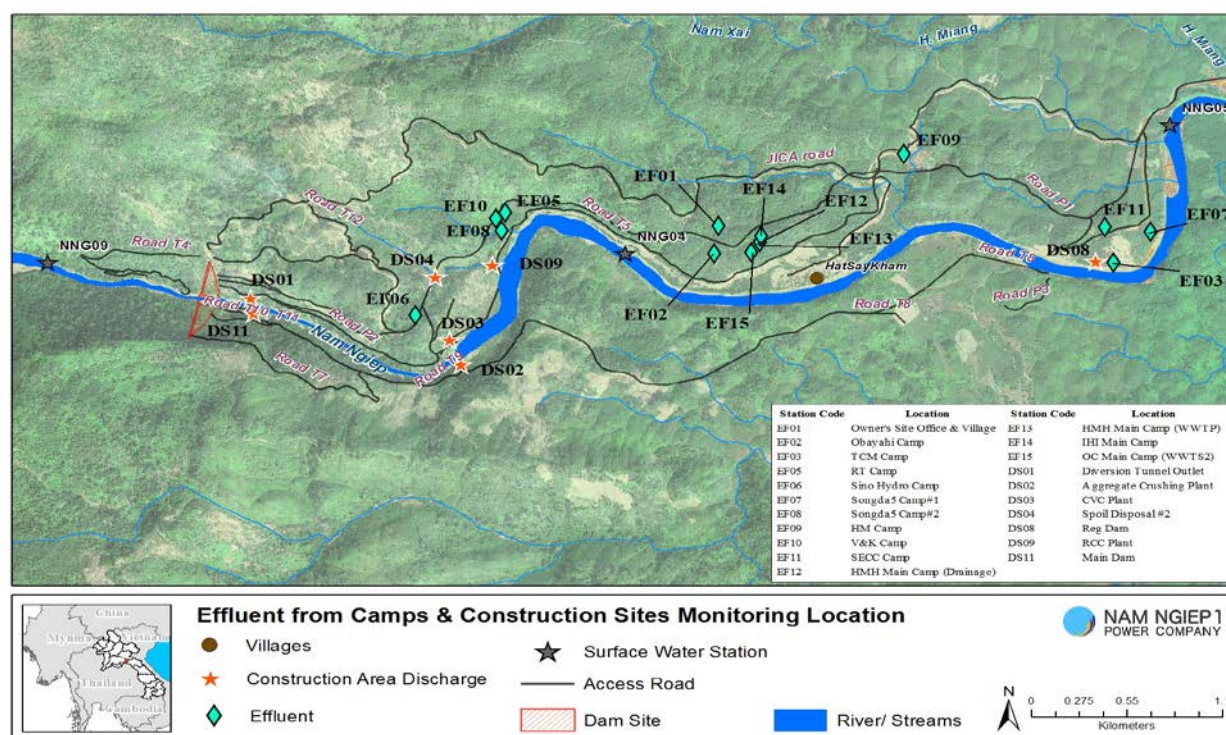
- a) Effluent discharge from camps and construction sites;
- b) Ambient surface water quality monitoring;
- c) Groundwater and community water supply;
- d) Landfill leachate;
- e) Ambient noise and noise emission monitoring.

All Environmental Quality Monitoring data are routinely reported to the Ministry of Natural Resources and Environment (MONRE) in the Monthly Environmental Management and Monitoring Reports (EMMR) and to ADB in the Quarterly Environment Monitoring Reports.

3.2.1 Effluent Discharge from Camps and Construction Sites

Since July 2016, the frequency of effluent monitoring has increased from monthly to fortnightly at all the camps, and from fortnightly to weekly at the construction sites. Results of the monitoring of effluents from the camps and construction sites are presented in **Table 3-4**, and the monitoring locations are displayed on the map in **Figure 3-4**.

Figure 3-4: Map of Effluent Discharge Monitoring Locations



Detailed monitoring results are provided in Annex 1 of this Report. The results indicate that none of the camps except the Owner's Site Office and Village comply with the applicable effluent standards. The corrective actions are summarized below.

Table 3-4: Compliance Assessment of the Effluent Discharge from the Camps and Construction Sites

Site	Sampling ID	Non-Compliance with applicable effluent standards	Corrective Actions
Owner's Site Office and Village	EF01	Minor non-compliances: Total nitrogen, Ammonia nitrogen	No corrective actions are needed. These are not likely to cause major impacts on the ambient water quality of Nam Ngiep.
OC Camp (WWTP1)	EF02	Biochemical Oxygen Demand (BOD ₅), COD, Ammonia nitrogen (NH ₃ -N), total nitrogen and total coliforms exceeded the Standards for both missions. In addition, the total phosphorus slightly exceeded the standard with a value of 2.54 mg/l for the second mission (sampling missions 18 January 2017).	No evidence on the WWTS improvement at this camp as agreed initially (to be completed by the end of February 2017). A meeting between NNP1PC (TD and EMO) and the CWC (OC) at OVSO will be held on 01 February 2017 to discuss the outstanding non-compliance issues and deadlines for corrective action implementation.
Sino Hydro Camp	EF06	BOD, Ammonia nitrogen (NH ₃ -N), total nitrogen and total coliforms	As above.

Site	Sampling ID	Non-Compliance with applicable effluent standards	Corrective Actions
		exceeded the Standard for both missions.	
Song Da 5 Camp No. 1	EF07	NH ₃ -N, total nitrogen, BOD and total coliform did not comply with the Standard for both missions. In addition, COD, total phosphorus and TSS in the second mission (sampling missions on 18 January 2017) did not comply with the Standard.	Chlorination has not commenced at this camp in January 2017. Water samples were collected from these ponds and contained high total coliforms. The Contractor agreed to complete the corrective actions by 15 February 2017 (see <i>Table 3-2</i>)
Song Da 5 Camp No. 2	EF08	NH ₃ -N, total nitrogen, BOD and COD did not comply with the Standard for both missions. In addition, total coliform in the first mission and total phosphorus in the second mission did not comply with the Standard but has improved after the chlorination by applying calcium hypochlorite in the chlorine contact tank.	Chlorination of the waste water has commenced since the end of December 2016. The results have improved (from total coliforms of 160,000 MPN/100 ml in December 2016 to 22,000 MPN/100 ml). NNP1PC-EMO will carry out chlorination break point tests in February 2017 using calcium hypochlorite and will continue to monitor the results.
Hitachi-Mitsubishi Hydro (HMH) Worker Camp No.1	EF09	Total coliforms did not comply with the Standard for the missions.	No progress on the WWTS improvement at this camp. NNP1PC suggested the Contractor to complete the improvement of their WWTS by 28 February 2017. See <i>Table 3-2</i> for corrective actions.
V&K Camp	EF10	Total Coliforms were higher than the applicable Standards for the both missions. Total nitrogen exceeded the standard for the first mission (sampling missions on 13 January 2017).	No progress with the WWTS improvement at this camp as initially agreed (to be completed by the end of February 2017). A meeting between NNP1PC (TD and EMO) and-the CWC (OC) at OVSO will be held on 01 February 2017 to discuss the outstanding non-compliance issues and deadlines for corrective action implementation.
SECC Camp	EF11	Minor non-compliance for NH ₃ -N, total nitrogen and total coliforms.	See <i>Table 3-2</i> for corrective actions. In addition, NNP1PC-EMO is monitoring the remaining camp building from the decommissioning activities and the WWTS to identify if chlorination is needed for the

Site	Sampling ID	Non-Compliance with applicable effluent standards	Corrective Actions
			remaining 10 workers staying at this Camp building in February 2017.
H-MH Main Camp (WWTS)	EF13	BOD ₅ , COD, Total Nitrogen and Total Coliforms did not comply with the Standard for both standard. In addition, TSS in the first mission, and Ammonia nitrogen in the second mission were higher than the standard.	No progress on the WWTS improvement. NNP1PC proposed that the Contractor is to complete the improvement of their WWTS by 28 February 2017.
IHI Main Camp	EF14	BOD ₅ , COD, Ammonia Nitrogen, Total Nitrogen and Total Coliforms exceeded the Standard for the both missions (sampling missions on 13 and 18 January 2017).	Chlorination tests for a breakpoint were carried out by NNP1PC-EMO before advising the Contractor. It was suggested to the Contractor that it should improve the existing wetland ponds in accordance with the Owner's Instruction Letter by 28 February 2017.
OC Camp (WWTS2)	EF15	BOD, COD and total coliforms were higher than the Standards for sampling missions on 13 and 18 January 2017. In addition, TSS exceeded the standard for the sampling mission on 13 January 2017 only.	No progress on the WWTS improvement at this Camp. NNP1PC suggested the Contractor to complete the improvement of their WWTS by 28 February 2017.
TCM Camp	EF03	Total coliform exceeded the standard for 18 January 2017.	As above.
Main Dam Construction Area	DS11	Non-compliance for pH at the turbidity treatment plant.	This non-compliant result was communicated to the Contractor for monitoring the plant's operation. The Contractor informed that the high pH was due to a maintenance issue at the treatment plant. This issue was addressed.
Re-regulation Dam	DS08	All parameters monitored complied with the standard.	No corrective action is needed.
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	The pH value (measured on 11 January 2017) was 5.84, lower than standard range	No corrective action is needed. The low pH values in the past 4 months confirm the natural water quality condition of the creek which passes this sampling site. Similar cases happened in the dry season of 2015.
RCC Plant	DS09	The TSS value exceeded the standard.	Refer to <i>Table 3-2</i> for corrective action.

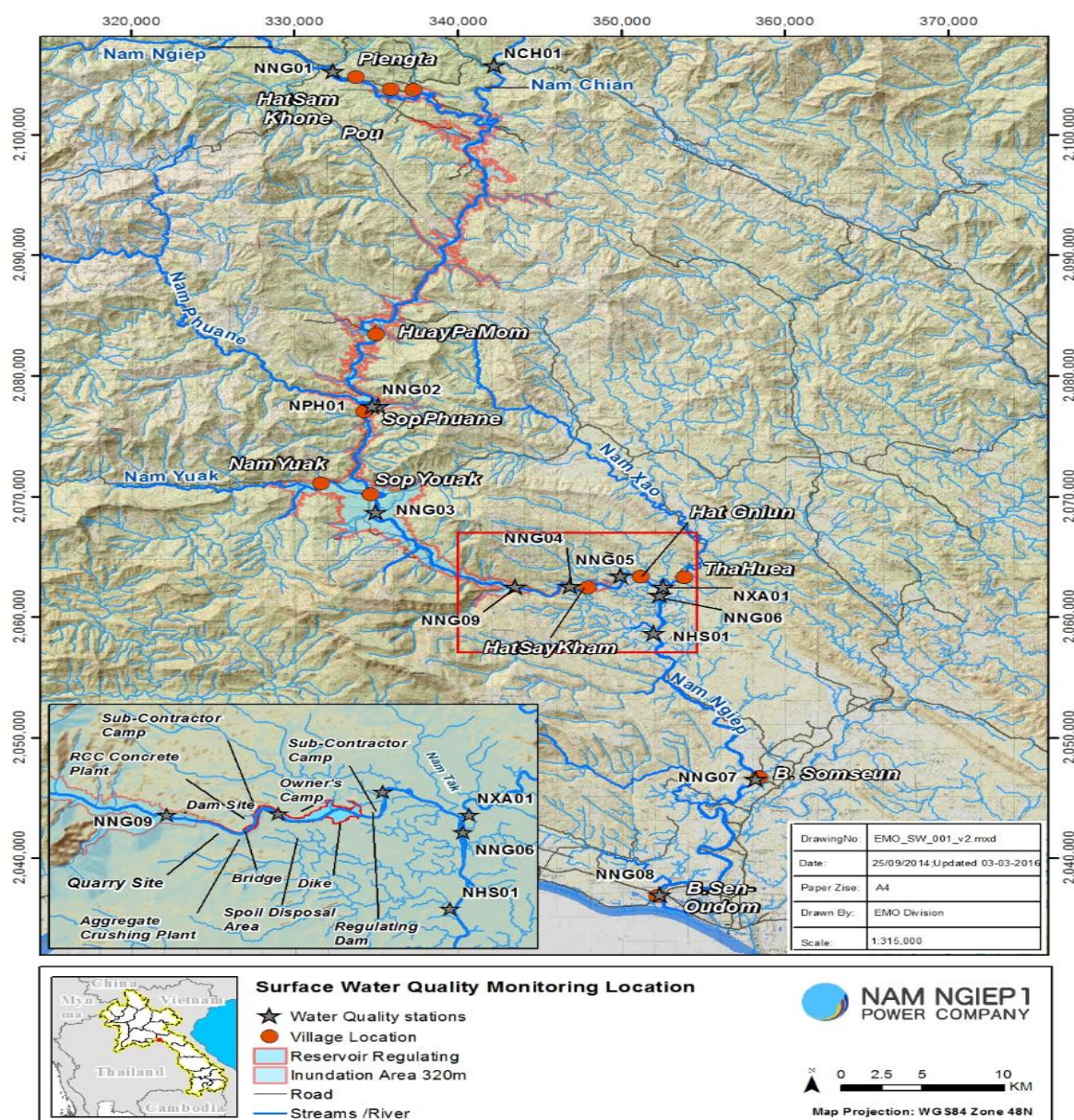
Site	Sampling ID	Non-Compliance with applicable effluent standards	Corrective Actions
CVC Plant	DS03	Wastewater was retained in the ponds and no discharge to the environment was observed.	No corrective action was needed.
Aggregate Crushing Plant	DS02	Minor non-compliances for TSS.	See <i>Table 3-2</i> for corrective actions.

3.2.2 Ambient Surface Water Quality Monitoring

Surface water samples are collected and analysed twice a month¹ 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 thirteen stations). From August 2016, weekly surface water quality monitoring (physical parameters only) has been undertaken with respect to Station NNG09 located immediately upstream of the Main Dam, NNG04 located in the reach within the Construction Area and NNG05 immediately downstream of Re-regulation Dam.

¹ 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 January 2017 are shown below.

Nam Ngiep

Most of the parameters monitored complied with the national surface water quality standards, except Chemical Oxygen Demand (COD) which continued to exceed the Standard for the stations of Nam Ngiep Upstream at Ban Phiengta (NNG01 – Upstream Construction Sites), Nam Ngiep Upstream of Nam Phouan Confluence (NNG02 – Upstream of the Construction Sites), Nam Ngiep Downstream of Ban Sop Yuak (NNG03 – Upstream of Construction Sites), Nam Ngiep Upstream Main Dam (NNG09 – Upstream of Construction Sites), Nam Ngiep Downstream of RT Camp (NNG04 – Within Construction Sites) and Nam Ngiep Downstream of Nam Xao Confluence (NNG06 – Downstream of the Construction Sites). The highest amount of COD recorded was at the Nam Ngiep Downstream of the decommissioned RT Camp (NNG04 – Within Construction Sites) at 11.7 mg/l.

Since Nam Ngiep surface water quality monitoring programme commenced in September 2014, EMO has frequently found elevated levels of COD with concentrations exceeding the surface water quality standards.

Table 3-5: Results of the Physical and Chemical Parameters of Nam Ngiep Surface Water Quality Monitoring

Parameters (Unit)	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	09/1/17	10/1/17	10/1/17	11/1/17	11/1/17	11/1/17	11/1/17	11/1/17	11/01/17
	Guideline									
pH	5.0 – 9.0	7.11	7.73	6.67	7.4	7.32	7.46	7.58	7.64	7.46
DO (%)		85.6	92.4	83	72	78.6	102.2	100	97.1	99.3
DO (mg/l)	>6.0	7.18	7.67	6.51	6.24	6.36	8.62	8.41	7.78	8.14
Conductivity (µs/cm)		121	95	68	103	113	86.7	89.1	118	115
TDS (mg/l)		60	47	35	51	56	43	45	59	57
Temperature (°C)		22.24	22.58	23.4	21.99	23.3	22.8	22.9	24.67	23.93
Turbidity (NTU)		62	61.60	26.7	31.7	30.4	22	17.9	27	16.8
TSS (mg/l)		228	98.9	42.1	46.7	42	44	42.6	39.3	26.1
BOD ₅ (mg/l)	<1.5	ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³
COD (mg/l)	<5.0	7.6	6.5	8.3	5.9	11.7	ND ¹⁶	9.3	ND ¹⁶	ND ¹⁶
NH ₃ -N (mg/l)	<0.2	0.2	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²
NO ₃ -N (mg/l)	<5.0	0.11	0.1	0.19	0.13	0.16	0.14	0.14	0.14	0.1
Manganese (mg/l)	<1	0.166	0.106	0.064	0.068	0.063	0.06	0.058	0.054	0.038
Total Iron (mg/l)		2.74	8.98	3.68	3.76	3.72	3.84	3.66	3.04	1.47
Total coliform (MPN/100 ml)	<5,000	1,100	790	490	790	1,100	790	790	790	490
Faecal coliform (MPN/100 ml)	<1,000	240	790	490	490	490	790	220	49	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: Results of Physical Parameters of Nam Ngiep Surface Water Quality Monitoring – Weekly and Fortnightly

Parameters (Unit)	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	06/1/17	06/1/17	06/1/17
	Guideline			
pH	5.0 – 9.0	7.13	7.15	7.14
DO (%)		90.4	85.6	81.8
DO (mg/l)	>6.0	7.17	6.9	6.66
Conductivity (µs/cm)		169	116	142
TDS (mg/l)		85	58	71

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	06/1/17	06/1/17	06/1/17
Parameters (Unit)	Guideline			
Temperature (°C)		26.01	25.06	24.12
Turbidity (NTU)		11.2	13.36	11.5

	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	23/1/17	24/1/17	24/1/17	25/1/17	25/1/17	25/1/17	25/1/17	25/1/17	25/1/17
Parameters (Unit)	Guideline									
pH	5.0 – 9.0	7.54	7.74	7.88	7.21	7.52	7.31	7.64	7.08	7.3
DO (%)		122.5	90.6	90.4	90.4	101.5	103.4	105	78.6	99.6
DO (mg/l)	>6.0	10.44	8.1	8.09	7.85	8.87	9.1	9.15	7.01	8.71
Conductivity (µs/cm)		126	121	124	135	116	88	119	196	119
TDS (mg/l)		63	60	62	67	58	44	59	98	60
Temperature (°C)		20.87	19.58	20.12	21.34	21.9	21.1	20.91	20.17	21.27
Turbidity (NTU)		16	16.5	11.2	13.2	24.8	14.4	11.7	14.1	25.4

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	17/1/17	17/1/17	17/1/17
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.66	7.16	6.96
DO (%)		84	82.1	84.1
DO (mg/L)	>6.0	7.1	6.74	6.86
Conductivity (µs/cm)		113	125	131
TDS (mg/l)		57	62	65
Temperature (°C)		22.29	23.99	24.25
Turbidity (NTU)		44	49.5	42.8

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

Nam Chiane (NCH01) is located about 66 km upstream of the Main Dam. The COD and faecal coliform exceeded the National Surface Water Quality Standard with recorded values of 6.3 mg/l and 1,300 MPN/100 ml respectively.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. All parameters monitored complied with the relevant surface water quality standards.

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

Nam Xao has a confluence with the Nam Ngiep downstream of the NNP1 Project construction site. The parameters monitored complied with the relevant surface water quality standards, except COD.

Houay Soup Nyai has a confluence with the Nam Ngiep River downstream of NNP1 Project construction site. The COD exceeded the National Surface Water Quality Standard with a recorded value of 8.7 mg/l.

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

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	09/1/17	10/1/17	11/1/17	11/1/17
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	6.82	7.87	7.28	7.25
DO (%)		77.3	104.2	84.9	76.6
DO (mg/l)	>6.0	6.24	8.94	6.95	6.49
Conductivity(μs/cm)		68	65	136.3	61.1
TDS (mg/l)		34	32	68	30
Temperature (°C)		22.33	21.31	24.5	22.6
Turbidity (NTU)		28	3.43	1.79	5.73
TSS (mg/l)		79.5	5.6	2.4	5.4
BOD ₅ (mg/l)	<1.5	ND ¹³	ND ¹³	ND ¹³	1.1
COD (mg/l)	<5.0	6.3	ND ¹⁶	6.3	8.7
NH ₃ -N (mg/l)	<0.2	ND ¹²	ND ¹²	ND ¹²	ND ¹²
NO ₃ -N (mg/l)	<5.0	0.11	0.08	0.06	0.11
Manganese (mg/l)	<1	0.051	0.026	0.041	0.044
Total Iron (mg/l)		0.815	0.28	0.324	1.32
Total coliform (MPN/100ml)	<5,000	4,900	46	790	130
Faecal coliform (MPN/100ml)	<1,000	1,300	33	170	33

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 (measured Every Fortnight)

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	23/1/17	24/1/17	25/1/17	25/1/17
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.58	8.16	7.23	6.65
DO (%)		115.9	102.3	100.9	77.8
DO (mg/L)	>6.0	10.85	9.47	8.66	7.09
Conductivity(μs/cm)		61	94	174	121
TDS (mg/L)		31	47	87	60

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	23/1/17	24/1/17	25/1/17	25/1/17
Parameters (Unit)	Guideline				
Temperature (°C)		17.01	18.62	22.34	19.5
Turbidity (NTU)		98	3.12	2.07	6.51

3.2.3 Groundwater Quality Monitoring

During January 2017, NNP1PC sampled and analysed the groundwater quality in 13 boreholes. Out of these, one borehole is community owned borehole at Hatsaykham Village, one borehole is a private well at Hat Gniun Village, six boreholes are built by the Project for re-settlers at Houay Soup Resettlement Area, and five boreholes are built by NNP1PC around NNP1 Project Landfill and Houay Soup Landfill.

All groundwater quality data are routinely reported to the Social Management Office of NNP1PC which then communicates the results to the village authorities and the local health centres as part of the Project's public health programme. The results are shown below.

Hatsaykham Village

The monitored parameters complied with the standards, except pH which was lower than the Standard with recorded values of 5.80 for the borehole number GHSK01 (at the same boreholes monitored in previous months).

Hat Gnuin Village

Contamination with faecal coliforms and E.coli bacteria was found with content of 21 MPN/100 ml which was much lower than the previous month but still exceeded the National Standard. In addition, pH result was 6.01 which was slightly lower than the Standard. Other parameters monitored complied with relevant groundwater quality standards.

Houay Soup Resettlement Area (HSRA)

The pH for the borehole number GHSP04 and GHSP06 with the values recorded of 5.82 and 6.28 respectively. In addition, contamination with faecal coliform and E.coli bacteria was found in the borehole number GHSP02 with value recorded of 230 MPN/100 ml. Other parameters complied with the standard.

NNP1 Solid Waste Landfill and Houay Soup Landfill

Lead was detected in two out of four boreholes at NNP1 Project Landfill (at MW1 and MW3), the result was slightly higher than the standard at 0.011 mg/l. Similar high value was detected at Houay Soup Landfill (MW5) at 0.021 mg/l. These results are similar to the levels found in September, October, November and December 2016. It is unlikely that the levels of lead found in those boreholes are caused by seepage of leachate pond from the landfills - not least because lead has not been detected in the leachate.

Figure 3-6: Groundwater Quality Monitoring Locations

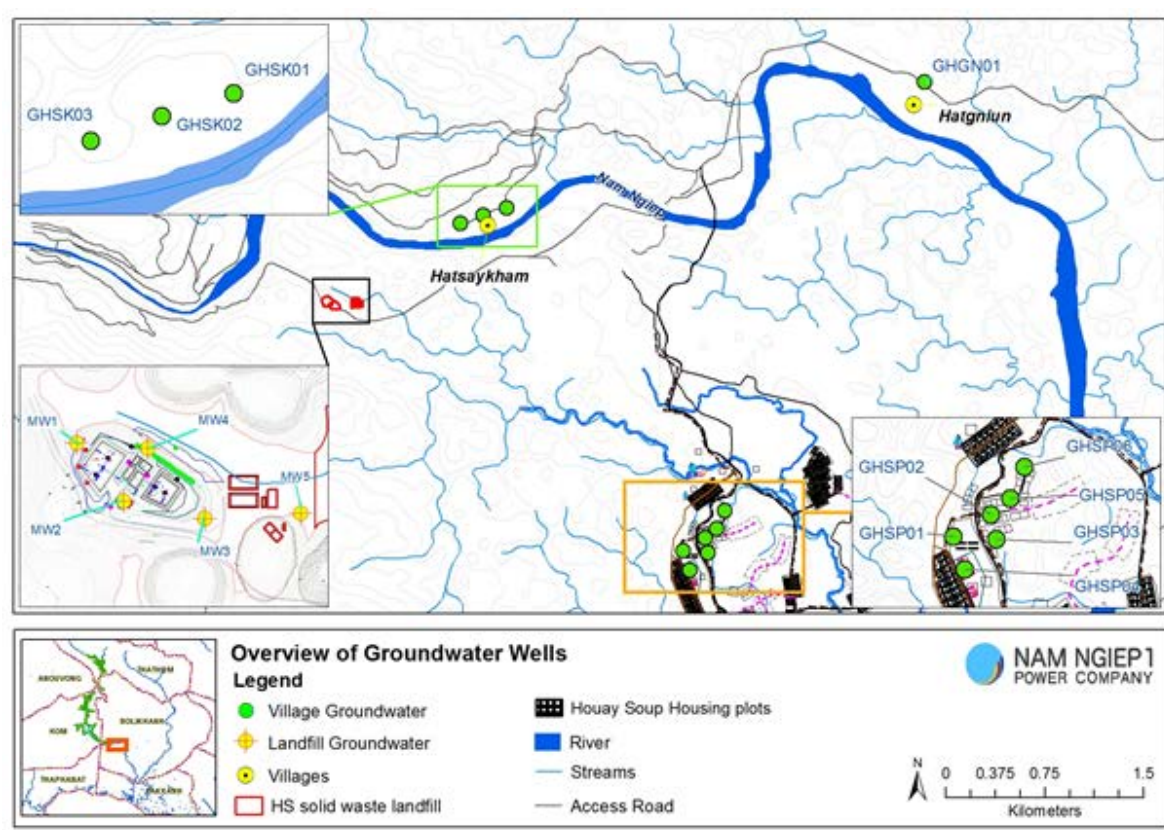


Table 3-9: Groundwater Quality Monitoring Results Hatsaykham and Hat Gniun Villages in January 2017

	Site Name	Hatsaykham Village			Hat Gnuin Village
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	16/1/17			20/1/17
Parameter (Unit)	Guideline				
pH	6.5-9.2	5.8	Broken Hand pump	Broken Hand pump	6.01
Sat. DO (%)		29.7			64.6
DO (mg/l)		2.32			5.12
Conductivity (µs/cm)		108			254
TDS (mg/l)	<1,200	54			127
Temperature (°C)		26.19			25.9
Turbidity (NTU)	<20	0.8			3.16
Faecal coliform (MPN/100 ml)	0	0			21
E. Coli Bacteria (MPN/100 ml)	0	0			21

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 3-10: Groundwater Quality Monitoring Results for Houay Soup Resettlement Area in January 2017

Parameter (Unit)	Site Name	Houay Soup Resettlement Area (HSRA)					
	Station Code	GHSP01	GHSP02	GHSP03	GHSP04	GHSP05	GHSP06
	Date	16/1/17	16/1/17	16/1/17	16/1/17	16/1/17	16/1/17
	Guideline						
pH	6.5-9.2	7.08	6.79	7.24	5.82	6.54	6.28
Sat. DO (%)		55.6	56	53.6	14	77.4	75
DO (mg/l)		4.4	4.54	4.3	1.06	6.04	5.89
Conductivity (µs/cm)		503	247	528	126	160	207
TDS (mg/l)	<1,200	251	123	264	63	80	104
Temperature (°C)		25.46	24.43	25.19	26.05	25.99	25.6
Turbidity (NTU)	<20	0.76	0.93	1.31	2.04	0.73	1.63
Faecal coliform (MPN/100ml)	0	0	230	0	0	0	0
Ecoli Bacteria (MPN/100ml)	0	0	230	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)			

Table 3-11: Groundwater Monitoring Results for NNP1 Project Landfill and Houay Soup Landfill

Parameters (Unit)	Site Name	NNP1 Landfill				Houay Soup Landfill
	Station Code	MW1	MW2	MW3	MW4	MW5
	Date	20/1/17	20/1/17	20/1/17	20/1/17	20/1/17
	Guideline					
pH		6.22	5.99	6.35	5.96	6.31
Sat. DO (%)		39.2	39.9	27.9	31.8	42.1
DO (mg/l)		3.12	3.17	2.23	2.53	3.33
Conductivity (µs/cm)		187.9	30.4	209.4	59.9	103
TDS (mg/l)		93.95	15.2	104.8	30	51.6
Temperature (°C)		25.8	25.9	25.7	25.9	26.2
Turbidity (NTU)		1.62	4.35	4.79	2.89	9.88
BOD (mg/l)		ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³
NH ₃ -N (mg/l)		ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²
Total Nitrogen (mg/l)		0.34	1.17	0.44	1.48	0.57
Copper (mg/l)		ND ¹⁸	ND ¹⁸	ND ¹⁸	ND ¹⁸	ND ¹⁸
Lead (mg/l)	<0.01	0.11	0.01	0.06	0.010	0.021
Total Phosphorus (mg/l)		0.04	0.03	0.1	0.04	0.07
Total coliform (MPN/100 ml)		0	0	0	0	400
Faecal Coliform (MPN/100 ml)		0	0	0	0	600
Total Petroleum hydrocarbons (mg/l)		ND ¹³	ND ¹³	ND ¹³	ND ¹³	ND ¹³

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring for GFWS system is conducted on a monthly basis with the aim to alert the users in case of health risks when using the water for bathing or washing. During January 2017, water samples were taken from the taps at Thaheua and Hat Gniun Villages.

Results of the assessment for GFWS of both Thaheua and Hat Gniun Villages are shown and summarised as below:

Thahuea Village (WTHH02): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E. coli which were found to be 33 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN2): Faecal coliforms and E. coli were found to be 20 MPN/100 ml.

Table 3-12: Results of the Gravity Fed Water Supply Quality Monitoring

	Site Name	Thaheua Village	Hat Gnuin Village
	Station Code	WTHH02	WHGN02
	Date	16/1/17	20/1/17
Parameter (Unit)	Guideline		
pH	6.5-8.5	6.55	6.85
Sat. DO (%)		75.3	97.2
DO (mg/l)		6.03	7.57
Conductivity (µs/cm)	<1,000	86	64.5
TDS (mg/l)	<600	43	32.2
Temperature (°C)	<35	25.52	27.3
Turbidity (NTU)	<10	2.3	1.45
Faecal coliform (MPN/100ml)	0	33	20
E. Coli Bacteria (MPN/100mL)	0	33	20

3.2.5 Landfill Leachate Monitoring

During January 2017, water samples were taken from the last landfill leachate ponds of the NNP1 Project Landfill (LL4). The location of landfill leachate monitoring is displayed in Figure 1-7. The results indicate compliance with the relevant standards in the final pond (LL4).

Figure 3-7: Landfill Leachate Monitoring Location

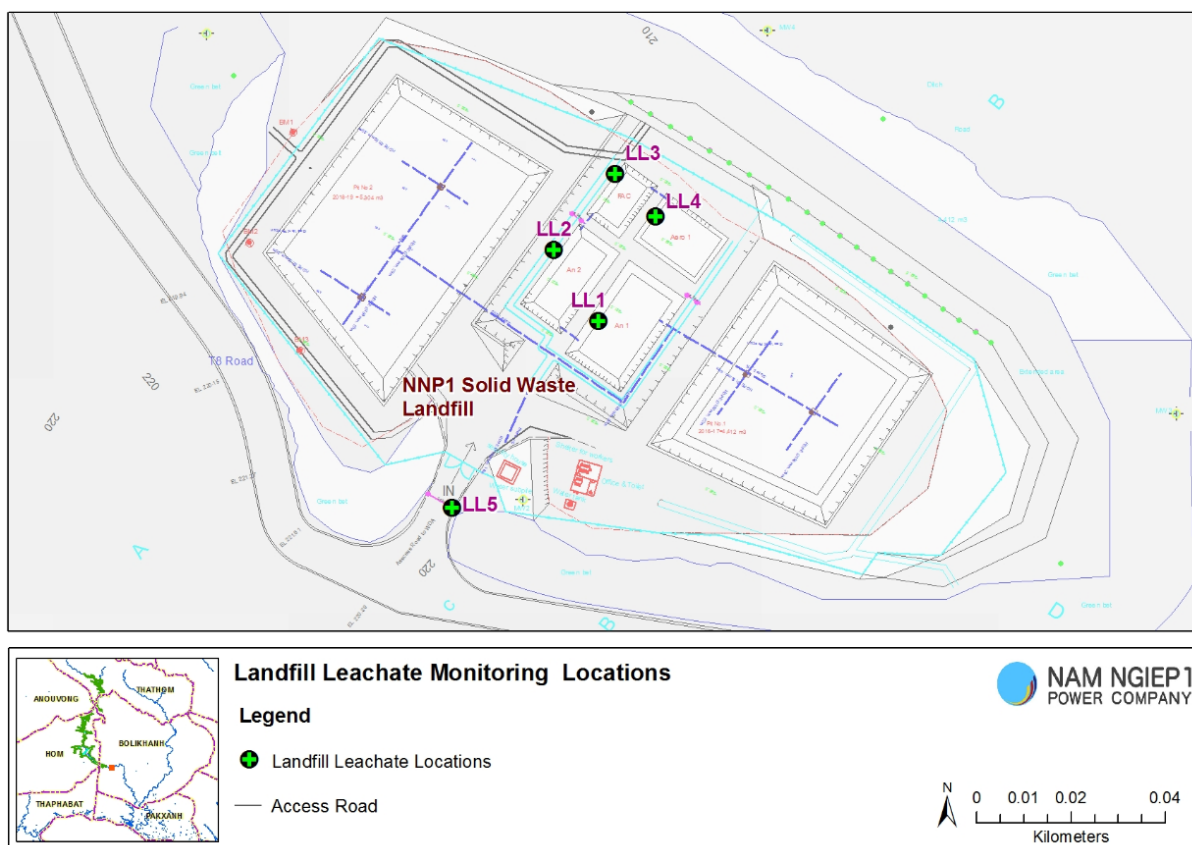


Table 3-13: Landfill Leachate Monitoring Results

	Site Name	NNP1 Landfill Leachate
	Station Code	LL4
	Date	20/01/2017
Parameters (Unit)	Guideline	
pH	6.0 - 9.0	7.89
Sat. DO (%)		104.2
DO (mg/l)		8.36
Conductivity (µs/cm)		174.4
TDS (mg/l)		87
Temperature (°C)		25.2
Turbidity (NTU)		7.31
BOD (mg/l)	<30	4.9
COD (mg/l)	<125	38.1
NH ₃ -N (mg/L)	<10.0	ND ¹²
Total nitrogen (mg/l)	<10.0	1.45
Oil & Grease (mg/l)	<10	ND ¹³
Copper (mg/l)	<0.3	ND ¹⁸
Lead (mg/l)	<0.2	ND ¹⁰
Total phosphorus (mg/l)	<2	0.02
Total coliform (MPN/100ml)	<400	30
Faecal Coliform (MPN/100ml)		31
Total petroleum hydrocarbons (mg/l)		ND ¹³

3.2.6 Dust Monitoring

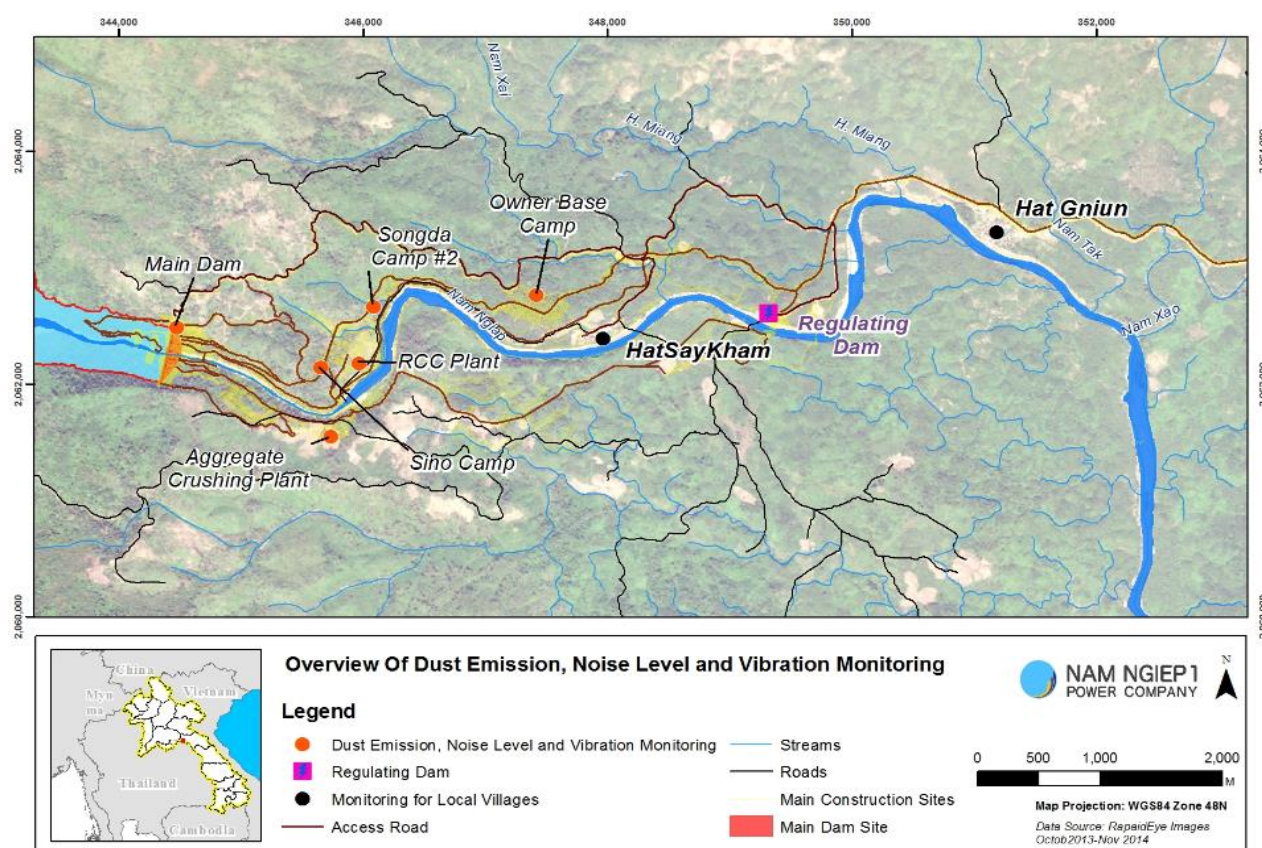
The monitoring points are indicated on the map in **Figure 3-8**. All average dust results during the monitored period complied with the National Standard, except at the Aggregate Crushing Plant. The results are presented in **Annex B**.

3.2.7 Noise Monitoring

During January 2017, noise monitoring was conducted in Ban Hat Gnuin for at least 72 consecutive hours. Noise monitoring was also conducted at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No. 2 and Sino Hydro Temporary Worker Camp (new) to assess possible impact on workers' health and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 consecutive hours.

The noise monitoring location are described in the Figure 3-8 below

Figure 3-8: Noise and Dust Emission Monitoring Locations



The noise levels recorded at the monitoring stations indicated full compliance with the National Standard for the time period of 06:01-22:00, except at the Aggregate Crushing Plant. The noise levels during the period of 22:01-06:00 were higher than the Standard at the Aggregate Crushing Plant, RCC Plant, Song Da5 Camp No.2, Sino Hydro Camp, Sino Hydro Temporary Worker Camp and the Main Dam [between 53.96 – 78.57 dB(A) compared to the Standard of 50 dB(A)].

3.3 PROJECT WASTE MANAGEMENT

3.3.1 Solid Waste Management

In January 2017, NNP1PC closely supervised the landfill operations including waste disposal, compaction and soil cover activities using a crawler excavator. The solid waste delivered to the NNP1 Project Landfill was regularly checked by NNP1PC staff (See Photograph 5 and Photograph 6 below). Approximately 131.7 m³ of solid waste was disposed at the NNP1 Project Landfill during January 2017, a decrease of 126 m³ compared to December 2016.

Photograph 5: Waste compaction and soil cover at the NNP1 Project Landfill



Photograph 6: Waste disposal spot checking by NNP1PC staff at the NNP1 Project Landfill



3.3.2 Hazardous Materials and Waste Management

During January 2017, joint hazardous materials and waste inventories were carried out at the main construction sites and subcontractors' camps as indicated in Table 3-14.

The types and amounts of hazardous materials generated at different construction sites and camps are sold to new vendors (Saysana and Xiengkhouane Processing Factory in the Vientiane capital) for disposal as indicated in **Table 3-14**. These new vendors will be audited by NNP1PC-EMO in February 2017

Table 3-14: Results of hazardous material inventory

No.	Hazardous Waste Type	Unit	Total in January 2017 (A)	Disposal by Selling (B)	Remainder (A - B)
1	Used hydraulic and engine oil	litre (l)	6,650	60	6,590
2	Empty used chemical drum/container	drum (20 l)	1,500	0	1,500
3	Used oil filters	No.	592	7	585
4	Used tyre	No.	387	32	355
5	Ink cartridge	No.	229	0	229
6	Empty paint and spray cans	can	168	0	168
7	Cement bag	bag	2,800	2,700	100
8	Empty used oil drum/container	drum (20 l)	104	7	97
9	Empty contaminated bitumen drum/container	drum (200 l)	82	0	82
10	Empty used chemical drum/container	drum (200 l)	31	0	31
11	Empty used oil drum/container	drum (200 l)	41	12	29
12	Contaminated soil, sawdust and concrete	bag	25	0	25

No.	Hazardous Waste Type	Unit	Total in January 2017 (A)	Disposal by Selling (B)	Remainder (A - B)
13	Halogen/fluorescent bulbs	No.	24	0	24
14	Contaminated textile and material	Bag	18	0	18
15	Car battery	No.	11	0	11
16	Clinical waste	kg	34	23	11
17	Acid and caustic cleaners	bottle	0	0	0
18	Used oil mixed with water	litre (l)	0	0	0

In January 2017, the amount of recyclable waste was recorded at each NNP1 Project construction site and offices including Song Da 5 Camp No.1, TCM Camp, GFE Camp, Re-regulation Dam, V&K Camp, Song Da5 Camp No.2, Song Da 5 Workshop at Disposal Area No.2, RCC Plant, Sino Hydro Worker's Camp, Sino Hydro Camp, Kenber Camp, SECC Camp and each Contractor's Camp at Houay Soup Resettlement Area (HSRA). The amount of sold recyclable waste is shown in Table 3-15:

Table 3-15: Amounts of Recyclable Waste Sold

No.	Type of Recycled Waste	Unit	Sold	Cumulative Total by January 2017
1	Scrap metal	kg	1,800	12,887
2	Glass	kg	119	470
3	Plastic bottles	kg	110	196
4	Paper/Cardboard	kg	141	176
5	Aluminium	kg	6	149

A total of 2,799 kg of recyclables waste from Hat Giun Recyclable Waste Bank was sold to local vendors in Pakxan District, Borikhamxay Province, and a total of 23 kg of clinical waste from the NNP1 Project site was transported and incinerated at the incinerator located within the Vientiane landfill. In addition, a total of 70 m³ of black water from the E&M Contractors' camps was disposed of at the designated Spoil Disposal Area No. 6 following NNP1PC-EMOs Standard Operating Procedure (SOP) for Sewage/Black Water Disposal (See Photograph 7 and Photograph 8 below).

Photograph 7: IHI & HM Hydro sewage sludge/black water were disposed of in the designated Spoil Disposal Area No. 6



Photograph 8: NNP1 Project Clinical Waste was Incinerated at Vientiane Landfill



The food waste generated from the Owner's Site Office and Village (OSOV), selected camps of Contractors and subcontractors continues to be collected by Hatsaykham villagers for use as animal feed (pig and poultry). A total of 3,326 kg was collected in January 2017 as shown in Table 3-16.

Table 3-16: Amount of Food Waste Collected by Villagers

NO.	SITE LOCATION NAME	UNIT	TOTAL
1	Song Da 5 Camp No. 2	kg	1,786
2	Song Da 5 Camp No. 1	kg	864
3	Obayashi Corporation Camp	kg	491
4	Owner's Village and Site Office	kg	185
Total		kg	3,326

During January 2017, NNP1PC-EMO conducted a waste management awareness training for NNP1PC Vientiane staff of Vientiane office, a total of 32 staff participated. The main purpose of the training was to raise waste management awareness (both with respect to non-hazardous and hazardous waste) and improve NNP1 Project good waste management practices (See Photograph 9 and Photograph 10 below).

Photograph: 9 & 10 Waste Management Awareness Training at Vientiane office



3.4 Community Waste Management

3.4.1 Community Recycling Programme

By the end of January 2017, a total of 484 kg of recyclable waste accumulated in the Community Recycle Bank. During January 2017 alone, a total of 788 kg of recyclable waste was recorded, an increase of 249 kg compared to December 2016. A total of 121 households hold accounts at the Community Recycle Bank (no increase in membership since October 2016). The percentages of participation in the programme for each village remain as 87% for Hat Gniun Village, 64% for Hatsaykham Village and 64% for Thahuea Village.

The types and amounts of waste recycled in January 2017 are presented in Table 3-17

Table 3-17: Types and amounts of waste traded

Types of Waste	Unit	Remaining In December 2016	Received In January 2017	Sold	Remaining Amount In January 2017
Glass	kg	210	184	0	394
Paper/cardboard	kg	397	93	400	90
Scrap metal	kg	983	360	1,343	0
Plastic bottle	kg	259	75	334	0
Aluminium cans	kg	324	75.5	399.5	0
Total	kg	2,173	788	2,477	484

NNP1PC-EMO continued to carry out trial trading of recyclable waste with new residents at Houay Soup Resettlement Area (HSRA) and host village such as Ban Thaheua, Hat Gniun and Hatsaykham Villages. This was also an opportunity to provide the villagers with waste management recommendations, which include waste segregation, waste generation reduction and waste disposal in a temporary waste pit at each household as well as how to manage recyclable waste before selling to the Community Recyclable Waste Bank at Hat Gniun Village (see Photograph 11 and Photograph 12 below):

Photograph 11: Waste management recommendation for new residents at HSRA



Photograph 1: NNP1PC bought recyclable waste from new residents at HSRA



3.4.2 Houay Soup Resettlement Area Waste Management

In January 2017, a total of 0.3 m³ of solid waste from HSRA's Contractors was disposed of at Houay Soup Resettlement Landfill. The Contractors were not permitted to dispose of their waste permanently in the temporary waste pit at their camps. The Houay Soup Landfill is opened every Tuesday and Thursday from 09:30 am to 10:30 am through individual arrangement with NNP1PC-EMO staff. The second phase of Houay Soup Landfill construction which includes a 2nd and 3rd lined waste pits, guardhouse and related facilities was commenced in the first week of January 2017 (see Photograph 13 and Photograph 14 below).

Photograph 2: Second and third waste pits were excavated during the second phase of Houay Soup Landfill construction



Photograph 3: Construction of guardhouse and related facilities were carried out in the second phase Houay Soup Landfill construction



3.5 Watershed and Biodiversity Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations ²	Status by January 2017
Prepare: 1) Full draft Nam Ngiep 1 Watershed Management Plan by 15 November 2016	It was agreed with ADB that the conditions precedent for disbursement of the loan amount related to the delivery of the full draft Nam Ngiep 1 Watershed Management Plan has been met, although some parts of the plan still need more work
Prepare draft Watershed Management Regulations by 15 November 2016	There is no further progress on Watershed Management regulation this month after the draft was submitted to ADB on 13 January 2017.
Final Watershed Management Plan by 23 December 2016	As agreed between ADB and NNP1PC, this target date is moved to the First Quarter of 2017
1) A draft provincial regulation submitted to Provincial Justice Department by 23 December 2016. 2) Start of public hearing process by 10 January 2017	As agreed between ADB and NNP1PC, this target date is moved to the First Quarter of 2017

² All previous deadlines on preparation of the Nam Ngiep 1 Watershed Management Plan and watershed management regulations were revised and agreed with ADB in August 2016. The Table only shows the current required submissions and their respective target dates

Obligations ²	Status by January 2017
Activities in January 2017	Results
Data and Information Collection and Analysis for WMP Development	<ul style="list-style-type: none"> • The plan preparation continues with the focus on finalizing Section 7 - baseline and trend analysis. • NNP1 Consultant and EMO had a discussion with WRPO, PONRE, PAFO, and ISP team of Xaysomboun Province on 17-18 January 2017 with the following notes: <ul style="list-style-type: none"> ○ The WMP, provincial regulation, and ISP should be in line with each other and therefore NNP1 requested continuous efforts and collaboration from Xaysomboun officials. ○ Xaysomboun Province will restructure WRPO following the transfer of DFRM to Ministry of Agriculture and Forestry (MAF). ○ NNP1 team also initiated the discussion about future reservoir management plan that needs cooperation and collaboration from Xaysomboun officials. • The meeting on geographical extent of NNP1 watershed area was held on 27 January 2017 at NNP1 Office with the participation from WRPO DFRM, Xaysomboun WRPO, Bolikhamxay WRPO BLX, representatives from Ministry of Energy and Mine (MEM) and Department of Energy and Business (DEB), and Nam Ngiep 2 (NN2) Company. • The meeting addressed the concern on the overlapping area and management responsibility between NNP1 and Nam Ngiep 2. The key notes from the discussion: <ul style="list-style-type: none"> ○ Central GOL recommended NNP1 to continue with WMP finalization using the existing definition of NNP1 watershed area ○ Central and Province GOL will have further discussion with other Project developers in the upper Nam Ngiep watershed including the concerned overlapping area between NNP1 and NN2 watershed.
Prepare draft Watershed Management Regulations by 15 November 2016	<ul style="list-style-type: none"> • There is no further progress on Watershed Management regulation this month after the draft was submitted to ADB on 13 January 2017.
WRPO Activities	<ul style="list-style-type: none"> • Xaysomboun WRPO completed village land-use planning exercise at three villages: Thamlo, Om, and Kohai in Anouvong District, Xaysomboun Province.
Xaysomboun ISP	<ul style="list-style-type: none"> • Xaysomboun ISP team has submitted the draft report to MONRE DEQP in the second week of January 2017. The

Obligations ²	Status by January 2017
	team also submitted the budget proposal to MONRE DEQP on the activities to finalize ISP report.

3.5.2 Biodiversity Offset Management

Obligations ³	Status by January 2017
Start of the Boundary Confirmation Baseline Survey by 20 September 2016	<ul style="list-style-type: none"> Completed
Consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016	<ul style="list-style-type: none"> ADB provided comments to the TOR in the second week of December and it was discussed during the mission that this deadline will be waived.
Issuance of the Boundary Confirmation Baseline Survey preliminary report by 30 November 2016	<ul style="list-style-type: none"> Completed
Issuance of the Boundary Confirmation Baseline Survey draft final report by 31 January 2017	<ul style="list-style-type: none"> In progress
ADB approval on the NNP1PC's draft legal agreement with the government by 31 January 2017	<ul style="list-style-type: none"> NNP1 drafted and submitted the legal agreement to ABD in November 2016.

Activities in January 2017	Results
Boundary Confirmation Baseline Survey led by ADB Consultant	<ul style="list-style-type: none"> Under preparation by ADB Consultant
ADB approval on the NNP1PC's draft legal agreement with the government by 31 January 2017	<ul style="list-style-type: none"> The draft legal agreement is under review by ADB

³ The biodiversity offset obligations were revised and agreed with ADB in August 2016. The Table only shows the current near term obligations up to end of January 2017

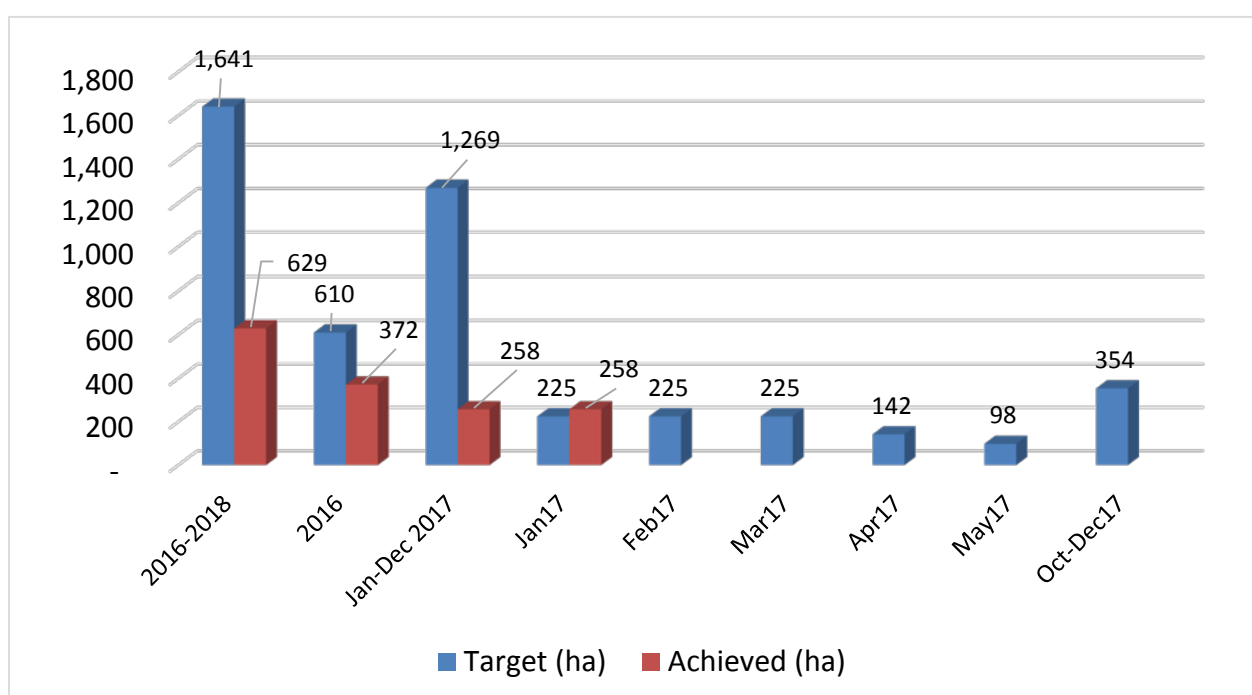
Activities in January 2017	Results
Consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016	<ul style="list-style-type: none"> • NNP1 advertised for expression of interests in the second week of January 2017. The deadline was extended and 4 applicants expressed their interest by the end of January 2017. • NNP1 will evaluate the CV profile of the applicants and shortlist qualified candidates for submission of a full proposal for further evaluation in February 2017. • Bolikhamxay Province through BOMC issued an official letter to NNP1 at the end of January 2017 to follow up on the status of BOMP Consultant recruitment as well as request the involvement of Bolikhamxay Province in the review of technical proposals and selection of the BOMP Consultant. This official notification is based on the discussion and agreement with Vice Governor of Bolikhamxay Province in December 2016.
Activities pre-BOMP period of 1 October 2016 – 31 September 2017	<ul style="list-style-type: none"> • ADB approved the pre-BOMP proposal and fund disbursement in the second week of January 2017 • BOMC created an official bank account under Ministry of Finance for the fund transfer and established bidding committee for the procurement of equipment under pre-BOMP proposal following the GOL procurement guideline. The fund transfer is expected in February 2017

3.5.3 Biomass Clearance

Activities in January 2017	Results
Labour recruitment	<ul style="list-style-type: none"> • 31 people from Longsan District were contracted with lump-sum payment for biomass clearance in Block 1 and Block 2 • 227 people from Nam Youak, Nong, Houaypamom, Hatsamkhone and Pou Villages were contracted with lump-sum payment for biomass clearance work in Block 2, Block 5, and Block 11 to Block 16. • The daily contract was signed with 4 villagers from Nong Village for piling and re-burning waste wood in Block 4 • The daily contract was signed with 69 village labourers from Phientga and Hatsamkhone Villages for vegetation clearing in Block 14, Block 16 and Block 17
Perform UXO work on priority biomass clearance areas	<ul style="list-style-type: none"> • There was no UXO found during the reporting period • QA/QC was undertaken and documented by Field Supervisor and Field Manager • At the end of reporting period, the overall UXO search and clearance has been completed for around 968 ha. The UXO work progress to date is showed in Table 3-18.

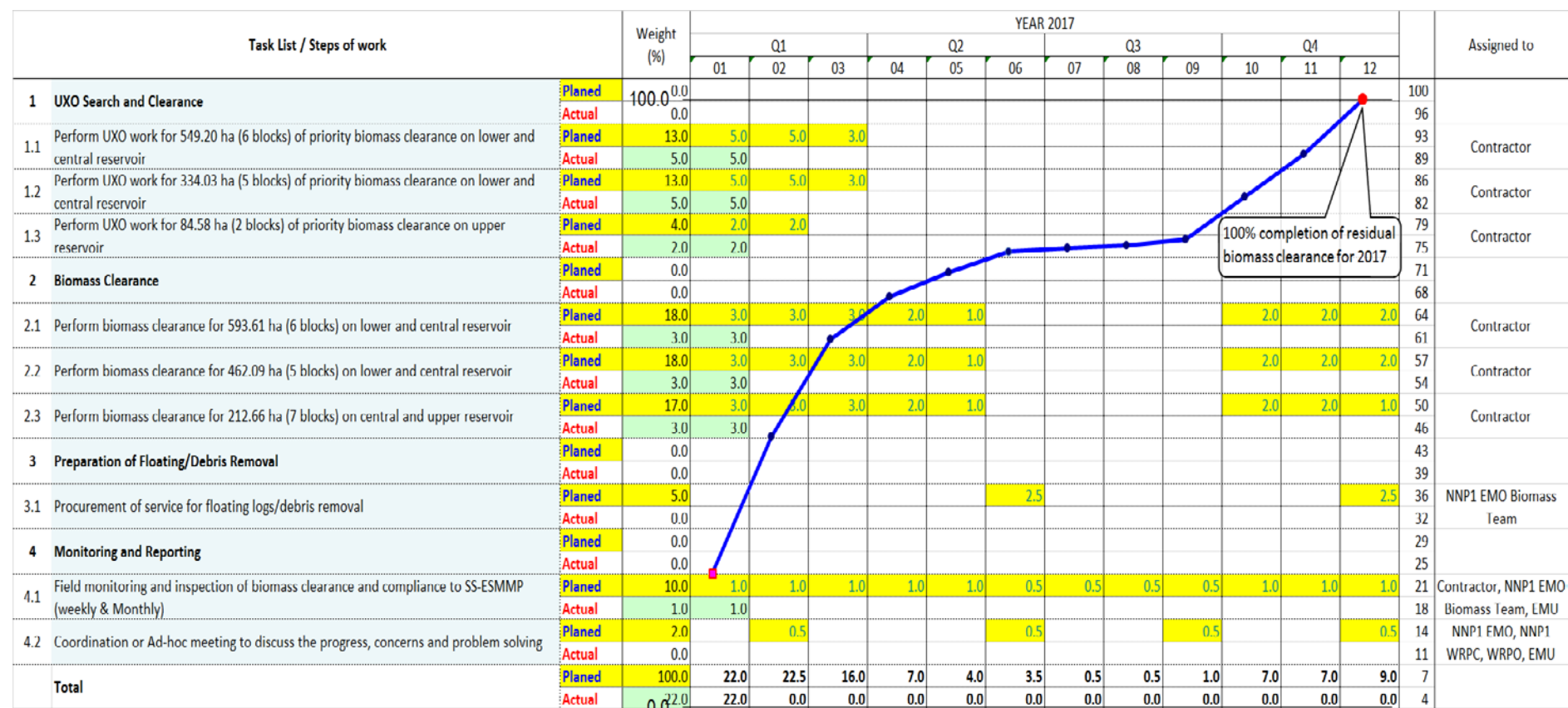
Activities in January 2017	Results
Perform biomass clearance	<ul style="list-style-type: none"> During the reporting period, the biomass clearing was completed for around 258 ha or about 114% of target in January 2017 To date, the overall biomass clearance (cutting and burning) has been completed for around 630 ha. The biomass clearance work progress to date is showed in Figure 3-9, Figure 3-10 and Table 3-18 The EMO team had a discussion with Xaysomboun PAFO on 18 January 2017 about the logging within the main reservoir managed under Hom District. It was noted that Xaysomboun Provincial Authority is not aware of this activity. The Province had received a letter from Hom District requesting logging permission based on timber inventory survey, but the Province had not yet issued an approval. The Province Investigation team consisting of representatives from Provincial Department of Finance, PAFO, Provincial State Audit Office, Provincial Department of Industry and Commerce and the respective offices at district level visited the biomass clearance area and the log yard of Hom GOL's Contractor on 19 January 2017 with the following actions: <ul style="list-style-type: none"> Called Hom District DAFO and the GOL Contractor to explain the overall status of the activity Immediately instructed to stop the logging work until there is the official announcement of approval by Xaysomboun Province authority.

Figure 3-9: Biomass Clearance work Progress in figure as of 31 January 2017



The overall progress of biomass clearance programme is demonstrated in Figure 3-10 below.

Figure 3-10: Gantt Chart of Biomass Clearance Programme in 31 January 2017



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

Table 3-18: Biomass and UXO clearance progress in each priority area as of 31 January 2017

Priority Area	Zone	Total Area (ha)	Island & Buffer Zone (315-320 m ASL)	Priority Biomass Clearance Area			Completed UXO Clearance as of 31 January 2017	Status of Biomass Clearance as of 31 January 2017 (ha)	
				Forests	Fallow-shifting Cultivation and Garden-Plantation Lands	Total			
Block 01	1	115.38	6.15	29.35	79.88	109.24	77.36	58.30	<ul style="list-style-type: none"> - Completed cutting and burning (bush and small trees) of 19 ha of forest area and 39.30 ha of communities' lands. - 5 labourers worked on cutting the branches of felled tree. There are around 1,527 felled trees.
Block 02	1	165.92	7.30	38.72	119.89	158.62	79.13	64.00	<ul style="list-style-type: none"> - Completed cutting and burning (bush and small trees) of 63.5 ha of communities' lands and 0.5 ha of forest. - 35 village labourers with lump-sum contract did vegetation clearing of communities land. - One tractor and one bulldozer used to prepare fire prevention.
Block 03	1	88.86	8.51	14.43	65.92	80.35	42.14	29.0	<ul style="list-style-type: none"> - Completed cutting (bush and small trees) of 19.7 ha of communities' lands and 9.3 ha of forest. - 28 village labourers with lump-sum contract and one tractor were employed for vegetation clearing in communities land.

Priority Area	Zone	Total Area (ha)	Island & Buffer Zone (315-320 m ASL)	Priority Biomass Clearance Area			Completed UXO Clearance as of 31 January 2017	Status of Biomass Clearance as of 31 January 2017 (ha)	
				Forests	Fallow-shifting Cultivation and Garden-Plantation Lands	Total			
Block 04	1	167.68	3.94	122.97	40.77	163.74	132.28	132.28	<ul style="list-style-type: none"> - Completed cutting and burning of 35.38 ha of communities land and 96.90 ha of forest. - Waste woods were re-piling and re-burning by 4 villagers from Nong Village with the daily contract.
Block 05	1	350.72	10.61	66.53	273.58	340.11	141.80	81	<ul style="list-style-type: none"> - Completed cutting and burning of 63 ha of communities land and 18 ha of forest. - 25 villagers did the biomass clearing - There were 2 bulldozers underwent maintenance and expected for mobilization in February 2017.
Block 06	1	46.71	14.87	20.31	11.54	31.84	8.96	10.00	<ul style="list-style-type: none"> - Completed cutting and burning (bush and small trees) of 10 ha of communities land in 2016. - Further biomass clearing will be resumed in the fourth quarter of 2017
Block 07	2	43.03	3.39	18.48	21.17	39.65	32.90		Not yet started
Block 08	2	41.00	3.40	14.64	22.97	37.61	18.96	4.00	<ul style="list-style-type: none"> - Completed cutting and burning (bush and small trees) of 4 ha of communities land in 2016.

Priority Area	Zone	Total Area (ha)	Island & Buffer Zone (315-320 m ASL)	Priority Biomass Clearance Area			Completed UXO Clearance as of 31 January 2017	Status of Biomass Clearance as of 31 January 2017 (ha)	
				Forests	Fallow-shifting Cultivation and Garden-Plantation Lands	Total			
									- Further biomass clearing will be resumed in the fourth quarter of 2017
Block 09	2	54.13	1.38	11.67	41.08	52.75	32.07		Not yet started
Block 10	2	317.39	48.28	128.97	140.14	269.10	153.65	35	<ul style="list-style-type: none"> - Completed vegetation cutting of 31.10 ha of communities land and 0.9 ha of forest area. - The progress of biomass clearing done by 43 villagers, 2 excavators, and 1 bulldozers.
Block 11	2	98.05	8.07	24.06	65.92	89.98	55.18	48.00	<ul style="list-style-type: none"> - Completed vegetation cutting of 41.36 ha of communities land and 6.64 ha of forest area.
Block 12	3	84.23	20.13	64.11		64.11	64.11	4	<ul style="list-style-type: none"> - Completed vegetation cutting of 4 ha. - The progress of biomass clearing done by 30 villagers
Block 13	3	131.35	30.10	76.44	24.81	101.24	101.25	67.19	<ul style="list-style-type: none"> - Completed vegetation cutting of 20.47 ha of communities land and 46.72 ha of forest area. - The progress of biomass clearing done by 50 villagers
Block 14	3	53.00	9.66	7.79	35.54	43.33	43.34	42.00	<ul style="list-style-type: none"> - Completed vegetation cutting of 42 ha - Fire prevention was being prepared by Contractor staff and

Priority Area	Zone	Total Area (ha)	Island & Buffer Zone (315-320 m ASL)	Priority Biomass Clearance Area			Completed UXO Clearance as of 31 January 2017	Status of Biomass Clearance as of 31 January 2017 (ha)	
				Forests	Fallow-shifting Cultivation and Garden-Plantation Lands	Total			
									labours from Hat Samkhone Village
Block 15	3	93.27	49.54	13.52	30.21	43.73	43.73	43.73	<ul style="list-style-type: none"> - Completed vegetation cutting of 42 ha - Fire prevention was being prepared by Contractor staff and labours from Hat Samkhone Village
Block 16	3	9.86	6.53	1.30	2.02	3.32	3.32	3.32	<ul style="list-style-type: none"> - Completed vegetation cutting of 11.29 ha in Block 16 and Block 17 - Fire prevention was being prepared - 10 villagers from Nahong Village did the biomass clearance for the 3.95 ha area in Block 18.
Block 17	3	44.25	36.29	1.33	6.63	7.96	7.96	7.96	
Block 18	3	7.18	3.23	3.95		3.95	3.95		
Total		1,912.01	271.38	658.55	982.08	1,640.63	1,040.74	629.78	

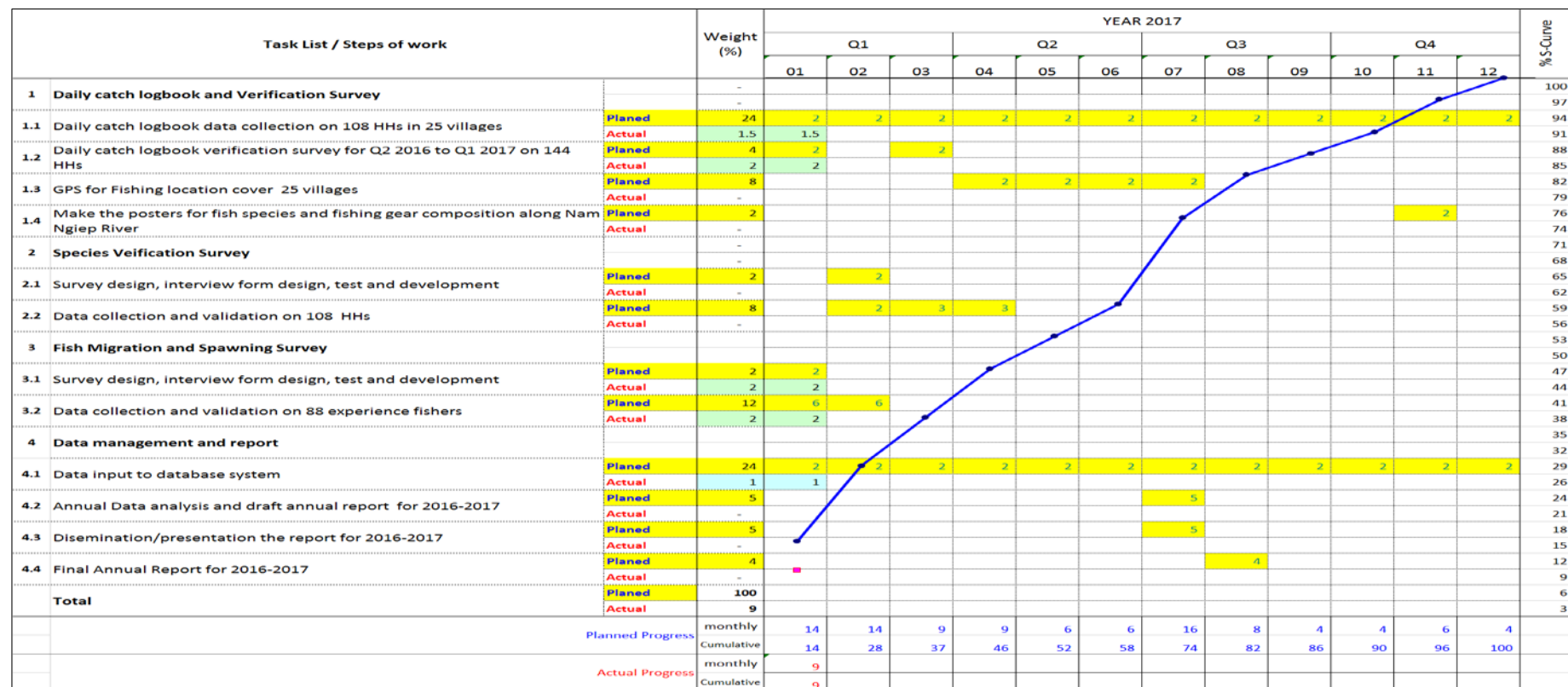
3.5.4 Fishery Monitoring

The fishery monitoring programme is progressing, and a database has been developed to support the future fish management programme as part of the in Nam Ngiep 1 Watershed Management Plan. Three types of the survey were conducted during January 2017 including daily fish catch logbook monitoring, daily catch logbook verification survey and fish migration and spawning survey. The gathered information is being put into the database.

The data from the daily fish catch logbook monitoring indicates that the mean daily fish catch in Nam Ngiep River was 2.4 kg/household/day in December 2016. The estimated total fish catch in Nam Ngiep basin for December 2016 is 53,000 kg. Around 31% of the catch was sold, 59% was consumed fresh, 5% processed and approximately 5% was used for other purposes.

The overall progress of fish monitoring programme is illustrated in **Figure 3-11** below.

Figure 3-11: Gantt Chart of Fish Monitoring Programme as of 31 January 2017



The blue line and yellow highlights represent the planned activity, and the red line and green highlight represent the actual progress

Activities in January 2017	Results
Daily Catch Logbook and Verification Survey	<ul style="list-style-type: none"> Completed the daily catch logbook survey in 110 households out of the total target of 162 households. 3,878 forms were used in the survey Target household will be reduced to 108 households by February Conducted daily catch logbook survey for round 6 on 144 households A fishery database has been developed The daily household catch on average for Nam Ngiep in December 2016 is 2.4 kg/household/day. The median catch for all fishing zone is presented in Figure 3-12. The estimated total catch for Nam Ngiep in December 2016 is approximately 53,000 kg as shown in Figure 3-13.
Household Catch Assessment Survey	<ul style="list-style-type: none"> Completed households catch assessment for 121 households Completed data input both household catch assessment survey and exit interview Data is analyzing by fisheries consultant
Village Community Interview	<ul style="list-style-type: none"> Completed village community interview in total 35 target villages. Completed data entry and submit to fishery consultant for analysis and report
Fish Migration and Spawning survey	<ul style="list-style-type: none"> Start to conduct the interview on fish migration and spawning survey for 2 trial villages and 3 target villages with 23 total fishermen There are 3 sub-forms of interview that include fish species list, fish occurrence and migration and fish spawning site Database is being developed
Gillnet Sampling Survey	<ul style="list-style-type: none"> Gillnet survey in 2017 will be conducted by EMO fishery monitoring team under the supervision of fishery consultant. The survey designed was modified from the previous work and scheduled for quarterly sampling starting in March 2017 The team is now procuring the sets of equipment for the gillnet sampling

Figure 3-12: Median daily household catch by fishing zone and Nam Ngiep mean value for all fishing zones combined (Kg/HH/day)

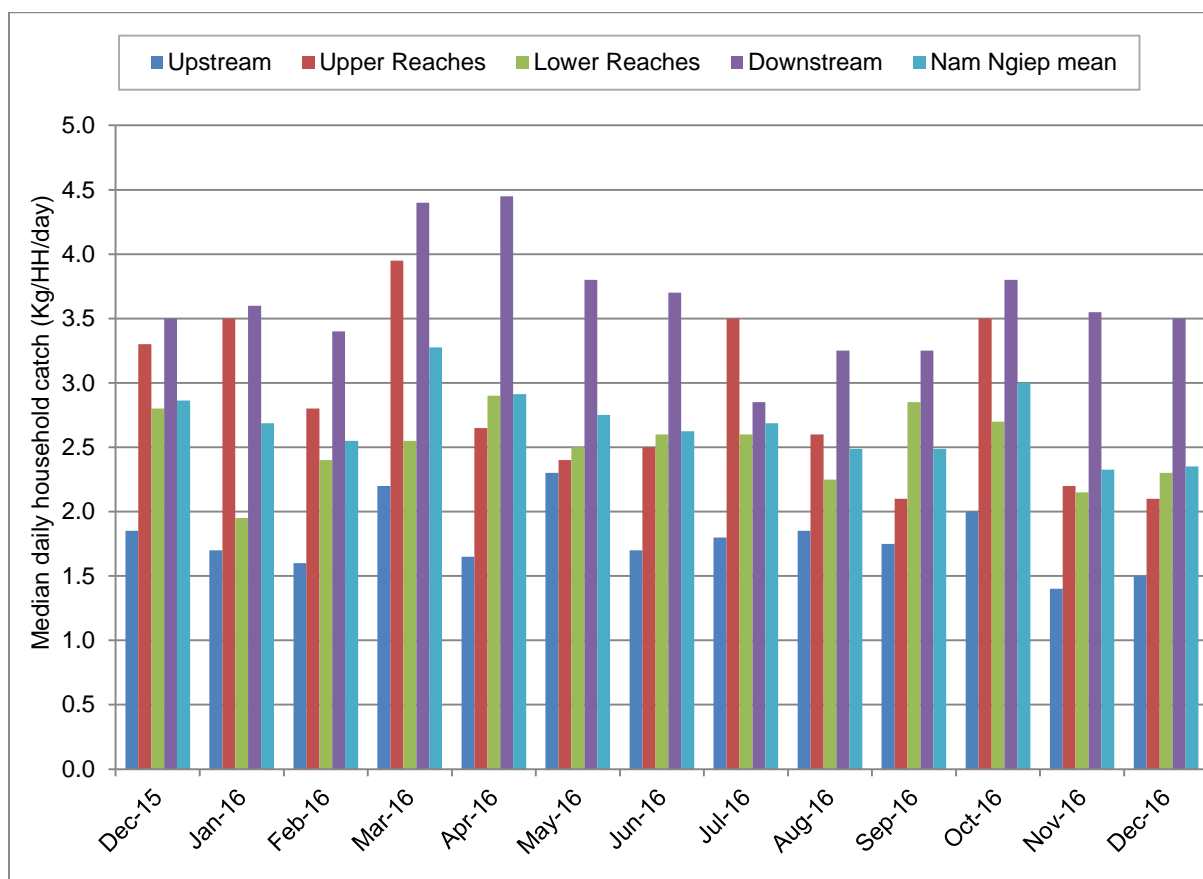
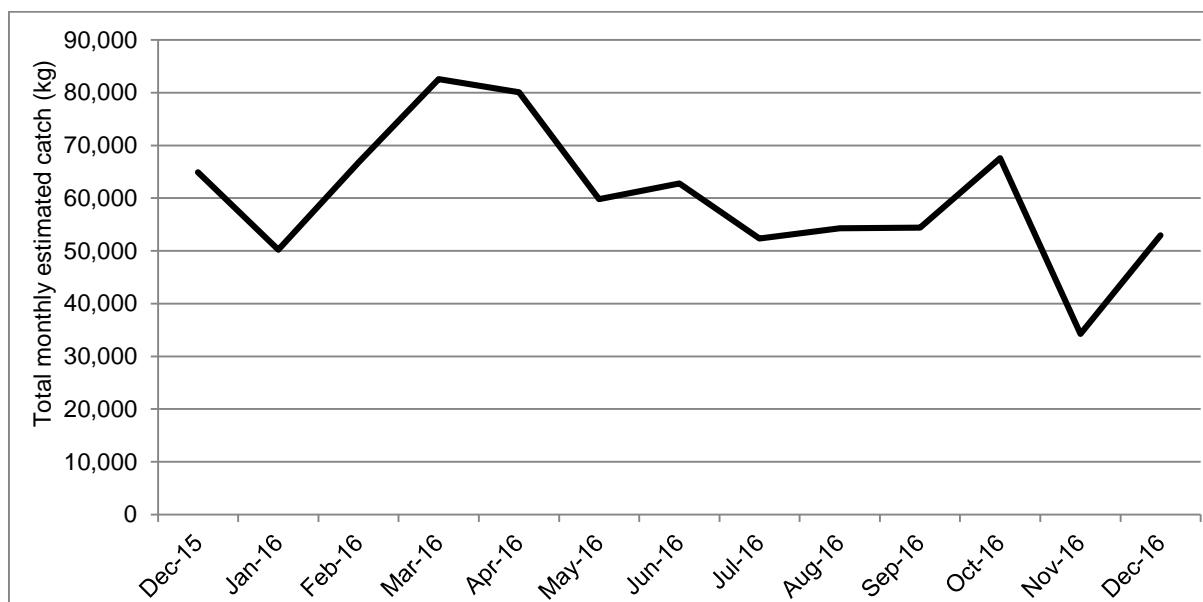


Figure 3-13: Total estimated fish catch for Nam Ngiep by month (Kg)



3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

EPF requested the discussion with Provinces and NNP1 in regard to the overall status of development and implementation of EPF's subprojects. NNP1 also expressed concern about continued degradation

of Houay Ngua Provincial Protected Area (PPA) that will be supported under Bolikhamxay EPF's sub-project. The meeting was scheduled in the second week of February 2017.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

A schedule for the 115 kV Transmission Line development, including the requirement of IEE revision and DDA process was developed in January 2017. An additional meeting was held in January 2017 between NNP1PC (TD). However, there was no further update on the progress of the IEE revision at the end of January 2017.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

After the discussion with ADB held on 17 December 2016 on way forward to conclude the DDA process. A follow up email was sent to ADB on 23 December 2016 describing how this DDA report will be concluded and asking for ADB opinion. ADB responded to NNP1 suggesting a way to conclude the DDA on 05 January 2017. Revisions were made by NNP1 and the DDA was sent back for ADB review on 18 January 2017. ADB had accepted the DDA report on 19 January 2017. The signed version of Nabong Sub-Station Environmental and Social DDA will be made public and submitted to ADB for the record in February 2017.

3.7 External Monitoring

A report from IAP's and LTA's last mission in December 2016 was submitted for NNP1PC review. NNP1PC comment and responses will be provided in February 2017.

3.7.1 Independent Monitoring Agency

There was no IMA mission and activity update during the month of January 2017.

3.7.2 Biodiversity Advisory Committee

BAC provided the comments on 1) the expected table of content of Biodiversity Offset Option Paper that will be prepared by ADB Consultant and 2) Biodiversity management plan for NNP1 Watershed Management plan prepared by biodiversity consultant. NNP1PC expects to receive the BAC mission report – for the mission in December 2016 – in February 2017.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

Table A- 1: Results of Camp Effluents in January 2017 (first mission)

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	13/1/17	13/1/17	13/1/17		12/1/17	13/1/17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	6.79	7.71	8.22	No water	7.28	7.15
Sat. DO (%)		13	24.5	53.4		0	26.4
DO (mg/l)		0.98	1.92	4.27		0	1.99
Conductivity (µs/cm)		582	926	832		693	266
TDS (mg/l)		291	462	416		347	133
Temperature (°C)		26.35	25.9	24.53		24.34	25.77
Turbidity (NTU)		1.09	19.2	53.2		12.7	15
TSS (mg/l)	<50	ND ¹⁶	18.2	64.3		29.4	12.1
BOD (mg/l)	<30	5.1	58.5	71.4		35.7	5
COD (mg/l)	<125	ND	146	219		68.9	26.5
NH ₃ -N (mg/l)	<10.0	11	30	ND		20	9
Total Nitrogen (mg/l)	<10.0	17.2	28.5	5.44		23.3	18
Oil & Grease (mg/l)	<10.0	ND ¹⁶	3	4		3	ND ¹⁶
Total Phosphorus (mg/l)		1.57	1.8	0.61		1.79	0.22
Total coliform (MPN/100ml)	<400	170	160,000	160,000		160,000	4,600
Faecal Coliform (MPN/100ml)		140	160,000	160,000		160,000	3,300
Discharge Volume (m3/day)		25.9	0	0		0	0

	Site Name	Songda5 Camp No.1	Songda5 Camp No.2	HMH Worker Camp No.1	SECC Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF13	EF14
	Date	12/1/17	12/1/17	12/1/17	12/1/17	13/1/17	13/1/17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	7.19	7.43	7.18	6.71	7.48	7.81
Sat. DO (%)		7.4	3.6	67.2	59.6	24.8	0
DO (mg/L)		0.57	0.27	4.96	4.74	2	0
Conductivity (µs/cm)		940	949	218	399	529	671
TDS (mg/L)		470	475	109	200	264	336
Temperature (°C)		25.75	24.94	29.36	24.53	24.6	25.68
Turbidity (NTU)		12.3	21	3.21	11.1	34.9	54.8
TSS (mg/l)	<50	15	16.8	2.5	24	71.4	11.3
BOD (mg/l)	<30	39.2	59.2	1	ND ¹³	96.3	71.2
COD (mg/l)	<125	95.2	145	ND ¹⁸	27.8	187	165
NH ₃ -N (mg/l)	<10.0	29	41	ND ¹²	10	8	15
Total Nitrogen (mg/L)	<10.0	27.9	28.2	6.35	10.4	15	17.3
Oil & Grease (mg/l)	<10.0	2	1	ND ¹⁶	ND ¹⁶	5	ND ¹⁶
Total Phosphorus (mg/L)		0.6	1.93	1.21	0.28	1.38	1.42
Total coliform (MPN/100ml)	<400	160,000	22,000	17,000	35,000	160,000	160,000

	Site Name	Songda5 Camp No.1	Songda5 Camp No.2	HMH Worker Camp No.1	SECC Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF13	EF14
	Date	12/1/17	12/1/17	12/1/17	12/1/17	13/1/17	13/1/17
Parameters (Unit)	Guideline						
Faecal Coliform (MPN/100ml)		160,000	79	7,000	4,600	160,000	160,000
Discharge Volume (m3/day)		0	43.2	0	0	0	17.3

Table A- 2: Results of Camp Effluents in January 2017 (second mission)

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	18/1/17	18/1/17	18/1/17	18/1/17	18/1/17	18/1/17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	6.66	7.7	8.1	7.01	7.28	6.84
Sat. DO (%)		11.8	40.6	76.1	56.2	14.9	30.9
DO (mg/L)		0.9	3.12	6.19	4.22	1.17	2.37
Conductivity (µs/cm)		523	897	802	149	695	463
TDS (mg/L)		262	449	401	75	347	231
Temperature (°C)		26.37	26.54	23.9	29.15	25.37	25.63
Turbidity (NTU)		1.1	16.7	25.6	4.94	15	38.9
TSS (mg/l)	<50	ND ¹⁶	29.4	29.7	7.4	23	ND ¹⁶
BOD (mg/l)	<30	ND ¹³	57.4	82	ND ¹³	53.1	4.6
COD (mg/l)	<125	ND ¹⁸	129	172	ND ¹⁸	93.5	ND ¹⁸
NH ₃ -N (mg/l)	<10.0	6	29	ND ¹²	ND ¹²	24	5
Total Nitrogen (mg/l)	<10	13.3	27.5	5.06	0.54	22	4.8
Oil & Grease (mg/l)	<10.0	ND ¹⁶	4	4	ND ¹⁶	2	ND ¹⁶
Total Phosphorus (mg/l)	<2	1.94	2.54	0.54	0.02	1.88	0.14
Total coliform (MPN/100ml)	<400	49	160,000	2,300	3,300	160,000	7,900
Faecal Coliform (MPN/100ml)		49	160,000	2,300	3,300	160,000	3,300
Discharge Volume (m3/day)		8.6	0	0	0	0	0

	Site Name	Songda5 Camp No.1	Songda5 Camp No.2	HMH Worker Camp No.1	SECC Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF13	EF14
	Date	19/1/17	19/1/17	19/1/17	19/1/17	19/1/17	19/1/17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	8.31	7.67	7.3	7.2	7.36	7.81
Sat. DO (%)		71.5	45.1	67.8	66.5	0	0
DO (mg/L)		5.57	3.61	5.58	5.07	0	0
Conductivity (µs/cm)		905	1,042	217	452	599	491
TDS (mg/L)		452	521	109	226	300	334
Temperature (°C)		27.04	25.65	28.62	28.16	24.12	26.84

	Site Name	Songda5 Camp No.1	Songda5 Camp No.2	HMH Worker Camp No.1	SECC Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF13	EF14
	Date	19/1/17	19/1/17	19/1/17	19/1/17	19/1/17	19/1/17
Parameters (Unit)	Guideline						
Turbidity (NTU)		19.9	15.3	3.61	16.4	14.8	32.5
TSS (mg/l)	<50	78.8	16.7	ND ¹⁶	10.7	17.5	17.5
BOD (mg/l)	<30	47.2	41.5	ND ¹³	4.5	73	83.2
COD (mg/l)	<125	198	145	ND ¹⁸	47.4	178	171
NH ₃ -N (mg/l)	<10.0	31	45	ND ¹²	11	11	12
Total Nitrogen (mg/l)	<10	37.3	31.5	5.38	12	14.4	14.5
Oil & Grease (mg/l)	<10.0	2	1	ND ¹⁶	ND ¹⁶	2	5
Total Phosphorus (mg/l)	<2	2.57	8.03	1.1	0.26	1.45	1.09
Total coliform (MPN/100ml)	<400	160,000	230	3,300	54,000	160,000	160,000
Faecal Coliform (MPN/100ml)		160,000	49	1,700	54,000	92,000	160,000
Discharge Volume (m3/day)		0	0	0	0	0	0

Table A- 3: Results of the Construction Area Discharge in January 2017

	Site Name	Aggregate Crushing Plant				CVC Plant			
	Station Code	DS02				DS03			
	Date	06/1/17	11/1/17	17/1/17	25/1/17	06/1/17	11/1/17	17/1/17	25/1/17
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	No Discharge	7.8	No Discharge	7.81	No Discharge			
Sat. DO (%)			64.9		68				
DO (mg/l)			5.46		5.35				
Conductivity (µs/cm)			117		110				
TDS (mg/l)			58		55				
Temperature (°C)			22.31		26.39				
Turbidity (NTU)			3,497		2,640				
TSS (mg/l)	<50		1,338		1,138				
Oil & Grease (mg/l)	<10		ND16		N/A				
Discharge Volume (m ³ /day)			130		86.0				

	Site Name	Spoil Disposal #2				RCC Plant			
	Station Code	DS04				DS09			
	Date	06/1/17	11/1/17	17/1/17	25/1/17	06/1/17	11/1/17	17/1/17	25/1/17
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	6.55	5.84	7.2	6.87	8.15	6.37	6.81	6.92
Sat. DO (%)		80.6	44.3	63.3	70.3	92.9	63	71.9	82
DO (mg/l)		6.13	3.58	5.15	5.61	7.16	5.2	5.59	6.13
Conductivity (µs/cm)		86	84	70	93	241	112	137	214
TDS (mg/l)		43	42	35	46	120	56	68	107
Temperature (°C)		26.09	25.37	24.74	24.87	28.3	23.25	27.13	29.07
Turbidity (NTU)		6.48	11.4	11.54	8.76	14	3,627	24,140	10,044
TSS (mg/l)	<50	11	13	ND ¹⁶	5	19	1,398	12,514	5,952
Oil & Grease (mg/l)	<10	N/A	ND ¹⁶	N/A	N/A	N/A	ND ¹⁶	N/A	N/A

Discharge Volume (m ³ /day)		172	172	172	345	9	259	258	172.0
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	Site Name	Regulating Dam				Main Dam			
	Station Code	DS08				DS11			
	Date	06/1/17	11/1/17	17/1/17	25/1/17	06/1/17	11/1/17	17/1/17	25/1/17
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	No Discharge	6.82	6.76	6.21	6.68	6.68	6.17	10.45
Sat. DO (%)			77.2	64.8	94.6	83	70.1	87.2	76.5
DO (mg/l)			6.14	4.38	7.23	6.54	6.16	6.92	5.64
Conductivity (µs/cm)			219	400	261	368	678	426	1263
TDS (mg/l)			109	200	131	184	339	213	632
Temperature (°C)			25.7	29.41	27.2	26.84	23.29	24.38	29.12
Turbidity (NTU)			10.98	0.09	9	8.52	13.3	11.74	11.7
TSS (mg/l)	<50		10	ND ¹⁶	13	10	21	22	30
Oil & Grease (mg/l)	<10		ND16	N/A	N/A	N/A	ND16	N/A	N/A
Discharge Volume (m³/day)			86	43	86	6,000	6,000	6,000	6,000

ANNEX B: AMBIENT DUST QUALITY

Table B- 1: 24-hour Average Dust Concentrations Measured in Ban Hat Gniun

Ban Hat Gniun - 24 Hours Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	05/01/2017 11:03	06/01/2017 11:03	07/01/2017 11:03
End Time	06/01/2017 11:03	07/01/2017 11:03	08/01/2017 11:03
Average Data Record in 24h (mg/m ³)	0.05	0.02	0.04
Guideline Average in 24h (mg/m ³)	0.12	0.12	0.12

Figure B- 1: Dust Monitoring Results at Ban Hat Gniun in January 2017

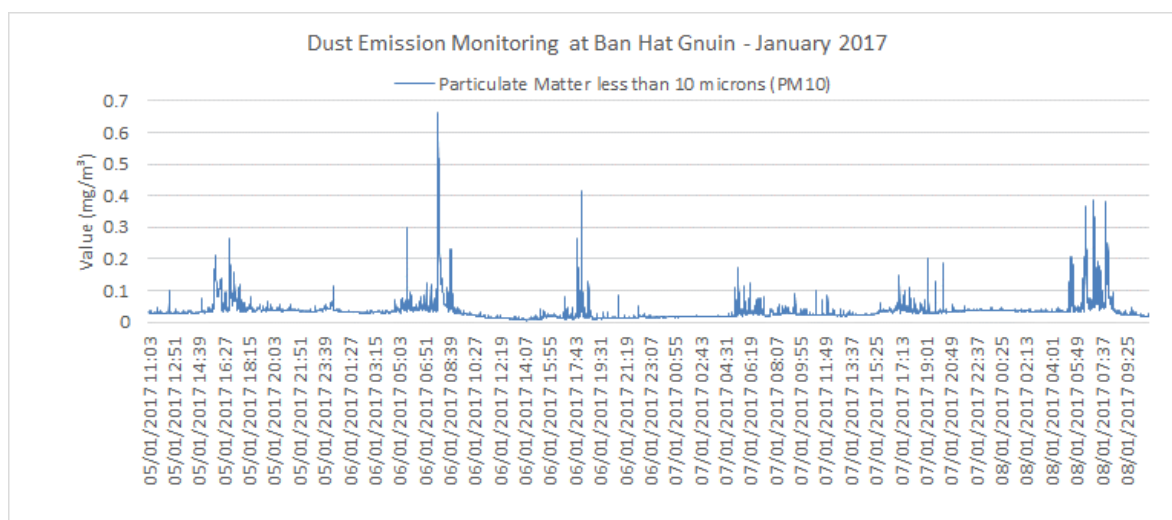


Figure B- 2: Dust Monitoring Results at the Aggregate Crushing Plant in January 2017

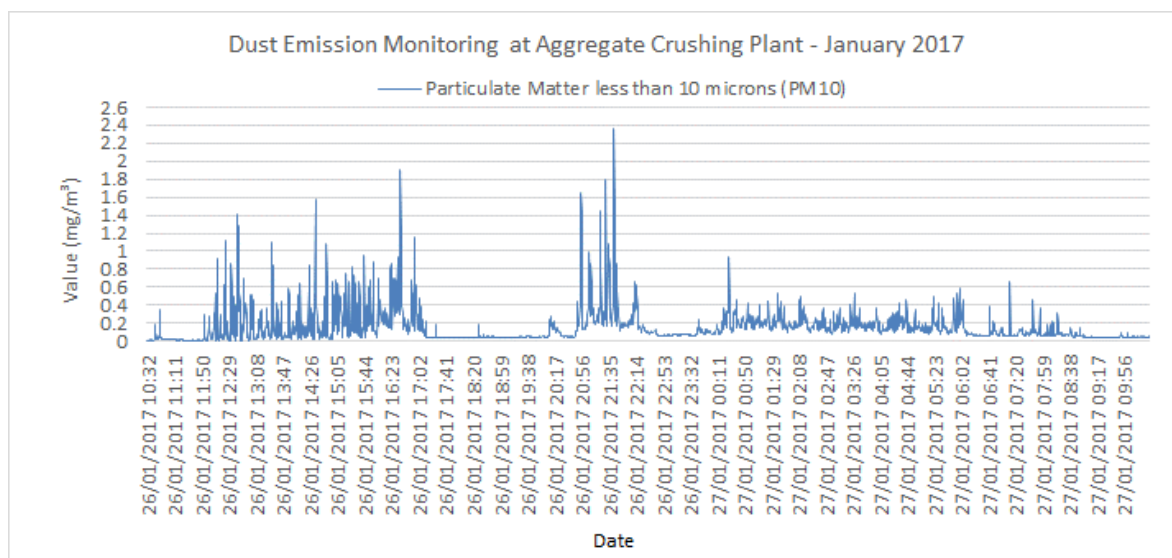


Figure B- 3: Dust Monitoring Results at the RCC Plant in January 2017

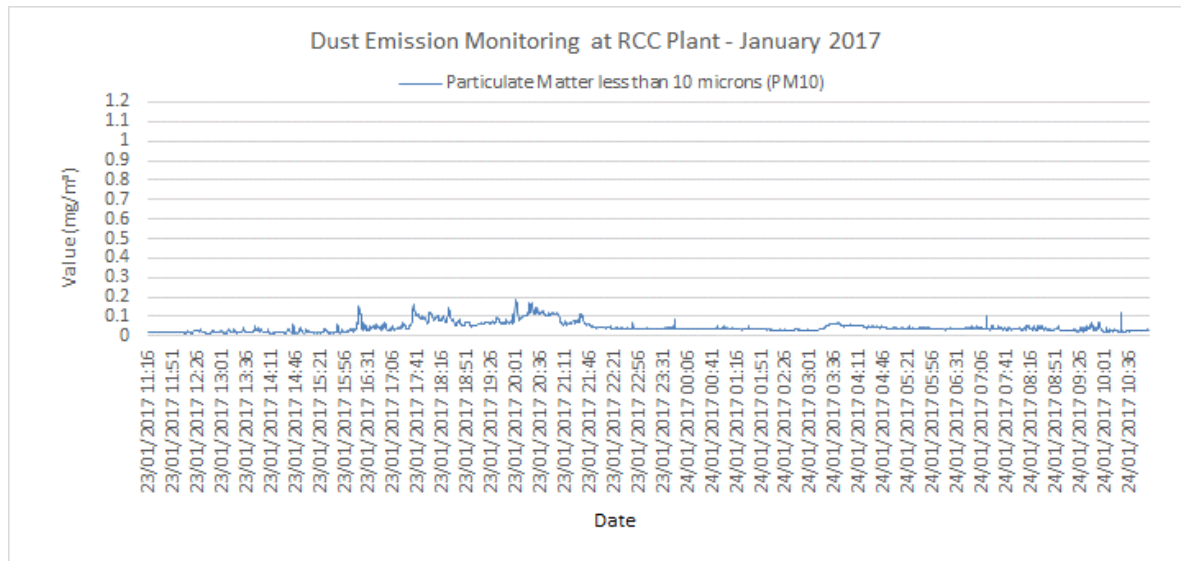


Figure B- 4: Dust Monitoring Results at the Sino Hydro Camp in January 2017

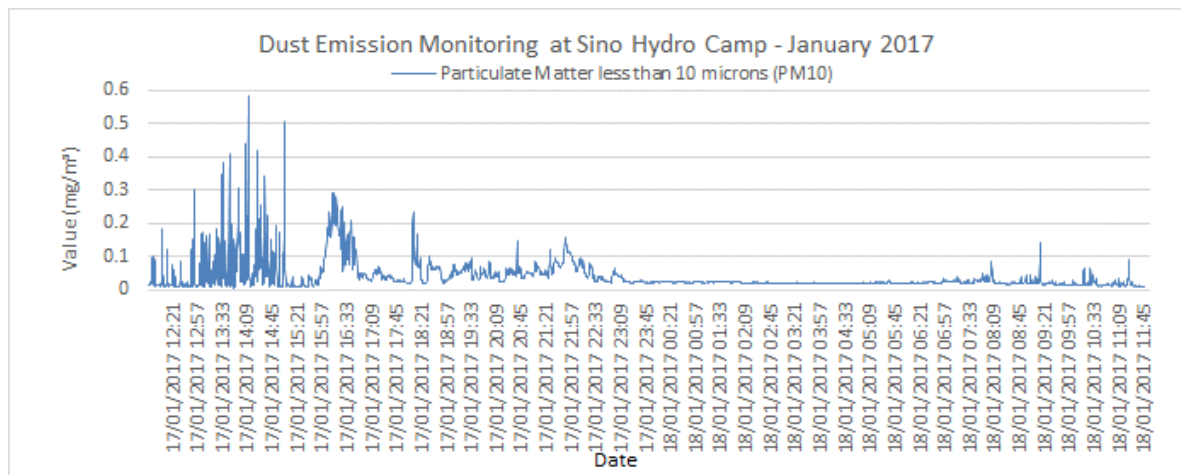


Figure B- 5: Dust Monitoring Results at the Sino Hydro Temporary Camp in January 2017

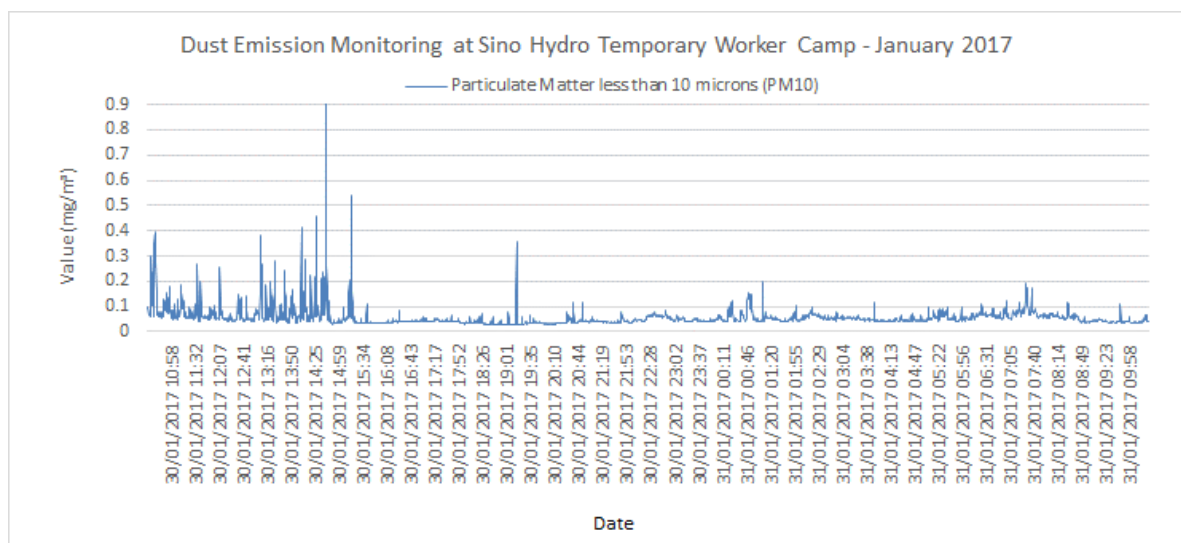
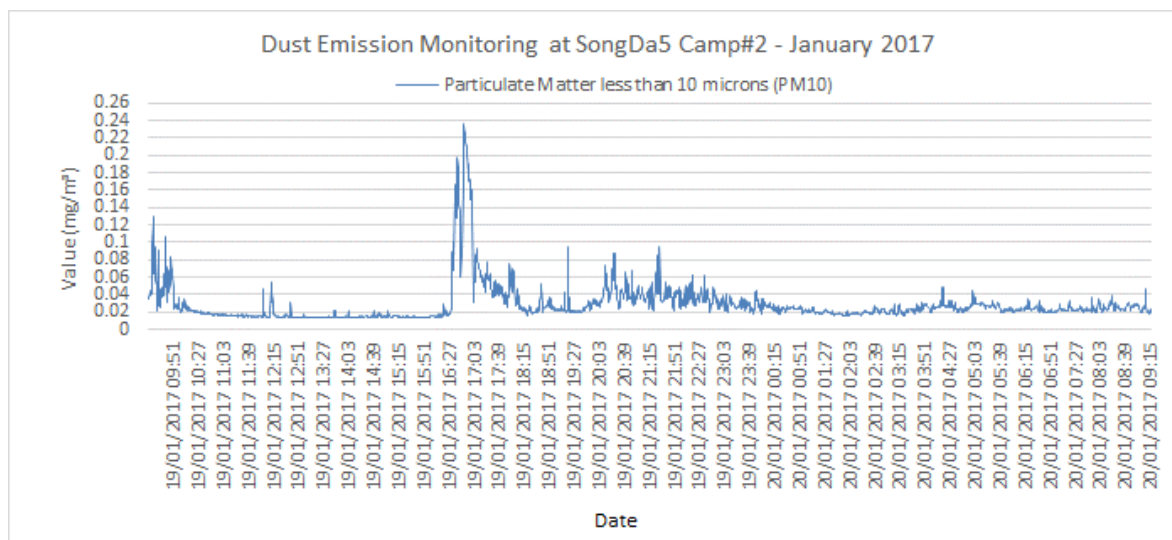


Figure B- 6: Dust Monitoring Results at the SongDa5 No.2 Camp in January 2017



ANNEX C: AMBIENT NOISE DATA

Table C- 1: Average Results of Noise Monitoring at Ban Hat Gnuin in January 2017

Noise Level (dB)	05-06/01/2017			06-07/01/2017			07-08/01/2017			08/01/2017
	11:45-18:00	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	06:01-11:45
Maximum Value Recorded	70.40	69.40	56.80	75.30	72.60	58.30	73.90	65.50	55.40	71.40
Guideline Max	115	115	115	115	115	115	115	115	115	115
Average Data Recorded	46.72	49.75	40.22	46.80	49.68	40.83	46.21	44.77	41.52	49.60
Guideline Averaged	55	55	45	55	55	45	55	55	45	55

Figure C- 1: Result of Noise Level Monitoring at Ban Hat Gnuin in January 2017

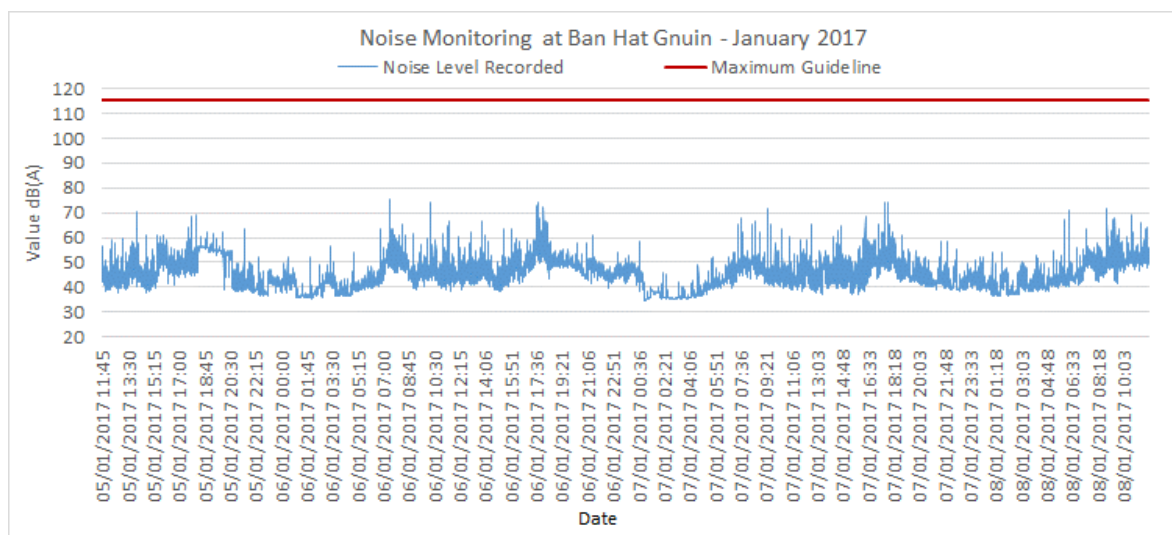


Table C- 2 and Table C-3: Average Results of Noise Monitoring at Aggregate Crushing Plant and RCC Plant in January 2017

Aggregate Crushing Plant

Noise Level (dB)	26-27/01/2017		27/01/2017
	11:15-22:00	22:01-06:00	06:01-11:15
Maximum Value Recorded	85	84.3	83.5
Guideline Max	115	115	115
Average Data Recorded	70.17	78.57	60.69
Guideline Averaged	70	50	70

RCC Plant

Noise Level (dB)	23-24/01/2017		24/01/2017
	11:56-22:00	22:01-06:00	06:01-11:56
Maximum Value Recorded	74.2	71.1	78.6
Guideline Max	115	115	115
Average Data Recorded	67.15	68.43	65.96
Guideline Averaged	70	50	70

Figure C- 2: Results of Noise Level Monitoring at the Aggregate Crushing Plant in January 2017

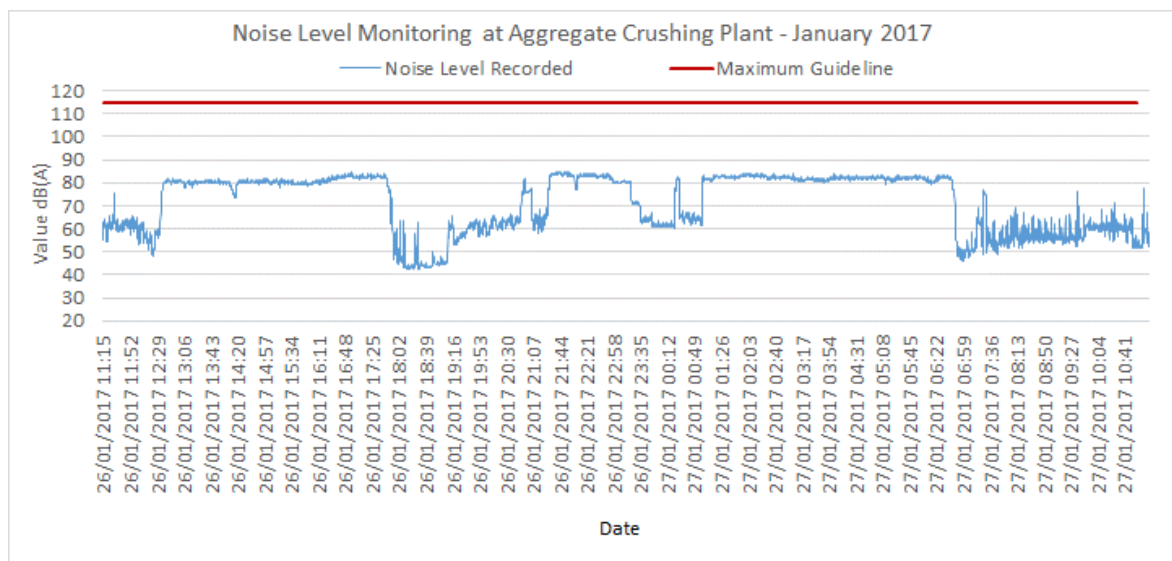


Figure C- 3: Results of Noise Level Monitoring at the RCC Plant in January 2017

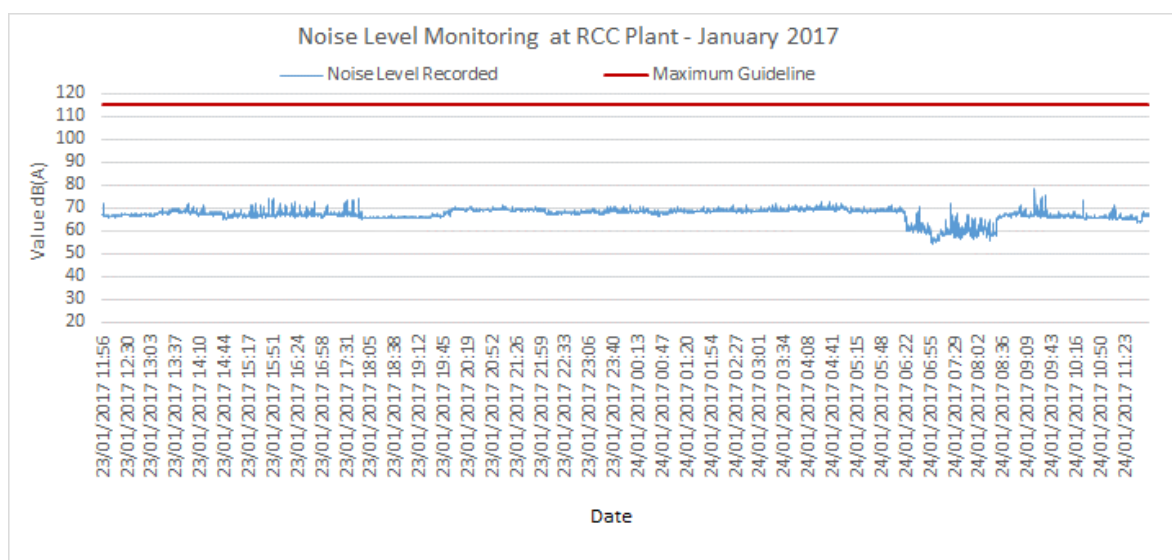


Table C- 5 and Table C- 6: Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in January 2017

Songda5 Camp No.2**Sino Hydro Camp**

Noise Level (dB)	19-20/01/2017		20/01/2017	Noise Level (dB)	17-18/01/2017		18/01/2017
	09:57 – 22:00	22:01 – 06:00	06:01-09:57		12:27 – 22:00	22:01 – 06:00	06:01-12:27
Maximum Value Recorded	61.2	62.1	63.8	Maximum Value Recorded	65	61.6	66.1
Guideline Max	115	115	115	Guideline Max	115	115	115
Average Data Recorded	53.75	57.74	54.42	Average Data Recorded	55.49	56.66	54.52
Guideline Averaged	70	50	70	Guideline Averaged	70	50	70

Figure C- 4: Results of Noise Level Monitoring at Songda5 Camp#2 in January 2017

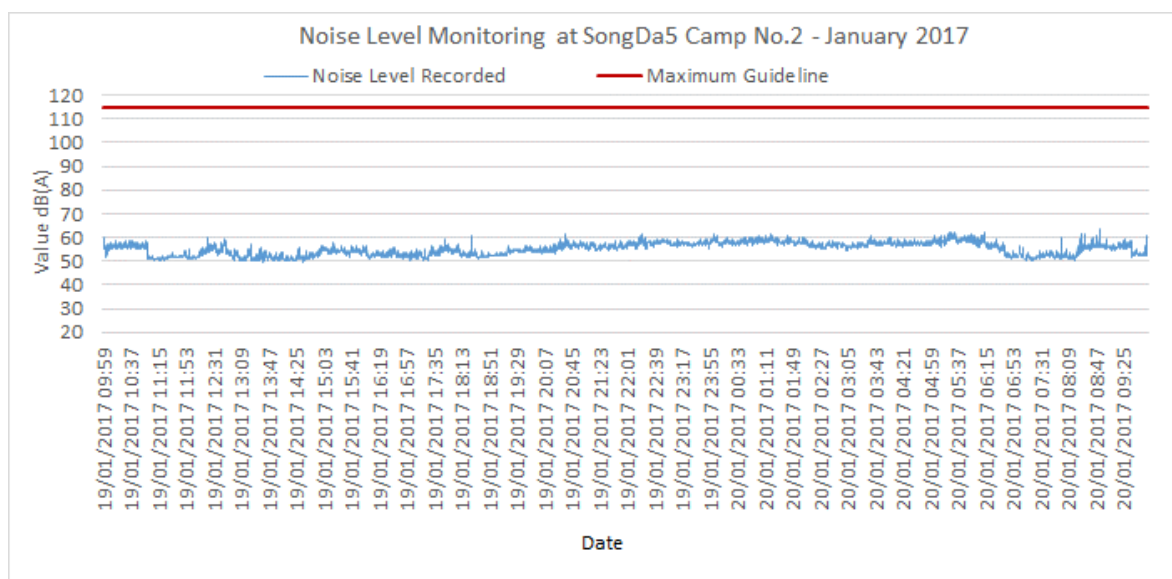


Figure C- 5: Results of Noise Level Monitoring at Sino Hydro Camp in January 2017

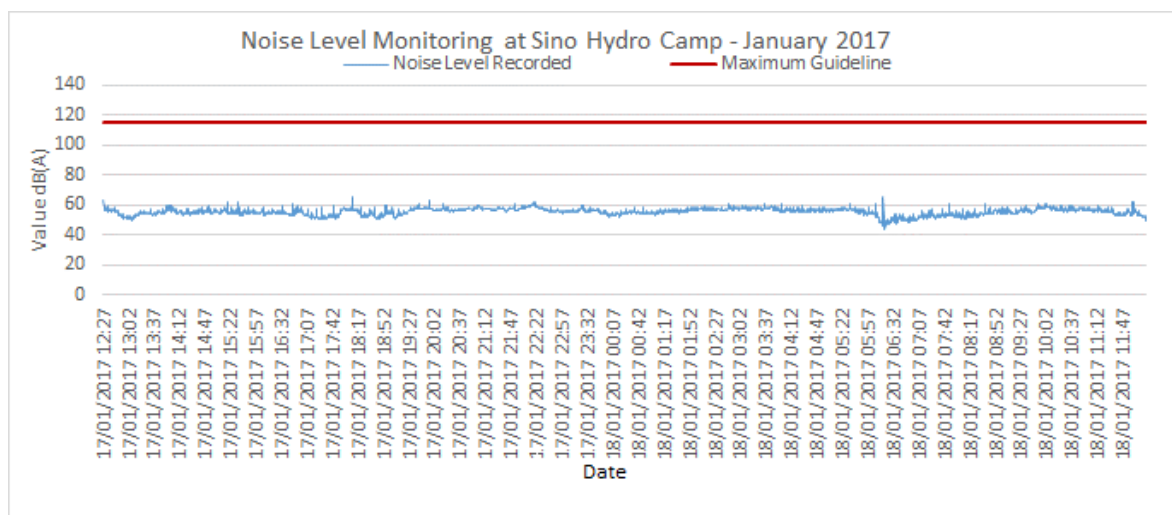


Table C- 7 and Table C- 8: Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in January 2017

Owner's Site Office and Village**Main Dam**

Noise Level (dB)	16-17/01/2017		17/01/2017	Noise Level (dB)	12-13/01/2017		13/01/2017
	10:51 – 22:00	22:01 – 06:00	06:01-10:51		10:09 – 22:00	22:01 – 06:00	06:01-10:09
Maximum Value Recorded	57.1	53.2	41.9	Data Record Max	64.8	68.4	65.7
Guideline Max	115	115	115	Guideline Max	115	115	115
Average Data Recorded	40.47	43.38	34.42	Data Record Average	54.67	53.96	53.93
Guideline Averaged	70	50	70	Guideline Averaged	70	50	70

Figure C- 6: Results of Noise Level Monitoring at Owner's Site Office and Village in January 2017

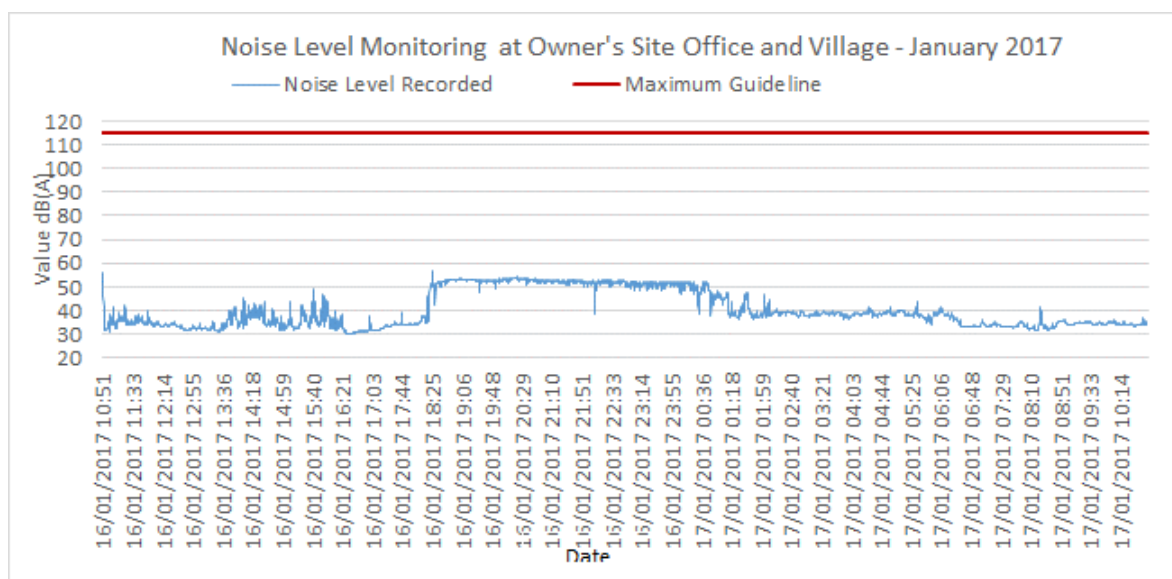


Figure C- 7: Results of Noise Level Monitoring at Main Dam in January 2017

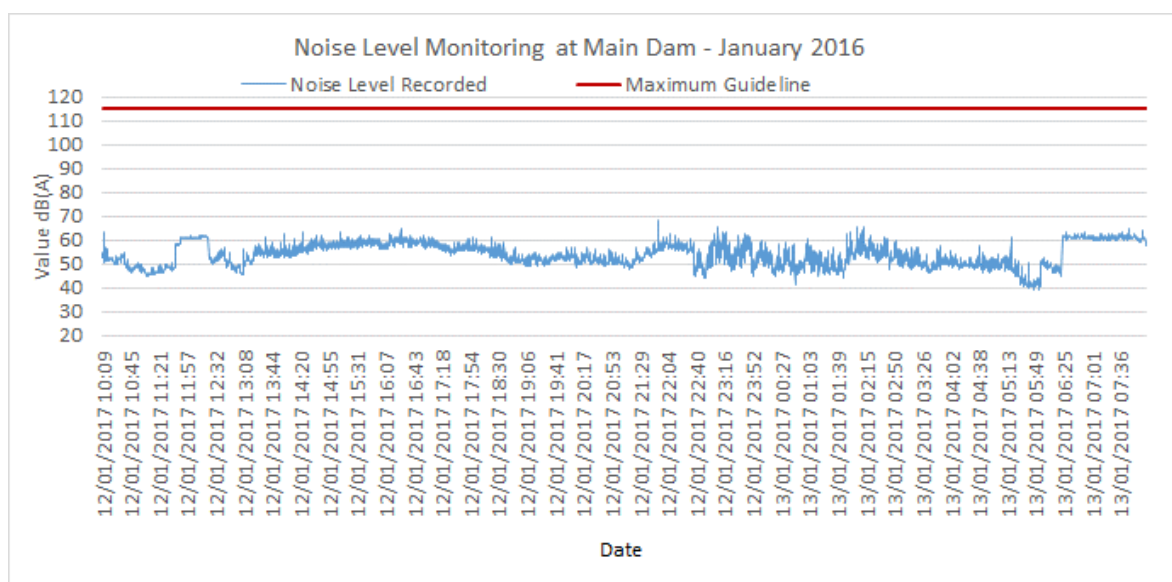


Table C- 9: Average Results of Noise Monitoring at the Sino Hydro Temporary Worker Camp in January 2017

Sino Hydro Temporary Worker Camp

Noise Level (dB)	30-31/01/2017		31/01/2017
	10:42 – 22:00	22:01 – 06:00	06:01-10:41
Maximum Value Recorded	65	63.6	64.4
Guideline Max	115	115	115
Average Data Recorded	65.00	55.98	55.49
Guideline Averaged	70	50	70

Figure C-8: Results of Noise Level Monitoring at Sino Hydro Temporary Worker Camp

