NAM NGIEP 1
POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

May 2017

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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
ECOCD	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

During May 2017, the Environmental Management Office (EMO) of NNP1PC received a total of 10 new Site Specific Environmental and Social Management and Monitoring Plans (SS-ESMMP) and three drawings for the improvement of Waste Water Treatment Systems (WWTS) at selected Camps. With nine SS-ESMMPs carried over from the previous months, there were 19 SS-ESMMPs and three drawings for EMO review during May 2017. Out of these, seven SS-ESMMPs and two drawings were cleared with conditions, six SS-ESMMPs and one drawing were cleared with no conditions, one SS-ESMMP was returned for further improvement, and five SS-ESMMPs are pending for a review which will be carried over to June 2017.

EMO issued five new Observations of Non-Compliances (ONC), one Non-Compliance Report Level 2 (NCR2) on Biodiversity Management and one Non-Compliance Report Level 3 (NCR3) on non-compliance with effluent limit values at the RCC Plant in May 2017. With six resolved, a total of 12 ONC, two NCR1, two NCR2 and one NCR3 are carried over into June 2017. EMO will follow up with the contractors to resolve the remaining issues in June 2017.

The Provincial and District EMU 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) during 18 to 19 May 2017. The main environmental issues identified by the EMU mission included discharge of turbid water from the sediment ponds at the aggregate crushing plant and the RCC plant, and need for improved maintenance of the completed waste water treatment systems at selected camps.

The effluent monitoring results for May 2017 indicated that only the wastewater treatment systems at the Owner's Site Office and Village and Song Da 5 Camp No. 1 complied with the relevant effluent standards. The non-compliances with effluent standards are believed to be a result of inadequate dosage of chlorine. In order to further improve the chlorination processes, NNP1PC-EMO undertook field inspections and laboratory testing on chlorination breakpoints during March to April 2017. The results were shared with the contractor. By the end of May 2017, three camps (Obayashi Corporation, V&K and Sinohydro) completed their WWTS improvements. Chlorination is expected to commence in early June 2017. NNP1PC-EMO will continue to monitor the chlorination process and provide training to the contractors on chlorination to ensure compliance with related standards.

The development of the Nam Ngiep 1 Watershed Management Plan continued to progress. NNP1PC submitted an improved version to ADB the first week of May 2017 and received feedback in the 3rd week of May 2017. The main comment was on budget shortfall. NNP1 further revised the Watershed Management Plan addressing ADB's comments and resubmitted the plan to ADB for their review on 25 May 2017. The feedback is expected by the week of 12th June 2017.

Recruitment of a consultant for the development of the Biodiversity Offset Management Plan (BOMP) resumed in May 2017 after discussion with Bolikhamxay Provincial Authority. The technical review and interview with the candidates were concluded at the end of May 2017. The commercial interview and contract settlement is expected to be concluded in June 2017.

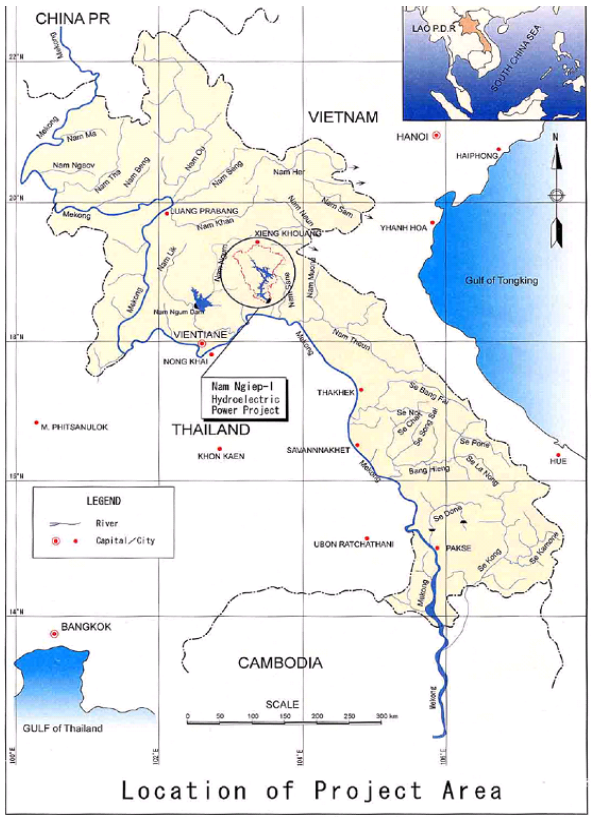
Biomass clearance continued to progress. The total vegetation cutting by the end of May 2017 is around 961 ha and the total biomass burning progress is around 768 ha.

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 May 2017 including daily fish catch logbook monitoring and gillnet 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 April 2017. The estimated total fish catch in Nam Ngiep basin for April 2017 is 64,300 kg. Around 37% of the catch was sold, 51% was consumed fresh, 7% 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 Bolikhan District of 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 Bolikhan District, will create a 70-km-long, narrow reservoir that extends up the Ngiep Valley as far as Thathom District. At almost 150 m high, the main dam will be the second largest in Lao PDR. The Power Station at this dam will generate up to 272 MW of electricity for export to Thailand. With a combined capacity of 290 MW, Nam Ngiep 1 will generate around 1,620 GWh of electricity annually. Two transmission lines will be required to transport the electricity generated by the project. From the main power station a 230-kV line will run for 125 km to the Nabong outside Vientiane Capital. A 115-kV transmission line will be constructed by EDL from the Re-regulation Power Station to Pakxan substation over a distance of 40 km.

This Environmental Monthly Monitoring Report (EMMR) provides a summary of environmental monitoring activities and mitigation actions in May 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 publically disclosed on the Project website in line with the ADB and GoL Public Disclosure Policies. Hard copies of the final reports will also be available upon requests at the Project's main office in Vientiane Capital and field office in Pakxan, Bolikhamxay Province.

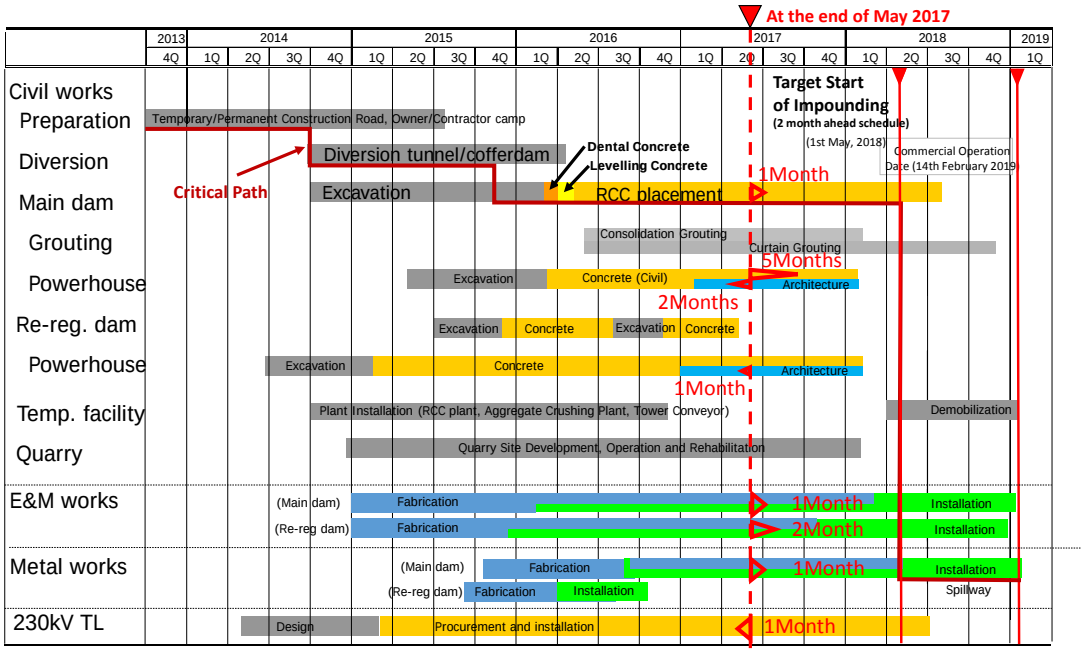
2. WORK PROGRESS OF PRINCIPAL CONTRACTORS

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

of May 2017 was 70.5%[1] (compared to planned progress of 73.0%), 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 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.

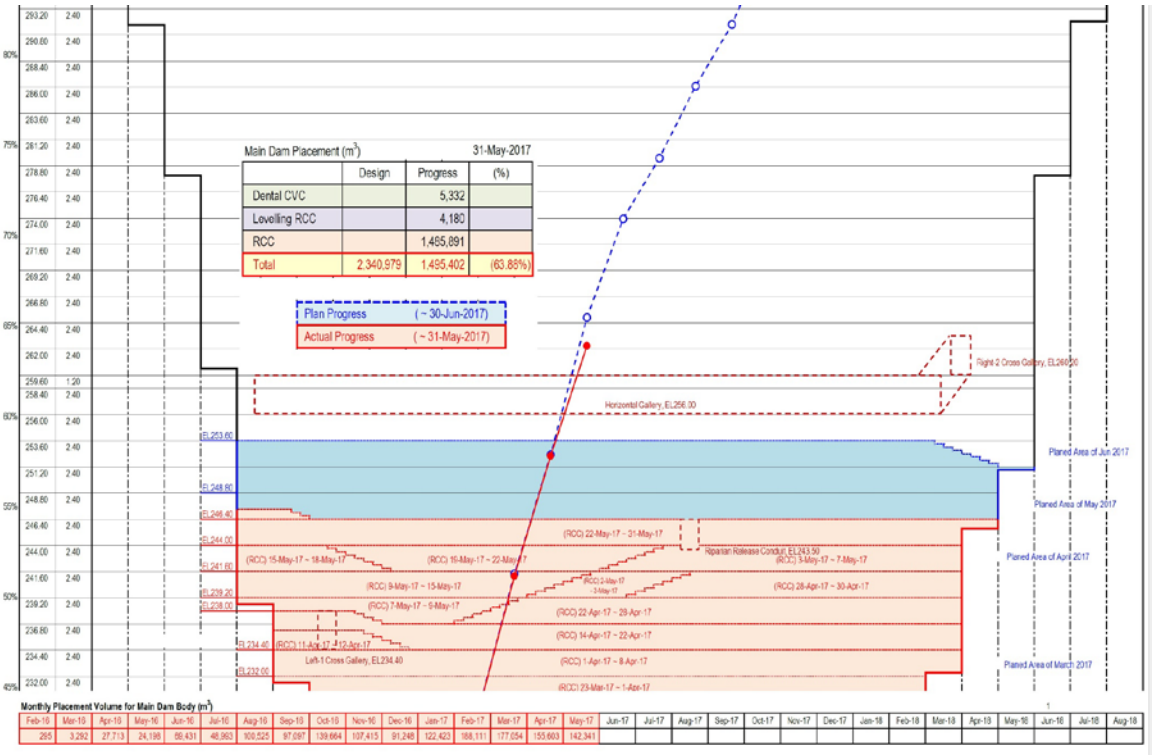
The cumulative actual work progress of the Civil Works until the end of April 2017 was 76.4 % (compared to planned progress of 75.6 %) calculated in the same manner as described above for the value of achieved Interim Milestone Payments excluding advance payment.

[1] The progress to-date is calculated as (Cumulative Amount of Achieved Interim Milestone Payments) / (Total Agreed Original Price of Construction Contracts) and expressed as a percentage. These totals exclude varied works and other adjustments allowed under each Contract.

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 04 May 2017



The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 90 % by achievement of total anticipated drilled length as of 02 June 2017 as a proportion of the total expected drilling

Table 2-1: Progress of consolidation and curtain drilling for grouting as of 28 May 2017

Item	Description	Total Drilling (m)	Completed (m)	Progress (%)
Consolidation Grouting	Anticipated Quantity	16,845	15,212	90
Curtain Grouting	Latest Design Quantity	27,945	7,180	26
	Anticipated Final Quantity	39,000	7,180	18

*The linear metres 'completed' are drilled and grouted.

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 May 2017.

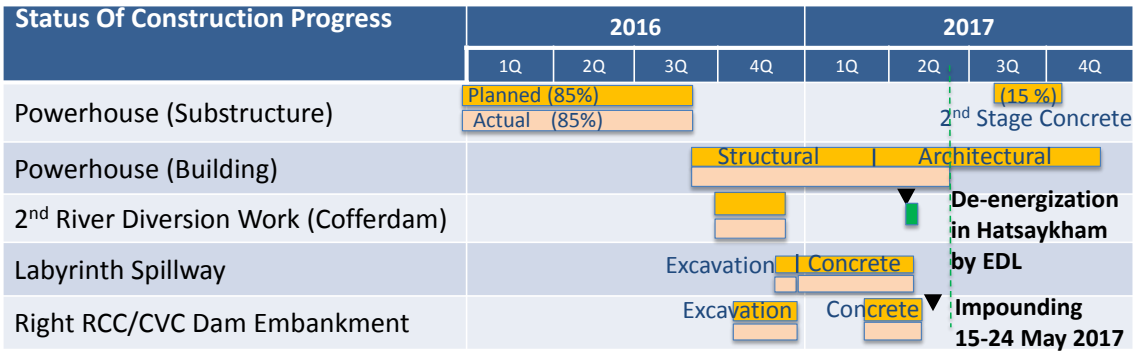
Location	Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
Main Powerhouse	32,600	24,769	76
Penstock Embedment	10,117	7,625	74

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 Figure 2-3 below.

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



Structure	Civil Structure	Building				Right Bank RCC Structure	Left Bank Backfill
	Intake, Powerhouse and Tailrace	Plastering Work	Painting Work	Windows	Block Wall over El. 177 m	RCC and CVC	Powerhouse and Switch Yard
	(m^3)	(m^3)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)
Design	26,549	17,515	6,135	27	1,576	11,576	45,000
Completed	24,748	17,515	4,372	14	1,563	11,576	44,000
Progress %	**93**	**100**	**96**	**52**	**99**	**100**	**98**

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 May 2017 was 60.8 % (compared to planned progress of 73.3%).

Figure 2-4: Preparation for installation of stay ring OHTC for unit 1 at the main powerhouse

Figure 2-5: Preparation for Installation of Stay Cone at the re-regulation 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 Hydro-Mechanical Works until the end of May 2017 was 35.4 % (compared to planned progress of 35.4 %).
The latest progress of penstock pipe fabrication at IHI field shop and erection at main dam as of the end of April 2017 ***in Table 2-3*** below

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

Item No.	Work Description	Work Progress (%)	Remarks
1.1	Assembly and Welding	84 %	Straight Pipes
1.1	Painting	79 %	Straight Pipes
1.1	Delivery to Main Dam Laydown Area	36 %	Straight Pipes
1.1	Site Erection at Main Dam	36 %	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 May 2017 was 85.3% (compared to planned progress of 86.2%).

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 May, 2016 (See Figure 2-6 below)

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

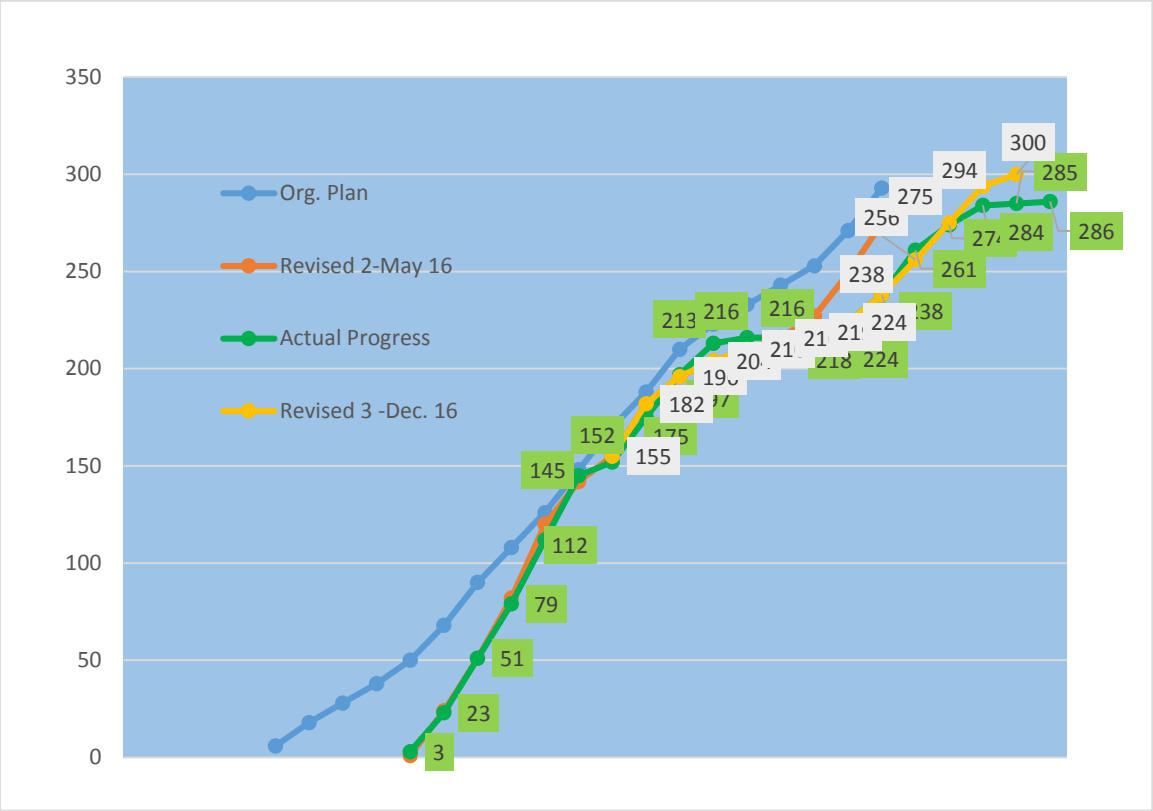


Figure 2-7: Cumulative Works Progress of tower foundation (Revised Planned & Actual)

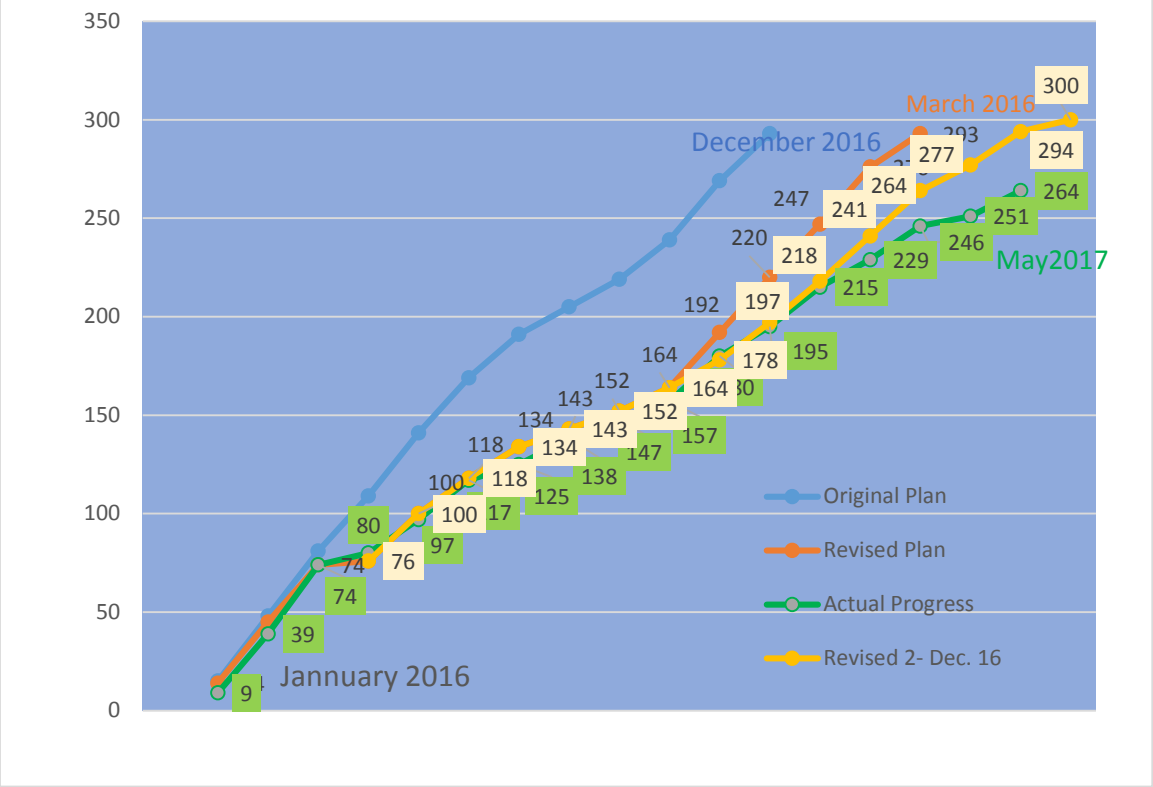


Figure 2-8: Revised Cumulative Works Progress of Tower Erection (Planned & Actual)

3. ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 ESMMP-CP Update 2017

A final version of an Environmental and Social Management and Monitoring Plan for the Construction Phase (ESMMP-CP) was completed and submitted to the Ministry of Natural Resources and Environment (MONRE) on 30 May 2017.

3.1.2 Site Specific Environmental and Social Management and Monitoring Plans

During May 2017, the Environmental Management Office (EMO) of NNP1PC received a total of ten new Site Specific Environmental and Social Management and Monitoring Plans (SS-ESMMP) and three drawings for improvement of the Waste Water Treatment System (WWTS) at selected Camps. With nine SS-ESMMPs carried over from previous months, there were 19 SS-ESMMPs and three drawings for EMO review during the reported month. Out of these, seven SS-ESMMPs and two drawings were cleared with conditions, six SS-ESMMPs and one drawing were cleared with no conditions, one SS-ESMMP was returned for further improvement, and five SS-ESMMPs are pending a review which will be carried over to June 2017.

Table 3-1: SS-ESMMP review status in May 2017

Title	Date Received	Response Status	Comments
SS-ESMMP for Building Construction at Main Powerhouse	22 February 2017 (4th submission)	Waiting for additional information	Provide a revised drawing for the WWTS that include chlorine contact tank to ensure proper treatment of the waste water

Title	Date Received	Response Status	Comments
SS-ESMMP for RCC Operation and Maintenance Work	08 March 2017 (4th submission)	Waiting for additional information	Provide revised drawing of the new sediment retaining structure and ponds.
SS-ESMMP for Irrigation Dam Reservoir Land Clearance at Houay Soup Resettlement Site on Nam Ngiep1 Hydro Power Project	27 March 2017 (1st submission)	Responded with 'No objection with comment' on 16 May 2017	Omit irrelevant information on environmental mitigation measures and provide a clear scope of work and methodology for land clearance (cutting, stockpiling and burning).
SS-ESMMP for the NNP1 Solid Waste Landfill Construction (Stage 2)	28 March 2017 (2nd submission)	Responded with 'No objection with comments' on 16 May 2017	Provide lining for the open ditch, incorporate the Site Decommissioning Plan for the Contractor's sub-camp and facilities as well as provide local plant species as part of landfill slope stabilisation and revegetation.
SS-ESMMP for Curtain Grouting Works at the Main Dam	29 April 2017 (8th submission)	Responded with 'No objection and no further comment's on 05 May 2017	
SS-ESMMP for Construction of Village Office & Hall	29 April 2017 (supplemental information)	Responded with 'No objection with no further comment' on 05 May 2017	
SS-ESMMP for Construction of Health Center at HSRA	29 April 2017 (supplemental information)	Responded with 'No objection with no further comment' on 05 May 2017	
SS-ESMMP for House Construction of Lot No. 1 & 2 at HSRA	17 April 2017 (1st submission)	Responded with 'No objection with comments' on 09 May 2017	Request for more information on the mitigation measures related to workers' camp and facilities. Provide waste management measures.
SS-ESMMP for House Construction of Lot No. 4 &5 at HSRA	5 May 2017 (2nd submission)	Responded with 'No objection with comments' on 05 May 2017	Delete irrelevant information from the previous work, provide clear mitigation measures on hazardous material management and attached the Site Decommissioning Plan
SS-ESMMP for Construction of Resource Centre and Pilot Plan Improvement at HSRA	29 April 2017 (2nd submission)	Responded with 'No objection and no further comments' on 05 May 2017	

Title	Date Received	Response Status	Comments
of Nam Ngiep 1 Hydro Project			
SS-ESMMP for House Construction Lot 3 for 2LR Resettlers at HSRA	04 May 2017 (1st submission)	Responded with 'No objection with comments' on 15 May 2017	Provide clear layouts, actual information on the camp location, environmental training and toolbox as well as a Preliminary Site Decommissioning Plan.
SS-ESMMP for House Construction of Lot 6 for 2LR Resettlers at HSRA	05 May 2017 (1st submission)	Responded with 'No objection with comments' on 11 May 2017	Provide drawing of a temporary toilet and more details are given on emptying the septic tank. Add details on environmental training and toolbox.
SS-ESMMP for Installation Work of 230 kVA Sub Station for Main Power Station	15 May 2017 (1st submission)	Responded with 'No objection with no further comments' on 03 June 2017	
SS-ESMMP for House Construction of seven (07) Units for 2LR Resettlement Site	29 May 2017 (2nd submission)	Responded with 'No objection with comments' on 05 June 2017	Provide the scope of site landscaping in a revised Preliminary Site Decommissioning Plan and add a clear construction site map.
SS-ESMMP for HM's Labour Camp No.2 (LILAMA 10 Camp)	15 May 2017 (4th submission)	Responded with 'No objection and no further comments' on 03 June 2017	
SS-ESMMP for Construction Work of Main Intake Inlet, Outlet and Canal at HSRA-01	15 May 2017 (1st submission)	Returned for further improvement	- Incomplete and insufficient contents; - Need clear mitigation measures for vegetation clearance, excavation and operation of borrow pits
SS-ESMMP for Construction of a Temporary Accommodation for 44 Households from 2LR	29 May 2017 (1st submission)	Under review	
SS-ESMMP for Construction of Village Office and Hall at Zone 2UR, Thathom District, Saysomboun Province	30 May 2017 (1st submission)	Under review	
DWP & SS-ESMMP for Construction of Primary and	30 May 2017 (1st submission)	Under review	

Title	Date Received	Response Status	Comments
Secondary School in HSRA			
Proposed drawing of the waste water treatment system at TCM & GFE camp improvement	30 May 2017 (2nd submission)	Under review	
Proposed drawing of the waste water treatment system at HM main camp & office	12 May 2017 (2nd submission)	Responded with 'No objection and no further comments' on 12 May 2017	
Proposed drawing of the waste water treatment system at V&K Camp	13 May 2017 (1st submission)	Responded with 'No objection with comments' on 16 May 2017	Revise the wastewater piping system drawing; provided information on the cross section of the wetland system.

3.1.3 Compliance Report

During May 2017, EMO issued five new Observations of Non-Compliances (ONC), one Non-Compliance Report Level 2 (NCR2) on Biodiversity Management, one Non-Compliance Report Level 3 (NCR3) on non-compliance with water discharge from the RCC Plant. With six ONC resolved, a total of 12 ONC, two NCR1, two NCR2 and one NCR3 are carried over into June 2017. EMO will follow up with the contractors to resolve the remaining issues in June 2017.

The ONC and NCR carried over from May 2017 to June 2017 are summarized in Table 3-2 below.

Table 3-2: Carried-Over ONCs and NCRs from May 2017 into June 2017

Site ID	Issues	Reporting	Actions
V&K Camp	Insufficient capacity of waste water treatment ponds to handle the operation of the V&K camp (ON_OC-0087). 1st inspection date: 02 June 2015 latest inspection: 23 May 2017	ONC (Closure Pending)	Construction of the waste water treatment system (WWTS) was completed and operated since the end of May 2017. Chlorination will be started in early June 2017.
HM Hydro Subcontract Workers' Camp (LALIMA 10 Camp)	The LILAMA 10 Camp is accommodating 11 workers currently, but the construction of the Waste Water Treatment System (WWTS) remained incomplete. The Camp is expected to accommodate about 200 workers by May 2018 (NCR_HM-0001). 1st inspection date: 28 September 2016 Latest inspection: 24 May 2017	NCR-1 (Closure Pending)	- Construction of the waste water treatment system (WWTS) completed. Currently, no waste water was released into the wetland ponds (still in the holding tanks). *Chlorine dosage has not started;* - Dead reed need to be replaced; - Chlorine dosage container and water pump shall be installed.

Site ID	Issues	Reporting	Actions
RCC Plant	Turbid Waste Water Discharge from RCC Plant's Sediment Ponds (NCR_OC-0018) 1st inspection date: 05 May 2017 Latest inspection: 23 May 2017	NCR3 (New)	- Submit the long outstanding Sedimentation Control System Operation Manual to NNP1PC; Monitor/measure the sediment accumulation in the ponds and clean-up sediments daily; and - Control the installed control valves and discharge pipes to ensure the operation follows the approved operation procedure by 31 May 2017;
Re-Regulation Dam (Borrow Pit Area)	The Contractor started operating a borrow pit with inadequate environmental management practices as indicated below: - Topsoil was stockpiled at an area sensitive to erosion; - The slope of the cut had no berm and cut-off drains; - No information and management measures on the excavation of this borrow pit was included in the two approved SS-ESMMP for the Re-Regulating Dam (ON_OC-0232). 1st inspection date: 30 August 2016 Latest inspection: 23 May 2017	ONC (Closure Pending)	During the joint site inspection on 23 May 2017, OC site engineer representative confirmed that the borrow pit will be closed in accordance with the submitted site closure plan for spoil disposal area located at the junction road P1 & P1A.
Re-Regulation Dam (Spoil Disposal Area located at the junction road P1 & P1A)	Spoil disposal activity from the Re-regulation Dam tailrace excavation (ON_OC-0236). 1st inspection date: 11 October 2016 Latest inspection: 23 May 2017	ONC (Closure Pending)	Spoil disposal activity was completed. During the joint site inspection on 23 May 2017, the contractor was required to combine the site closure layout with the closure plan (P1&P1A) and submit it to NNP1PC by 19 June 2017.
Re-Regulation Dam (New Spoil Disposal Area)	New Spoil Disposal Area created from the Re-regulation Dam tailrace excavation without management measures (ON_OC-0254). 1st inspection date: 25 April 2017 Latest inspection: 23 May 2017	ONC (Closure Pending)	During the joint site inspection on 23 May 2017, the contractor has done some preliminary works including cut-off drain and slope compaction. The contractor confirmed that the site closure plan will be incorporated into the existing site closure plan for spoil disposal areas located at the junction of Roads P1 and P1A by 19 June 2017.

Site ID	Issues	Reporting	Actions
Aggregate Crushing Plant	- 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). 1st inspection date: 08 November 2016 Latest inspection: 23 May 2017	NCR-2 (Closure Pending)	- The contractor has raised the level of the outlet by about 10 cm, and cleaned-up sediment from the sediment ponds every two days; - EMO will carry out a daily effluent quality monitoring for turbidity during the wet season (until 30 September 2017) for compliance check purposes.
Sino Hydro Workshop	Poor housekeeping and improper hazardous waste management. Some oil spills were still observed, used oil and oily rags were stored in open areas (NCR_OC-0017). 1st inspection date: 21 March 2017 Latest inspection: 23 May 2017	NCR-1 (Closure pending)	Hazardous material containers were removed to hazardous material storage. An additional hazardous material storage was under construction. The contractor is required to respond to the NCR by 31 May 2017 (second extension). .
Kenber Camp	The Waste Water Treatment System (WWTS) has malfunctioned. The piping system is clogged and consequently causes the waste water to overflow from the first wetland pond to outside and the planted reeds are dead due to a lack of maintenance (ON_OC-0248). 1st inspection date: 07 February 2017 Latest inspection: 23 May 2017	ONC (Closure pending)	A renovation was completed and the WWTS has been in full operation since March 2017. However, it was observed in middle of May 2017 that the piping work installation for pond 3 to pond 4 did not work properly. The contractor already fixed the piping system and replanted the grasses at the last pond. A joint inspection will be conducted in June 2017 to conclude the pending issue.
	Inadequate management of hazardous materials and waste. Oil spills from the oil re-fuelling activities were left on site without cleaning up (ON_OC-0259). 1st inspection date: 23 May 2017	ONC (New)	- Clean up the contaminated soil and store it at the designated hazardous material storage for proper disposal/elimination; - Provide a proper work procedure for hazardous material handling and refuelling activities including spills response /spills clean-up; - Hazardous Material and Waste Management Training needs to be

Site ID	Issues	Reporting	Actions
			provided to the operator of fuel storage. - The above improvements shall be completed by 5 June 2017.
	The WWTS renovation works were completed in April 2017 (chlorine dosage has not started- water samples are collected from the pond). However, wastewater flow and filtration problem was observed.	ONC (New)	The contractor was required to carry out regular maintenance of the WWTS by checking the piping system and lining as well as replacing dead reeds by 31 May 2017.
Biomass Clearance Zone	A broken tractor was parked near a UXO temporary workers' camp without a rain protection and oil spill protection tray. As a result, oil has leaked from the broken engine/hydraulic parts of the tractor into the ground (ON_UCC-0002). 1st inspection date: 23 May 2017	ONC (New)	- Completely remove the contaminated soil and store in the designated temporary hazardous storage area for proper elimination; - Seal the broken part of the tractor and provide proper oil spill tray to ensure no oil spills onto the ground by 25 May 2017.
Sand stockpile at former RT camp	Another sand stockpiling area for material recovered from the RCC plant sediment pond (the first two sediment ponds) has been established at the former RT Camp without installing erosion and sediment control devices (ONC_OC-0250) 1st inspection date: 07 March 2017 Latest inspection: 23 May 2017	ONC (Pending closures)	About 90% of sand was removed. The Civil Contractor needs to completely remove the remaining sand stockpile by end of June 2017 (second extension).
PK Camp	No proper hazardous material storage. Fuel drums were stored on the bare ground without spill protection facilities (ON_PK-0002). 1st inspection date: 19 April 2017 Latest inspection date: 30 May 2017	ONC (Pending closure)	EMO was previously informed that the camp would be demobilized due to work completion. However, during the latest joint site inspection on 30 May 2017, it was informed that the Contractor was offered a new work contract.
Sand stockpile at a former spoil disposal area no.8	Some sections of the wooden silt fence were broken which allowed the transportation of sand from the stockpile area into the adjacent road side drainage (ON_OC-0257). 1st inspection date: 9 May 2017 Latest inspection date: 23 May 2017	ONC (New)	The Contractor was instructed to repair existing wooden silt fences around the sand stockpile area and place sand bags to close the gaps at the base and around wooden silt fences by 23 May 2017. A status will be updated in June monthly progress report after next by weekly inspection in June 2017.
Former SongDa5 Batching Plant Yard	Big piles of sand which dropped from the joints of the aggregate conveyor belt towers have not been completely removed after	ONC (New)	The Contractor was required to completely clean-up and regularly remove the deposited sand under the aggregate conveyor belt towers where evident from the Aggregate Plant to

Site ID	Issues	Reporting	Actions
	many verbal agreements since February 2017 (ON_OC-0258). 1st inspection date: 9 May 2017 Latest inspection date: 23 May 2017		RCC Plant to a designated sand stockpile area or the Spoil Disposal Area no.6 by 23 May 2017. A status will be updated in June monthly progress report after next by weekly inspection in June 2017.
Re-regulation Dam	Non-Compliance on the Fish Catch in Nam Ngiep (SP10 Biodiversity Management and NNP1PC's Code of Conduct, NC_OC-0019). 1st inspection date: 24 May 2017	NCR2 (New)	The Contractor is required to strictly enforce NNP1PC's policies especially the Code of Conduct and ESMMP-CP SP10: Biodiversity Management with its sub-contractors as the following: - Ensure that the sub-contractors will not repeat the same environmental violations (SP10: Biodiversity Management) through providing regular trainings and applying applicable penalties if found and; - In the future, the Environmental & Safety Patrol Report needs to record discussed environmental issues, recommendations and corrective actions identified and agreed during the Patrol.

Photograph 1: EMU Inspected V&K Camp WWTS 	*Photograph 2: EMU Inspected SongDa5 No. 2 Camp.* 
Photograph 3: Construction of The WWTS at Obayashi Corporation's Camp 	*Photograph 4: Construction Of The WWTS at Sinohydro Camp* 

Figure 3-1: Site Inspection Locations

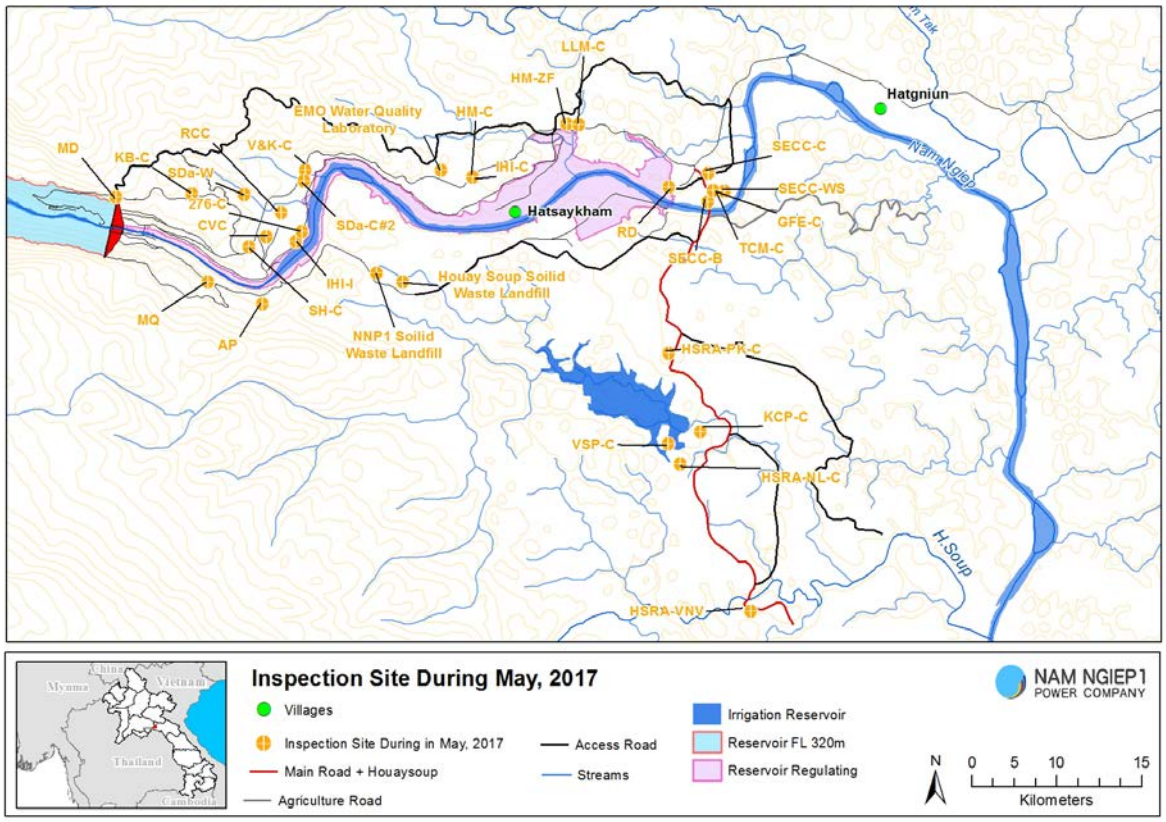


Figure 3-2: 230 kV Transmission Line Construction Monitoring

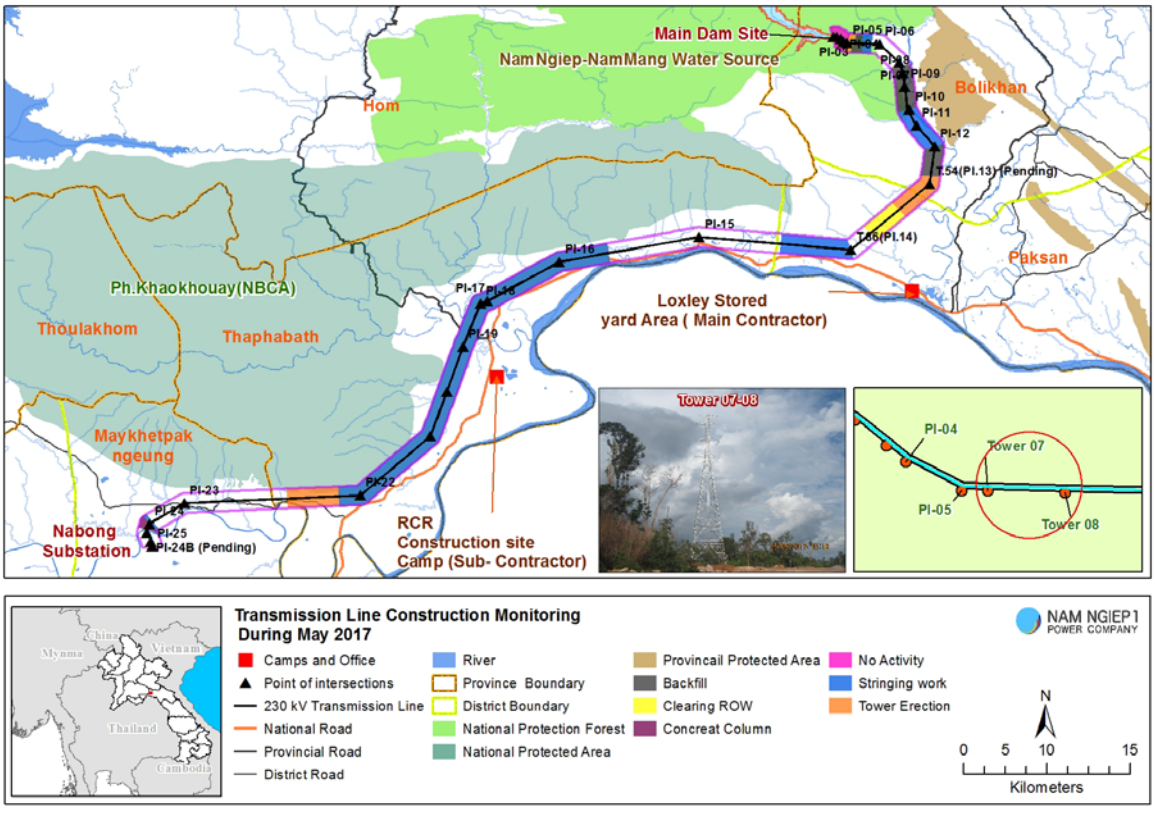
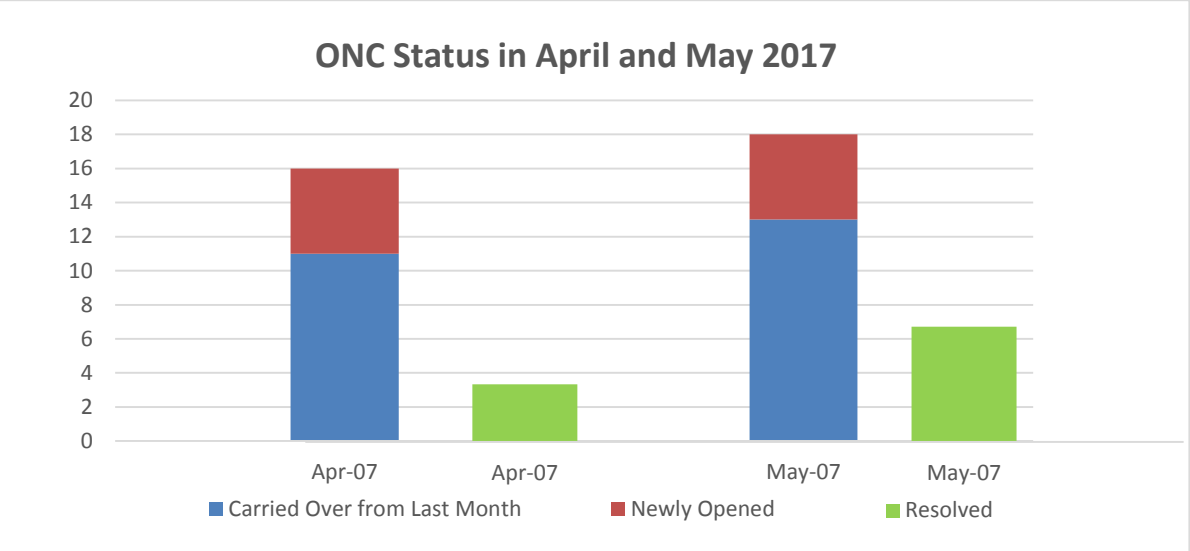


Table 3-3: Summary of ONC and NCR

Items	ONC	NCR-1	NCR-2	NCR-3
Carried Over from the Last Month (April 2017)	13	2	1	0
Newly Opened in this Month (May 2017)	5	0	1	1
Resolved in this Month (May 2017)	6	0	0	0
Carried over into next Month (June 2017)	12	2	2	1
Unsolved exceeding deadline	**9**	**2**	**1**	**0**

Figure 3-3: Observations of non-compliance (ONCs) in May 2017 Compared with April 2017



3.1.5 Inspection by Environmental Monitoring Units

During 18 to 19 May 2017, the Provincial and District EMU 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). After the wrap-up meeting, the EMUs submitted their mission report to NNP1PC on 07 June 2017. The EMUs identified the following main environmental issues:

a) Waste water discharge from the sediment pond at the aggregate crushing plant still has high turbidity of 15,130 NTU and TSS of 6,003 mg/l (based on the EMO water quality testing results);
b) Waste water discharge from the sediment ponds at the RCC plant still has high turbidity of 3,962 NTU and TSS of 1,714 mg/l (based on the EMO water quality testing results);
c) Stagnant rain water was observed around the chlorine contact tank and monitoring tank at the V&K Camp because the adjacent open ditch was higher than the chlorine tank elevation;
d) The WWTS of Song Da 5 Camp Number 2 had strong odour and there was trash floating in the wetland ponds.

An official response with progress on the corrective action implementation will be submitted to the EMU in June 2017.

3.2 Environmental Quality Monitoring

The NNP1PC Environmental Laboratory at the Owner's Site Office and Village is operated mainly for TSS, BOD, total coliform, faecal coliform and E. Coli bacteria testing. The Laboratory, in collaboration with the United Analysis and Engineering Consultant Company Limited (UAE) has completed a

performance verification of its analyses for Total Suspended Solids (TSS) in May 2017. The TSS results from NNP1PC Environmental Laboratory are in acceptable range compared to the UAE Laboratory. NNP1PC Environmental Laboratory will take over the TSS analyses in July 2017 according to the water quality analysis service agreement between UAE Laboratory and NNP1PC.

In addition, during the re-regulation reservoir impounding period (18-24 May 2017), NNP1PC-EMO has undertaken daily water quality monitoring for physical parameters (pH, Dissolved Oxygen, Conductivity, Total Dissolved Solids (TDS), temperature and turbidity). After the impounding, this has become a weekly and monthly water quality monitoring which complement the existing monitoring programme presented in the ESMMP-CP 2017 Volume III.

The environmental quality monitoring programme consists of the following components:

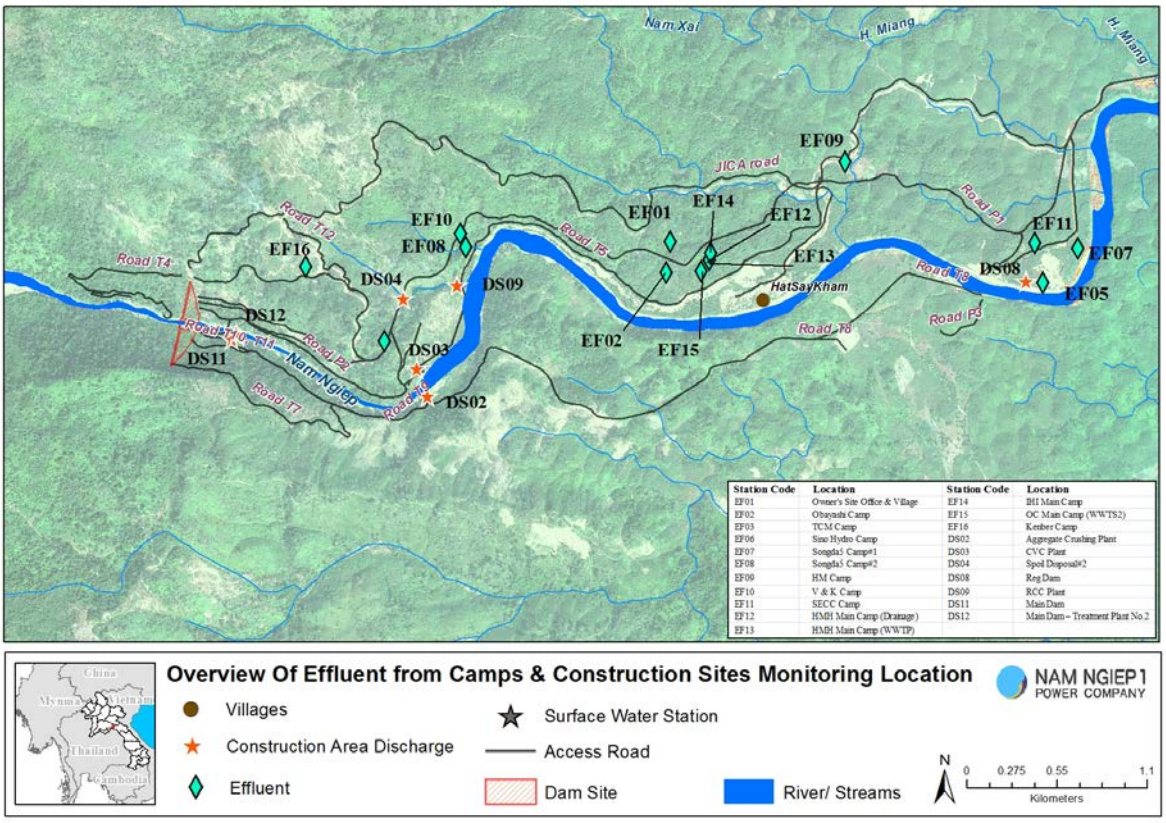
a) Effluent discharge from camps and construction sites;
b) Ambient surface water quality monitoring;
c) Groundwater and community water supply;
d) Reservoir water quality monitoring;
e) Landfill leachate;
f) Ambient noise and noise emission monitoring.

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, which are also published on the Company's website.

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. During May 2017, all camp effluents regardless of the discharge condition were monitored. Results of effluent monitoring 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 A*** of this EMO section of the Report. The effluent monitoring results for May 2017 indicate that only the wastewater treatment systems at the Owner's Site Office and Village and Song Da 5 Camp No. 1 comply with the relevant effluent standards. The non-compliances with effluent standards are believed to be a result of inadequate dosage of chlorine. In order to further improve the chlorination processes, NNP1PC-EMO undertook field inspections and laboratory testing on chlorination breakpoints during March to April 2017. The results were shared with the contractor. By the end of May 2017, three camps (Obayashi Corporation, V&K and Sinohydro) completed their WWTS improvements. Chlorination is expected to commence in early June 2017. NNP1PC-EMO will continue to monitor the chlorination process and provide training to the contractor on chlorination to ensure compliance with related standard.

Progress on implementation of the corrective actions for the non-compliant camps and key construction areas is summarized below.

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

Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
Owner's Site Office and Village	EF01	Minor non-compliances for total nitrogen	No corrective actions are needed. These are not likely to cause any significant impacts on the ambient water quality of Nam Ngiep.
Obayashi Camp (WWTP1)	EF02	Significant non-compliances for COD,	The Contractor completed the improvement of the WWTS at the

Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
		BOD_5, ammonia nitrogen (NH_3-N), total nitrogen and total coliforms	end of May 2017. The operation is likely to start in early June 2017. NNP1PC-EMO will continue to closely monitor and provide training to the Contractor on the chlorination operation.
Sino Hydro Camp	EF06	Significant non-compliance for NH_3-N, total phosphorus, total nitrogen and total coliforms.	The WWTS at his camp was completed by the end of May 2017 and chlorination is likely to commence in early June 2017. NNP1PC-EMO will continue to closely monitor and provide training to the Contractor on the chlorination operation.
SongDa 5 Camp No. 1	EF07	Minor non-compliances: COD and total phosphorus, total coliform, NH_3-N, and total nitrogen	NNP1PC-EMO will continue to monitor and provide training to the Contractor on the chlorination process.
SongDa 5 Camp No. 2	EF08	Significant non-compliance: total coliform, BOD_5, NH_3-N, COD, and total nitrogen,	As above.
Zhefu Camp (Subcontractor of Hitachi-Mitsubishi Hydro Workers' Camp	EF09	Minor non-compliance: TSS, BOD_5 , NH_3-N, COD, total nitrogen and total coliforms	The Contractor agreed to install an additional of 1 m^3 chlorine contact tank and a 1 m^3 chlorine monitoring tank according to the Owner's instruction letter issued in November 2016. A design drawing is being prepared for submission to NNP1PC.
V&K Camp	EF10	Minor non-compliance: TSS, BOD_5, NH_3-N, COD, total nitrogen and total coliforms	The WWTS improvement will be completed and put in operation with chlorination by early June 2017. NNP1PC-EMO will provide training to the Contractor on chlorination in June 2017.
SECC Camp	EF11	None. The Camp was decommissioned and cleaned up.	No corrective actions are needed. The effluent monitoring will be halted from June 2017.
H-MH Main Camp (WWTS)	EF13	Minor non-compliance for BOD_5, total coliforms, NH_3-N, COD and total nitrogen.	NNP1PC-EMO will continue to monitor and provide training on the chlorination operation to the Contractor in June 2017.
IHI Main Camp	EF14	Significant non-compliance: TSS, NH_3-N, BOD_5, COD, total nitrogen and total coliforms	NNP1PC-EMO recommended the Contractor to dose chlorine manually to ensure a well mixing and sufficient contact time for the chlorination process. In addition, NNP1PC-EMO will continue to monitor and provide

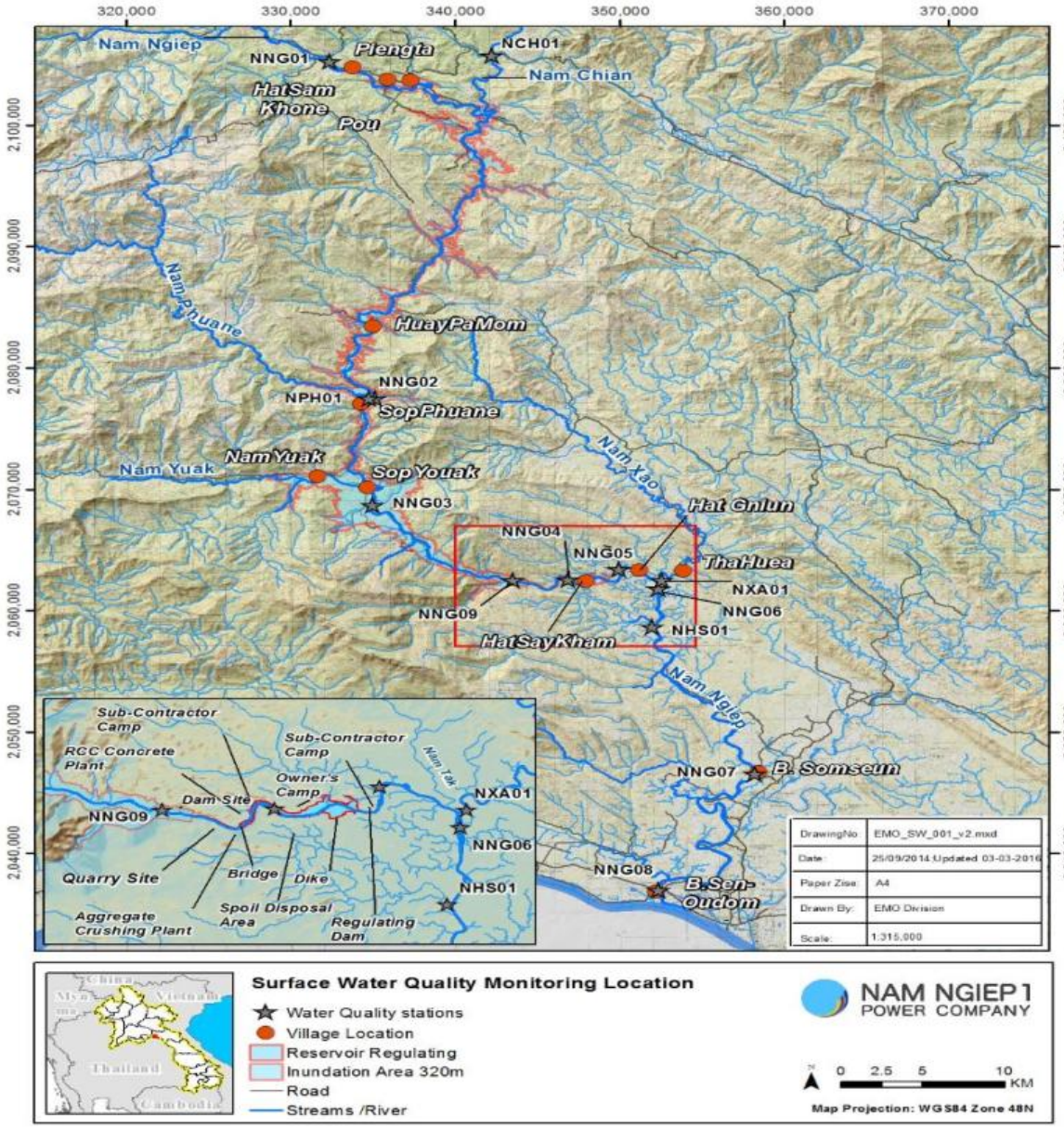
Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
			training on chlorination operation to the Contractor.
Obayashi Camp (WWTS2)	EF15	Significant non-compliance: BOD_5, COD, and total coliforms.	The WWTS improvement will be completed and put in operation by early June 2017. This sampling site will be halted as the wastewater at this site (WWTS2) will be treated together with the main system located at the soccer field.
Kenber Camp	EF16	Significant non-compliance: TSS, BOD_5, COD and NH_3-N, total nitrogen and total coliforms	No discharge was observed from the WWTS and the waste water has not yet been treated with chlorine (see table 2 on the non-compliance issues).
Main Dam Construction Area (Treatment Plant No.1)	DS11	Minor Non-compliance: pH and TSS	NNP1PC-EMO instructed the Contractor to check and ensure that the treatment plant operates properly.
Re-Regulation Dam	DS08	No Sampling due to no waste water discharge.	No action is needed.
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	Minor non-compliance: pH and TSS.	No action is needed. The low pH is a natural phenomenon in this area. NNP1PC will continue to monitor the amount of TSS during the wet season.
RCC Plant	DS09	Minor non-compliance: TSS	Refer to Table 3-2 for corrective action.
Aggregate Crushing Plant	DS02	Significant non-compliance: TSS	See Table 3-2 for corrective actions.

3.2.2 Ambient Surface Water Quality Monitoring

Surface water samples are collected and analysed twice a month[2] from nine stations in Nam Ngiep and four stations in the main tributaries including the lower Nam Chian, Nam Phouane, Nam Xao and Houay Soup (total 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 the re-regulating dam.

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

Figure 3-5: Surface Water Quality Monitoring Stations



Key findings for surface water quality monitoring in April 2017 are shown below.

Nam Ngiep

The monitored parameters complied with the national surface water quality standards, except for Chemical Oxygen Demand (COD) and Faecal Coliform. The COD exceeded the standard for most of the stations monitored, except Nam Ngiep Downstream RT Camp (NNG04 – Nam Ngiep within Construction Sites). The COD peak was 9.8 mg/l at Nam Ngiep downstream Ban Sopyuak (NNG03 – Nam Ngiep upstream the Construction Site). In addition, faecal coliform was also recorded as exceeding the Standard at Nam Ngiep upstream of Nam Phoun confluence (NNG02 – Nam Ngiep upstream the Construction Site) with a value of 1,100 MPN/100 ml.

Since Nam Ngiep surface water quality monitoring programme commenced in September 2014, EMO has frequently found elevated levels of COD and faecal coliform 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

	River Name	Nam Ngiep								
	Zone	Location Refer to Construction Sites								
		Upstream				Within	Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	3-May-17	4-May-17	4-May-17	4-May-17	4-May-17	4-May-17	4-May-17	4-May-17	4-May-17
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.51	7.52	7.27	7.35	7.28	8.05	8.19	7.87	8.07
DO (%)		84.9	106.2	103.9	89.8	88.2	87.5	98.6	100.3	89.6
DO (mg/l)	>6.0	6.87	8.62	7.86	7.16	6.81	6.39	7.26	7.38	6.37
Conductivity (µs/cm)		127	122	123	122	120	125	127	125	128
TDS (mg/l)		63	61	61	61	60	62	63	63	64
Temperature (°C)		24.2	26.97	28.24	28.28	28.11	27.78	26.92	28.82	29.37
Turbidity (NTU)		60.76	44.13	29.9	44.17	44.31	39.2	37.27	30.89	29.93
TSS (mg/l)		79.2	66.8	46	55.2	46	56.3	62.5	44.6	36.8
BOD5 (mg/l)	<1.5	ND[13]	1.3	1.3	ND[13]	ND[13]	ND[13]	ND[13]	ND[13]	ND[13]
COD (mg/l)	<5.0	8.7	8	9.8	8	ND[16]	7.3	6.7	6.9	5.5
NH3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
NO3-N (mg/l)	<5.0	0.07	0.09	0.09	0.1	0.09	0.09	0.08	0.09	0.07
Total coliform (MPN/100ml)	<5,000	940	1,100	920	700	920	240	350	170	33
Fecal coliform (MPN/100ml)	<1,000	170	1,100	920	540	350.0	240	350	110	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)	ND[17] (<2.7 mg/L)			

Table 3-6: Results of Physical Parameters of Nam Ngiep Surface Water Quality Monitoring – Weekly and Fortnightly

	River Name	Nam Ngiep		
	Zone	Location Refer to Construction Sites		
		Upstream	Within	Downstream
	Station Code	NNG09	NNG04	NNG05
	Date	10-May-17	10-May-17	10-May-17
Parameters (Unit)	**Guideline**			
pH	5.0 – 9.0	7.55	7.45	8.22
DO (%)		85.5	88.2	89.9
DO (mg/l)	>6.0	6.29	6.32	6.96
Conductivity (µs/cm)		122	123	123
TDS (mg/l)		61	62	62
Temperature (°C)		27.75	30.12	30.37
Turbidity (NTU)		33.77	40.24	45.37

	River Name	Nam Ngiep		
	Zone	Location Refer to Construction Sites		
		Upstream	Within	Downstream
	Station Code	NNG09	NNG04 / R6	NNG05
	Date	18-May-17	18-May-17	18-May-17
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.42	7.53	7.43
DO (%)		110.3	100.9	142.8
DO (mg/l)	>6.0	9.91	9.12	11.59
Conductivity (µs/cm)		142	112	115
TDS (mg/l)		71	56	57
Temperature (°C)		24.8	24.7	24.1
Turbidity (NTU)		63.7	66.8	47

	River Name	Nam Ngiep								
	Zone	Location Refer to Construction Sites								
		Upstream				Within	Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04/R6	NNG05	NNG06	NNG07	NNG08
	Date	22-May-17	23-May-17	23-May-17	24-May-17	24-May-17	24-May-17	24-May-17		
Parameters (Unit)	Guideline									
pH	5.0 – 9.0	7.58	7.48	7.3	7.6	7.94	6.98	7.14	No Monitoring Due to Insufficient Equipment	
DO (%)		101.5	102.6	104.5	103.3	93	105.1	106.6		
DO (mg/l)	>6.0	7.41	7.74	7.72	8.16	7.1	7.86	7.87		
Conductivity (µs/cm)		39	120	125	100.1	120	108	110		
TDS (mg/l)		19	60	62.5	50.05	60	54	55		
Temperature (°C)		29	27.9	29	25.9	28.16	28.8	29.5		
Turbidity (NTU)		42.8	51.8	42.5	64	38.23	28.5	28.5		

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

Nam Chiane (NCH01) is located about 66 km upstream of the Main Dam. Most of the parameters monitored comply with the applicable Standard, except COD. The COD exceeded the National Surface Water Quality Standard with a value of 6.7 mg/l.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The COD exceeded the National Surface Water Quality Standard with a value of 6.3 mg/l.

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 COD exceeded the National Surface Water Quality Standard with a value of 7.1 mg/l.

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 26.9 mg/l. In addition, on 5 May 2017, DO level was lower than the National Surface Water Quality Standard with a recorded value of 4.31 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 Houay Soup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	3-May-17	4-May-17	5-May-17	5-May-17
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.04	6.88	7.53	7.08
DO (%)		90.2	92	98.2	56.9
DO (mg/l)	>6.0	7.26	7.07	7.11	4.31
Conductivity (µs/cm)		79	103	171	108
TDS (mg/l)		39	51	86	54
Temperature (°C)		24.35	26.08	28.92	27.7
Turbidity (NTU)		16	5.37	3.39	14.11
TSS (mg/l)		24.6	6.3	ND[16]	9.5
BOD_5 (mg/l)	<1.5	ND[13]	1.2	ND[13]	ND[13]
COD (mg/l)	<5.0	6.7	6.3	7.1	26.9
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.12	0.02	0.03	0.09
Total coliform (MPN/100 ml)	<5,000	2,400	33	350	130
Fecal coliform (MPN/100 ml)	<1,000	24	17	350	79

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	22-May-17	23-May-17	24-May-17	24-May-17
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	6.9	6.8	7.1	6.45
DO (%)		105.3	103.8	90.2	96.7
DO (mg/l)	>6.0	7.96	7.83	6.47	7.25
Conductivity (µs/cm)		80	80	130	84
TDS (mg/l)		40	40	65	42
Temperature (°C)		27.1	27.9	31.2	28.6
Turbidity (NTU)		36	6.78	6.12	11.39

3.2.3 Groundwater Quality Monitoring

During May 2017, NNP1PC sampled and analysed the groundwater quality in six boreholes which were built by the Project for resettlers at Houay Soup Resettlement Area (HSRA). Immediately prior to the start of impounding of the re-regulating reservoir on 15 May 2017, all three water wells at Hatsaykham Village were decommissioned and plugged to prevent potential contamination of the groundwater.

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

Houay Soup Resettlement Area (HSRA)

All parameters monitored at the six boreholes complied with the relevant standards.

Figure 3-6: Groundwater Quality Monitoring Locations

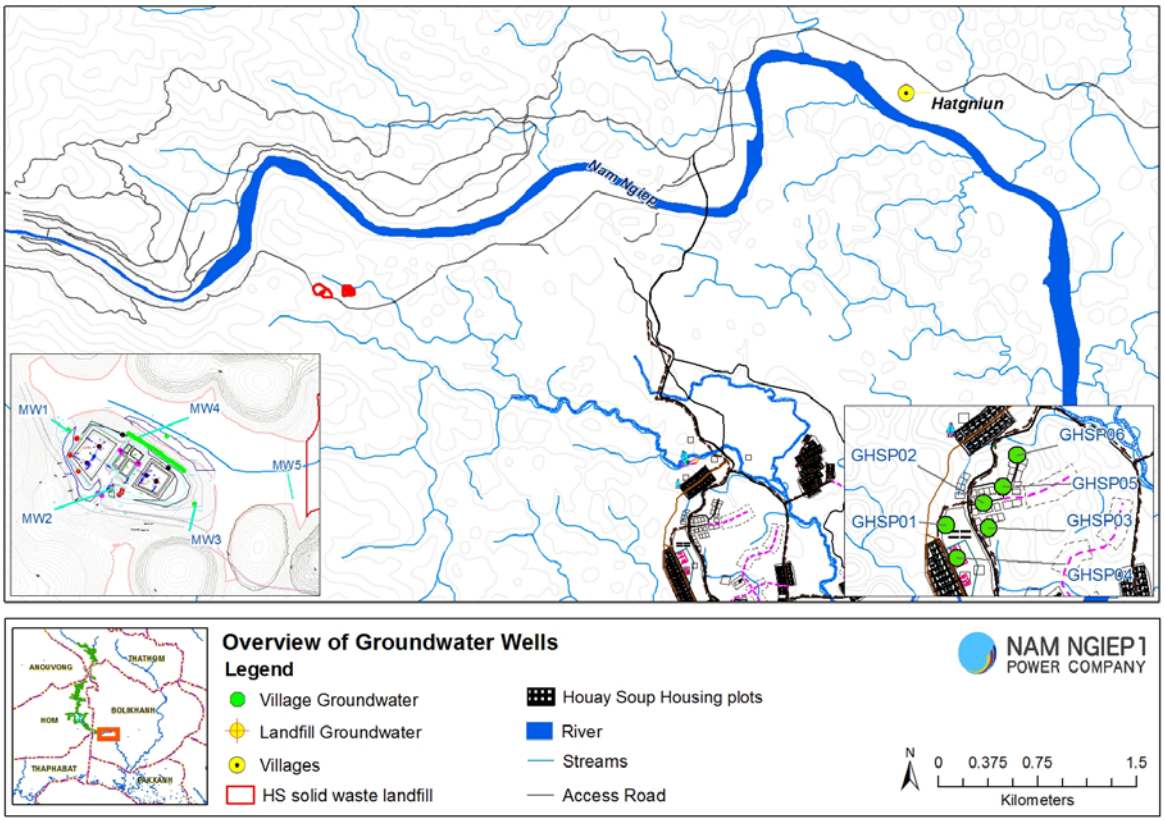


Table 3-9: Groundwater Quality Monitoring Results for Houay Soup Resettlement Area in May 2017

	Site Name	Houay Soup Resettlement Village					
	Station Code	GHSP01	GHSP02	GHSP03	GHSP04	GHSP05	GHSP06
	Date	8-May-17	8-May-17	8-May-17	8-May-17	8-May-17	8-May-17
Parameter (Unit)	**Guideline**						
pH	6.5-9.2	7.25	6.71	7.19	6.56	6.92	7.25
DO (%)		34.2	49.2	38.5	35.3	56.6	62.6
DO (mg/l)		2.43	3.41	2.87	2.53	4	4.57
Conductivity (µs/cm)		268	290	513	271	312	390
TDS (mg/l)	<1,200	134	145	257	136	156	195
Temperature (°C)		29.28	31.33	29.14	31.36	30.26	27.96
Turbidity (NTU)	<20	0.92	0.6	0.56	1.55	0.61	0.58
Fecal coliform (MPN/100 ml)	0	0	0	0	0	0	0
E. Coli Bacteria (MPN/100 ml)	0	0	0	0	0	0	0

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

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring for GFWS systems 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 May 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 23 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN2): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E. Coli, which were found to be 130 MPN/100 ml for both parameters.

The presence of the E.Coli found in the GFWS system is a normal situation after rain where the surface water is likely to be contaminated by runoff from grazing land in the source area. The local villagers were informed about the results and encouraged to boil their drinking water.

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

	Site Name	Thaheua Village	Hat Gnuin Village
	Station Code	WTHH02	WHGN02
	Date	9-May-17	9-May-17
Parameter (Unit)	**Guideline**		
pH	6.5-9.2	7.38	7.43
DO (%)		59.8	73.3
DO (mg/l)		4.44	5.59
Conductivity (µs/cm)		94	124
TDS (mg/l)	<1,200	47	62
Temperature (°C)		29.34	27.96
Turbidity (NTU)	<20	1.19	0.8
Fecal coliform (MPN/100 ml)	0	23	130
E. coli Bacteria (MPN/100 ml)	0	23	130

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

3.2.5 Landfill Leachate Monitoring

During May 2017, water samples were taken from the last landfill leachate pond of the NNP1 Project Landfill (LL4). The location of landfill leachate monitoring and results are shown in ***Figure 3-7*** and ***Table 3-12*** below. The results indicate compliance with the relevant standards in the final pond (LL4). Thus approximately 70 m^3 of the leachate in the last leachate pond (LL4) was pumped out and used to water newly grown grasses on the slope of the landfill at the end of May 2017.

Figure 3-7: Landfill Leachate Monitoring Location

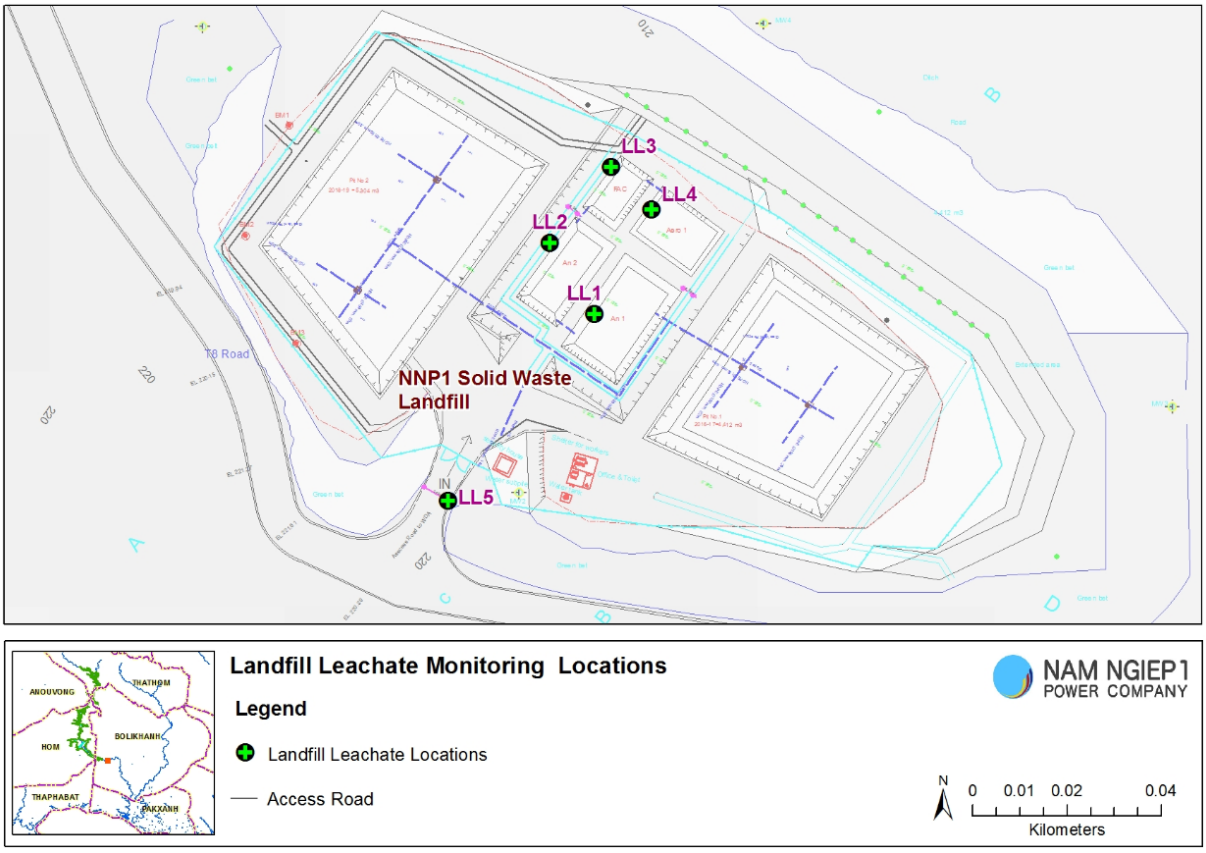


Table 3-11: Landfill Leachate Monitoring Results

	Site Name	NNP1 Landfill (Last Leachate Pond)	Houay Soup Landfill (Last Leachate Pond)
	Station Code	LL4	LL6
	Date	9-May-17	9-May-17
Parameters (Unit)	**Guideline**		
pH	6.0 - 9.0	8.82	6.86
Sat. DO (%)		91.5	72.5
DO (mg/l)		6.44	5.22
Conductivity (µs/cm)		296	80
TDS (mg/l)		148	40
Temperature (°C)		31.8	31.41
Turbidity (NTU)		4.72	6.34
BOD_5 (mg/l)	<30	3	2.1

	Site Name	NNP1 Landfill (Last Leachate Pond)	Houay Soup Landfill (Last Leachate Pond)
	Station Code	LL4	LL6
	Date	9-May-17	9-May-17
Parameters (Unit)	**Guideline**		
COD (mg/l)	<125	44.2	ND[18]
Total coliform (MPN/100 ml)	<400	79	350

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

3.2.6 Dust Monitoring

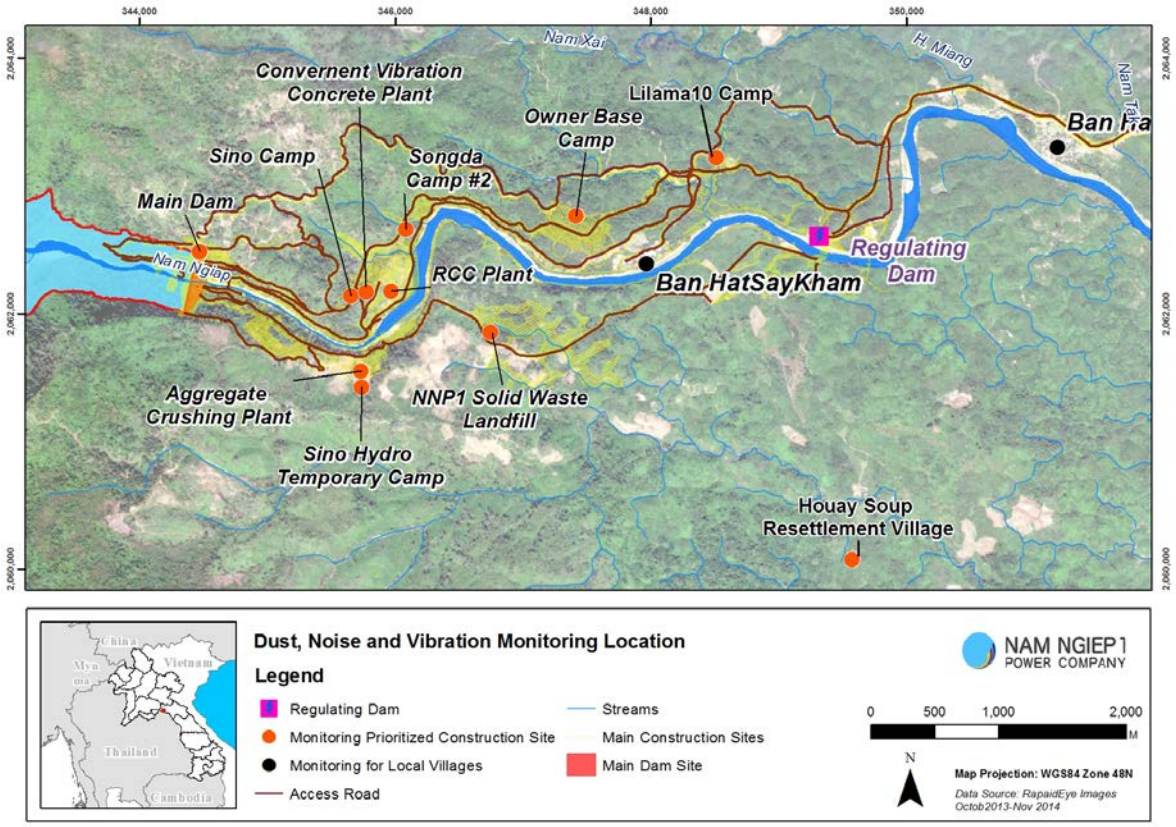
The monitoring points are indicated on the map in ***Figure 3-8***. Most of dust measurements complied with the National Standard, except at the Aggregate Crushing Plant, Sino Hydro Temporary Worker Camp and RCC Plant. Staff have been advised to wear dust masks while working in the areas at risk. The results are presented in ***Annex B***.

3.2.7 Noise Monitoring

During May 2017, noise monitoring was conducted in Hat Gniun and Houay Soup Resettlement Area for at least 72 consecutive hours. Noise monitoring was also conducted at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Sino Hydro Temporary Worker Camp and Lilama10 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 all monitoring stations indicated full compliance with the National Standard for the period of 06:01-22:00, except at the Houay Soup Resettlement Area (18 May 2017) due to the heavy rain during the mission. The noise levels during the period of 22:01-06:00 were higher than the Standard at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Sino Hydro Temporary Worker Camp and the Main Dam [between 51.54 – 75.01 dB(A) compared to the Standard of 50 dB(A)] and at Houay Soup Resettlement Village [on 19 May 2017 (50.46 dB(A)) compare to the Standard of 45 dB(A)].

3.3 PROJECT WASTE MANAGEMENT

3.3.1 Solid Waste Management

In May 2017, an approximate 131 m^3 of solid waste was disposed of at the NNP1 Project Landfill, a decrease of 2.8 m^3 compared to April 2017. The construction of NNP1 Landfill (stage 2) was completed including a second waste pit, HDPE lined open ditch, internal road, slope re-vegetation and perimeter fencing. A joint work completion inspection will be organised by NNP1PC-TD in the beginning of June 2017 (see *Photograph 5* and *Photograph 6* below).

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

Photograph 6: Completion of a second stage construction of NNP1 Project landfill

A total of 189 kg of recyclable waste were sold to Khounmixay Processing Factory by the Contractors as shown in *Table 3-12*

Table 3-12: *Amounts of Recyclable Waste Sold*

No.	Type of Recycled Waste	Unit	Sold	Cumulative Total by May-17
1	Scrap metal	kg	0	18,179
2	Glass	kg	66	348
3	Plastic bottles	kg	55	297.5
4	Paper/Cardboard	kg	57	174.5
5	Aluminium	kg	10.5	167
Total		**Kg**	**189**	**19,166**

3.3.2 Hazardous Materials and Waste Management

In May 2017, joint hazardous materials and waste inventories were carried out at the main construction sites and subcontractors' camps. A monthly Hazardous Material and Waste Inventory is shown in *Table 3-13*.

Table 3-13: Results of hazardous material inventory

No.	Hazardous Waste Type	Unit	Total in May 2017 (A)	Disposal by Selling (B)	Remainder (A - B)
1	Used hydraulic and engine oil	litre (l)	5,860	0	5,860
2	Used oil filters	number	653	0	653
3	Empty paint and spray cans	can	499	0	499
4	Empty used chemical drum/container	drum (20 l)	430	0	430
5	Used tyre	No.	425	0	425
6	Ink cartridge	No.	316	0	316
7	Cement bag	bag	300	0	300
8	Acid and caustic cleaners	bottle	136	0	136
9	Empty used oil drum/container	drum (20 l)	138	49 (Reuse)	89
10	Empty used chemical drum/container	drum (200 l)	53	0	53
11	Empty used oil drum/container	drum (200 l)	48	13 (Reuse)	35
12	Halogen/fluorescent bulbs	No.	31	0	31
13	Contaminated soil, sawdust and concrete	bag	26	0	26
14	Contaminated textile and material	Bag	24	0	24
15	Car battery	No.	11	0	11
16	Clinical waste	kg	6	0	6
17	Empty contaminated bitumen drum/container	drum (200 l)	0	0	0
18	Used oil mixed with water	liter (l)	0	0	0

3.3.3 Other Non-hazardous Waste Management

A total of 50 m^3 of construction waste, 13 m^3 of grey water and 7 m^3 of sewage sludge from SECC Contractor's site decommissioning activities were transported and disposed of at the Spoil Disposal Area No.6 by following their Site Decommissioning Plan and Standard Operating Procedures (SOP) for Sewage/Black Water Disposal (See *Photograph 7* and *Photograph 8* below)

Photograph 7: SECC's grey water and Sewage Sludge was Disposed of At the Designated Spoil Disposal Area No. 6

Photograph 8: SECC's construction waste was transported and disposed to Disposal area No.6

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 7,307 kg was collected in May 2017 as shown Table 3-14:

Table 3-14: Amounts of Food Waste Collected by Villagers

NO.	SITE NAME	UNIT	TOTAL
1	Song Da5 Camp No. 2	Kg	2,935
2	Song Da5 Camp No. 1	Kg	2,628
3	Obayashi Corporation Camp	Kg	1,118
4	Owner's Village and Site Office (OSOV)	Kg	448
5	LILAMA 10 Camp	Kg	178
6	HSRA-DLC-C	Kg	0
Total		**Kg**	**7,307**

3.4 Community Waste Management

3.4.1 Community Recycling Programme

In May 2017, a total of 968 kg of recyclable waste was recorded, an increase of 203 kg compared to April 2017.

The types and amounts of waste recycled in March and remaining in May 2017 are presented in Table 3-15

Table *3-15: Types and amounts of waste traded*

Types of Waste	Unit	Remaining in April 2017	Additions in May 2017	Sold	Remaining in May 2017
Scrap metal	kg	919	250	0	1,169
Glass	kg	473	531	455	549
Paper/cardboard	kg	240	28	0	268
Plastic bottle	kg	34	121	0	155
Aluminium cans	kg	50	38	0	88
Total	**kg**	**1,716**	**968**	**455**	**2,229**

During 11 – 14 May 2017, NNP1PC (Environmental and Social Division) carried out a final waste cleaning-up at Hatsaykham Village prior to start of impounding the re-regulating reservoir. A total of 13.5 m^3 of solid waste in the former Hatsaykham Village was disposed of at Houay Soup Landfill (see below). In addition, approximately 160 kg of recyclable waste was separated and stored at a Community Recyclable Waste Bank at Hat Gniun Village; 145 m^3 of combustible waste was burned on site and 29 m^3 of sewage sludge from the septic tanks was disposed of at the designated Spoil Disposal Area No. 6 following NNP1PC Standard Operating Procedures (SOP) for Sewage/Black Water Disposal (See and below). NNP1PC continued the clean-up after completion of impounding by collecting floating rubbish and debris during 24-27 May 2017. A total of 275 kg of floating rubbish was transported and disposed of at the NNP1 Project landfill and 4.3 m^3 of floating debris was transported and disposed of at the designated Spoil Disposal Area No. 6.

Photograph 9: Septic tank sludge from Hatsaykham clean-up was Disposed of At the Designated Spoil Disposal Area No. 6

Photograph 10: Recyclable waste from Hatsaykham Clean-up was transported and stored at Hat Gniun recyclable waste bank

In addition, a total of 12 contractors working at HSRA were trained on environmental management including SP01: Erosion and Sediment Control; SP02: Water Availability and Pollution Control; SP03: Emission and Dust Control; SP04: Waste Management; amongst others (see and below):

Photograph 11: Environmental Management Training for HSRA's contractors 	*Photograph 12: general waste from the cleaning-up of the former hatsaykham village and hsra's contractors were disposed of at houay soup landfill* 

3.4.2 Houay Soup Resettlement Area Waste Management

NNP1PC is in the process of hiring a contractor to work on the slope stabilisation and erosion control at the Houay Soup Landfill and planned to be completed by June 2017. Another local contractor is being hired to operate the Houay Soup Landfill. The procurement is expected to be completed in July 2017.

3.5 Watershed and Biodiversity Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligation[3]	Status by May 2017
Prepare draft Watershed Management Regulations by 15 November 2016	A first draft of the NNP1 Watershed Management Regulations was submitted to ADB on 13 January 2017. The discussion will be resumed after ADB approve the latest version of watershed management plan.
Final Watershed Management Plan by 23 December 2016	As agreed between ADB and NNP1PC, this target date is moved to the end of the First Quarter of 2017. The progress of plan improvement continued until end of April 2017. The improved version was submitted in the first week of May 2017 to ADB's consultant and NNP1PC received feedback from ADB in the 3rd week of May 2017. After internal discussions, a revised version was submitted to ADB on 25 May 2017. Comments from ADB are expected in the week of 12 June 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 end of the First Quarter of 2017. There is no further progress on Watershed Management regulations this month after the draft was submitted to ADB on 13 January 2017. The discussion will be resumed after ADB approve the latest version of watershed management plan.

[3] 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.

Activities in May 2017	Results
Preparation for NNP1 Watershed Management Plan	• The improved version was submitted to ADB in the first week of May 2017. The document was commented by ADB in the middle of May 2017. • A further improved version was submitted to ADB on 25 May 2017. • ADB confirmed that the review will be provided in the week of 12 June 2017. • In parallel with the review and approval by ADB, the document was translated into Lao language for review by GOL. After the approval from ADB and review by GOL, a technical workshop with WRPC/WRPO and relevant GOL offices will be held to discuss the plan. The technical workshop is expected at the end of June or early July 2017.
Prepare draft Watershed Management Regulations	The discussion will be resumed after the latest version of the watershed management plan has been approved by ADB.
WRPO Activities	• Due to the move of the Department of Forest Resource Management (DFRM) from MONRE to Ministry of Agriculture and Forestry (MAF), the WRPO will be reorganized. • The new organization structure and assignment for Xaysomboun WRPO are being reviewed by MAF and MONRE, while Bolikhamxay Forestry Management Sector is already operated under Provincial Agriculture and Forestry Office (PAFO) • Prime Minister Decree (PM Decree) No. 99 was issued on 9 March 2017 on the scope of work of MAF. This PM Decree emphasizes that MAF has shared responsibility on the watershed management across the country but particularly on forestry related matter. • Another PM Decree No. 145 was issued on 8 May 2017 on the scope of work of MONRE. This PM Decree emphasizes that MONRE has the responsibility of the macro watershed management across the country.
Xaysomboun Intergraded Spatial Planning (ISP)	• Xaysomboun ISP team is finalizing the ISP and preparing it for final review and approval by the provincial and district leaderships. • NNP1 EMO Team followed up and collected the improved ISP from Xaysomboun ISP Team. The improved ISP is also being reviewed by MONRE DEQP.

3.5.2 Biodiversity Offset Management

Obligation[4]	Status by May 2017
A consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016.	• Recruitment of a consultant for the development of the Biodiversity Offset Management Plan (BOMP) resumed in May 2017 after discussion with Bolikhamxay Provincial Authority. The technical review and interview with the candidates were concluded at the end of May 2017. The commercial interview and contract settlement is expected to take place in June 2017.
ADB approval on the NNP1PC's draft legal agreement with the government by 31 January 2017 and execute the legal agreement by 15 February 2017	• The first draft was prepared on 14 October 2016 and the revised version elaborating Biodiversity Advisory Committee (BAC), comments was submitted to ADB on 28 November 2016. • ADB confirmed that NNP1PC could proceed and negotiate the draft legal agreement with GOL on 16 February 2017 • There was discussion between EMO and BOMC to improve the draft legal agreement on 18-19 May 2017. The improved draft was submitted to Bolikhamxay Provincial Governor Office at the end of April 2017 for further review. • BOMC further requested NNP1 EMO to fully translate the document into Lao language in the first week of May 2017. After a series of reviews by BOMC and Bolikhamxay Provincial Authority, the BOMC informed NNP1 EMO at the end of May 2017 that the Lao version of the document was approved and signed by Vice Governor of Bolikhamxay. However, the official stamping will be completed once the English version of the document is ready and signed by NNP1PC.
Baseline survey for summer (observations during March and May 2017) starts by 28 February.	• On 21 February 2017, ADB confirmed that the summer baseline survey should be rescheduled and form part of BOMP implementation.

[4] 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

Activities in May 2017	Results
A consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016.	• Recruitment of a consultant for the development of the Biodiversity Offset Management Plan (BOMP) has been delayed in April 2017 pending further discussions with ADB on funding, and institutional and partnership arrangements for the implementation of the BOMP. • NNP1 Management had a meeting with Bolikhamxay Vice Governor on 10 May 2017 to discuss the engagement of International NGO (Wildlife Conservation Society, WCS) and Consultant to develop Biodiversity Offset Management Plan (BOMP). The key messages from Vice Governor is that the engagement of WCS should follow country policy and procedure and Bolikhamxay Provincial Authority to take part in the evaluation process of the BOMP Consultant. • NNP1 Management further interviewed the candidates for BOMP Consultant and the technical evaluation was completed in the last week of May 2017. It will be followed up by commercial interview and expected to settle the contract with the selected candidates in first or second week of Jun 2017.
Activities pre-BOMP period of 01 October 2016 – 31 September 2017	• BOMC started advertising for a consultant to assist with pre-BOMP activities in the second week of March 2017. Only two applicants have expressed an interest in the assignment. The Procurement Committee including Bolikhamxay Provincial Authority and BOMC evaluated the profile of candidates in the 2nd week of May 2017 and further requested candidates to submit the additional supporting document such as the certification of work from relevant agencies. The candidates could only comply with the requirement by end of May 2017 and so the procurement will be concluded in the first or second week of June 2017. • BOMC and NNP1 EMO had technical discussion on 19 April 2017 to further refine the detailed ToR of BOMC and Local Coordination Unit. The improved ToR is still pending for approval by BOMC Chairperson until end of May 2017. • BOMC and NNP1 EMO had discussion on 25 April 2017 to finalize the detailed proposal of community mapping with the following key points: simplify the objectives, refine the approaches, and finalize the schedule. The

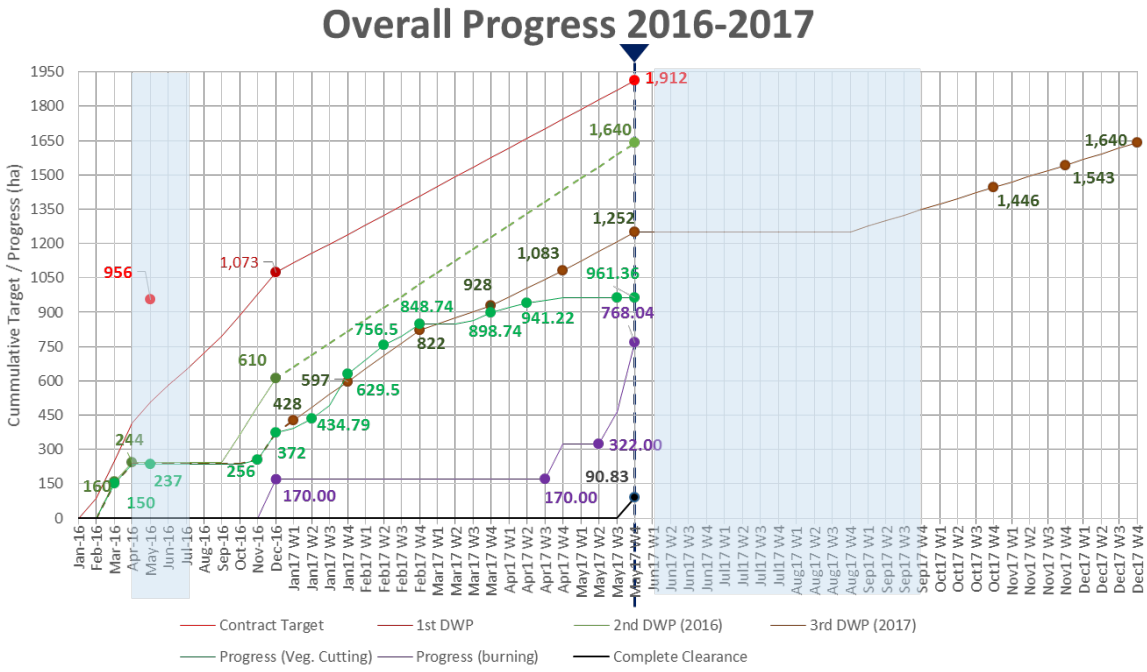
	proposal was approved by BOMC Chair on 03 May 2017 and the activity was commenced from 02-23 May 2017. The follow up notes from the wrap up discussion on 23 May 2017 at BOMC Secretariat Office in Viengthong District: o To summarize all the data obtained from the village community mapping workshop and field visit o To produce the maps showing the infrastructure and land use status of each village o To coordinate with other relevant GOL office on the detail information/progress of each development projects within or nearby Nam Chouan-Nam Xang (NCNX) Offset site as well as the information about settlement in Vangphieng and Na Gnang Village o To finalize the report o To present the results of the community mapping to relevant provincial and district authorities o To share the results to the community in each village • Bolikhamxay Provincial Military is responsible for setting-up a communication system in the Biodiversity Offset Site. On 23 May 2017, the Head of BOMC Secretariat informed that the setup is waiting for agreement of location to install the equipment and permission by Bolikhamxay Provincial Military. • BOMC shared the first quarterly report (January – March 2017), monthly activity and financial report until April 2017 to NNP1 EMO for references.

3.5.3 Biomass Clearance

Activities in May 2017	Results
Labour recruitment and machinery management	• 3 Contractor staff mobilized to support the work at Zone 2UR • 5 Contractor staff working to cut down remaining trees, chop and pile logs/debris for burning at Block 2 • Bulldozer working intermittently to pile and burn the log/debris at Block 3
Perform biomass clearance	• Vegetation cutting was completed for around 15 ha in May 2017 and in total vegetation cutting

	has been completed for around 961.36 ha. The small progress is mainly because the contractor could not mobilize workers as planned. • The biomass stock piling and burning (second burning) continue to progress and by the end of May 2017 the total progress of biomass burning is around 768.04 ha. • There is no further update from local GOL authorities on the removal of the stockpiled logs from biomass clearance areas. • The biomass clearance progress to date can be seen in Figure 3-10 and Table 3-16

Figure 3-9: ***Status of Biomass Clearance in Different Phases as of 30 May 2017***



Note: Complete phase of clearance is from vegetation cutting until final burning into ashes

The overall progress of biomass clearance programme is demonstrated in Figure 3-11 below.

	Task List / Steps of work		Weight (%)	YEAR 2017												% S-Curve
				Q1			Q2			Q3			Q4			
				01	02	03	04	05	06	07	08	09	10	11	12	
1	**UXO Search and Clearance**	Planed	-													100
		Actual	-													96
1.1	Perform UXO work for 549.20 ha (6 blocks) of priority biomass clearance on lower and central reservoir	Planed	13.0	5.0	5.0	3.0										93
		Actual	12.0	5.0	4.0	3.0										89
1.2	Perform UXO work for 334.03 ha (5 blocks) of priority biomass clearance on lower and central reservoir	Planed	13.0	5.0	5.0	3.0										86
		Actual	12.0	5.0	4.0	3.0										82
1.3	Perform UXO work for 84.58 ha (2 blocks) of priority biomass clearance on upper reservoir	Planed	4.0	2.0	2.0											79
		Actual	4.0	2.0	2.0											75
2	**Biomass Clearance**	Planed	-													71
		Actual	-													68
2.1	Perform biomass clearance for 593.61 ha (6 blocks) on lower and central reservoir	Planed	18.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	2.0	64
		Actual	8.0	3.0	2.0	1.0	1.0	1.0								61
2.2	Perform biomass clearance for 462.09 ha (5 blocks) on lower and central reservoir	Planed	18.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	2.0	57
		Actual	9.0	3.0	2.0	2.0	1.0	1.0								54
2.3	Perform biomass clearance for 212.66 ha (7 blocks) on central and upper reservoir	Planed	17.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	1.0	50
		Actual	10.0	3.0	2.0	3.0	1.0	1.0								46
3	**Preparation of Floating/Debris Removal**	Planed	-													43
		Actual	-													39
3.1	Procurement of service for floating logs/debris removal	Planed	5.0						2.5						2.5	36
		Actual	-													32
4	**Monitoring and Reporting**	Planed														29
		Actual														25
4.1	Field monitoring and inspection of biomass clearance and compliance to SS-ESMMP (weekly & Monthly)	Planed	10.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	1.0	1.0	1.0	21
		Actual	5.0	1.0	1.0	1.0	1.0	1.0								18
4.2	Coordination or Ad-hoc meeting to discuss the progress, concerns and problem solving	Planed	2.0		0.5				0.5			0.5			0.5	14
		Actual	0.5		0.5											11
	Total	Planed	**100.0**													7
		Actual	50.5													4
	Planned Progress	monthly		22.0	22.5	16.0	7.0	4.0	3.5	0.5	0.5	1.0	7.0	7.0	9.0	
		Cumulative		22.0	44.5	60.5	67.5	71.5	75.0	75.5	76.0	77.0	84.0	91.0	100.0	
	Actual Progress	monthly		22.0	17.5	13.0	4.0	4.0	-	-	-	-	-	-	-	
		Cumulative		22.0	39.5	52.5	56.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	

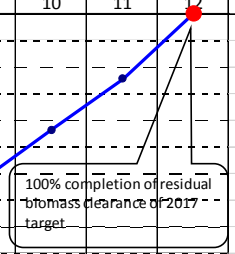


Figure 3-10: Gantt Chart of Biomass Clearance Programme in 30 May 2017

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

Table 3-16: *Biomass and UXO Clearance Progress in Each Priority Area as of 31 May 2017*

Target area				2nd verified Biomass Clearance Progress			Remaining area		
Block ID	Forest	Community land	Total	Vegetation Cutting	Vegetation burning	Completed Clearance - checked by NNP1 EMO	Forest	Community land	
								Compensated	Not yet compensate
B1	29.35	79.88	109.24	54.06			8.12	32.89	14.16
B2	38.72	119.89	158.62	99.47	86.37	9.00	16.52	9.63	32.93
B3	14.43	65.92	80.35	44.93	30.83	13.00	10.79	13.14	11.50
B4	122.97	40.77	163.74	132.28	132.28	20	2.22	16.09	13.15
B5	66.53	273.58	340.11	118.75	59.51	11.00	41.84	102.15	77.37
B6	20.31	11.54	31.84				22.99	6.08	2.77
B7	18.48	21.17	39.65				14.41	10.46	14.78
B8	14.64	22.97	37.61				14.64	18.21	4.75
B9	11.67	41.08	52.75				11.67	26.44	14.65
B10	128.97	140.14	269.10	168.74	135.00	30.00	43.33	42.66	14.36
B11	24.06	65.92	89.98	89.98	89.98				
B12	64.11		64.11	30.53	30.53		33.58		
B13	76.44	24.81	101.24	101.24	101.24				
B14	7.79	35.54	43.34	43.33	43.33				
B15	13.52	30.21	43.73	43.73	43.73	7.83			
B16	1.30	2.02	3.32	3.32	3.32				
B17	1.33	6.63	7.96	7.96	7.96				
B18	3.95		3.95	3.95	3.95				
Total	**658.55**	**982.08**	**1,640.63**	**942.28**	**768.04**	**90.83**	**220.11**	**277.75**	**200.42**

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. Two types of the survey were conducted during May 2017 including daily fish catch logbook monitoring and gillnet 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 April 2017. The estimated total fish catch in Nam Ngiep basin for April 2017 is 64,300 kg. Around 37% of the catch was sold, 51% was consumed fresh, 7% processed and approximately 5% was used for other purposes.

The overall progress of fish monitoring programme is illustrated in below.

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 May 2017*

	Task List / Steps of work		Weight (%)	YEAR 2017												% S-Curve	Assigned to
				Q1			Q2			Q3			Q4				
				01	02	03	04	05	06	07	08	09	10	11	12		
1	**Daily catch logbook and Verification Survey**	Planed	-													100	
		Actual	-													97	
1.1	Daily catch logbook data collection on 108 HHs in 25 villages	Planed	24	2	2	3	2	2	2	3	2	2	2	2	2	94	NNP1 EMO Fish Monitoring Team
		Actual	10.0	1.5	2.0	3.0	2.0	1.5								91	
1.2	Daily catch logbook verification survey for Q2 2016 to Q1 2017 on 144 HHs	Planed	4	2		2										88	NNP1 EMO Fish Monitoring Team
		Actual	4	2		2										85	
1.3	GPS for Fishing location cover 25 villages	Planed	8				2	2	2	2						82	NNP1 EMO Fish Monitoring Team
		Actual	-													79	
1.4	Make the posters for fish species and fishing gear composition along Nam Ngiep River	Planed	2											2		76	NNP1 EMO Fish Monitoring Team
		Actual	-													74	
2	**Species Veification Survey**	Planed	-													71	
		Actual	-													68	
2.1	Survey design, interview form design, test and development	Planed	2		2											65	Consultant and NNP1 EMO Fish Monitoring Team
		Actual	-													62	
2.2	Data collection and validation on 108 HHs	Planed	8		2	3	3									59	NNP1 EMO Fish Monitoring Team
		Actual	-													56	
3	**Fish Migration and Spawning Survey**															53	
																50	
3.1	Survey design, interview form design, test and development	Planed	2	2												47	Consultant and NNP1 EMO Fish Monitoring Team
		Actual	2	2												44	
3.2	Data collection and validation on 88 experience fishers	Planed	12	6	6											41	NNP1 EMO Fish Monitoring Team
		Actual	12	2	7	3										38	
4	**Data management and report**															35	
																32	
4.1	Data input to database system	Planed	24	2	2	2	2	2	2	2	2	2	2	2	2	29	NNP1 EMO Fish Monitoring Team / NNP1 ESD Database Team
		Actual	9.5	1.0	2.0	2.0	1.5	3.0								26	
4.2	Annual Data analysis and draft annual report for 2016-2017	Planed	5							5						24	Consultant
		Actual	-													21	
4.3	Disemination/presentation the report for 2016-2017	Planed	5							5						18	Consultant
		Actual	-													15	
4.4	Final Annual Report for 2016-2017	Planed	4								4					12	Consultant
		Actual	-													9	
	Total	Planed	100													6	
		Actual	38													3	
		Planned Progress	monthly	14	14	9	9	6	6	16	8	4	4	6	4		
			Cumulative	14	28	37	46	52	58	74	82	86	90	96	100		
		Actual Progress	monthly	9	11	10	4	5	-	-	-	-	-	-	-		
			Cumulative	9	20	30	33	38	38	38	38	38	38	38	38		
	Budget Code EL4.03	Approved	USD	6,410	810	4,610	1,610	4,610	610	8,630	78	2,711	1,528	4,541	278		36,425
		Actual Paid	USD														-

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

Activities in May 2017	Results
Daily Catch Logbook and Verification Survey	• Completed the daily catch logbook survey in 108 households out of the total target of 108 households. 3,014 forms were used in the survey. • A fishery database has been developed. • The daily household catch on average for Nam Ngiep in April 2017 is 2.4 kg/household/day. The median catch for all fishing zone is presented in Figure *3-13*. • The estimated total catch for Nam Ngiep in April 2017 is approximately 64,300 kg as shown in *Figure 4-2*.
Household Catch Assessment Survey	• Draft report was submitted by fishery consultant.
Village Community Interview	• On progress for data analysis and reporting by fishery consultant.
Fish Migration and Spawning survey	• On progress for data analysis and reporting by fishery consultant.
Gillnet Sampling Survey	• Completed data collection at 7 stations included some water quality measurement, setting and retrieving gillnet and fish size measurement.

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

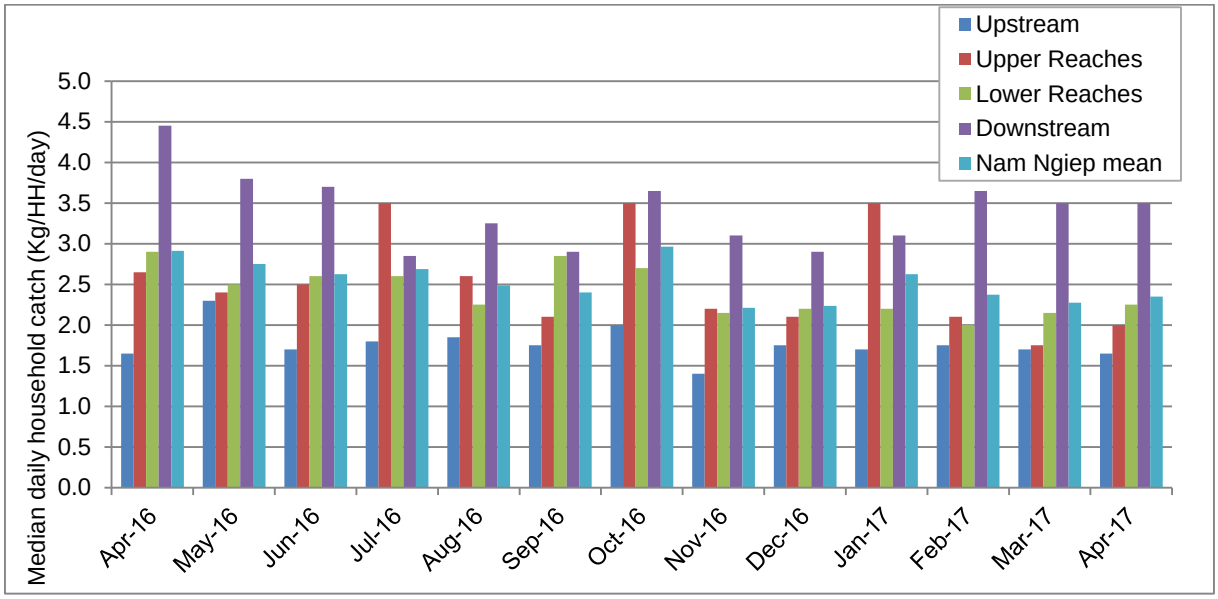
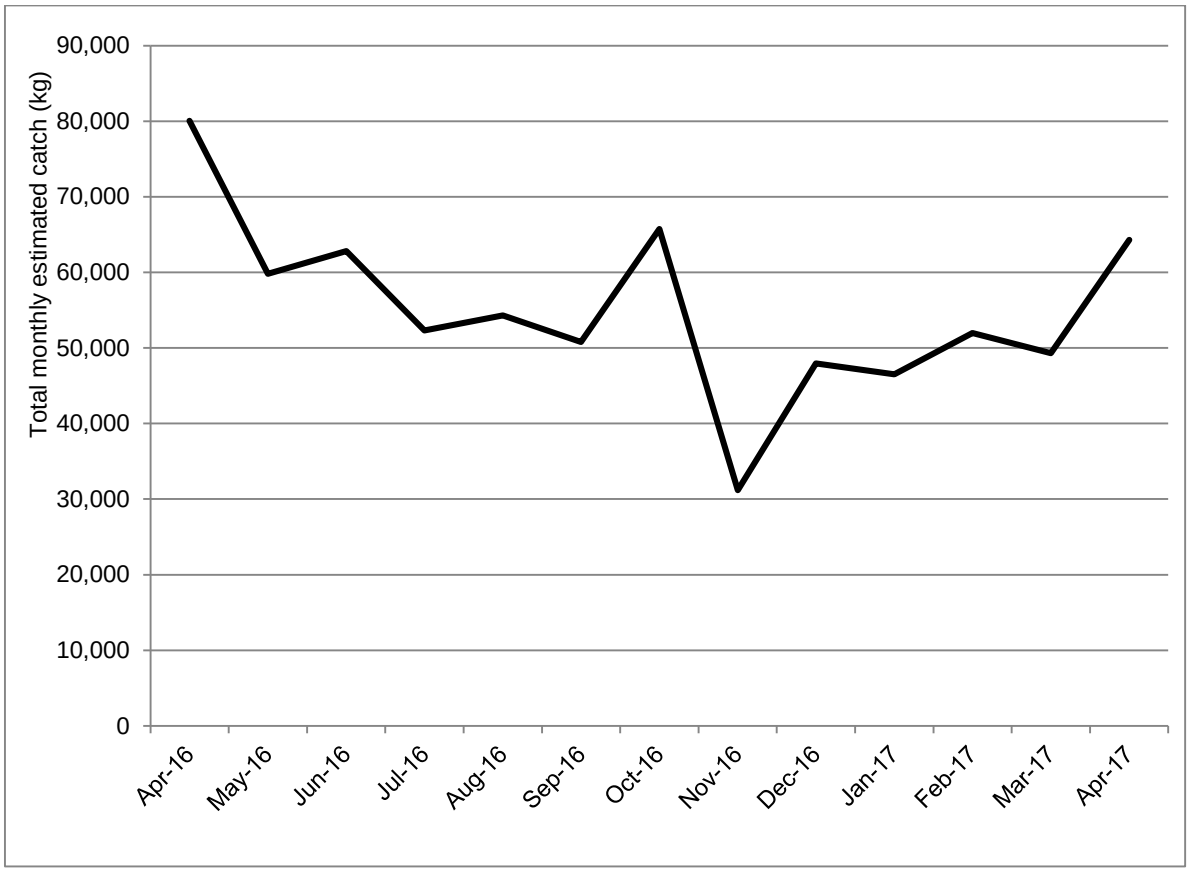


Figure 3-13: Total estimated fish catch for Nam Ngiep by month (Kg)



3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

EMO team completed another round of review on the revised EPF sub-project proposal of Xaysomboun and Xiengkouang on 23 March 2017 for further improvement. There was no further update after several follow up by NNP1 EMO in May 2017.

Bolikhamxay Team (sub-project implementation team) submitted the February progress report of sub-project implementation work to EPF. EPF Bolikhamaxay Team shared monthly progress report to NNP1 EMO regularly since then. NNP1 EMO also provided comments and requested to have discussion with EPF team on the overall implementation work from February – May 2017 especially on the detail info / documentation on the progress report, to review the effectiveness of check point into Houay Ngoua Area, as well as to have aerial photographs of the area for the spatial analysis and further discussion.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

Late May 2017, the EDL visited NNP1 ESD to discuss the alignment of the transmission line, and EMO explained to the EDL on the requirement for IEE revision. The due diligence assessment (DDA) will be resumed once the IEE is revised (based on the new alignment) and environmental and social mitigation measures are implemented.

3.7 External Monitoring

There was no external monitoring during the reported period.

3.7.1 Biodiversity Advisory Committee

BAC submitted the 5th BAC mission report in the first week of February 2016.

NNP1 EMO provided the comments to 5th BAC mission report in the second week of March 2017. The report was further revised by BAC Team Leader in the last week of March 2017. Second feedback was provided by NNP1 EMO on 28 April 2017. The final version was concluded on 22 May 2017. The report was shared with ADB, IAP, and LTA on 25 May 2017.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

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

	Site Name	Owner Site Office and Village		Obayashi Camp WWT1		Obayashi Camp WWT2		Sino Hydro Camp	
	Station Code	EF01		EF02		EF15		EF06	
	Date	9-May-17	19-May-17	9-May-17	19-May-17	9-May-17	19-May-17	9-May-17	19-May-17
Parameters (Unit)	Guideline								
pH	6.0 - 9.0	7.02	8.3	7.76	8.34	8.26	8.43	8.24	8.01
Sat. DO (%)		11.3	18.5	0	11.7	54.7	55.7	7	46.3
DO (mg/l)		0.82	1.42	0	0.9	4.02	4.38	0.52	3.57
Conductivity (µs/cm)		458	360	899	500	813	422	1.118	564
TDS (mg/l)		229	180	450	250	406	211	559	282
Temperature (°C)		28.52	29.95	30.26	27.25	29.89	25.9	29.08	27.11
Turbidity (NTU)		0.65	1.02	18.7	13.9	43.33	12.41	11.83	34.2
TSS (mg/l)	<50	ND[16]	ND[16]	27.1	22.3	27.4	12.4	20.6	34.4
BOD (mg/l)	<30	ND[13]	ND[13]	51.4	56.4	43	18.9	25.4	12.5
COD (mg/l)	<125	ND[16]	ND[16]	142	104	177	67.8	103	38.3
NH3-N (mg/l)	<10.0	4	4	32	29	ND[12]	6	69	10
Total Nitrogen (mg/l)	<10.0	12.3	5.89	36	31.6	7.81	7.88	46.4	13.9
Total Phosphorus (mg/l)	<2	0.8	1.5	1.64	1.56	0.11	0.54	2.1	0.83
Oil & Grease (mg/l)	<10.0	ND[13]	N/A	5	N/A	2	N/A	1	N/A
Total coliform (MPN/100 ml)	<400	13	33	160,000	160,000	160,000	2,400	160,000	160,000
Faecal Coliform (MPN/100 ml)		13	*33*	160,000	*160,000*	160,000	*2,400*	160,000	*160,000*
Discharge Volume (m3/day)		*17.3*	86.4	*0*	0	*0*	0	*0*	0

	Site Name	V & K Camp		SongDa5 Camp No.1		SongDa5 Camp No.2		Zhefu Camp	
	Station Code	EF10		EF07		EF08		EF09	
	Date	9-May-17	19-May-17	10-May-17	19-May-17	10-May-17	19-May-17	9-May-17	19-May-17
Parameters (Unit)	Guideline								
pH	6.0 - 9.0	7.94	7.8	7.8	8.45	7.71	7.6	7.52	8.33
Sat. DO (%)		0	9.1	66.4	34.6	0	17.4	15.4	7.2
DO (mg/l)		0	0.71	4.56	2.72	0	1.4	1.16	0.55
Conductivity (µs/cm)		609	259	779	478	1,007	840	677	632
TDS (mg/l)		304	130	390	238	504	420	335	316
Temperature (°C)		30.58	25.67	33.75	26.31	31.33	27.85	32.7	27.22
Turbidity (NTU)		53	26	17.48	15.6	25.76	14.2	47.33	35.6
TSS (mg/l)	<50	70.7	32.9	45.1	19.4	24.6	18.6	85.6	69.3
BOD (mg/l)	<30	49.6	5.2	ND[13]	8.8	63	34	66.2	96.3
COD (mg/l)	<125	170	ND[16]	128	36.2	163	139	212	204
NH3-N (mg/l)	<10.0	22	4	20	15	61	56	39	36
Total Nitrogen (mg/l)	<10.0	30.1	5.31	23.2	17.5	43.2	34.7	40.8	34.6
Total Phosphorus (mg/l)	<2	1.72	0.24	3.49	1.03	4.88	2.06	1.73	1.67
Oil & Grease (mg/l)	<10.0	ND[13]	N/A	ND[13]	N/A	3	N/A	1	N/A

	Site Name	Owner Site Office and Village		Obayashi Camp WWT1		Obayashi Camp WWT2		Sino Hydro Camp	
	Station Code	EF01		EF02		EF15		EF06	
	Date	9-May-17	19-May-17	9-May-17	19-May-17	9-May-17	19-May-17	9-May-17	19-May-17
Parameters (Unit)	Guideline								
Total coliform (MPN/100 ml)	<400	160,000	17,000	4.5	540	160,000	23	160,000	160,000
Faecal Coliform (MPN/100 ml)		160,000	*9,400*	4.5	*540*	160,000	*4.5*	160,000	*160,000*
Discharge Volume (m3/day)		*0*	4.3	*86.4*	43.2	*28.8*	0	*0*	0

	Site Name	SECC Camp		HMH Main Camp WWTS		IHI Camp		Kenber Camp	
	Station Code	EF11		EF13		EF14		EF16	
	Date	9-May-17	19-May-17	10-May-17	19-May-17	10-May-17	19-May-17	9-May-17	19-May-17
Parameters (Unit)	Guideline								
pH	6.0 - 9.0	6.62	No Sample. Due to this camp was decommissioned	6.13	8.06	7.35	7.88	8.97	8.1
Sat. DO (%)		7.3		0	12.6	0	16	27.2	58.6
DO (mg/l)		0.55		0	0.98	0	1.25	1.92	4.46
Conductivity (µs/cm)		211		862	551	715	968	483	376
TDS (mg/l)		106		431	275	359	484	241	188
Temperature (°C)		27		29.3	26.29	30.16	28.17	31.56	27.66
Turbidity (NTU)		14.11		21.09	7.72	18.76	33	56.26	49.8
TSS (mg/l)	<50	16.7		42.2	29.9	20.4	51.9	115	84.4
BOD (mg/l)	<30	4.2		49.2	9.7	74.7	91.2	77.8	34.6
COD (mg/l)	<125	ND[16]		108	32.4	210	239	296	136
NH3-N (mg/l)	<10.0	ND[12]		26	17	20	9	12	14
Total Nitrogen (mg/l)	<10.0	2.09		25.8	20.9	20.4	11.7	21.4	14.6
Total Phosphorus (mg/l)	<2	0.05		1.08	0.45	4.44	0.98	1.28	0.82
Oil & Grease (mg/l)	<10.0	ND[13]		3	N/A	5	N/A	7	N/A
Total coliform (MPN/100 ml)	<400	130		79	1,600	160,000	160,000	160,000	54,000
Faecal Coliform (MPN/100 ml)		70		79	*1,600*	160,000	*160,000*	160,000	*35,000*
Discharge Volume (m3/day)		*0*		*6*	6	*8.6*	8.6	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) ND[18] (<25.0 mg/L)

Table A- 2: Results of the Construction Area Discharge in May 2017

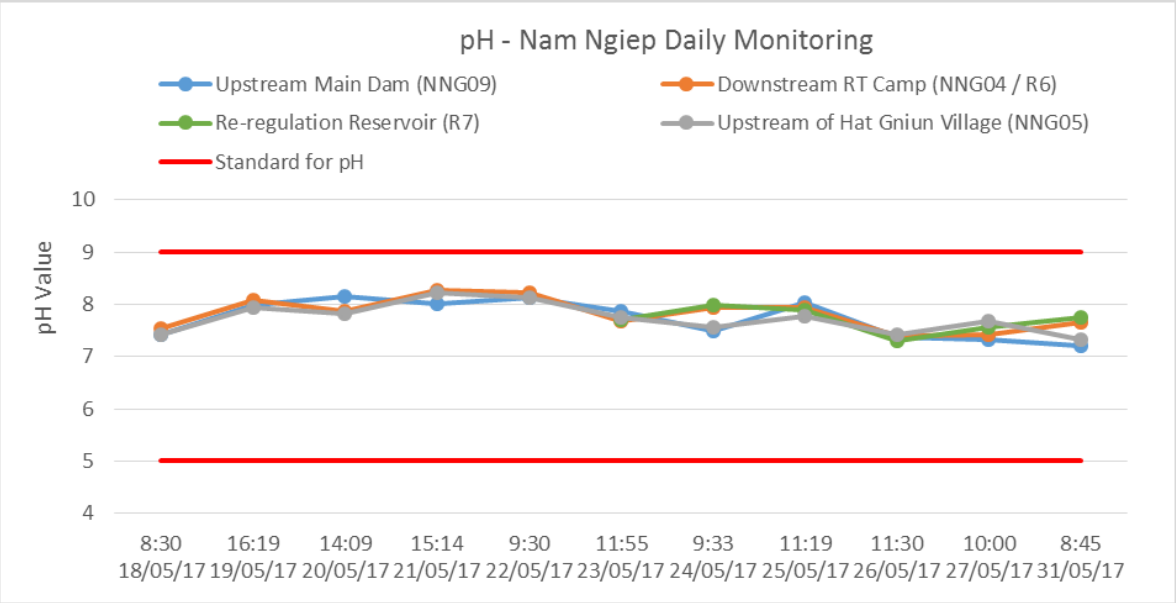
	Site Name	Aggregate Crushing Plant					CVC Plant				
	Station Code	DS02					DS03				
	Date	5-May-17	10-May-17	18-May-17	24-May-17	31-May-17	5-May-17	10-May-17	18-May-17	24-May-17	31-May-17
Parameter (Unit)	**Guideline**										
pH	6.0 - 9.0	8.89	8.44	7.57	7.5	7.86	No water discharged	No water discharged	7.5	No water discharge	No water discharge
Sat. DO (%)		77.9	57.3	120	100.9	31			110.1		
DO (mg/l)		5.67	4.41	10.13	6.79	2.16			8.35		
Conductivity (µs/cm)		215	170	139	88	124			236		
TDS (mg/l)		107	85	69	44	62			118		
Temperature (°C)		28.87	27.35	23.29	29.5	32.97			23.98		
Turbidity (NTU)		1,331	2,441	15,130	3,665	900			12,670		
TSS (mg/l)	<50	855	932	6,035	1,377	1,264			5,755		
Oil & Grease (mg/l)	<10	ND[13]	N/A	N/A	N/A	N/A			N/A		
Discharge Volume (m^3/day)		*86.40*	*17.30*	*432.00*	*86.40*	*172.00*			*86.40*		

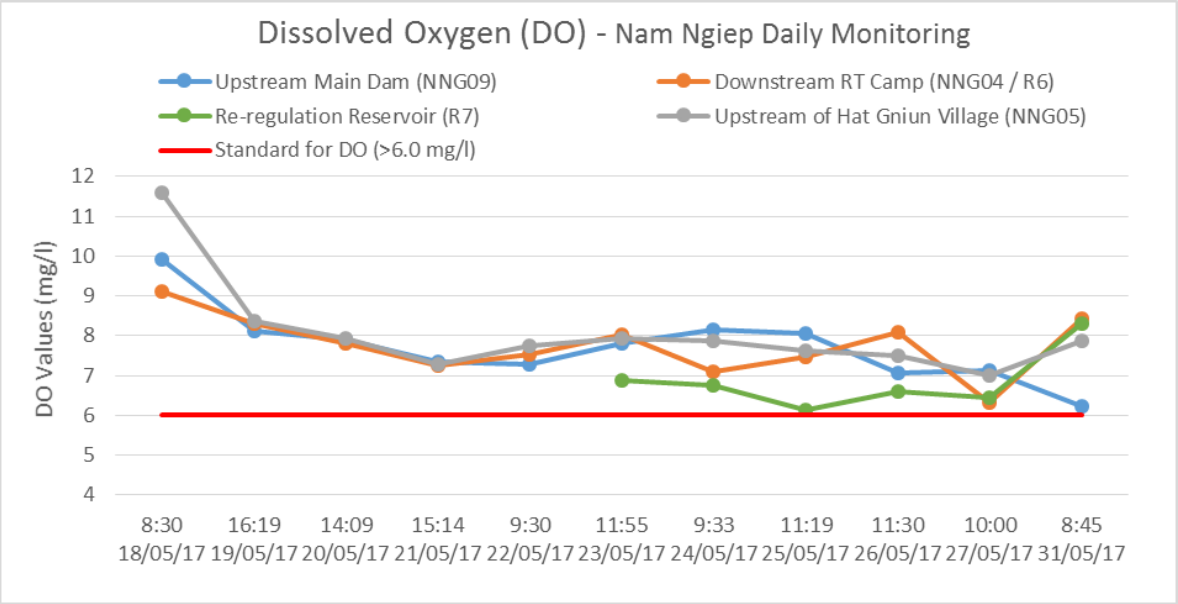
	Site Name	Spoil Disposal #2					RCC Plant				
	Station Code	DS04					DS09				
	Date	5-May-17	10-May-17	18-May-17	24-May-17	31-May-17	5-May-17	10-May-17	18-May-17	25-May-17	31-May-17
Parameter (Unit)	**Guideline**										
pH	6.0 - 9.0	5.98	6.16	7.1	6.98	7.13	7.64	No water discharge	7.99	7.86	7.41
Sat. DO (%)		54	38.5	110.9	76.3	16.4	84		87.02	37.9	28.7
DO (mg/l)		4.18	2.44	8.98	5.95	1.26	6.78		7.02	2.65	1.91
Conductivity (µs/cm)		121	122	213	160	86	200		228	300	264
TDS (mg/l)		61	61	106	80	43	100		117	152	132
Temperature (°C)		26.72	27.99	24.22	26.5	27.18	34.5		24.01	33.19	35.48
Turbidity (NTU)		33.8	26.63	94	14	31	1,158		3,962	76.53	69.24
TSS (mg/l)	<50	43.0	16.7	147	7.60	21.70	585.8		1,492	85	84
Oil & Grease (mg/l)	<10	ND[13]	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A
Discharge Volume (m^3/day)		*43.20*	*43.20*	*259.20*	*259.20*	*172.00*	250		*345.60*	N/A	N/A

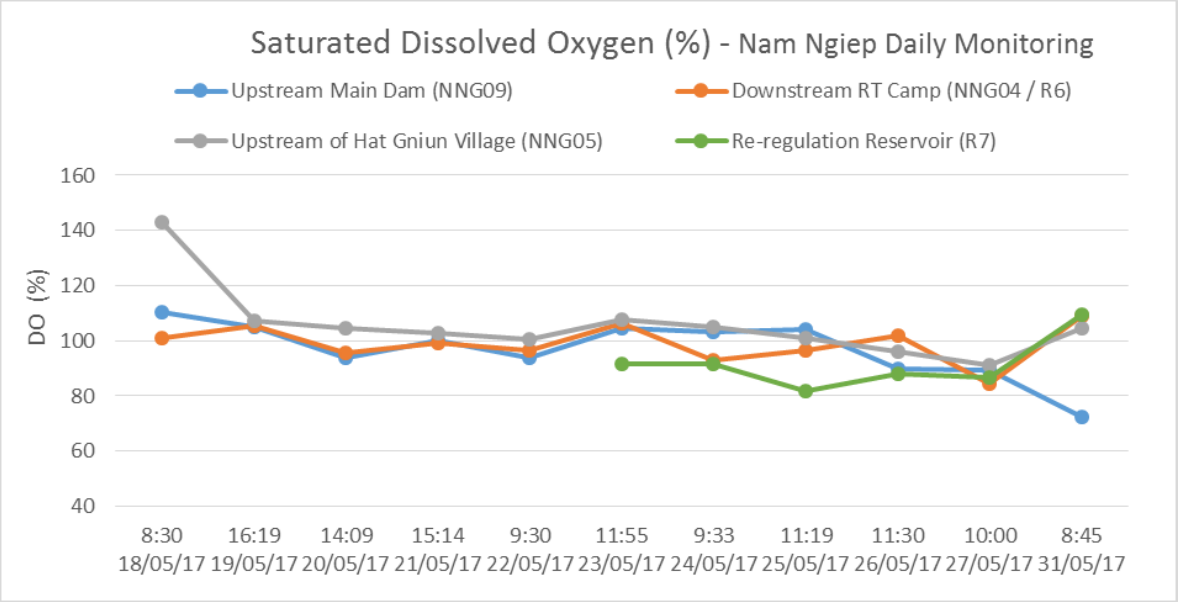
	Site Name	Main Dam (Treatment Plant No.1)					Main Dam (Treatment Plant No.2)				
	Station Code	DS11					DS12				
	Date	5-May-17	10-May-17	18-May-17	25-May-17	31-May-17	5-May-17	10-May-17	18-May-17	25-May-17	31-May-17
Parameter (Unit)	**Guideline**										
pH	6.0 - 9.0	11.53	5.46	7.63	10.82	8.57		10.83			11.52
Sat. DO (%)		68.2	82.1	101.1	34.2	39.6		74.3			37.5
DO (mg/l)		5.21	6.22	8.65	2.47	2.88		5.16			2.56
Conductivity (µs/cm)		2,093	1,064	1,600	1,480	1,712	No water	505	No water	No water	787
TDS (mg/l)		1,047	532	800	740	857	discharge	253	discharge	discharge	394
Temperature (°C)		27.72	28.22	23.98	30.1	30.96		33.46			34.25
Turbidity (NTU)		27.28	11.75	9	7.92	12.45		103			11.73
TSS (mg/l)	<50	68.9	28	23	85	47		123			21.51
Oil & Grease (mg/l)	<10	ND[13]	N/A	N/A	N/A	N/A		N/A			N/A
Discharge Volume (m^3/day)		*6,000*	*6,000*	*6,000*	*6,000*	*6,000*		28.8			6

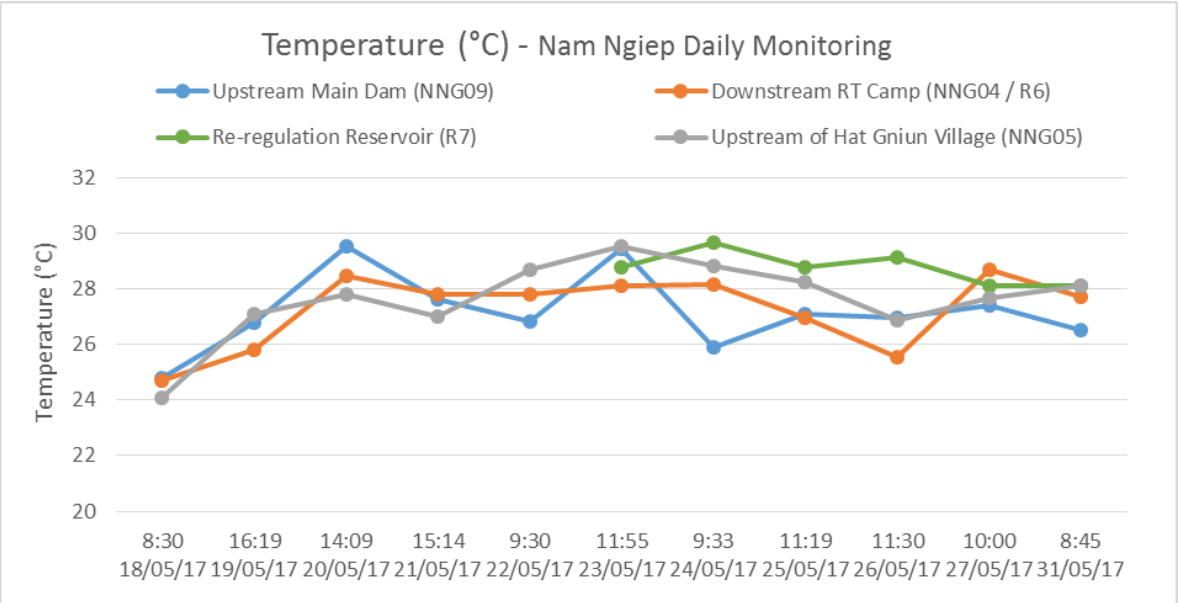
ND[1] (<0.0005 mg/L)	ND[2] (<0.0003 mg/L)	ND[3] (<0.0002 mg/L)	ND[4] (<0.005 mg/L)	ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L)	ND[7] (<0.07 mg/L)	ND[8] (<0.04 mg/L)	ND[9] (<0.02 mg/L)	ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L)	ND[12] (<0.2 mg/L)	ND[13] (<1.0 mg/L)	ND[14] (<1.5 mg/L)	ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)	ND[17] (<2.7 mg/L)	ND[18] (<25.0 mg/L)		

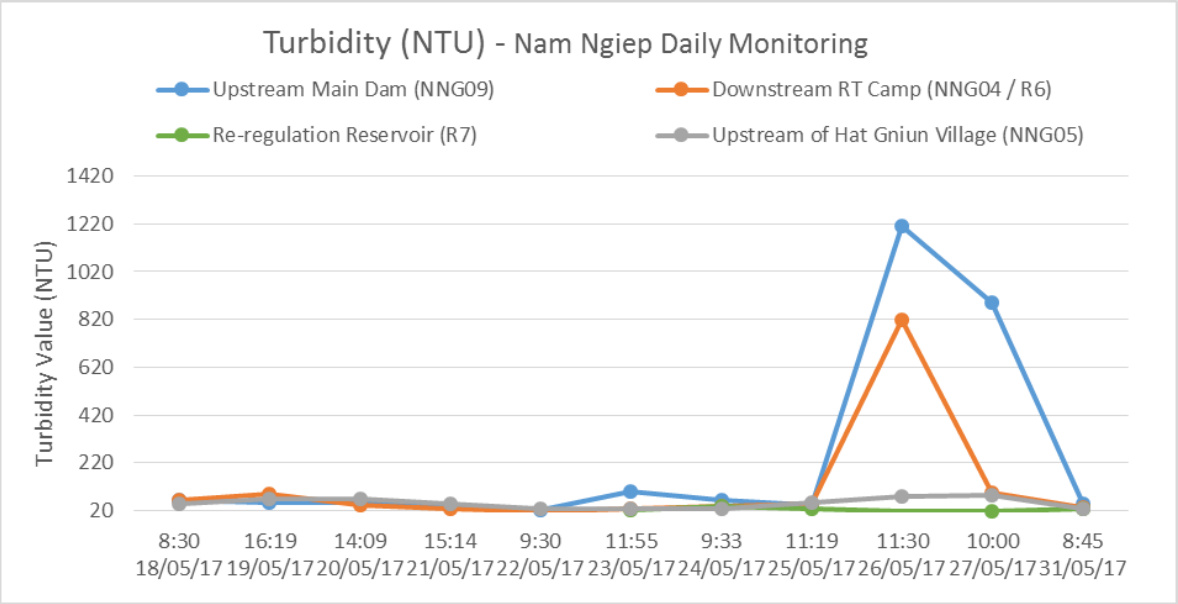
Table A- 3: Results of the Re-regulation Reservoir Monitoring in May 2017 (During and After Impounding)




Dissolved Oxygen (DO) - Nam Ngiep Daily Monitoring
Upstream Main Dam (NNG09)
Downstream RT Camp (NNG04 / R6)
Re-regulation Reservoir (R7)
Upstream of Hat Gniun Village (NNG05)
Standard for DO (>6.0 mg/l)
DO Values (mg/l)
12
11
10
9
8
7
6
5
4
8:30 16:19 14:09 15:14 9:30 11:55 9:33 11:19 11:30 10:00 8:45
18/05/17 19/05/17 20/05/17 21/05/17 22/05/17 23/05/17 24/05/17 25/05/17 26/05/17 27/05/17 31/05/17


Saturated Dissolved Oxygen (%) - Nam Ngiep Daily Monitoring
Upstream Main Dam (NNG09)
Downstream RT Camp (NNG04 / R6)
Upstream of Hat Gniun Village (NNG05)
Re-regulation Reservoir (R7)
DO (%)
160
140
120
100
80
60
40
8:30 16:19 14:09 15:14 9:30 11:55 9:33 11:19 11:30 10:00 8:45
18/05/17 19/05/17 20/05/17 21/05/17 22/05/17 23/05/17 24/05/17 25/05/17 26/05/17 27/05/17 31/05/17


Temperature (°C) - Nam Ngiep Daily Monitoring
Upstream Main Dam (NNG09)
Downstream RT Camp (NNG04 / R6)
Re-regulation Reservoir (R7)
Upstream of Hat Gniun Village (NNG05)
Temperature (°C)
32
30
28
26
24
22
20
8:30 16:19 14:09 15:14 9:30 11:55 9:33 11:19 11:30 10:00 8:45
18/05/17 19/05/17 20/05/17 21/05/17 22/05/17 23/05/17 24/05/17 25/05/17 26/05/17 27/05/17 31/05/17


Turbidity (NTU) - Nam Ngiep Daily Monitoring
Upstream Main Dam (NNG09)
Downstream RT Camp (NNG04 / R6)
Re-regulation Reservoir (R7)
Upstream of Hat Gniun Village (NNG05)
Turbidity Value (NTU)
1420
1220
1020
820
620
420
220
20
8:30 18/05/17
16:19 19/05/17
14:09 20/05/17
15:14 21/05/17
9:30 22/05/17
11:55 23/05/17
9:33 24/05/17
11:19 25/05/17
11:30 26/05/17
10:00 27/05/17
8:45 31/05/17

ANNEX B: AMBIENT DUST QUALITY

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

Hat Gnuin Village - 24 Hours Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	21-May-17 14:48	22-May-17 14:48	23-May-17 14:51
End Time	22-May-17 14:47	23-May-17 14:50	24-May-17 14:48
Average Data Record in 24h (mg/m3)	0.05	0.05	0.04
Guideline Average in 24h (mg/m3)	***0.12***	***0.12***	***0.12***

Figure B- 1: Dust Monitoring Results at Ban Hat May in April 2017

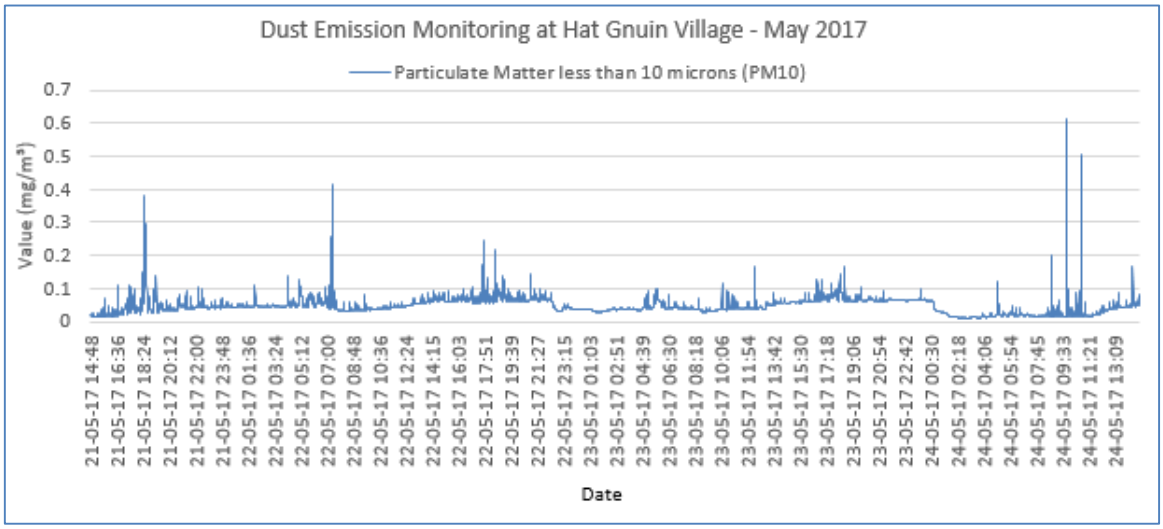


Table B- 2: 24-hour Average Dust Concentrations Measured in Houay Soup Resettlement Area

Houay Soup Resettlement Area - 24 Hours Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	18-May-17 13:44	19-May-17 13:44	20-May-17 13:44
End Time	19-May-17 13:44	20-May-17 13:44	21-May-17 13:44
Average Data Record in 24h (mg/m3)	0.01	0.03	0.04
Guideline Average in 24h (mg/m3)	0.12	0.12	0.12

Figure B- 2: Dust Monitoring Results at Houay Soup Resettlement Village in May 2017

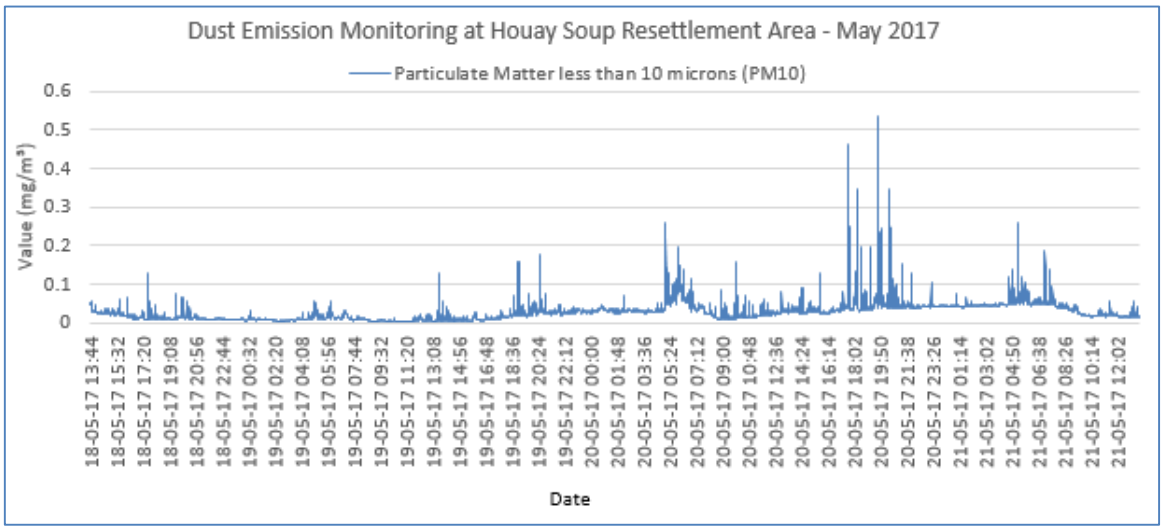


Figure B- 3: Dust Monitoring Results at the Aggregate Crushing Plant in May 2017

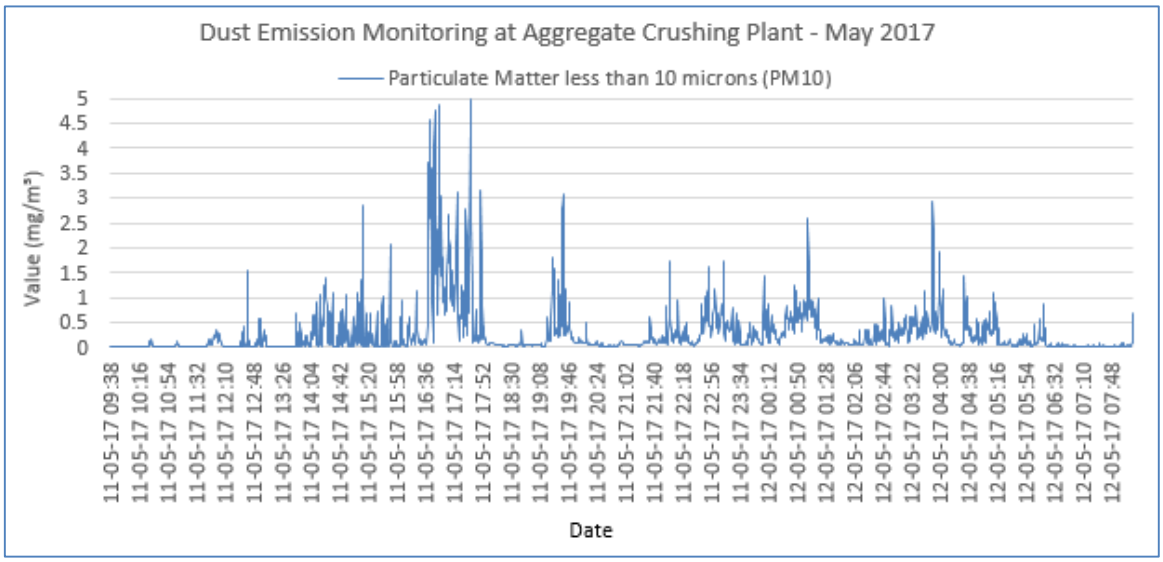


Figure B- 4: Dust Monitoring Results at the RCC Plant in May 2017

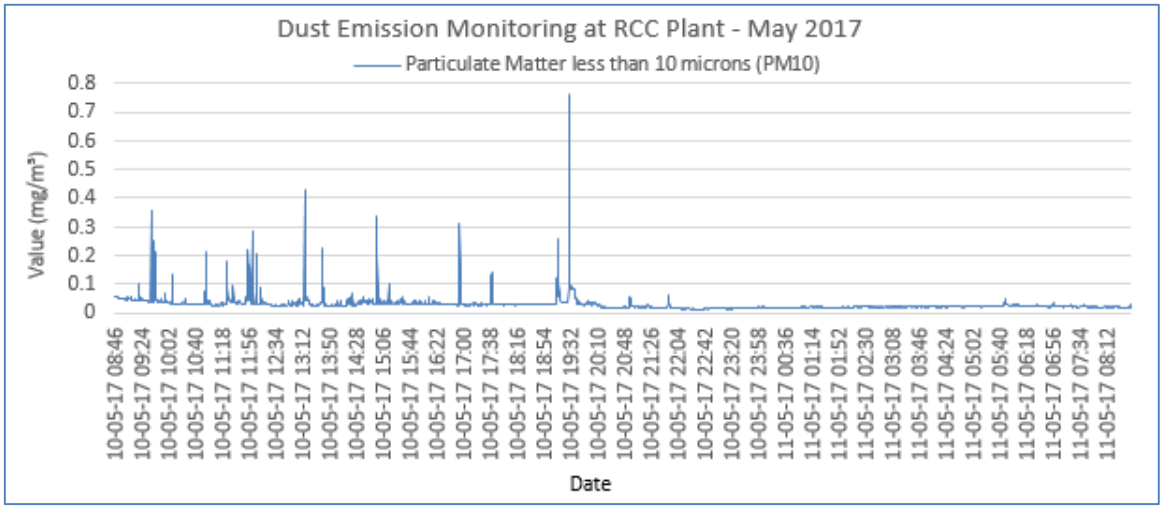


Figure B- 5: Dust Monitoring Results at the Sino Hydro Camp in May 2017

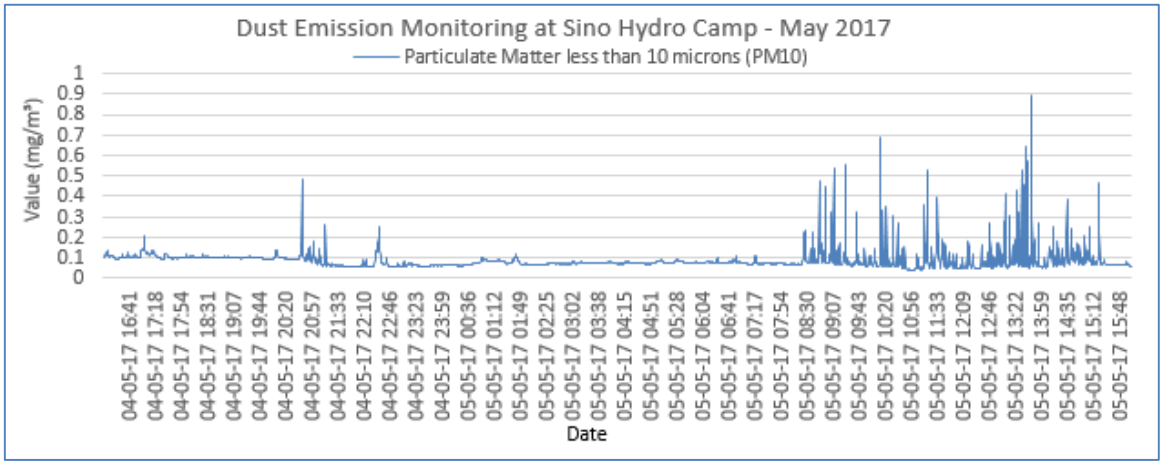


Figure B- 6: Dust Monitoring Results at the Sino Hydro Temporary Camp in May 2017

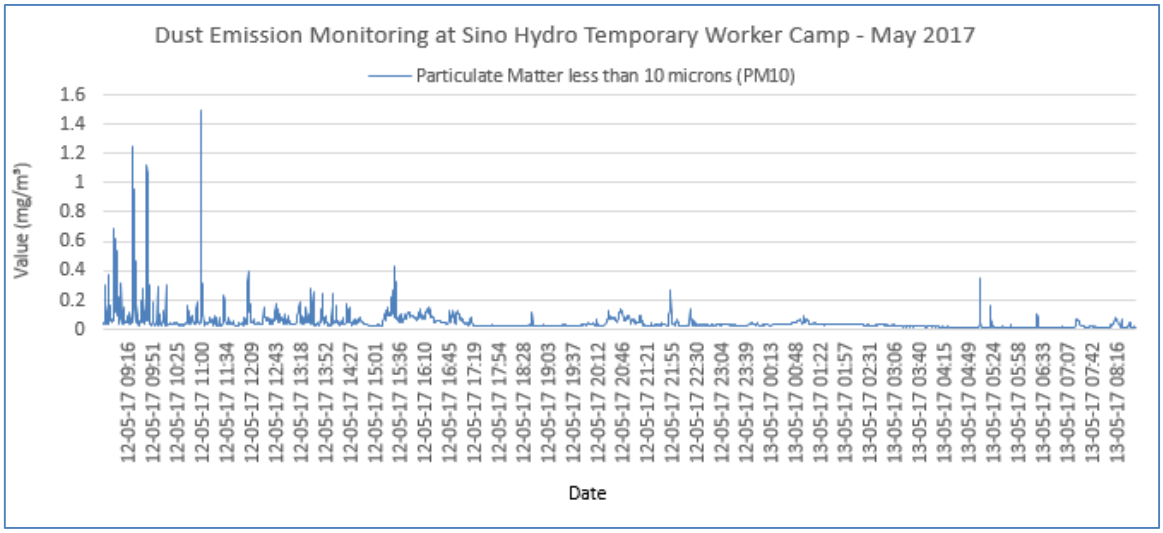


Figure B- 7: Dust Monitoring Results at the SongDa5 No.2 Camp in *May 2017*

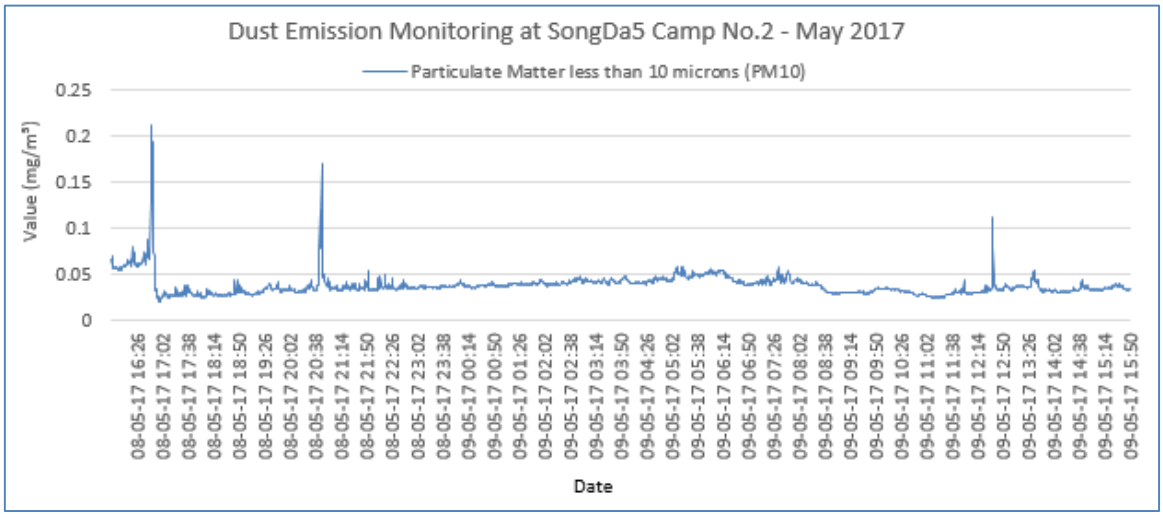


Figure B- 8: Dust Monitoring Results at Main Dam in May 2017

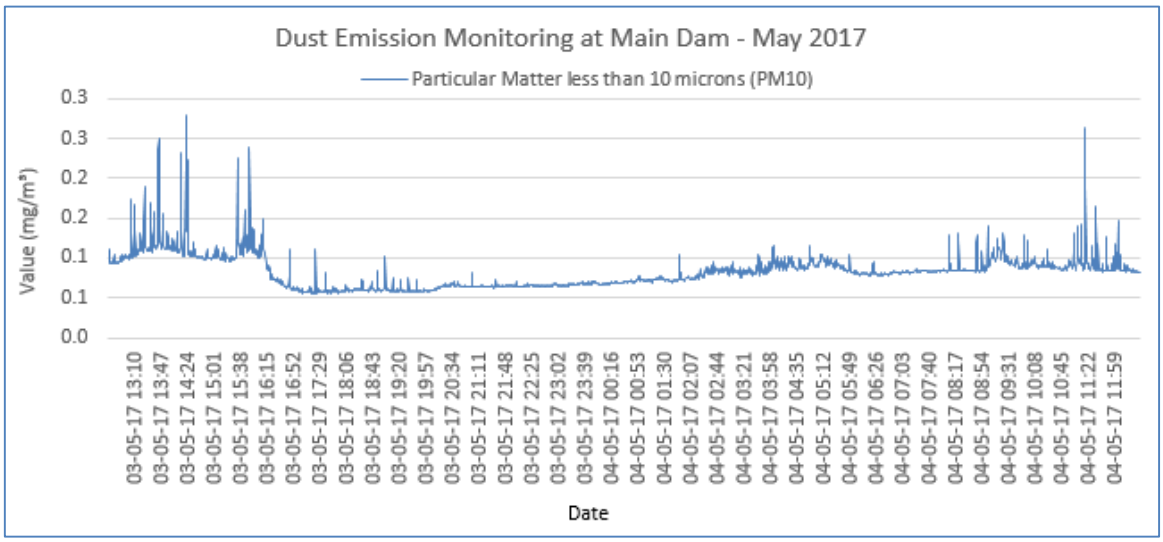
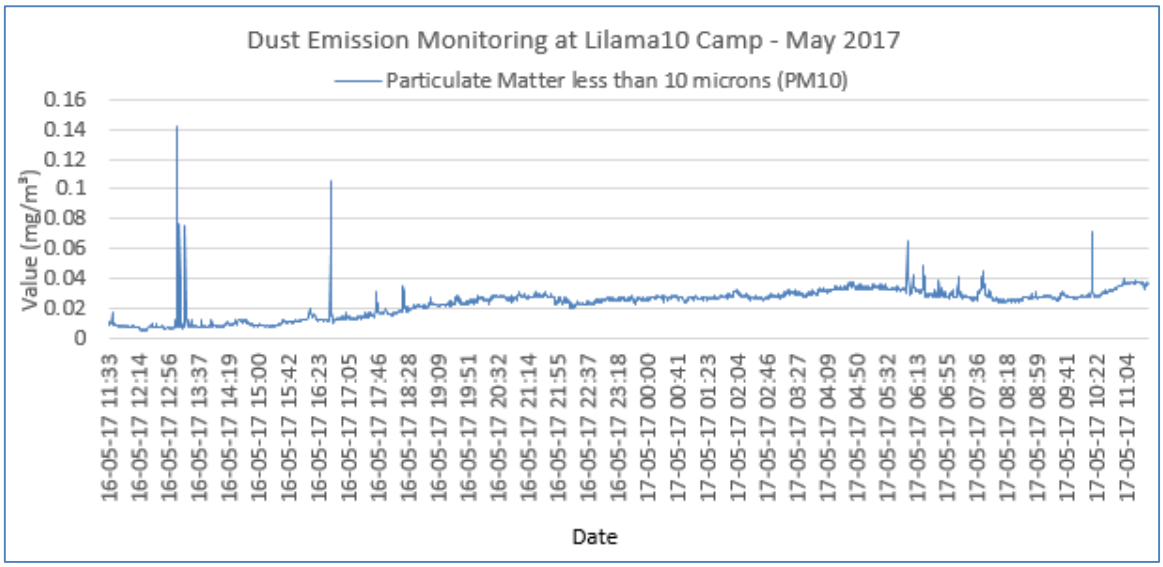


Figure B- 9: Dust Monitoring Results at the Lilama10 Camp in May 2017



ANNEX C: AMBIENT NOISE DATA

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

Noise Level (dB)	21-22/May/17			22-23/May/17			23-24/May/17			24/May/17
	15:43-18:00	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 - 15:43
Maximum Value Recorded	72.20	68.20	63.20	72.90	69.30	76.50	70.10	62.70	62.40	78.00
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	45.19	47.91	44.44	45.43	49.59	47.35	44.91	46.25	41.82	47.72
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 May 2017

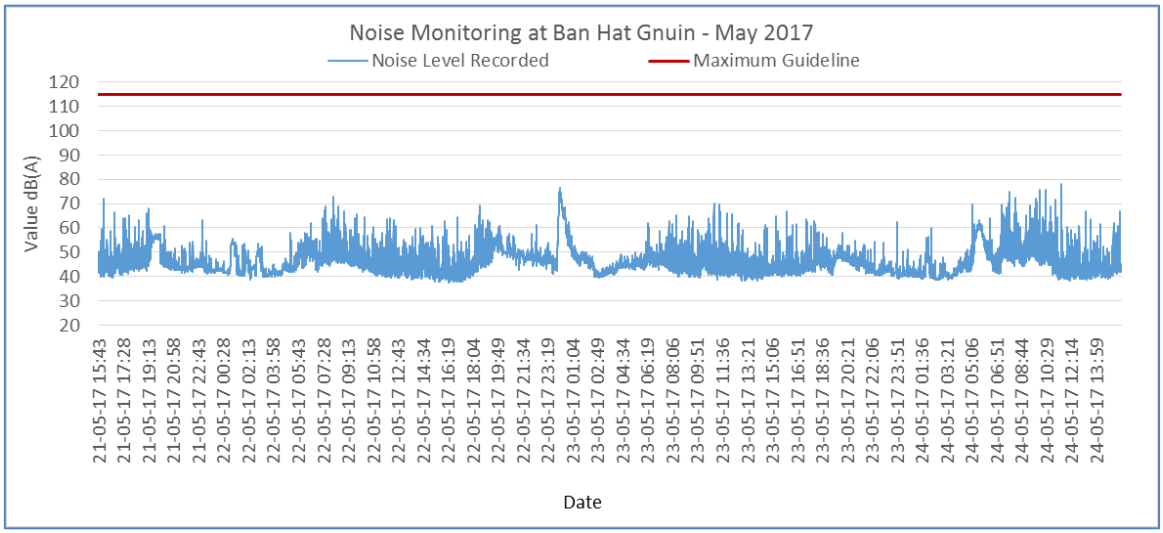


Table C- 2: Average Results of Noise Monitoring at Houay Soup Resettlement Area in April 2017

Noise Level (dB)	1-2/04/2017			2-3/04/2017			3-4/04/2017			04/04/2017
	15:07-18:00	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 - 15:07
Maximum Value Recorded	57.50	57.30	52.80	66.20	73.60	51.50	66.20	65.00	58.10	65.90
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	42.87	39.53	37.79	40.50	44.44	39.84	41.46	47.64	39.60	42.55
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

Figure C- 2: Result of Noise Level Monitoring at Houay Soup Resettlement Village in May 2017

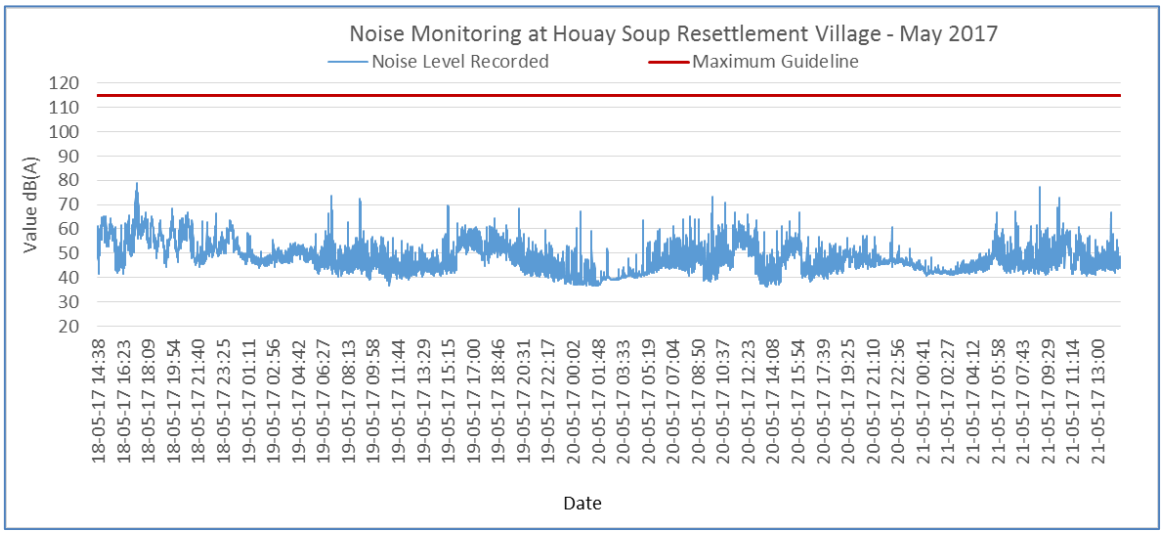


Table C- 2 and Table C-3: Average Results of Noise Monitoring at Aggregate Crushing Plant and RCC Plant in May 2017

Aggregate Crushing Plant

Noise Level (dB)	11-12/May/17		12/May/17
	10:31 – 22:00	22:01 – 06:00	06:01-09:09
Maximum Value Recorded	78.8	80.3	79.6
Guideline Max	***115***	***115***	***115***
Average Data Recorded	64.91	75.01	71.11
Guideline Averaged	***70***	***50***	***70***

RCC Plant

Noise Level (dB)	10-11/May/17		11/May/17
	09:38 – 22:00	22:01 – 06:00	06:01-09:38
Maximum Value Recorded	80	73.4	65.3
Guideline Max	***115***	***115***	***115***
Average Data Recorded	60.11	64.13	54.69
Guideline Averaged	***70***	***50***	***70***

Figure C- 3: Results of Noise Level Monitoring at the Aggregate Crushing Plant in May 2017

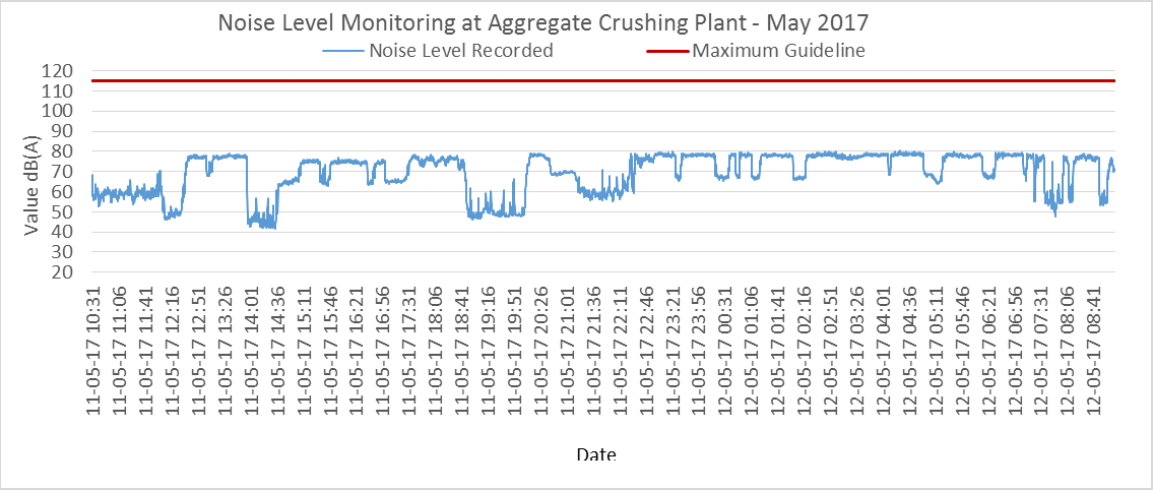


Figure C- 4: Results of Noise Level Monitoring at the RCC Plant in May 2017

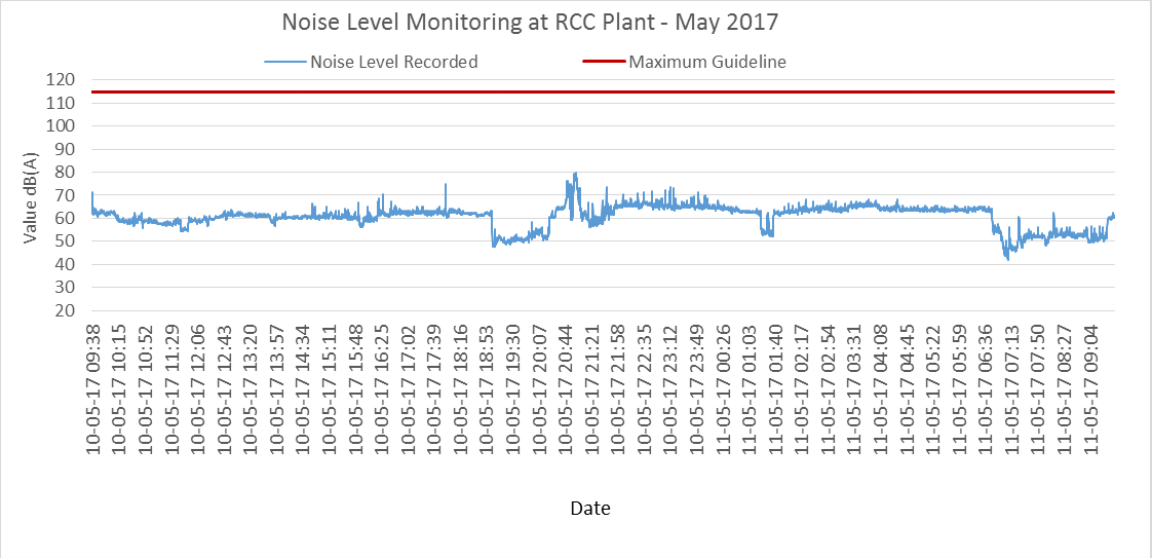


Table C- 5 and Table C- 6: ***Average Results of Noise Monitoring at SongDa Camp#2 and Sino Hydro Camp in May 2017***

Song Da 5 Camp No.2

Noise Level (dB)	08-09/May/17		09/May/17
	16:35 – 22:00	22:01 – 06:00	06:01-16:35
Maximum Value Recorded	79.4	58.5	59.1
Guideline Max	***115***	***115***	***115***
Average Data Recorded	50.72	51.54	48.83
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Camp

Noise Level (dB)	04-05/May/17		05/May/17
	17:01 – 22:00	22:01 – 06:00	06:01-17:01
Maximum Value Recorded	60.7	62.1	63.1
Guideline Max	***115***	***115***	***115***
Average Data Recorded	51.78	55.95	53.53
Guideline Averaged	***70***	***50***	***70***

Figure C- 5: Results of Noise Level Monitoring at SongDa5 Camp#2 in May 2017

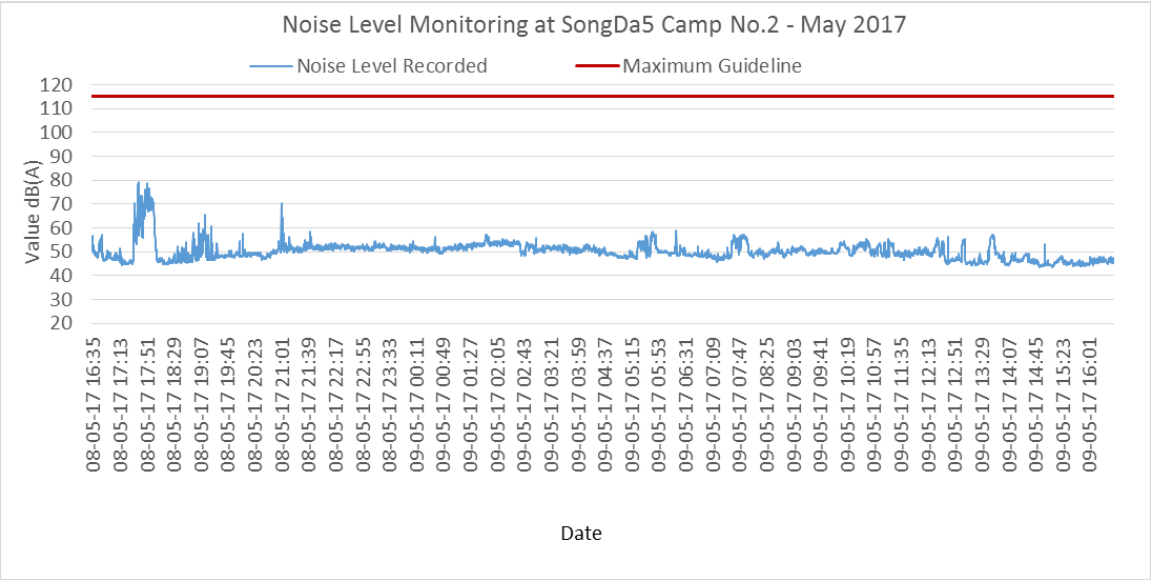


Figure C- 6: Results of Noise Level Monitoring at Sino Hydro Camp in May 2017

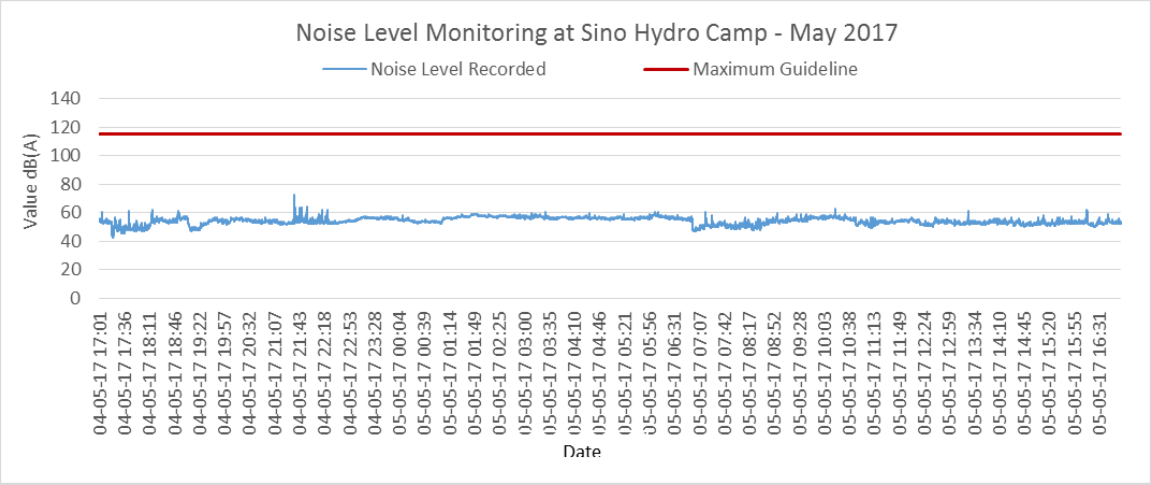


Table C- 7 and Table C- *8:* ***Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in May 2017***

Owner's Site Office and Village

Noise Level (dB)	15-16/May/17		16/May/17
	12:02 – 22:00	22:01 – 06:00	06:01-11:54
Maximum Value Recorded	57.5	81.1	70.2
Guideline Max	***115***	***115***	***115***
Average Data Recorded	41.08	49.80	45.21
Guideline Averaged	***70***	***50***	***70***

Main Dam

Noise Level (dB)	03-04/May/17		04/May/17
	12:49 – 22:00	22:01 – 06:00	06:01-12:34
Data Record Max	65.4	66.3	67
Guideline Max	***115***	***115***	***115***
Data Record Average	54.10	57.96	55.66
Guideline Averaged	***70***	***50***	***70***

Figure C- 7: Results of Noise Level Monitoring at Owner's Site Office and Village in May 2017

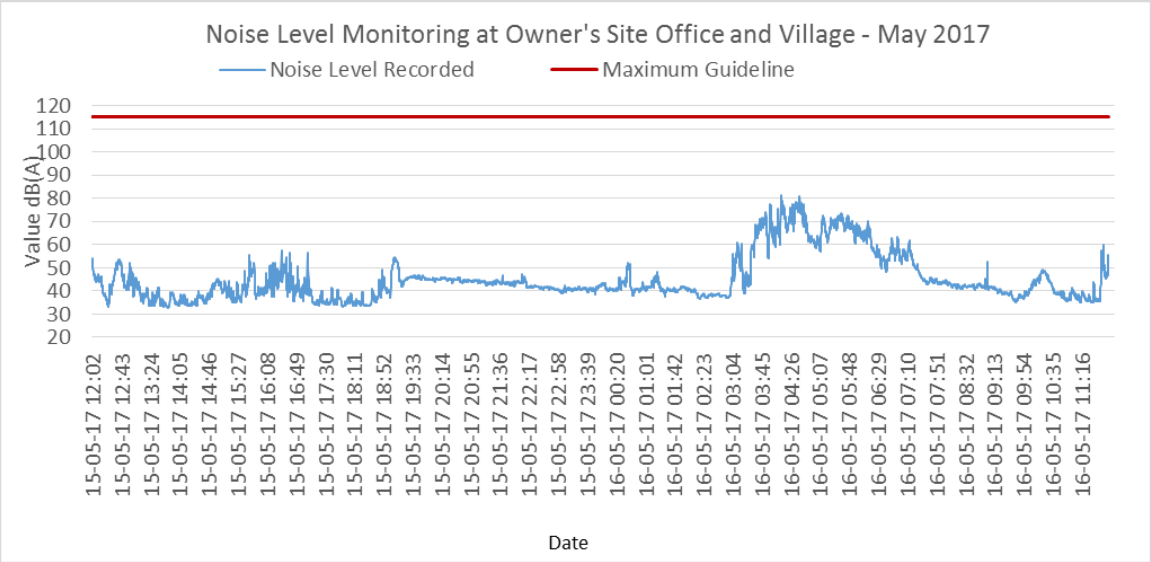


Figure C- 8: Results of Noise Level Monitoring at Main Dam in May 2017

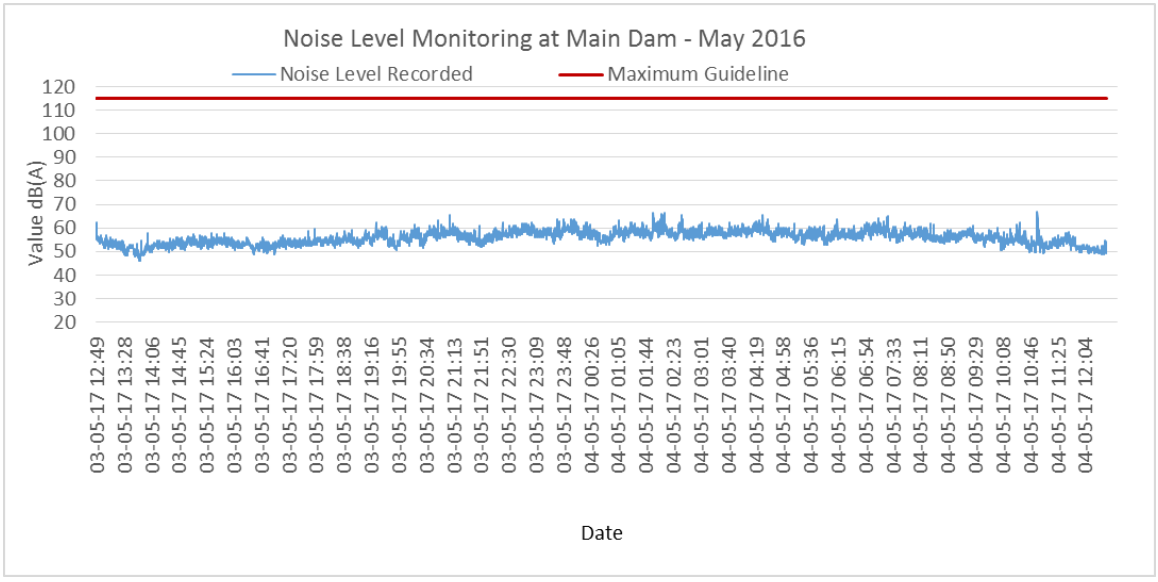


Table C- 9: Average Results of Noise Monitoring at the Sino Hydro Temporary Worker Camp *and Lilama10 Camp in May 2017*

Sino Hydro Temporary Worker Camp

Noise Level (dB)	12-13/May/17		13/May/17
	09:37 – 22:00	22:01 – 06:00	06:01-09:37
Maximum Value Recorded	75.7	82.5	65
Guideline Max	***115***	***115***	***115***
Average Data Recorded	56.25	63.26	53.00
Guideline Averaged	***70***	***50***	***70***

Lilama 10 Camp

Noise Level (dB)	16-17/May/17		17/May/17
	12:29 – 22:00	22:01 – 06:00	06:01-12:29
Maximum Value Recorded	64.8	69	72.4
Guideline Max	***115***	***115***	***115***
Average Data Recorded	47.06	60.96	51.98
Guideline Averaged	***70***	***50***	***70***

Figure C-9: Results of Noise Level Monitoring at Sino Hydro Temporary Worker Camp

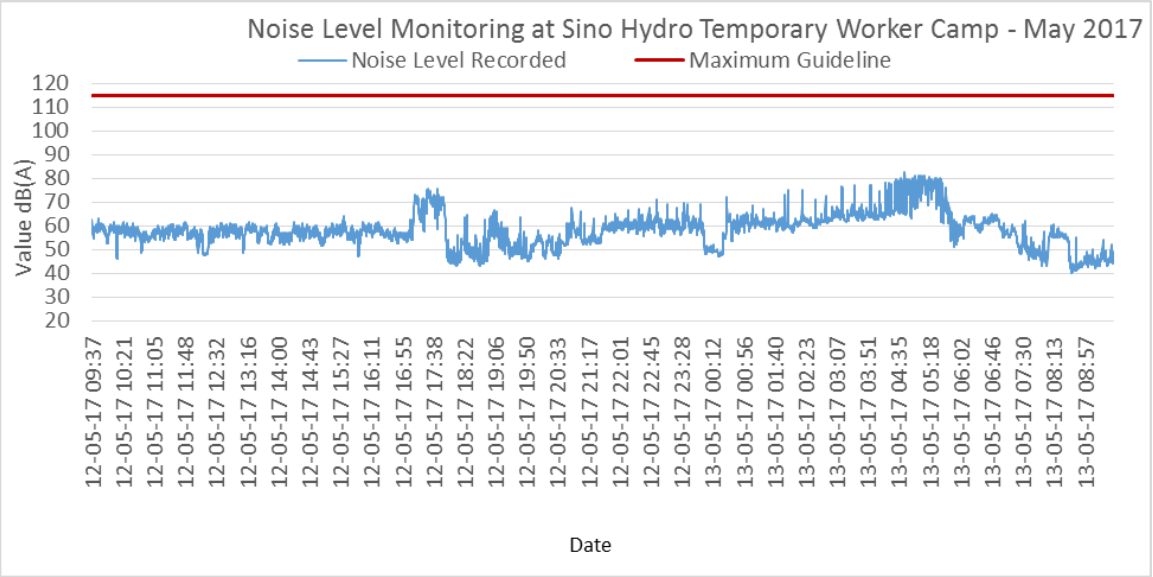


Figure C-10: Results of Noise Level Monitoring at Lilama10 Camp in May 2017