NAM NGIEP 1
POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

August 2016

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BBREVIATIONS / ACRONYMS

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

LTA	Lender's Technical Advisor
MoM	Minutes of Meeting
MoNRE	Ministry of Natural Resource and Environment, Lao PDR
NCR	Non-Compliance Report
NNP1PC	Nam Ngiep 1 Power Company Limited
NPF	National Protection Forest
NTFP	Non-Timber Forest Products
NTP	Notice to Proceed (under each construction contract)
NVDI	Normalised Difference Vegetation Index
OC	Obayashi Corporation
ONC	Observation of Non-Compliances
PONRE	Provincial Department of Natural Resource and Environment, MONRE
PRLRC	Provincial Resettlement and Livelihood Restoration Committee
PvPA	Provincial Protection Area
RCC	Roller Compacted Concrete
ROW	Right of Way
REDP	Resettlement and Ethnic Development Plan
RFP	Request for Proposal
RI	Recordable Injury
RMU	Resettlement Management Unit
SLBMP	Salvage Logging Biomass Management Plan
SCOD	Scheduled Commercial Operation Date (as defined in EGAT PPA)
SFCD	Scheduled Financial Close Date (as defined in EGAT PPA)
SHM	Shareholders Meeting
SIR	Site Inspection Report
SMO	Social Management Office of ESD within NNP1PC
SS-ESMMP	Site Specific Environmental and Social Monitoring and Management Plan
STD	Sexually Transmitted Disease
TD	Technical Division of NNP1PC
THB	Thai Baht
TL	Transmission Line(s)
TLWC	Transmission Line Works Contract
ToR	Terms of Reference
TSS	Total Suspended Solids
USD	US Dollar
UXO	Unexploded Ordinance

VGC	Village Grievance Committee
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 August 2016, the Environmental Management Office (EMO) of the Environmental and Social Division (ESD) of NNP1PC received a total of ten SS-ESMMPs and one ESMMP. Out of these, five SS-ESMMPs and one ESMMP were accepted with conditions, two SS-ESMMPs were reviewed and returned for improvement, and three SS-ESMMPs are under review and are carried over to September 2016. NNP1PC issued sixteen Observations of Non-Compliances (ONCs) and one Non-Compliance Report (NCR) Level 1, a minor increase from fourteen ONCs in July 2016. With a carry-over from July 2016, a total of thirty-one ONCs and one NCR were active in August 2016. Out of these, sixteen ONCs were resolved, fifteen ONCs and one NCR will be carried over into September 2016. Out of those carried over from August 2016, eleven ONCs and one NCR were not resolved within the deadlines[1]. NNP1PC will follow up with the Contractors to resolve the remaining issues during September 2016.

The progress of construction of the on-Site laboratory continues to be slow. The Detailed Work Programme (DWP) and SS-ESMMP were prepared and submitted by the appointed Contractor to NNP1PC and they were reviewed and returned for further improvement. The laboratory equipment has been purchased and is expected to be delivered in November 2016.

Water quality monitoring data for August 2016 indicates that at all construction camps had higher concentrations of total coliforms than the effluent standards. Following the completion of a joint assessment on the wastewater treatment systems (WWTS) between the Thai Expert, the EMO and Technical Division of NNP1PC and the Civil Contractor during the period 29-30 June 2016, the Expert submitted a report on 11 August 2016 with additional recommendations to improve the WWTS in number of more recently constructed camps. An internal meeting between NNP1PC-TD and EMO was planned to take place on 07 September 2016 to discuss and agree on the recommendations including the timing of implementation.

On 05 August 2016, a joint final inspection of the NNP1 Project Solid Waste Landfill construction was undertaken between NNP1PC and the Contractor. A draft Landfill Operation Manual was completed and the responsible staff were trained on the operation of the landfill. Prior to starting the operation, NNP1PC held a meeting with all the principal Contractors regarding the landfill operation. This was officially commenced on 10 August 2016 with opening hours on Monday to Friday from 09:00 to 10:30 am. The NNP1 Project Landfill is managed by NNP1PC and an approximate total of 103 m^3 of waste was deposited there during August 2016.

The results of the analyses of the leachate from the four landfill leachate ponds show that BOD, COD and faecal coliforms gradually decreased from one pond to the next, but the concentrations were still higher than the relevant standards in the final pond. However, there was no discharge of the leachate to the environment.

By the end of August 2016, the construction of the Houay Soup Solid Waste Landfill was in progress, with a temporary waste pit, a permanent waste pit and anaerobic treatment ponds completed. The construction of a wetland pond, fence and site office were ongoing.

There was no Environmental Monitoring Unit (EMU) visit in August 2016.

[1] Progress on the implementation of corrective action were slow

The development of the NNP1 Watershed Management Plan (WMP) continues to progress. The first draft interim report was shared with ADB for their review prior to the official submission on 01 September 2016. As the full WMP is expected to be completed by the end of December 2016, ADB has agreed that a second payment from the watershed management fund may be released to the government to support the necessary activities. It was agreed that the government will work with NNP1PC and prepare and submit an action plan and budget to ADB for approval prior to releasing the payment. The recruitment of an international consultant was in progress in the reporting period and the consultant is expected to be engaged at the beginning of September 2016 to support the preparation of the WMP.

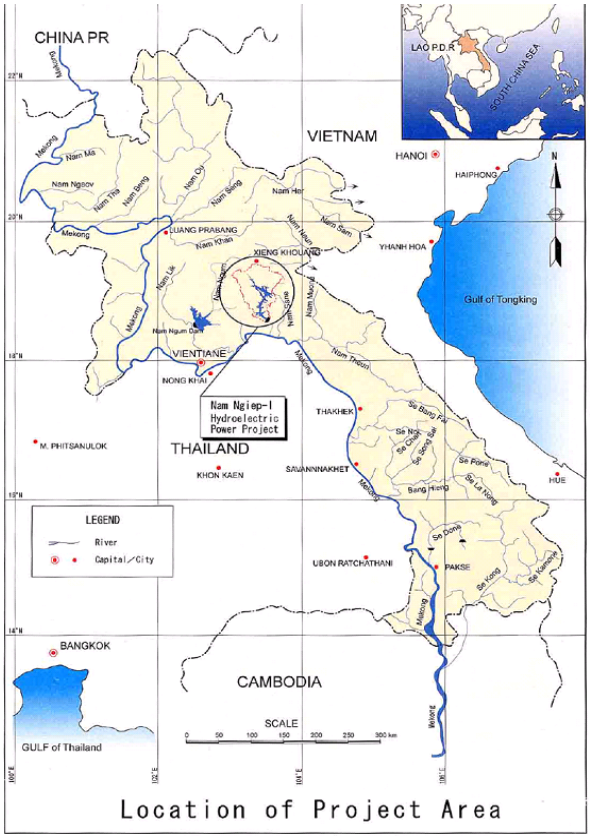
On 19 August 2016, the final version of the biodiversity reconnaissance report for the Nam Chouan Nam Xang Biodiversity Offset Site (the designated primary offset site of NNP1) in the Nam Mouan Nam Gnouang National Protection Forest was submitted to ADB. ADB subsequently confirmed that the report is satisfactory to ADB. NNP1PC continued to make preparations for the Boundary Confirmation Baseline Survey to be carried out by the ADB consultant and NNP1PC in the offset site. The survey is expected to start on 20 September 2016 and last until the end of October 2016. NNP1PC is preparing the Terms of Reference for preparation of the Biodiversity Offset Management Plan (BOMP), and it was agreed with ADB that a pre-BOMP activities plan should be developed and funded to support immediate activities for biodiversity protection in the offset site.

The biomass removal activities have been temporarily put on hold during the rainy season.

1 INTRODUCTION

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

Figure 1-1: Location Map



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

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

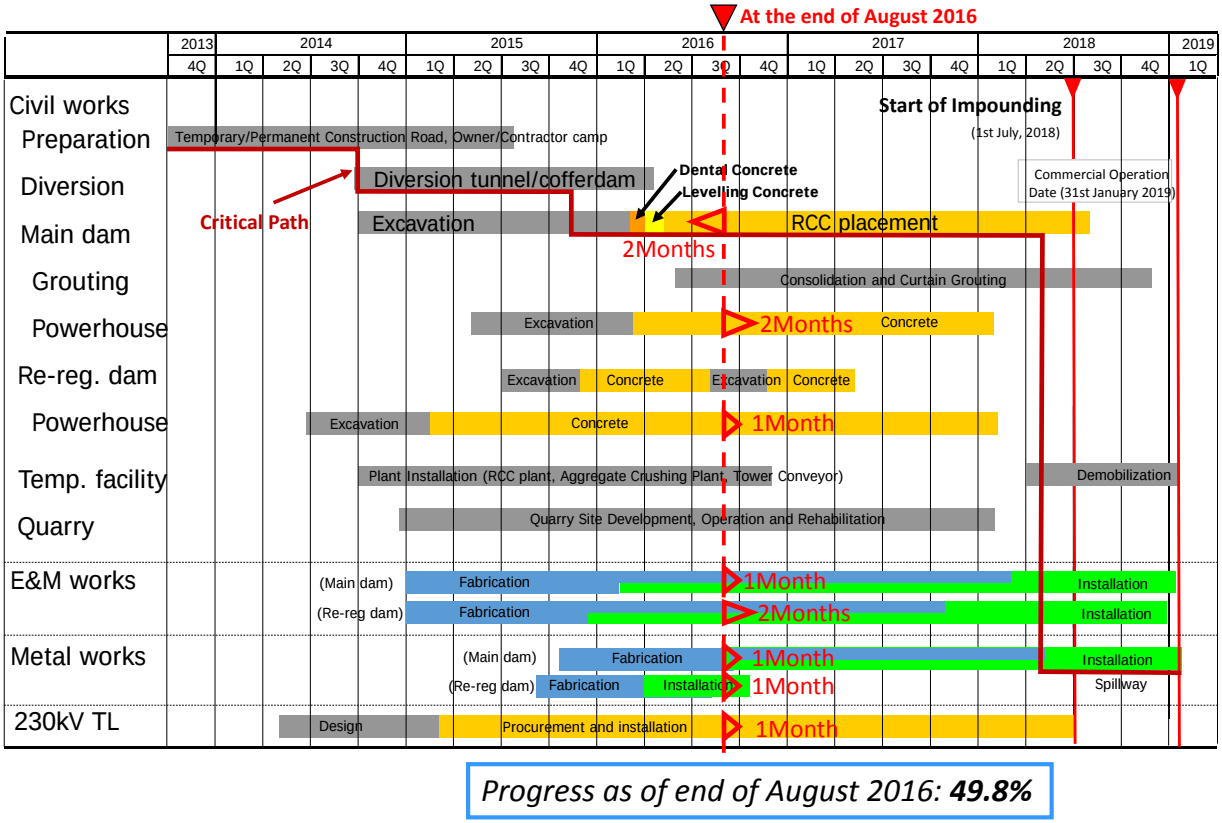
The EMMR and other related reports including related construction Site Specific Environmental and Social Monitoring and Management Plans (SS-ESMMPs) are publically disclosed on the Project website in line with the ADB and GoL Public Disclosure Policies. Hard copies of the final reports will also be available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

2 WORK PROGRESS OF PRINCIPAL CONTRACTORS

Construction Works for the Project are being carried out through four separate main construction contracts under the supervision of the Technical Division of NNP1PC. The four contracts are the Civil Works, the Electrical and Mechanical Works, the Hydraulic Metal or Hydro-mechanical Works and the 230kV Transmission Line Works. August 2016 was 49.8%[1] (compared to planned progress of 49.2%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments, varied works and other adjustments allowed under each Contract. In terms of the value of actual work done the percentage is slightly understated since work completed, but not paid, is not included.

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

Figure 2-1: Overall Construction Schedule



Progress as of end of August 2016: ***49.8%***

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 August 2016 was 50.2% (compared to planned progress of 49.2 %) calculated in the same manner as described above for the value of achieved Interim Milestone Payments excluding advance payment.

2.1.1 Main dam and power house

After starting the main dam excavation works in October 2014 on the left bank, the works were about one month advanced when diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes were 20% greater than expected and part of this additional work is necessary to construct a 'shear key' structure due to the weak layers of rock encountered in the dam foundation. Following the efforts on Site, the additional excavation work was completed at the end of February 2016. The cost of the additional excavation and RCC concrete placement necessitated expenditure of contingency amounts provided exactly for such eventualities. The dental concreting works were commenced in March 2016, and conventional RCC levelling concrete placement for the main dam in the 'shear key' structure up to El. 170.5 m was completed at the beginning of May. Consolidation grouting at the main dam area was commenced on 10 May 2016 and RCC concrete placement for the main dam body was commenced on 21 May 2016. Consolidation grouting covers the whole footprint of the main dam and RCC concrete placement and consolidation grouting are implemented in parallel, section by section. On 19 August 2016, construction of the Diversion Conduit commenced using a temporary steel frame and steel sheets as formwork for the sidewalls as shown in Figure 2-2.

Figure 2-2 **Installation of steel frame for Diversion Condui**

The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 39.8 % by achievement of total drilled length at the end of August 2016 as a proportion of the total expected drilling shown in *Table 2-1* below.

Table **2-1 Progress of Consolidation drilling and grouting at 31 August 2016**

Total Anticipated Drilling (m)	Completed (m)	Progress (%)
16,420	6,540	39.8

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

Table 2-2: Progress of Main Powerhouse Structural Concrete Works to 31 August 2016.

Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
32,600	14,558	44.6

2.1.2 Re-regulation dam and powerhouse

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

Structural concrete works were commenced in March 2015, in coordination with installation of the grounding system. The progress of structural concrete works is shown in Table 2-3 below

Table 2-3: Progress of Re-regulation Dam Left Bank Structural Concrete Works to 31 August 2016

	Concrete Volume (m^3) Placed by the End of August 2016						
Structure	Intake	Powerhouse	Tailrace	Retaining Wall	Spillway	Left Bank RCC Structure	Overall Total
Anticipated Quantity	26,549			508	23,500	13,200	63,757
Completed Quantity	11,722	11,169	1,681	508	3,758	13,228	42,066
Progress	**93%**			**100%**	**16%**	**100%**	**66%**

The concrete volume placed already for both powerhouse and dam is 42,066m^3 being 66% of the revised total estimate of 63,757 m^3 for all structures. The powerhouse concreting has advanced well 42,066m^3 being 66% 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. Following installation of guide frames for re- regulation waterway gate and stop log and re-regulation intake gate in April 2016, secondary concrete embedment of the guide frames was completed in May 2016 and structural concrete works for the retaining wall to support the substation yard was commenced in June 2016.

The Dyke (saddle dam) embankment works on the right bank near the Houay Soup Resettlement Area were also started in November 2015 and was completed on 30 April 2016.

2.1.3 Temporary work facility

2.1.3.1 DIVERSION TUNNEL INLET AND OUTLET

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

2.1.3.2 SECONDARY UPSTREAM COFFERDAM

The concrete placement works in both conventional and roller compacted concrete (CVC and RCC respectively) for the secondary upstream cofferdam were started in November 2015 and completed ahead of construction schedule in the middle of February 2016. The grout curtain works were completed on 02 April 2016.

2.1.3.3 TEMPORARY BRIDGE

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

2.1.3.4 PLANT YARDS

These comprise the Aggregate Crushing Plant, the CVC Batching Plant and the RCC Batching Plant. Foundation work and installation of equipment were completed at all the plant yards and the belt conveyor system from the RCC plant to the main dam was completed in early April 2016.

2.1.3.5 QUARRY

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

2.1.3.6 DISPOSAL AREAS

The disposal area on the right bank has been available for operation since January 2015, as was the adjacent waste disposal area. The 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.

The Lao local contractor, Phoukham Chanvong, was appointed and their work to complete the waste landfill was commenced in April 2016 and substantially completed in July 2016. This Contractor is following on with a second solid waste landfill construction contract for the Houay Soup Resettlement Area.

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 until the end of August 2016 was 53.0% (compared to planned progress of 53.0%). This delay is due to the change of schedule of delivery of stator material for Unit 1 of the main powerhouse and receipt of runner material of re-regulation powerhouse at the Electrical and Mechanical Works Contractor's factory from April 2016 to August 2016 and from June 2016 to July 2016 respectively. However, the stator of Unit 1 of the main powerhouse and the runner of the re-regulation powerhouse will be shipped from the factory to the Site on schedule by coordination of the manufacturing schedule in the factory. Accordingly, it has no impact on the overall construction schedule. The status of embedded pipe installation is shown in Figure 2-3.

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

2.3 Hydro-Mechanical Works

The HMWC was executed between IHI Infrastructure Systems (IIS) and NNP1PC on 18 April 2014 and the NTP was issued to the Contractor on 03 October 2014. The cumulative work progress of the Hydraulic Metal Works until the of August 2016 was 25.1% (compared to planned progress of 25.1%).

The latest progress of penstock pipes fabrication at IHI field shop as of the end August 2016 is shown ***in Table 2-4*** below

Table. 2-4: Progress of the penstock pipe fabrication at the IHI field shop as at the end of August *2016*

Item No.	Work Activity	Fabrication Progress (%)	Remarks
1.1	Assembly & Welding	30 %	
1.1	Painting	23 %	
1.1	Delivery to Main Dam Laydown Area	5 %	
1.1	Site Erection at Main Dam	5 %	

Latest progress of steel gate installation for each work item at the end of August 2016 is shown ***in Table 2-5*** below.

Table. 2-5: progress of steel gate installation for each work item at the end of August 2016

Item No.	Work Item Description	Gate Leaf Installation Progress (%)	Remarks
2.1	Re-regulation Waterway Gate	100 %	Gate leaf installation is completed except for rubber seal. Initial stage for installation of hoist & control panels is ongoing.
2.2	Re-regulation Waterway Stop Log	100 %	Dry and functional test before initial filling of reservoir was completed and approved by Owner's Engineer.
2.3.1	Re-regulation Intake Gate	100 %	Gate leaf installation is completed except for rubber seal. Installation of hoist and control panels is ongoing.
2.3.2	Re-regulation Intake Trash Rack	100 %	Installation of trash rack is completed and approved by the Owner's Engineer.
2.4	Re-regulation Draft Gate	60 %	Installation of rubber seals is ongoing for the 4 segments of draft gate leafs.

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 August 2016 was 52.6% (compared to planned progress of 63.2 %). The difference is chiefly as a result of delay to commencement of construction works by approximately 7 months while awaiting compensation matters to be resolved by NNP1PC. The delay to commencement of construction works was approximately 7 months while awaiting compensation matters to be resolved by NNP1PC. The Contractor agreed to accelerate its Works and on target to get back onto the original schedule for tower foundation excavation and tower erection. During the rainy season and with further delays due to compensation virtually full access to most sections of alignment was achieved in 2015 following resolution of remaining environmental and social matters. In the last month there has been progress with tower erection but tower excavation is now suspended until October 2016 due to inaccessibility of tower positions due to wet conditions.

In respect of the delay to commencement of most works the Contractor is studying its programme to ensure that sufficient resources are committed as the works progress to ensure that completion is achieved in good time. Onset of daily rains has made access to all areas difficult but the Contractor follows its revised acceleration schedule, after the progress for the construction of tower foundations slowed after April, 2016 (See Figure 2-4 below)

Figure 2-4 Cumulative Work Progress of Tower Installation (Plan and Actual)

3 ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 Site Specific Environmental and Social Management and Monitoring Plans

During August 2016, the Environmental Management Office (EMO) of NNP1PC received a total of ten SS-ESMMP and one ESMMP. Out of these, five SS-ESMMPs and one ESMMP were accepted with conditions, two SS-ESMMPs were reviewed and returned for improvement, and three SS-ESMMPs are under review and carried over to September 2016.

Table 3-1 *SS-ESMMPs review status in August 2016*

Title	Date Received	Status	Comments
SS-ESMMP for the Construction of Tractor Road at HSRA	22 July 2016 (1st revision)	No objection with conditions on 04 August 2016	Revise construction map, borrow pit management and erosion and sedimentation control
SS-ESMMP for the Construction of HM Subcontractor Labour Camp No.2 (LILAMA 10)	22 July 2016 (3rd revision)	No objection with conditions on 15 August 2016	Provide information on site decommissioning and revise the detailed design of oil/grease trap
SS-ESMMP for Installation of Embedded Part of Stay Cone (Preliminary Work) for Regulating Station	22 July 2016 (1st revision)	No objection with conditions on 17 August 2016	Provide additional mitigation measures on noise and vibration, remove reference to irrelevant sub-plan (SP01) and amend some environmental assessment components in the environmental assessment check list

HM Contractor's ESMMP	21 July 2016 (2nd revision)	No objection with conditions on 22 August 2016	Revise environmental and social monitoring and management plan, waste management, noise and vibration control
SS-ESMMP for Curtain Grouting Works at the Main Dam	05 August 2016 (1st submission)	No objection with conditions on 01 September 2016	Provide information on the amount of surface water from Nam Ngiep River to be used as grouting mix, revise sub-plan requirements and erosion and sediment control measures
SS-ESMMP for Operation and Maintenance Works of RCC Plant	26 July 2016 (1st submission)	Objection (returned with comments) on 15 August 2016	The SS-ESMMP did not address the potential key environmental risks that are relevant to the operation and maintenance works of the RCC plant especially the gravel and sand washing activities
SS-ESMMP for Construction of the EMO Water Quality Laboratory	03 August 2016 (1st submission)	Objection (returned with comments) on 10 August 2016	The SS-ESMMP did not address the potential key environmental risks that are relevant to the actual proposed construction site located at the Owner's Site Office and Village.
SS-ESMMP for Main Road Construction at the HSRA	24 June 2016 (2nd submission of drawings)	No objection	No comments
SS-ESMMP for Building Construction at the Main Powerhouse	30 July 2016 (1st revision)	Under review	Not applicable
SS-ESMMP for Grouting Works for Regulating Power Station	17 August 2016 (1st submission)	Under review	Not applicable
SS-ESMMP for Embedded Part of Stay Cone (Preliminary Work) for Regulating Station	23 August 2016 (2nd submission)	Under review	Not applicable

3.1.2 Compliance Report

NNP1PC issued sixteen Observations of Non-Compliances (ONCs) and one Non-Compliance Report (NCR) Level 1, which is a minor increase from fourteen ONCs in July 2016. With a carry-over from July 2016, a total of thirty-one ONCs and one NCR were active in August 2016. Out of these, sixteen ONCs were resolved, fifteen ONCs and one NCR will be carried over into September 2016. Out of the carried over, eleven ONCs and one NCR were not resolved within the deadlines. NNP1PC will follow up with the Contractors to resolve the remaining issues in September 2016.

Table 3-2 ONCs Carried Over from August 2016 to September 2016

Site ID	Issues	Reporting	Actions
Song Da 5 Camp No.2	The WWTS construction was not consistent with the proposed design (ON_OC-0085). 1st inspection date: 02 June 2015 Latest follow up: 30 August 2016	1 ONC (Pending)	The 2nd final report from the external Thai WWTS expert (Mr. Pipat) about improvement of the waste water treatment systems was issued on 11 August 2016. The consultant's recommendations will be discussed in the internal meeting between the TD and the EMO on 07 September 2016.
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 follow up: 30 August 2016	1 ONC (Pending)	The existing wetland ponds are not proper lined and sealed with concrete; this resulted in seepage of grey water at the first wetland pond where the treatment process starts. Improvement approaches in accordance with the external Thai expert's recommendations, will be discussed at the internal meeting between the TD and the EMO on 07 September 2016.
H-M Hydro Subcontract Worker Camp (LALIMA 10 Camp	1. The Contractor has commenced the construction of the WWTS without submitting revised detailed designs and updated SS-ESMMP responding to the Owner's comments (ON_HM-0004). 1st inspection date: 25 May 2016 Latest follow up: 22 June 2016	1 ONC (Pending)	1. Improvement requirements have been incorporated in the comment sheet for the 3rd revision SS-ESMMP for construction of LALIMA 10 Camp. NNP1PC will follow-up on the modifications.
	2. Improper design of the oil and grease traps for kitchen and bathing areas (ON-HM-0010) 1st inspection date: 03 August 2016 Latest follow up: 31 August 2016	1 ONC (New)	2. Instruction for oil/grease trap improvement was provided during the latest joint bi-weekly inspection. Corrective actions need to be completed by September 2016.
RCC Plant Yard	Lack of proper sedimentation facilities to improve the turbid water quality generated from the site (ONC_OC-0217) 1st inspection date: 28 June 2016 Latest follow up: 30 August 2016	1 ONC (Pending)	- On 15 August 2016, EMO provided no objection with comments for the 1st submission of SS-ESMMP for the Operation and Maintenance of the RCC Plant. - The Contractor is required to follow the agreed actions specified in previous issued SIR which include the frequently clean-up the sediment ponds when it is observed that they are 60% full, regularly remove dried sediment from the drying yards to keep space for

Site ID	Issues	Reporting	Actions
			incoming clean-up sediment from the ponds.
Borrow Pit for HSRA Irrigation Canal	A borrow pit was operated about 10 m from Houay Soup Noi (a small stream) for irrigation construction without environmental protection measures as per the approved SS-ESMMP dated 11 May 2016 (ON_VSP-0001). 1st inspection date: 25 May 2016 Latest follow up: 02 August 2016	1 ONC (Pending)	A 9 m^3 capacity sediment pond was installed. However, the agreed corrective action was not fully implemented as per the Owner's requirements including installing erosion and sediment control system. On 11 May 2016, EMO responded with 'no objection with comments' on the 1st submission of the SS-ESMMP for Irrigation canal construction.
SECC Camp (Access Bridge Contractor)	A temporary waste disposal pit was filled up by rain water without maintenance and/or provision of a new disposal pit (ON_SECC-0034). 1st inspection date: 12 July 2016 Latest follow up: 24 August 2016	1 ONC (pending)	Due to poor accessibility to the mentioned waste pit, from September 2016 SECC agreed to dispose of the waste at the temporary pit at the Houay Soup Solid Waste Landfill in accordance with NNP1PC's instructions.
	Inadequate management of grey water retention pond from washing and kitchen areas which resulted in strong smell (ON_SECC-0036). 1st inspection date: 12 July 2016 Latest follow up: 24 August 2016	1 ONC (New)	Some improvement was observed including the following: - The earth bund of the grey water pond was increased; - Some water hyacinth was removed; - The Bio-enzyme liquid was applied to reduce the unpleasant smell. Regular maintenance is needed until expected site decommissioning at the end of September 2016.
Borrow Pit for HSRA Main Road	The Contractor operated a borrow pit at the area adjacent to the Houay Soup Noi River without appropriate environmental management plan and/or mitigation measures (ON_VRC-0004) 1st inspection date: 12 July 2016 Latest follow up: 10 August 2016	1 ONC (pending)	Provide erosion and sediment control systems for the borrow pit including a silt fence and/or a similar means by 24 August 2016 (second deadline). Revise and re-submit the SS-ESMMP for the main road construction as per the EMO comments.
VRC camp	Mixed disposal of recyclable waste and non-recyclable waste was observed during the joint site inspection (ON_VRC-0005) 1st inspection date: 12 July 2016 Latest follow up: 10 August 2016	1 ONC (pending)	The Contractor was instructed to recover recyclable waste from the pit and sell to the local villagers at the Recycle Bank located at Hat Gniun Village that operates every Wednesday from 9:30 am to 4:00 pm. There was no action implemented since the previous inspection. The corrective action needs to be

Site ID	Issues	Reporting	Actions
			completed by 24 August 2016 (2nd extension).
SECC Workshop & Industrial Area	Inadequate Hazardous Waste Management. About 15-20 kg of oil-contaminated sand was disposed of on the side slope of the SECC working platform which is close to the Nam Ngiep River (NCR_SECC-0001) 1st inspection date: 09 August 2016 Latest follow up: 24 August 2016	1 NCR (Pending)	- Immediately collect the referred oil-contaminated sand and store in the hazardous storage facility for proper disposal by an authorized service provider; - Provide a detailed training programme to the Contractor's staff related to hazardous material and waste management as per the requirements stated in SP02.16, SP 02.17, SP05.12, SP05.20 and SP05.35. The draft training material shall be shared with EMO for prior review; - Conduct this training regularly as per proposed training programme. EMO shall be invited to observe the training. It was observed during the latest inspection dated 24 August 2016 that some corrective actions including cleaning up (30%) of soil contaminated sand was completed. Therefore, the second extension was provided for the Contractor to complete the remaining clean-up by 09 September 2016.
Re-Regulation Dam	Raw wastewater (pre-treated water) overflowing from the first sediment pond to the Nam Ngiep River (ON_OC-0227). 1st inspection date: 16 August 2016 Latest follow up: 30 August 2016	1 ONC (pending)	The Contractor was instructed to separate the rain water and waste water by relocating the water pump and pipelines within three days. These corrective actions were completed. However, EMO will conduct a one-off water quality testing of the direct rain water discharging point to verify if it meets the water quality standard. The Contractor would continue to monitor, maintain and clean up the ponds to ensure effective sediment settlement. Therefore, this ONC will be pending until a follow-up inspection is carried out in September 2016.
Sino Hydro Workers Camp	Sino Hydro's Camp with about 59 residents and a workshop were without approved designs of the	1 ONC (Pending)	The following corrective actions need to be completed by 31 August 2016:

Site ID	Issues	Reporting	Actions
	septic tank systems and hazardous material storage area. The following issues were observed: - Lack of proper hazardous materials and waste storage area was installed. Full oil drums, used oil containers and many oil filters were left on ground exposed to the rain. - Lack of proper waste segregation: oily clothes, plastic/glass bottles and food waste were deposited in the same containers; - Lack of adequate cooking and washing areas which resulted in the accumulation of food waste and grey water behind the Camp. (ON_OC-0230) 1st inspection date: 24 August 2016		- Construct adequate hazardous material and waste storage area. - Collect, store and eliminate the oil filters and any oil contaminated waste as per SP 05.35; SP 06.7 and SP 06.10; - Improve the cooking and washing area to prevent food waste and grey water accumulation at camp site; - Provide the detailed designs for the septic tank system installed on site and camp operation information; and - Provide site closure/rehabilitation plan.
PKC Camp (HSRA Landfill Contractor)	Poor hazardous waste management was observed at the temporary workers' camp. The designated storage area for petrol/engine oil did not have proper impermeable surface and earth bund. As a result, used oil was spilled on the ground inside the storage area. Some used engine oil was found to be poured onto the ground outside the storage area and there was some diesel spill located less than 5 m from the natural drainage (ON_PKC-0001) 1st inspection date: 25 August 2016	1 ONC (New)	The following corrective actions need to be completed by 29 August 2016: - Clean up the spills and dispose used engine oil properly; - Provide steel or thick plastic trays or sheets to cover the surface of the designated storage area for petrol and engine oil. Place and display "hazardous material/waste poster" in local language for awareness by the workers as well as providing some spill response kits.
Song Da 5 Camp No.1	The septic tanks at this Camp were nearly full (i.e. the remaining space from the water surface to the top of the tank was about 10-15 cm). Similar remaining tank capacity was observed for the black water which indicated a potential risk of overflowing outside the septic tanks (ON_OC-0300). 1st inspection date: 30 August 2016 Latest follow up: Not applicable	1 ONC (New)	Pump out the black water and dispose of it at the Spoil Disposal Area No. 6 in accordance with the draft Standard Operating Procedure (SOP) on the Sewage Sludge and Black Water Disposal by 12 August 2016.
Re-Regulation	The Contractor started operating a borrow pit with inadequate	1 ONC (New)	Submit a revised SS-ESMMP to include this borrow pit and provide

Site ID	Issues	Reporting	Actions
Dam Borrow Pit Area	environmental management practices as indicated below: - Topsoil was stockpiled at sensitive erosion area; - The cut slope area had no berm and cut-off drains; - Spoil was disposed and stockpiled on the access road to the SECC waste disposal pit. No information and management measures on the excavation of this borrow pit was included in the two (02) approved SS-ESMMPs for the Re-Regulation Dam (i.e. the Re-Regulation Dam Left Bank Excavation and Re-Regulation Dam Power Station (ON_OC-0301). 1st inspection date: 30 August 2016		the following information by 27 September 2016: - Estimated quantity of materials to be used; - Biomass clearing and topsoil management; - Spoil management and disposal (stockpiling, excavation, etc.); - Detail design of slope stabilization including cut-off drains and berm; - Site environmental rehabilitation and site closure plan. - Clean up the spoil was pushed into a heap such that it blocked access to the SECC temporary disposal pit.

Figure 3-1 Site Inspection Location

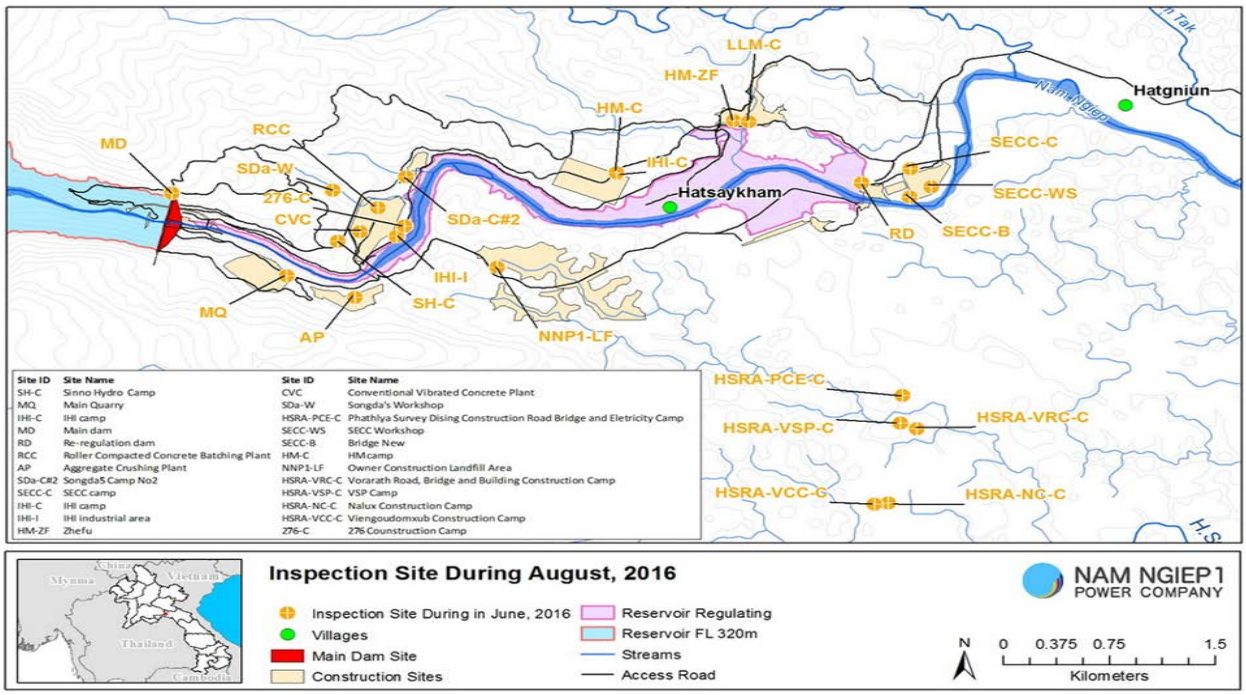


Figure 3-2: 230 kV Transmission Line Construction Monitoring

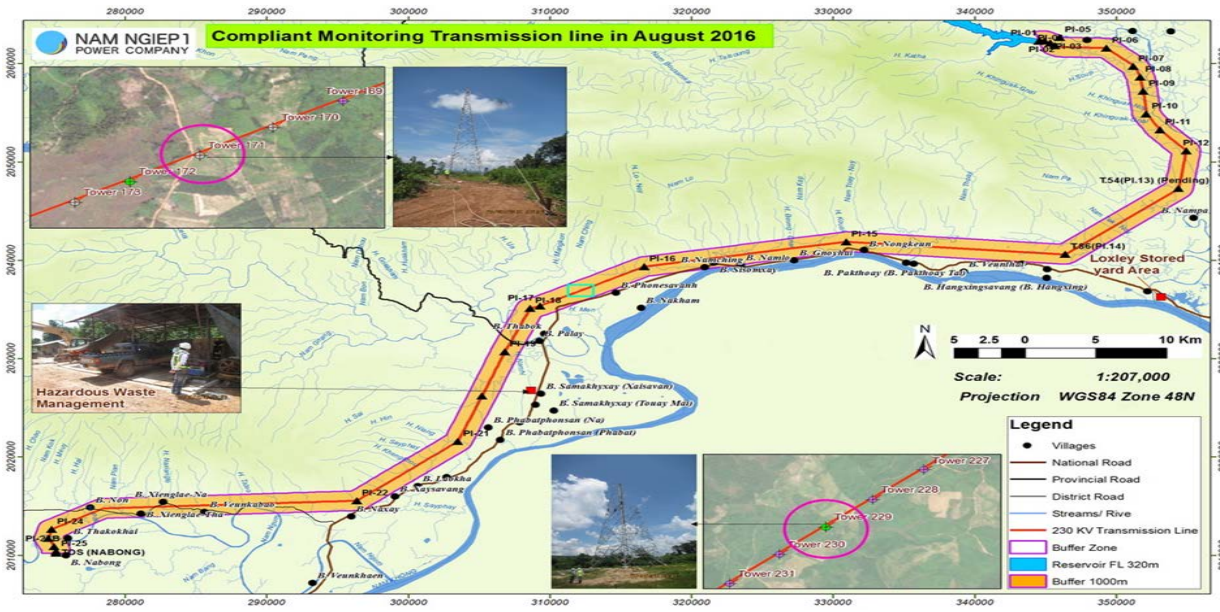
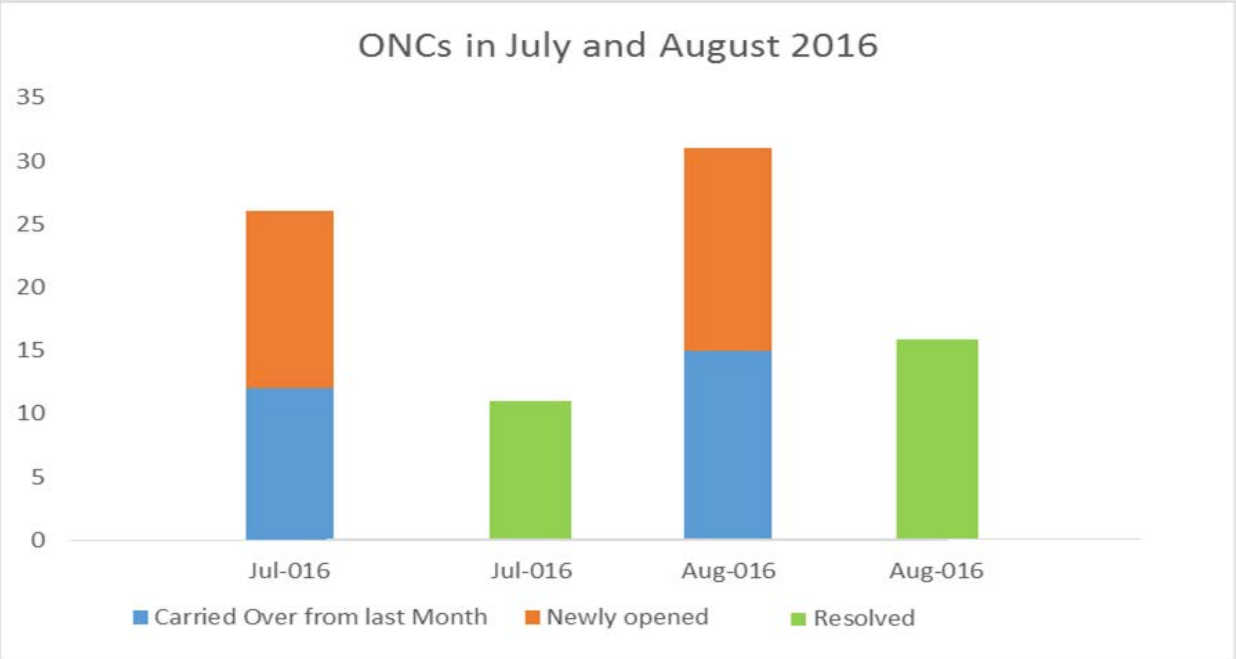


Table 3-3 Summary of ONCs and NCRs

Reporting Period (01-31 August 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from July 2016	15	0	0	0
New issues this month	16	1	0	0
Resolved this month	16	0	0	0
Carried forward into September 2016	15	1	0	0
Unresolved exceeding deadline	11	1	0	0

Figure 3-3: Observations of non-compliance (ONCs) this month compared with previous month



3.1.3 Monitoring by the Environmental Monitoring Unit of the Government

On 25 August 2016, EMO received a letter from MONRE regarding the proposed Environmental Monitoring Unit (EMU) mission to be carried out from 30 August to 03 September 2016. The proposed mission was cancelled and no alternate date was provided.

3.2 Environmental Quality Monitoring

An SS-ESMMP for building an on-Site water quality testing laboratory for EMO was submitted by the Contractor and later was returned by NNP1PC for further revisions. A follow up meeting with the Contractor was held on 18 August 2016 to further discuss the NNP1PC environmental and safety requirements. The Contractor will revise the originally submitted document and re-submit according to the comments provided. The procurement of the laboratory equipment with a supplier in Thailand was ongoing in August 2016. It is expected that the equipment will arrive by November 2016.

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

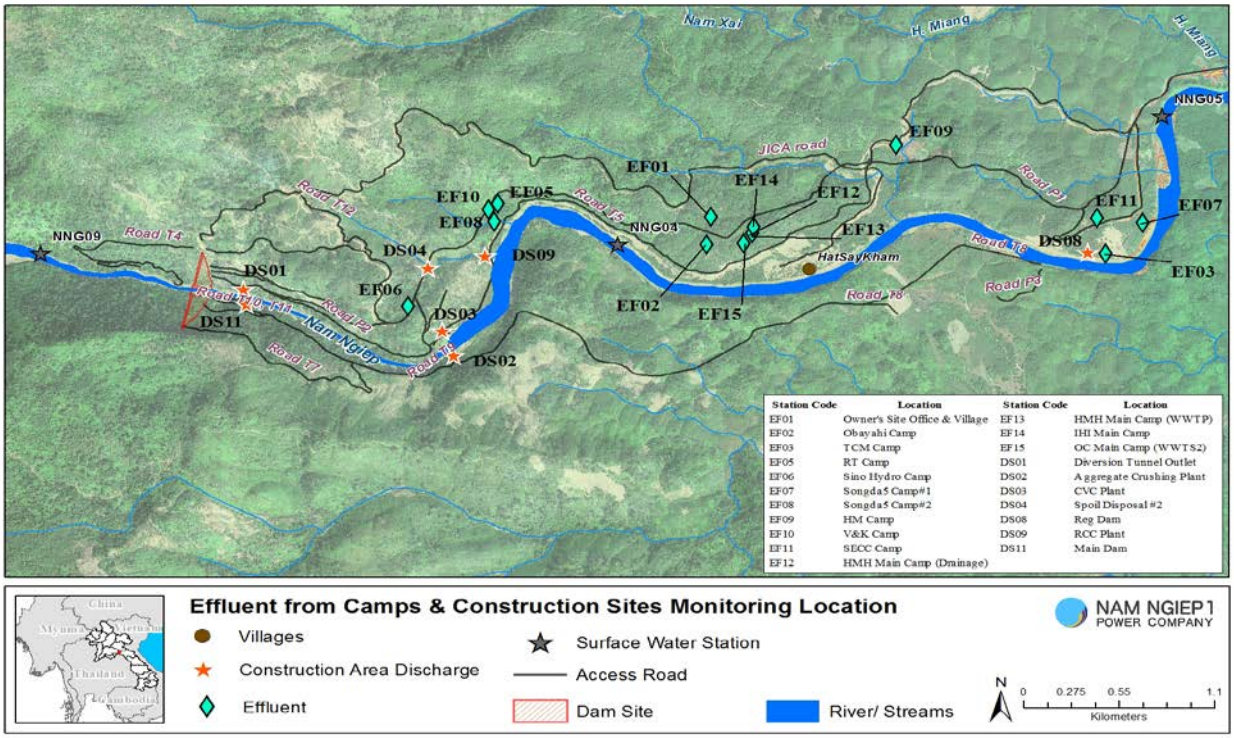
a) Effluent discharge from camps and construction sites;
b) Ambient surface water quality monitoring;
c) Groundwater and community water supply;
d) Ambient noise and noise emission monitoring.

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 the Asian Development Bank (ADB) in the Quarterly Monitoring Reports

3.2.1 Effluent Discharge from Camps and Construction Sites

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

Figure 3-4: Map of Effluent Discharge Monitoring Locations



All parameters were assessed with reference to the Effluent Standards specified in the Project's Concession Agreement Annex C, Appendix 2 Clause 1.13. During August 2016, all construction camps had higher concentrations of total coliforms than the effluent standard. Following the completion of a joint assessment on the waste water treatment systems (WWTS) between a Thai Expert, NNP1PC (TD and EMO), and the Civil Contractor during the period 29-30 June 2016, a revised WWTS report with additional recommendations for a number of more recently constructed camps was submitted on 11 August 2016. An NNP1PC internal meeting between TD and EMO was planned on 07 September 2016 to discuss and agree on recommendations including timing of implementation.

Detailed monitoring results are included in the Annex and the assessment of compliance and corrective actions are summarized in Table 3-4.

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

Site	Sampling ID	Non-Compliance	Corrective Actions
Owner's Site Office and Village	EF01	The total coliform increased from 110 MPN/100ml in the first fortnightly mission to 3,300 MPN/100 ml in August 2016 (second fortnightly mission).	It was observed during the second mission that villagers' livestock was grazing at the wetland and dropping their manure. This is the likely source of increased total coliform and faecal coliform. To avoid this problem, it is

Site	Sampling ID	Non-Compliance	Corrective Actions
			being considered to fence-off the wetland.
OC Camp (WWTP1)	EF02	Biochemical Oxygen Demand (BOD_5), Ammonia nitrogen (NH_3-N), and total coliforms exceeded the Standards for both missions.	An internal meeting is planned to be held on 07 September 2016 to finalise the requirements for the WWTS improvement in all the Camps, based on the external consultant's report. The requirements will then be presented to the Contractors for implementation.
TCM Camp	EF03	Total coliforms were higher than the Standard at 24,000 MPN/100 ml during the first mission and 4,900 MPN/100 ml in the second mission.	As above
Sino Hydro Camp	EF06	Total coliforms were higher than the Standard at 160,000 MPN/100 ml in the first fortnight and 92,000 MPN/100 ml in the second fortnight.	As above
Song Da 5 Camp No. 1	EF07	Total coliforms did not comply with the Standard with recorded values of 160,000 MPN/100 ml for the first fortnight mission and 1,100 MPN/100 ml for the second fortnight; COD exceeded the standard with a recorded value of 138 mg/l.	As above
Song Da 5 Camp No. 2	EF08	NH_3-N and total coliforms did not comply with the Standard for both missions.	As above
Hitachi-Mitsubishi Hydro(H-MH) Worker Camp No.1	EF09	NH_3-N and total coliforms did not comply with the Standard for both missions.	As above
V&K Camp	EF10	Total coliforms and TSS did not comply with the	As above

Site	Sampling ID	Non-Compliance	Corrective Actions
		Standards for both missions.	
SECC Camp	EF11	Total coliforms did not comply with the Standards. The measured values of total coliform for both fortnights were 160,000 MPN/100 ml.	As above
H-MH Main Camp Drainage	EF12	Total coliform results was not complied with the standard as value recorded of 160,000 MPN/100 ml.	As above
H-MH Main Camp (WWTS)	EF13	Total coliforms did not comply with the Standards. The measured values of total coliform for both fortnights were 160,000 MPN/100 ml.	As above. In addition, this Camp will be the first to implement the required WWTS improvement.
IHI Main Camp	EF14	Biochemical Oxygen Demand (BOD_5), COD, and total coliforms exceeded the Standards for both missions. Ammonia nitrogen (NH_3-N) was not complied with the standard with a recorded value of 27 mg/l for the second fortnight.	As above. In addition, this Camp will be the first to implement the required WWTS improvement together with IHI.
OC Camp (WWTS2)	EF15	Total coliforms were higher than the Standards at 160,000 MPN/100 ml during the first fortnight and 54,000 MPN/100 ml in the second fortnight.	As above
Main Dam Construction Area	DS11	The measured TSS was 68.2 mg/l and on 16 August 2016 was 165 mg/l. Nonetheless, the measurement conducted on 11 and 25 August 2016 complied with the Standard.	

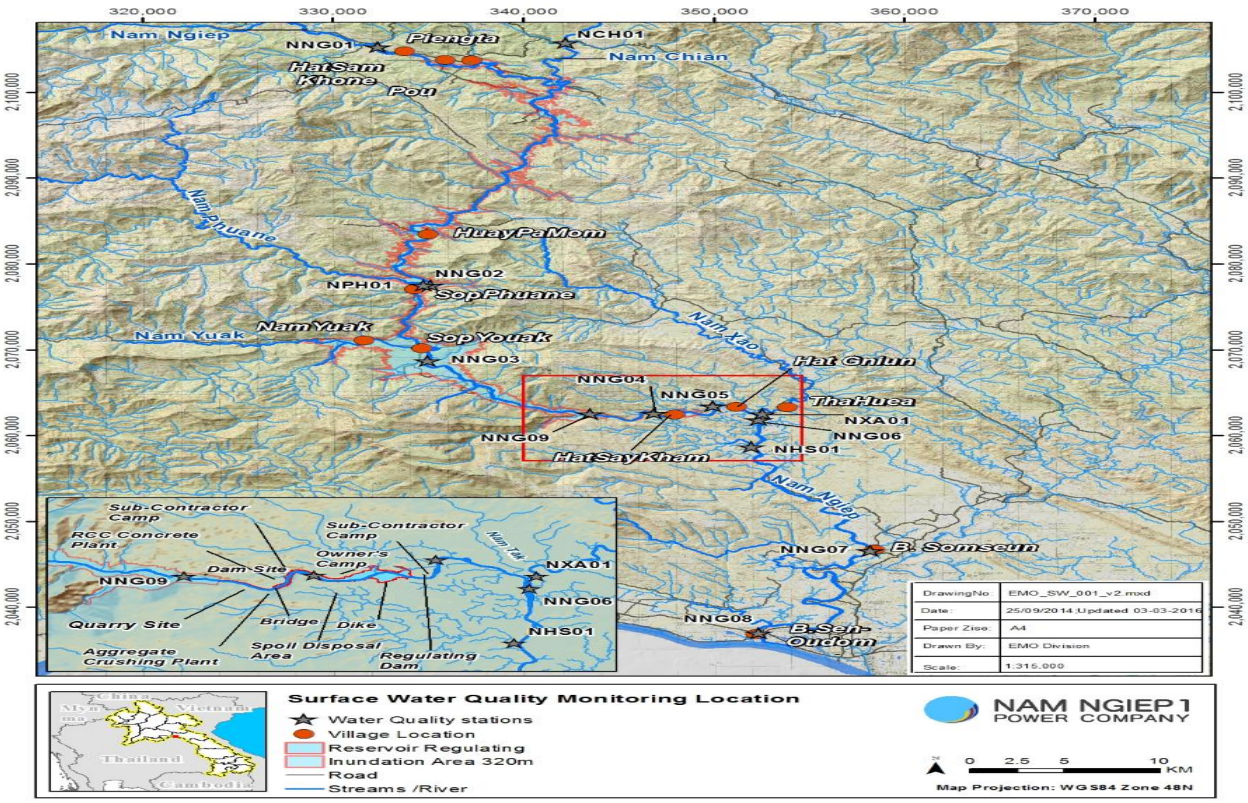
Site	Sampling ID	Non-Compliance	Corrective Actions
Re-regulation Dam	DS08	All parameters complied with the standard.	
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	All parameters complied with the standard.	
RCC Plant	DS09	All TSS results in August 2016 were higher than the Standard (<50 mg/l) with recorded values of 9,876 mg/l, 14,061 mg/l, 344 mg/l and 51,895 mg/l respectively.	See Table 1-2 for corrective actions.
CVC Plant	DS03	A TSS result in August 2016 was higher than the Standard (<50 mg/l) with recorded values of 302 mg/l.	The area is used temporarily for washing the aggregate until the aggregate crushing plant is in full operation. The current treatment system was designed to treat pH from the mixer trucks and was not able to treat the sediment effectively. The Contractor was asked to regularly remove the sediment from the ponds and reuse the waste water.

At the time of sampling, no discharge was observed at the Obayashi Camp WWTS 1 (EF02), Obayashi Camp WWTS 2 (EF15), TCM Camp (EF03), Sino Hydro Camp (EF06), Song Da 5 Camp No.1 (EF07), Song Da 5 Camp No. 2 (EF08), SECC Camp (EF11), HMH Main Camp WWTP (EF13) and IHI Main Camp (EF14). Thus, the samples were collected from the final sediment pond at these camps. Also, no sampling was conducted during the period 11-25 August 2016 at the CVC Plant (DS03) as there was no waste water discharged from the sediment ponds.

3.2.2 Surface (Ambient) Water Quality Monitoring

Surface water samples are collected and analysed twice a month 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). The weekly surface water quality monitoring (physical parameters only) has commenced in August 2016 and included Station NNG09 located upstream of construction sites, NNG04 located within Construction Sites and NNG05 downstream of construction sites. The location of surface water monitoring stations are indicated on the maps in Figure 3-5

Figure 3-5: Surface Water Quality Monitoring Stations



Key findings for surface water quality monitoring in March 2016 are shown in Table 3-5, Table 3-6, Table 3-7, Table 3-8 and Table 3-9.

Nam Ngiep

The Chemical Oxygen Demand (COD) exceeded the Standard for the all stations of Nam Ngiep River. The highest amount of COD recorded was at Nam Ngiep Upstream of Ban Phiengta (NNG01 – Upstream of Construction Sites) at 15.8 mg/l. In addition, faecal coliforms were recorded at the stations of Nam Ngiep Downstream Nam Xao Confluence (NNG06 –Downstream of Construction Sites) and Nam Ngiep at the Bridge of Road 13 (NNG08 – Downstream of Construction Sites) with values of 1,300 MPN/100 ml and 2,100 MPN/100 ml respectively. Moreover, the total coliform was found at the station of Nam Ngiep at the Bridge of Road 13 (NNG08 – Downstream of Construction Sites) with recorded values of 17,000 MPN/100 ml. Thus, the elevated levels COD, faecal coliform and total coliform are not likely to be influenced by the Project activities.

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

	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	01/08/16	02/08/16	02/08/16	03/08/16	03/08/16	03/08/16	03/08/16	03/08/16	03/08/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.59	7.47	7.74	7.62	7.53	7.05	7.43	7.27	7.08
DO (%)		95.8	95.6	99.6	101.5	102.4	100.1	94.1	97.1	100.2
DO (mg/L)	>6.0	7.71	7.39	7.65	7.97	7.79	7.91	7.35	7.49	7.4
Conductivity (µs/cm)		83.2	70.3	65.6	62.7	61.9	114	142	81.1	35.1
TDS (mg/l)		41	35	32	31	31	57	71	40.5	27.55
Temperature (°C)		23.9	26.4	26.8	25.8	27.7	26.31	26.46	26.9	29.4
Turbidity (NTU)		34.7	19.2	23.1	25.4	57.2	36.1	46.7	32	28.8
TSS (mg/l)		124	63.7	59.6	58.4	157	76.2	78.2	71.5	67.8
BOD_5 (mg/l)	<1.5	ND[13]	ND[13]	1	ND[13]	ND[13]	ND[13]	ND[13]	ND[13]	ND[13]
COD (mg/l)	<5.0	15.8	7.8	8	6.9	7.8	8	9.4	9.8	6.9
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.18	0.15	0.14	0.12	0.12	0.14	0.16	0.14	0.14
Manganese (mg/L)	<1	0.142	0.084	0.071	0.064	0.075	0.081	0.09	0.076	0.074
Total Iron (mg/L)		6.67	2.58	2.3	2.36	4.62	3.42	2.94	2.94	3.08
Total coliform (MPN/100ml)	<5,000	4,900	3,300	3,300	540	790	3,300	4,900	430	17,000
Faecal coliform (MPN/100ml)	<1,000	490	490	790	130	330	490	1,300	130	2,100

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: Monitoring results of Nam Ngiep Surface Water Quality (Measured Fortnightly)

	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	23/08/16	24/08/16	24/08/16	25/08/16	25/08/16	25/08/16	25/08/16	25/08/16	25/08/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.1	7.03	7.14	7.09	7	7.15	6.96	6.98	6.92
DO (%)		95.6	98.5	101.3	103	107.7	105.4	102.1	99.5	91.3
DO (mg/L)	>6.0	7.65	7.46	7.71	7.99	8.07	8.04	7.64	7.54	6.97
Conductivity (µs/cm)		77.9	64.4	62	61.2	60	75.8	62.7	59.6	52.9
TDS (mg/l)		39	32	31	30.5	30	38	31	30	26
Temperature (°C)		24.2	27.6	27.4	26.8	28.5	27.5	28.6	28	27.7
Turbidity (NTU)		67	41.4	42.8	60.9	38.3	45.5	38.5	44.6	45.7

Table 3-7: Monitoring results of Nam Ngiep Surface Water Quality at the Upstream, within and Downstream of Construction Sites (Measured Weekly)

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	11/08/16	11/08/16	11/08/16
Parameters (Unit)	**Guideline**			
pH	5.0 – 9.0	7.4	7.34	7.36
DO (%)		102.1	103.2	102.1
DO (mg/L)	>6.0	7.92	7.78	7.68
Conductivity (µs/cm)		70.7	68.6	68.6
TDS (mg/l)		35	34	34
Temperature (°C)		26.7	28.2	28.3
Turbidity (NTU)		24.4	25.2	23.2

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	16/08/16	16/08/16	16/08/16
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.37	7.37	7.6
DO (%)		130.1	105.1	107.2
DO (mg/L)	>6.0	8.33	8.46	8.23
Conductivity (µs/cm)		61.9	59.9	59.4
TDS (mg/l)		32	30	30
Temperature (°C)		24.3	26.4	27.1
Turbidity (NTU)		150	129	109

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

Nam Chiane (NCH01) is located about 66 km upstream of the NNP1 Project construction site. The COD slightly exceeded the National Surface Water Quality Standard with recorded values of 5.9 mg/l.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The COD slightly exceeded the National Surface Water Quality Standard with recorded values of 5.5 mg/l.

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

Nam Xao has confluence with the Nam Ngiep downstream of the NNP1 Project construction site. The COD and faecal coliforms exceeded the National Surface Water Quality Standard with recorded values of 12.2 mg/l and 4,900 MPN/100 ml respectively.

Houay Soup Nyai has a confluence with the Nam Ngiep River downstream of NNP1 Project construction site. The COD was found to exceed the National Surface Water Quality Standard (less than 5.0 mg/l) with a recorded value of 10.4 mg/l.

Table 3-8: Results of Physical and Chemical Parameters of Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	01/08/2016	02/08/2016	03/08/2016	03/08/2016
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.78	7.62	7.63	6.87
DO (%)		101.1	100.7	92.2	82.6
DO (mg/L)	>6.0	8.15	8.08	7.19	6.65
Conductivity(µs/cm)		29.7	66.9	141	53
TDS (mg/L)		14	34	70	27
Temperature (°C)		23.8	24.3	26.27	25.03
Turbidity (NTU)		14	14	43.1	22.4
TSS (mg/l)		57.2	45.8	72.8	20.3
BOD_5 (mg/l)	<1.5	ND[13]	ND[13]	ND[13]	ND[13]
COD (mg/l)	<5.0	5.9	5.5	12.2	10.4
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.16	0.12	0.16	0.17
Manganese (mg/L)	<1	0.045	0.057	0.108	0.04
Total Iron (mg/L)		1.55	1.16	2.92	1.05
Total coliform (MPN/100mL)	<5,000	3,300	1,700	4,900	1,300
Faecal coliform (MPN/100mL)	<1,000	330	490	4,900	33

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

Table 3-9: Physical Parameters Results of Surface Water Quality – Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup (fortnightly measured)

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	23/08/2016	24/08/2016	25/08/2016	25/08/2016
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.34	7.08	6.05	6.58
DO (%)		103.3	101.7	98.2	93.5
DO (mg/L)	>6.0	8.25	7.78	7.37	7.05
Conductivity(µs/cm)		25.2	61.6	72.2	16.22
TDS (mg/L)		12	30	36	8
Temperature (°C)		24.1	26.9	28.5	27.9
Turbidity (NTU)		37	27.1	10.63	5.4

3.2.3 Groundwater Quality Monitoring

NNP1PC sampled and analysed the groundwater quality in 13 boreholes. Two boreholes are community boreholes at Ban Hatsaykham, one is a private well at Ban Hat Gniun, six boreholes are resettlers water supply at Houay Soup Resettlement, and four borehole are landfill ground water observation at NNP1 Solids Waste Landfill.

The results are shown below. The water from the boreholes in Ban Hatsaykham is used by 42 households for drinking, bathing, washing and domestic use purposes. The water from the well in Ban Hat Gnuin is used by 6 households for bathing and washing purposes. The water from the boreholes in Houay Soup Resettlement is to be used by 30 households for drinking, bathing and domestic use purpose commencing in November 2016. All groundwater quality data are routinely reported to the Social Management Office who regularly communicate the results to the village authorities and the local health centres as part of the Project's public health programme.

Ban Hatsaykham

Most of the monitored parameters for two boreholes (GHSK01 and GHSK03) complied with the standards, except pH which was lower than the Standard range between 6.50 and 9.20 with recorded values of 6.22 and 6.23 respectively.

Ban Hat Gnuin

The faecal coliforms and E.coli bacteria contamination were 490 MPN/100 ml which exceeded the National Groundwater Standard. In addition, the pH level was measured at 5.46 which was slightly lower than the Standard range of between 6.50 and 9.20.

Houay Soup Resettlement Area

A small concentration of faecal coliforms and E.coli bacteria were found in two (GHSP3 & GHSP04) out of six boreholes with recorded values of 4 MPN/100 ml and 2 MPN/100ml respectively (non-compliant with the standard). In addition, the pH level at borehole GHSP04 was 6.23 which was slightly lower than standard range of 6.5-9.2. The monitoring will be conducted again in September 2016 to confirm the contamination level prior to the arrival of the Project Affected People. The remaining parameters monitored were complied with the standard.

NNP1 Solid Waste Landfill

Faecal coliforms in concentrations ranging from 24.5 and 170 MPN/100 ml were detected in the groundwater samples from monitoring wells MW1, MW2 and MW4. No faecal coliforms was found in MW3. All four monitoring wells had low pH levels which were consistent with other host villages' wells.

Figure 3-6: Groundwater Quality Monitoring Locations

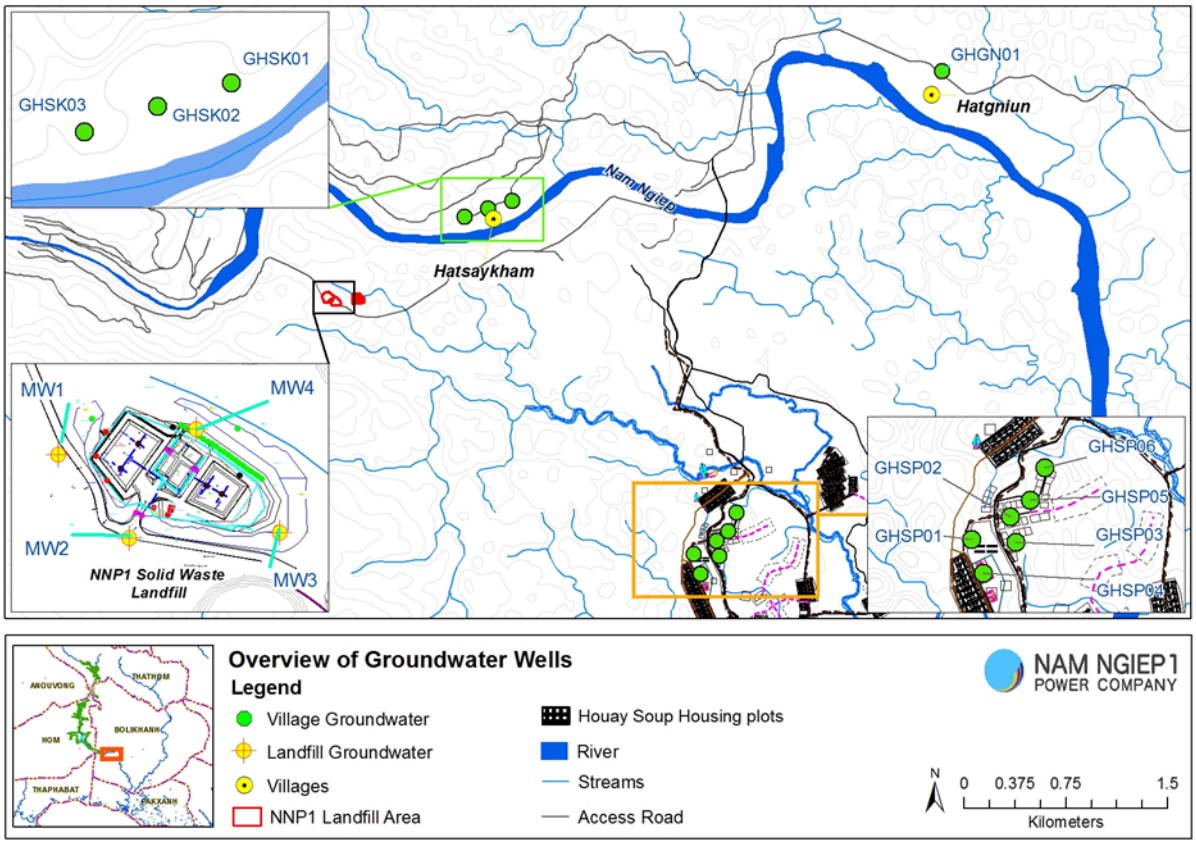


Table 3-40: Groundwater Quality Monitoring Results during the first and second mission (Hatsaykham village only)

	Site Name	Ban Hatsaykham			Ban Hat Gniun
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	09/08/2016	09/08/2016	09/08/2016	09/08/2016
Parameter (Unit)	**Guideline**				
pH	6.5-9.2	6.22	Pump is broken	6.23	5.46
Sat. DO (%)		72.3		58.5	42.7
DO (mg/L)		5.57		4.46	3.25
Conductivity (µs/cm)		41.4		18.84	40.7
TDS (mg/L)	<1,200	20.52		9.42	20.3
Temperature (°C)		27.1		27.7	27.9
Turbidity (NTU)	<20	0.39		0.5	6.26
Faecal coliform (MPN/100ml)	0	0		0	490
Ecoli Bacteria (MPN/100ml)	0	0		0	490

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 3-51: NNP1 Project Landfill's Baseline Groundwater Monitoring Results

	Site Name	NNP1 Landfill			
	Station Code	MW1	MW2	MW3	MW4
	Date	10/08/2016	10/08/2016	10/08/2016	10/08/2016
Parameters (Unit)	**Guideline**				
pH		6.58	5.68	5.36	5.98
Sat. DO (%)		22.1	24.1	36.7	17.1
DO (mg/L)		1.68	1.89	2.68	1.31
Conductivity (µs/cm)		208.6	24.1	98.8	102.9
TDS (mg/L)		104.3	12	49.4	51.45
Temperature (°C)		27.7	27.5	26.3	27.4
Turbidity (NTU)		4.37	1.72	0.72	1.32
BOD (mg/L)		ND[13]	ND[13]	ND[13]	ND[13]
COD (mg/L)		ND[16]	ND[16]	ND[16]	ND[16]
NO_3-N (mg/l)		ND[9]	0.12	0.17	0.39
NO2-N (mg/l)		ND[7]	ND[7]	ND[7]	ND[7]
Arsenic (mg/l)	<0.01	ND[2]	ND[2]	ND[2]	ND[2]
Manganese (mg/l)		0.189	0.016	ND[4]	0.011
Mercury (mg/l)	<0.001	ND[3]	ND[3]	ND[3]	ND[3]
Iron (mg/l)		0.226	0.098	0.12	0.114
Faecal Coliform (MPN/100 ml)		24	5	0	170

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring of the GFWS systems in Ban Hat Gnuin and Ban Thaheua is conducted on a monthly basis with the aim of alerting users to potential impacts when bathing and washing.

Results of the assessment for GFWS of Ban Hat Gnuin and Ban Thaheua are shown in Table 3-12 and summarised as follows:

Ban Thahuea (WTHH02): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E.coli which were found to be 700 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN02): All parameters complied with the National Drinking Water Standards except turbidity which was recorded at 14.2 NTU, and both faecal coliforms and E.coli which were found to be 490 MPN/100 ml.

Table 3-62: Results of the Gravity Fed Water Supply Quality Monitoring

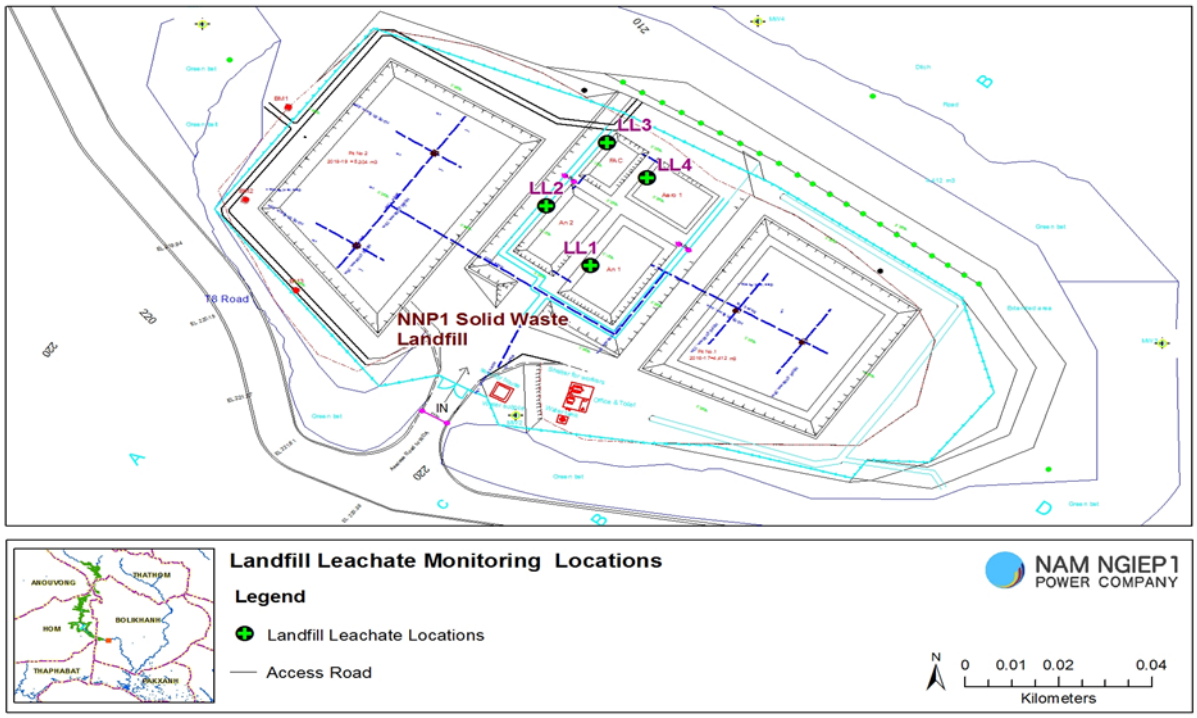
	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	09/08/2016	09/08/2016
Parameter (Unit)	**Guideline**		
pH	6.5-8.5	7.41	7.38
Sat. DO (%)		100.8	96.5
DO (mg/L)		7.58	7.17
Conductivity (µs/cm)	<1,000	30.3	44.4
TDS (mg/L)	<600	15.1	22.2
Temperature (°C)	<35	28.6	29.3
Turbidity (NTU)	<10	6.21	1.8
Faecal coliform (MPN/100ml)	0	70	26
Ecoli Bacteria (MPN/100mL)	0	70	26

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 August 2016, water samples were taken from all four landfill leachate ponds. There was no leachate discharge in to the environment during the mission

Figure 3-7: Landfill Leachate Monitoring Location



The results of the analyses of leachate from the four landfill leachate ponds indicate that BOD, COD and faecal coliforms were higher than the relevant standards. Detailed results are presented in the Table 3-13 below.

Table 3-73: Landfill Leachate Monitoring Results

	Site Name	NNP1 Landfill (Leachate Ponds)			
	Station Code	LL1	LL2	LL3	LL4
	Date	19/08/2016	19/08/2016	19/08/2016	19/08/2016
Parameters (Unit)	**Guideline**				
pH	6.0 - 9.0	6.92	6.98	7.21	7.33
Sat. DO (%)		53.6	25.5	25.3	17.4
DO (mg/L)		4.03	1.9	1.9	1.32
Conductivity (µs/cm)		386	356	319	262
TDS (mg/L)		193	178	159.5	131
Temperature (°C)		27.7	27.8	27.8	27.2
Turbidity (NTU)		32.4	35.5	44.3	47.4
BOD (mg/L)	<30	145	104	95	80.8
COD (mg/L)	<125	254	230	204	160
NO_3-N (mg/l)		0.03	ND[9]	ND[9]	ND[9]
NO2-N (mg/l)		ND[7]	ND[7]	ND[7]	ND[7]
Arsenic (mg/l)	<0.01	0.002	0.0023	0.0012	0.0016
Manganese (mg/l)		2.38	2.2	2	1.69
Mercury (mg/l)	<0.001	ND[3]	ND[3]	ND[3]	ND[3]
Iron (mg/l)		10.4	8.28	6.52	5.77
Faecal Coliform (MPN/100ml)	<400	160,000	13,000	17,000	7,900

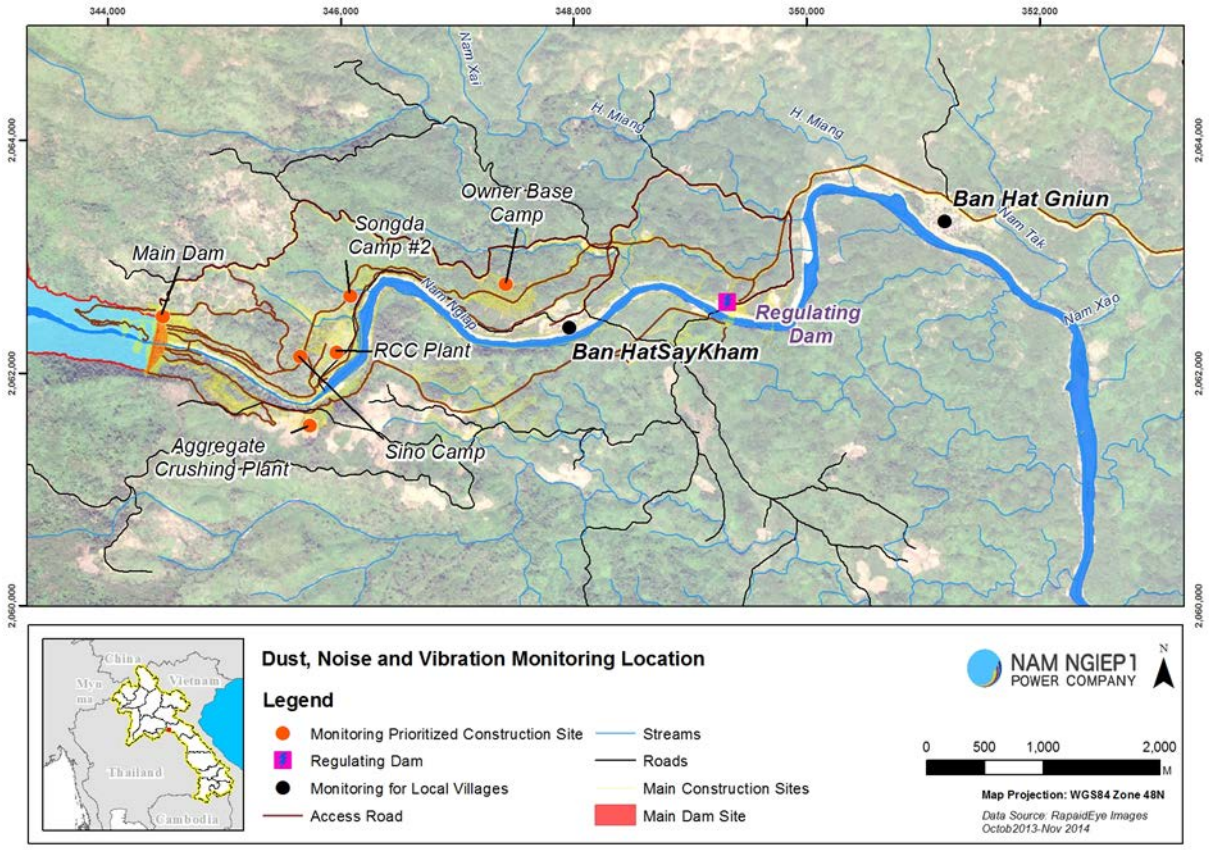
3.2.6 Dust Monitoring

Dust monitoring for Ban Hat Gnuin, Ban Hatsaykham, Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No. 2 and Owner's Site Office and Village was cancelled because of malfunctioning equipment. The dust aerosol monitoring equipment will be sent to the supplier in the United States for maintenance and spare part replacement which will take approximately two months. This is not likely to cause major issues with scheduled dust monitoring during the rainy season.

3.2.7 Noise Monitoring

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

Figure 3-8: Noise and Dust Emission Monitoring Locations



The recorded noise levels indicate full compliance with the National Standard for the period of 06:01-22:00 in all stations monitored except the Aggregate Crushing Plant where it was recorded at 78.45 dB(A) during 10:51-22:00 during 29-30 August 2016 which was higher than the National Standard set at 70 dB(A) and 50 dB(A) respectively – this coincided with a period of heavy rain which is the likely cause of the elevated noise levels. For the period of 22:01-06:00, slightly higher levels than the Standard were recorded at Ban Hat Gnuin and Ban Hatsaykham [between 49.44 – 55.50 dB(A) compared to the Standard of 45 dB(A)]; the RCC, Aggregate Crushing Plant, Sino Hydro Camp, Sino Hydro Temporary Worker Camp and the Main Dam [between 53.37 – 77.35 dB(A) compared to the Standard of 50 dB(A)]. With reference to the investigation on this matter as was conductedin August 2016, the key causes of high noise levels

are most likely the windy and raining conditions during the night time period for all sites except the Aggregate Crushing Plant.

Results of the noise monitoring for July 2016 are shown in Annex 2.

3.3 Construction Site Waste Management

3.3.1 Solid Waste Management at the Construction Site

On 05 August 2016, a joint final inspection of NNP1 Project Solid Waste Landfill construction was undertaken between NNP1PC and the landfill Contractor. A draft Landfill Operation Manual was completed and the responsible staff were trained on the operation of the landfill. Prior to the operation, NNP1PC held a meeting with all the principal Contractors regarding the landfill operation. The landfill operation was officially commenced on 10 August 2016. The landfill will be open on weekdays Monday to Friday from 09:00 to 10:30 am. The NNP1 Project landfill is managed by NNP1PC and an approximate total of 103 m^3 of waste was disposed during August 2016 (see Photograph 1 and Photograph 2).

Photograph 1: Final Inspection of the Project Landfill	Photograph 2: Daily Waste Disposal at the Project Landfill
	

3.3.2 Hazardous Materials and Waste Management

During August 2016, joint hazardous materials and waste inventories were carried out at the main construction sites and subcontractors' camps including Loxley's Stockyard (230 kV transmission line), Loxley Subcontractor's site office (RCR) and Workshop, TCM Camp, V&K Camp, CVC Plant, Sino Hydro fuel station, Sino Hydro's worker camp, Song Da5 Industrial Area, HM Hydro Workers' Camp, IHI Workers' Camp and SECC Workshop.

On 04 August 2016, a total of 415 kg of glass bottles from the Community Recycle Waste Bank at Hat Gniun village was sold to the Keo Lao Factory in Vientiane. In addition, a total of 19 kg of clinical waste from the NNP1 Project site was transported and incinerated at the incinerator located within the Vientiane landfill.

Photograph 3: Recyclable Waste from Recycle Waste Bank Ssold to Keo Lao Factory	Photograph 4: Clinical Waste was Incinerated at Vientiane Landfill
	

Table 3-8 Results of *Hazardous material inventory*

No.	Hazaradous Waste Type	Unit	Total inN August 2016 (A)	Disposal by Selling (B)	Remainder (A - B)
1	Used hydraulic and engine oil	Litre (L)	2,930	0	2,930
2	Used oil mixed with water	L	200	0	200
3	Empty used oil drum/container	Drum (20 L)	51	0	51
4	Empty used oil drum/container	Drum (200 L)	21	1	20
5	Empty contaminated bitumen drum/container	Drum (200 L)	82	0	82
6	Used oil filters	Piece	175	0	175
7	Contaminated soil, sawdust and concrete	Bag	13	0	13
8	Contaminated textile and material	Bag	4	0	4
9	Used tyre	Piece	164	24	140
10	Empty used chemical drum/container	Drum (200 L)	44	19	25
11	Car battery	Unit	12	1	11
12	Empty paint and spray cans	Can	47	0	47
13	Acid and caustic cleaners	Bottle	0	0	0
14	Clinical waste	Kg	19	19	0
15	Ink cartridge	Unit	84	0	84
16	Halogen/fluorescent bulbs	Unit	8	0	8
17	Empty used chemical drum/container	Drum (20 L)	1000	0	1,000
18	Cement bag	Bag	1,000	0	1,000

In addition, the amount of recyclable waste was recorded at each NNP1 Project construction site and offices including ESD office, Loxley office and stockyard in Paksan, Subcontractor site office (RCR) and workshop at Thaphabath District, Song Da 5 Camp No. 1, TCM Camp, V&K Camp, Song Da 5 Camp No. 2, Song Da 5 Workshop at the Spoil Disposal area No. 2, RCC Plant, Sino Hydro Camp, Sino Hydro's worker, SECC Camp and each Contractor's camp at Houay Soup Resettlement Area (HSRA). The amount of sold recyclable waste is summarised below

Table 3- 14: Amounts of recycle waste sold

N0..	Rcycled Waste Type	Unit	Sold	Cumulative Total at 31 August 2016
1	Scrap metal	kg	630.0	22,026.0
2	Aluminium	kg	9.5	117.9
3	Glass	kg	8.0	324.0
4	Plastic Bbottles	kg	6.9	94.7
5	Paper/Cardboard	kg	1.0	71.3

The food waste generated from the Owner's Site Office and Village, selected camps of the contractors and subcontractors was collected by Hatsaykham villagers for use as animal feed (pig and poultry). A total of 4,082 kg was collected in August 2016 as shown below

Table 3-15: Amount of food waste collected by villagers

NO.	SITE LOCATION NAME	UNIT	TOTAL
1	Song Da 5 Camp No. 2	kg	1,823
2	Song Da 5 Camp No. 1	kg	1,342
3	OC Camp	kg	617
4	TCM Camp	kg	37
Total		kg	4,082

3.4 Community Waste Management Support

3.4.1 Community Recycling Programme

Since July 2015, a total of 7,776.7 kg of recyclables were received by the Community Recycle Bank. During August 2016, a total of 373 kg of recyclable waste was recorded, a reduction of 45 kg comparing to July 2016. A total of 121 households hold accounts at the Community Recycle Bank (no increase in membership in August 2016). The percentages of participation in the programme for each village are:

Ban Hat Gniun 87%
Ban Hatsaykham 64%
Ban Thahuea 64%

Table 3-96: Types and amounts of waste traded

Types of Waste	Unit	Amount Recycled In August 2016	Accumulated Amount Recycled (July 2015 – August 2016)
	kg	190.5	2,594.2
	kg	105	631
	kg	36	2,216

	kg	28.5	1,158
	kg	13	1,177
	kg	**373**	**7,776.7**

Photograph 5: Recyclable Waste being Sold to the Community Recycle Waste Bank

Photograph 6: Recyclables Received from HM Hydro Contractor

In August 2016, the purchase of recyclables from villagers and students continued. Some recyclables were transported from contractors' camps to the Recycle Waste Bank at Hat Gniun Village. Recyclables will continue to be stockpiled at the Community Recycle Waste Bank, the Owner's Site Office and Village and the Contractors/subcontractors with the intention of arranging a routine collection by the Khounmixay Processing Factory.

3.4.2 Community Training Programmes on Waste Management

On 09 August 2016, NNP1PC staff, village chief and district authorities organised waste management induction training for the camp followers and shop owners at Hat Ngiun Village. A total of nine shop owners participated in the waste management induction training. The main purpose of this induction course was to explain about waste management including waste segregation, waste generation reduction (reduce, reuse and recycle), waste disposal methods and types of waste that are accepted at the Community Recycle Waste Bank.

Photograph 7: Waste management consultation for Laos camp followers/shops

Photograph 8: Waste management consultation for Vietnamese camp followers/shops

3.4.3 Houay Soup Resettlement Area Waste Management

By the end of August 2016, a temporary waste pit, a permanent waste pit and anaerobic treatment ponds were completed at the Houay Soup Solid Waste Landfill. The construction of a wetland pond, fence and site office were ongoing.

Photograph 9: Permanent Waste Pit No.1

Photograph 10: Anaerobic treatment ponds

3.5 Watershed Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations[2]	Status by August 2016
Prepare: 1) Interim Nam Ngiep 1 Watershed Management Plan by 01 September 2016; and 2) Full draft Nam Ngiep 1Watershed Management Plan by 15 November 2016	The first draft of the interim Nam Ngiep 1 Watershed Management Plan was shared with ADB on 19 August 2016.
Prepare draft Watershed Management Regulations by 15 November 2016	There was no further progress this month.
Final Watershed Management Plan by 23 December 2016	Not relevant at this time
1) Draft provincial regulation submitted to Provincial Justice Department by 23 December 2016. **2)** Start of public hearing process by 10 January 2017	Not relevant at this time
Activities in August 2016	Results
Data and Information Collection and Analysis for WMP Development	• The draft interim progress report was internally discussed and improved to meet the submission of interim progress report on 01 September 2016. • The key discussion and improvements include: restructuring the content of the baseline analysis to focus on identifying key factors and spatial patterns of change and their causes related to water resources use and importance, further revision of the integrated fishery and biodiversity management plan, and to complete the activity package.
Procurement of Consultants to Support the WMP Development	• The consultant selected based on NNP1PC procurement procedures declined to sign the contract because of other priorities and the contract negotiation proceeded with the

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

Obligations[2]	Status by August 2016
	second candidate. Final contract settlement is expected in the first week of September 2016.
WRPO Activities	• WRPO DFRM, WRPO Xaysomboun, and WRPO Bolikhamxay conducted study tour to Nam Theun 2 Hydropower Project from 08 to11 August 2016 to learn from the experiences of that project concerning watershed management practices. • WRPO DFRM, WRPO Xaysomboun, and WRPO Bolikhamxay met with ADB representative on 24 August 2016 and the discussion noted that: o The complete payment for office construction should be settled without any delay. o The next fund request will be evaluated first on which activities could be continued until the WMP is ready. • WRPO Xaysomboun: o Continue forest resource management focussing on logging monitoring within the watershed area. o Internal discussion to enforce the law related to forest management and wildlife protection o Planned for the next pre-WMP activities to: 1) continue with staff training/capacity building; 2) improvement of watershed regulation; and 3) enforcement of forest management and wildlife protection • WRPO Bolikhamxay: o Prepare a progress report after six months of implementation of priority activities pre-WMP o Planning for socio-economic data collection in Nam Xao sub-watershed and the downstream area are expected to start in August 2016 • WRPO DFRM: o Facilitate GOL consultant for his assignment particularly to understand better the status of WMP development and relevant information to be further discussed in collaboration with NNP1. o Provide the review on the overall WRPO activities after half year of implementation.
Xaysomboun ISP	• Revised version of District and Province ISP report was submitted to MONRE DEQP and some information was elaborated for the draft interim progress report.

3.5.2 Biodiversity Offset Management

Obligations[3]	**Status by August 2016**
Final Biodiversity Reconnaissance Report by 30 June 2016	• ADB confirmed that the report is satisfactory to ADB
Start of the Boundary Confirmation Baseline Survey by 20 September 2016	
Consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016	
Issuance of the Boundary Confirmation Baseline Survey preliminary report by 30 November 2016	
Issuance of the Boundary Confirmation Baseline Survey draft final report by 31 January 2017	
Activities in July 2016	Results
Ground truth survey report	• ADB, IAP, BAC and LTA provided their comments on the final draft report to NNP1PC on 25 July 2016. • The final version is expected to be ready on 1 September 2016.
Milestones related to NNP1 Biodiversity Program	• Most of the milestones under the biodiversity programme will be rescheduled. • The key milestones that will be revised for the deadline includes: o Preparation of offset option paper o Biodiversity offset baseline survey will be designed and scheduled in consultation with the Biodiversity Advisory Committee, ADB and BOMC o Preparation of Biodiversity Offset Management Plan

	o Preparation of Provincial Regulation for biodiversity offset • In this regard, the current preparation of biodiversity baseline survey put in holds until the first wet season baseline by ADB Consultant is completed.
BOMC establishment	• Biodiversity Offset Management Committee (BOMC) was established on 04 July 2016. This committee is primary responsible to provide guidance and supervision related to NNP1 Biodiversity Offset works. • The first BOMC internal workshop conducted on 29 July 2016 with the primary objectives: o To brief all BOMC members and relevant provincial offices on the overall progress / status of NNP1 biodiversity offset program. o To further discuss on the sequence of activities with the time frame prior to BOMP development.

3.5.3 Biomass Clearance

The overall progress of biomass clearance programme is demonstrated in Figure 3-9 below.

Figure 3-9: Gantt Chart of Biomass Clearance Programme in August 2016

	Task List / Steps of work		Weight (%)	YEAR 2016 Q1 01	02	03	Q2 04	05	06	Q3 07	08	09	Q4 10	11	12	Actual%
1	**Preparation of Biomass Clearance Operation**	Planed	100.0													100
		Actual	0.0													97.4
1.1	Development of EMP, Implementation Plan, and SS-ESMMP for biomass Clearance	Planed	10.0	10.0												94.8
		Actual	10.0	10.0												92.2
1.1.1	Training on environmental protection measures, safety protocols, and compliance protocols	Planed	2.5			2.5										89.6
		Actual	2.5			2.5										87
1.2	Procurement of equipments for biomass work	Planed	5.0			5.0										84.4
		Actual	2.5			2.5										81.8
2	**UXO Search and Clearance**	Planed	0.0													79.2
		Actual	0.0													76.6
2.1	Perform UXO work for 935 ha (6 blocks) of priority biomass clearance	Planed	15.0			2.5	7.5	5.0								74
		Actual	10.5			2.5	3.0	1.0	4.0							71.4
2.2	Perform UXO work for 554 ha (5 blocks) of priority biomass clearance	Planed	12.5				5.0	5.0	2.5							68.8
		Actual	4.0						4.0							66.2
2.3	Perform UXO work for 423 ha (7 blocks) of priority biomass clearance	Planed	10.0							1.0	1.0	1.0	2.0	2.5	2.5	63.6
		Actual	0.0													61
3	**Biomass Clearance**	Planed	0.0													58.4
		Actual	0.0													55.8
3.1	Perform biomass clearance for 257 ha (block 4, 6 & 7) on lower and central reservoir	Planed	6.5		1.5	2.5	2.5									53.2
		Actual	5.5		1.5	2.0	1.0	1.0								50.6
3.2	Perform biomass clearance for 721 ha (block 1-3 & 5) on lower and central reservoir	Planed	15.0			1.5	1.5	1.5	1.5	1.0	1.0	1.5	1.5	2.0	2.0	48
		Actual	4.0			1.0	1.0	1.0	1.0							45.4
3.3	Perform biomass clearance for 95 ha (block 8-9) on central reservoir	Planed	8.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	42.8
		Actual	0.0													40.2
3.4	Utilization of NTFP and waste biomass and rice plantation on cleared biomass area (project affected villagers)	Planed	3.0	1.5			1.5									37.6
		Actual	3.0	0.5	1.0		1.5									35
4	**Floating/Debris Removal**	Planed	0.0													32.4
		Actual	0.0													29.8
4.1	Procurement of equipment and service for floating logs/debris removal	Planed	1.0												1.0	27.2
		Actual	0.0													24.6
5	**Monitoring and Reporting**	Planed	0.0													22
		Actual	0.0													19.4
5.1	Field monitoring and inspection of biomass clearance and compliance to SS-ESMMP (weekly & Monthly)	Planed	9.5		1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	1.5	1.0	1.0	16.8
		Actual	4.5		1.0	1.0	1.0	0.5	1.0							14.2
5.2	Coordination or Ad-hoc meeting to discuss the progress, concerns and problem solving	Planed	2.0		0.5				0.5			0.5			0.5	11.6
		Actual	1.0		0.5		0.3	0.3								9
	Total	Planed	100.0	**11.5**	**3.0**	**15.0**	**19.0**	**13.5**	**6.0**	**3.5**	**3.5**	**4.5**	**6.0**	**6.5**	**8.0**	6.4
		Actual	47.5	**10.5**	**4.0**	**11.5**	**7.8**	**3.8**	**10.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	3.8
		Planned Progress	monthly	11.5	3.0	15.0	19.0	13.5	6.0	3.5	3.5	4.5	6.0	6.5	8.0	
			Cumulative	11.5	14.5	29.5	48.5	62.0	68.0	71.5	75.0	79.5	85.5	92.0	100.0	
		Actual Progress	monthly	10.5	4.0	11.5	7.8	3.8	10.0	0.0	0.0	0.0	0.0	0.0	0.0	
			Cumulative	10.5	14.5	26.0	33.8	37.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	
	Budget Code EE1.04, EE1.05	Approved	USD	217,274	2,900	237,250	21,400	900	236,550	700	700	1,200	100,700	900	420,273	
		Actual Paid	USD	216,366	1,383	- 677	610	277	77							

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

Activities in August 2016	Results
Labour recruitment	• The field work was carried out only for UXO. There were a total of 48 day labourers employed for the UXO work in Block 2-3 and Block 5-6.
Perform UXO work for 9 blocks of priority biomass clearance	• UXO work (scrub cutting and UXO detection) was carried out intermittently in Block 2-3 and Block 5-6 as can be seen from Figure 3-10 – Figure 3-12 • The total progress of UXO work is around 31.72 ha.
Perform biomass clearance of block 1-9 on lower and central reservoir	• During the reporting period, there was no further progress of biomass clearance.
Utilization of NTFP, waste biomass and lesser value tree	• Hom District Authority confirmed that a salvage logging company, Chanthalai Company, was contracted to remove and buy the cut trees of diameter 20-80 cm in priority biomass clearance areas, Block 1, Block 4-5, and Block 8-9. • The Company is currently conducting the tree inspection and cost evaluation for the work which is expected to start in December 2016.
Opportunity of short-term crop plantation on cleared biomass area (project affected villagers)	• Villagers completed the first round of harvesting of crops planted in the cleared biomass area, Block 4-5. • The harvested crops included cucumber, melon, pumpkin and maize. The data will be presented in the next reporting period.

Figure 3-10: UXO Search and Clearance in Block 2

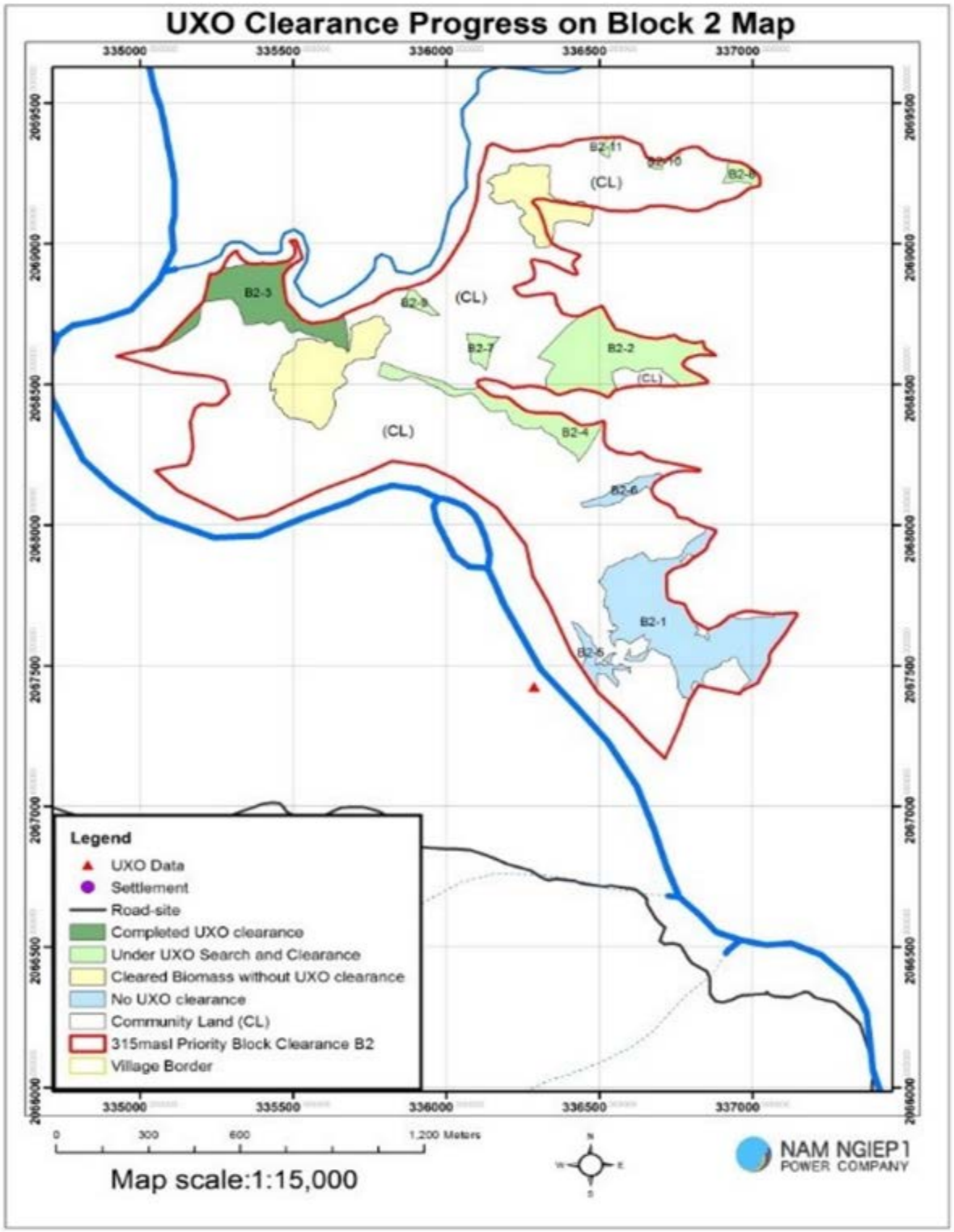


Figure 3-11 Map showing the progress UXO work in priority block 5

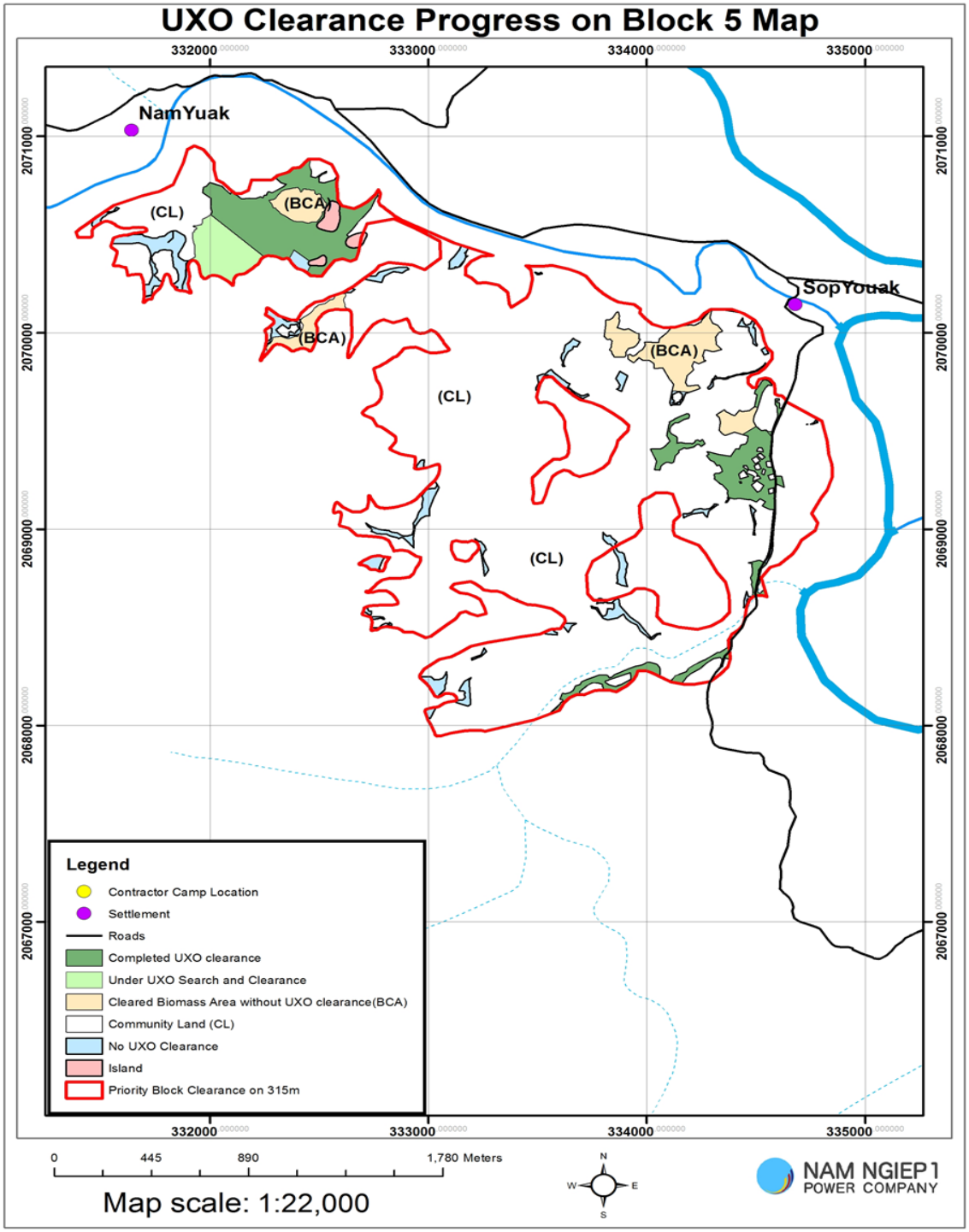
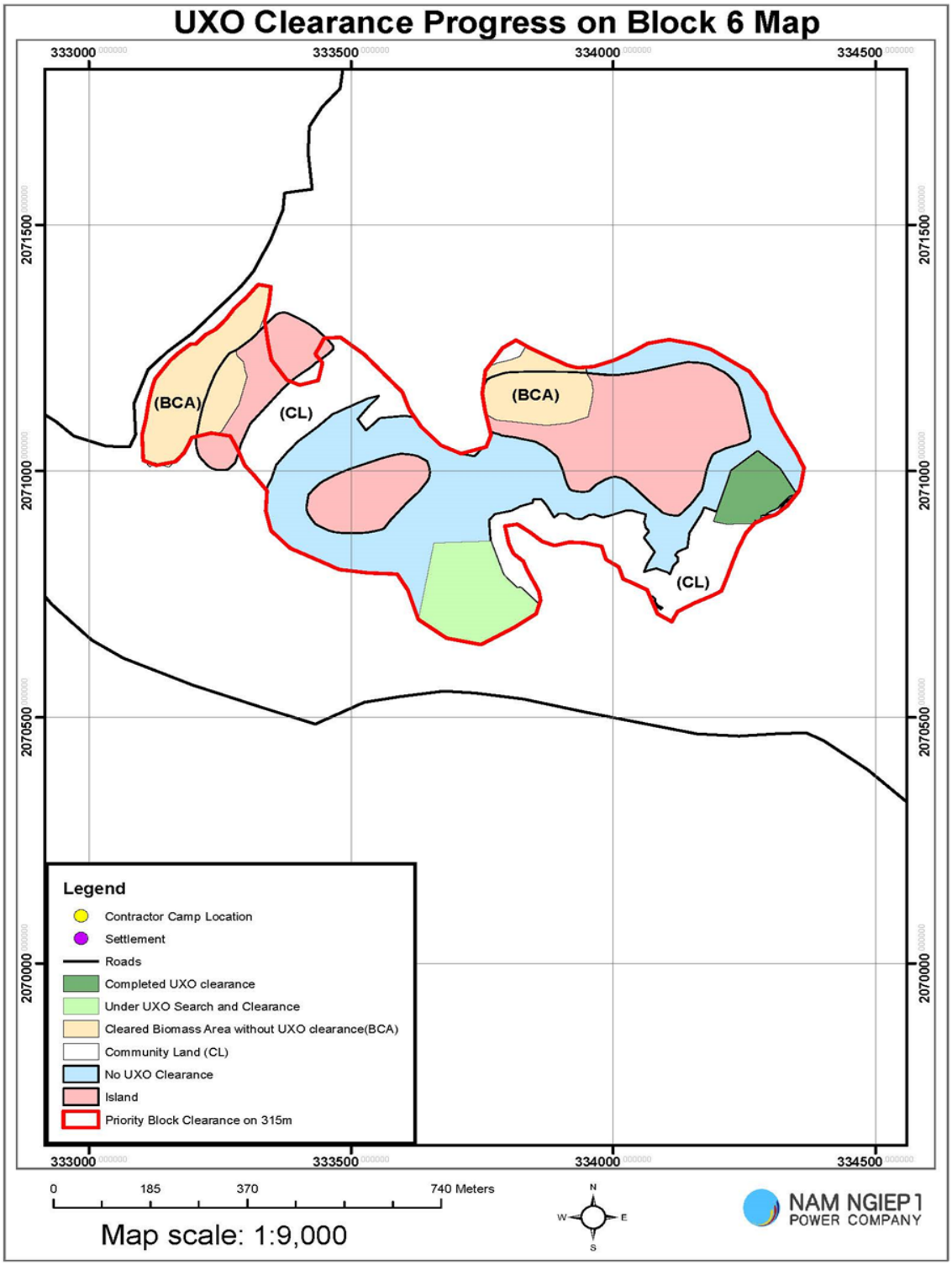


Figure 3-12 Map showing the progress UXO work in priority Block 6


UXO Clearance Progress on Block 6 Map
333000
333500
334000
334500
2071500
2071000
2070500
2070000
(BCA)
(CL)
(BCA)
(CL)
Legend
Contractor Camp Location
Settlement
Roads
Completed UXO clearance
Under UXO Search and Clearance
Cleared Biomass Area without UXO clearance(BCA)
Community Land (CL)
No UXO Clearance
Island
Priority Block Clearance on 315m
0
185
370
740 Meters
Map scale: 1:9,000
N
W
E
S
NAM NGIEP 1
POWER COMPANY

3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

There was no update during the month of August 2016 for the implementation of the sub-project in Bolikhamxay and the development of sub-projects for Xaysomboun and Xieng Khuang.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

There was an agreement between SMO and EDL for the assessment of the new alignment that is passing through the HSRA. After completion, the IEE will be updated accordingly.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

ADB has provided their comments to the DDA report submitted in May 2016. NNP1PC continues to incorporate their comments into a final report.

3.7 External Monitoring

3.7.1 Independent Monitoring Agency

The IMA inception report was submitted in August 2016 to MoNRE and NNP1, and the feedback has been provided.

3.7.2 Biodiversity Advisory Committee

BAC was established in May 2015 with the primary role to provide technical advice on the survey, planning, management, monitoring and evaluation on the biodiversity offset and biodiversity conservation for the watershed/Project area.

The BAC is officially available from June 2016 having Dr. Boonratana as BAC Team Leader. BAC has since carried out a total of 4 missions to NNP1.

In December 2015, all parties (ADB/IAP/LTA/BAC) agreed that Mr. Timmins to be best qualified to be involved in the survey, planning and implementation of the biodiversity offset activities. In agreeing to this NNP1PC has released Mr. Timmins in April 2016 from being a BAC member so that he will be able to perform the agreed role. Since then NNP1PC is looking for candidates for a replacement of Mr. Timmins as a 3rd member of BAC.

NNP1PC has shortlisted several potential candidates for the 3rd member position and is of the opinion that Dr. William Duckworth is best suited for the position. As suggested by the ADB, Dr. William Duckworth will be the BAC Chairperson instead of Dr. Boonratana. NNP1PC is in the process of finalizing the contract of Dr. William Duckworth.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

Table A- 1: Results of Camp Effluents in August 2016 –First Fortnightly

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	03/08/16	04/08/16	04/08/16	04/08/16	04/08/16	04/08/16
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	7.99	7.91	8.56	7.57	7.37	8.64
Sat. DO (%)		18.2	8.5	75.7	88.7	18.2	96.5
DO (mg/L)		1.36	0.65	5.84	6.89	1.47	7.57
Conductivity (µs/cm)		456	577	323	60	357	52.2
TDS (mg/L)		228	288	162	30	180	26
Temperature (°C)		28.62	27.5	26.8	26.8	26.4	25.6
Turbidity (NTU)		11.5	28.4	12.3	25.7	22.7	782
TSS (mg/L)	<50	ND[5]	43.5	6.4	23.4	7.8	364
BOD (mg/L)	<30	ND[13]	33.6	8.8	ND[13]	22.4	2.9
COD (mg/L)	<125	11.8	55.6	33.3	13.3	48.2	22.8
NH_3-N (mg/L)	<10.0	5	24	6	ND[12]	9	2
Oil & Grease (mg/L)	<10.0	ND[13]	4	1	ND[13]	3	1
Total coliform (MPN/100ml)	<400	110	160,000	160,000	24,000	160,000	160,000
Faecal Coliform (MPN/100ml)		23	160,000	54,000	490	35,000	160,000
Discharge Volume (m3/day)		***5.8***	***0***	***0***	***0***	***0***	***0***

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH worker Camp #1	SECC Camp	HMH Main Camp - Drainage	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	04/08/16	04/08/16	03/08/16	04/08/16	04/08/16	04/08/16	04/08/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	8.65	7.58	7.52	7.22	8.16	8.01	8.18
Sat. DO (%)		220.5	20.3	28.4	15.1	98.3	20	1.1
DO (mg/L)		16.65	1.58	2.07	1.16	7.75	1.25	0.08
Conductivity (µs/cm)		417	428	381	216.1	26.7	347	511
TDS (mg/L)		208	214	190	108	13.3	173.5	255
Temperature (°C)		28.3	26.4	30.1	27.4	25.8	27.6	27.4
Turbidity (NTU)		16.3	20.7	14.8	23.9	17.1	14.52	38.1
TSS (mg/L)	<50	48.6	11.8	35.2	22	21.1	43.4	38.3
BOD (mg/L)	<30	12.1	18.8	18.5	15.4	ND[13]	17.3	83.1
COD (mg/L)	<125	95.8	57.6	76.6	46.4	ND[5]	49.8	160
NH_3-N (mg/L)	<10.0	7	15	22	3	ND[12]	6	9
Oil & Grease (mg/L)	<10.0	ND[13]	1	1	1	ND[13]	ND[13]	4
Total coliform (MPN/100ml)	<400	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Faecal Coliform (MPN/100ml)		92,000	28,000	160,000	160,000	13,000	160,000	160,000
Discharge Volume (m3/day)		***0***	***0***	***1.4***	***0***	***86.4***	***0***	0

Table A- 2: Results of Camp Effluents in August 2016 – Second Fortnightly

	Site Name	Owner Site Office and	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	16/08/16	15/08/16	15/08/16	15/08/16	15/08/16	16/08/16
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	6.9	7.97	7.67	7	7.33	7.94
Sat. DO (%)		29.3	4.7	84.5	39.4	19.9	48.4
DO (mg/L)		2.14	0.35	6.47	3.07	1.54	3.45
Conductivity (µs/cm)		348	692	393	98.2	246	205.3
TDS (mg/L)		174	346	196	49	123	102.5
Temperature (°C)		29.6	27.7	26.9	27.3	26.3	31.1
Turbidity (NTU)		4.38	32.9	7.41	3.8	28.9	104
TSS (mg/L)	<50	ND[5]	22.8	ND[5]	8.4	8.1	70
BOD (mg/L)	<30	3.4	89.8	2.4	2.2	8.3	2.7
COD (mg/L)	<125	12	167	49	16.1	34.9	30
NH_3-N (mg/L)	<10.0	4	27	ND[12]	ND[12]	4	5
Oil & Grease (mg/L)	<10.0	ND[13]	8	ND[13]	ND[13]	2	ND[13]
Total coliform (MPN/100ml)	<400	3,300	160,000	54,000	4,900	92,000	35,000
Faecal Coliform (MPN/100ml)		2,400	160,000	13,000	700	7,000	2,400
Discharge Volume (m3/day)		***17.3***	***0***	***0***	***0***	***0***	***0***

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH worker Camp #1	SECC Camp	HMH Main Camp - Drainage	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	15/08/16	15/08/16	15/08/16	15/08/16		15/08/16	15/08/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	8.07	7.42	7.68	7.17	No Water	7.74	7.85
Sat. DO (%)		167.2	11.8	37.4	21.4		98.5	98.7
DO (mg/L)		12.63	0.94	2.78	1.64		7.54	7.61
Conductivity (µs/cm)		410	457	325	179.6		340	783
TDS (mg/L)		205	228	163	78		170	392
Temperature (°C)		27.9	26.6	28.8	27.1		27.1	26.6
Turbidity (NTU)		6.6	14.6	56.7	17.8		10.35	20.2
TSS (mg/L)	<50	29.2	16.1	77.5	17.8		32.2	45.4
BOD (mg/L)	<30	7.7	17.8	5.6	5.9		13.9	175
COD (mg/L)	<125	138	53.4	47.3	33.7		98	308
NH_3-N (mg/L)	<10.0	9	19	20	2		5	27
Oil & Grease (mg/L)	<10.0	ND[13]	ND[13]	ND[13]	ND[13]		ND[13]	4
Total coliform (MPN/100ml)	<400	1,100	54,000	92,000	160,000		160,000	160,000
Faecal Coliform (MPN/100ml)		1,100	7,900	92,000	17,000		160,000	160,000
Discharge Volume (m3/day)		***0***	***0***	***0***	***0***		***0***	***0***

Table A- 3: *Results of the Construction Area Discharge in August 2016*

	Site Name	Aggregate Crushing Plant				CVC Plant			
	Station Code	DS02				DS03			
	Date	03/08/2016	11/08/2016	16/08/2016	25/08/2016	03/08/2016	11/08/2016	16/08/2016	25/08/2016
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	7.88	7.54	8.28	7.76	8.24	No Water Discharged		
Sat. DO (%)		99.1	101.6	100	101.9	106.6			
DO (mg/L)		7.59	7.28	7.54	7.35	7.92			
Conductivity (µs/cm)		38.2	39	61.7	31.2	115.3			
TDS (mg/L)		19	19	31.5	15	57			
Temperature (°C)		27.3	31	28.1	30.9	28.9			
Turbidity (NTU)		23,200	3,728	128	1,110	618			
TSS (mg/L)	<50	3,037	1,371	617	6,612	302			
Oil & Grease (mg/L)	<10	ND[13]	N/A	ND[13]	N/A	ND[13]			
Discharge Volume (m^3/day)		***259.2***	***3,456***	***173***	***86.4***	***8.6***			

	Site Name	Spoil Disposal #2				RCC Plant			
	Station Code	DS04				DS09			
	Date	03/08/2016	11/08/2016	16/08/2016	25/08/2016	03/08/2016	11/08/2016	16/08/2016	25/08/2016
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	6.89	7.28	7.8	6.16	8.27	7.62	7.25	6.82
Sat. DO (%)		42.1	66.4	80	71.2	94.4	99.4	101.1	99.5
DO (mg/L)		3.3	4.99	6.18	5.17	6.94	7.07	7.14	6.6
Conductivity (µs/cm)		93	14.39	13.19	11.57	216.9	142.1	228	98.5
TDS (mg/L)		46	7	7	6	109	71	114	48
Temperature (°C)		25.81	28	26.6	30.2	29.6	31.5	31.9	33.9
Turbidity (NTU)		19.8	15.6	22.5	12.9	20,370	23,910	147	5,800
TSS (mg/L)	<50	17.4	12.4	24.1	11.2	9,876	14,061	344	51,895
Oil & Grease (mg/L)	<10	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A
Discharge Volume (m^3/day)		***3,456***	***1,728***	***1,728***	***864***	***3,456***	***432***	***259***	***86.4***

	Site Name	Regulating Dam				Main Dam			
	Station Code	DS08				DS11			
	Date	03/08/2016	11/08/2016	16/08/2016	25/08/2016	03/08/2016	11/08/2016	16/08/2016	25/08/2016
Parameter (Unit)	Guideline								
pH	6.0 - 9.0	6.39	7.31	7.37	7.2	7.37	7.51	7.32	7.2
Sat. DO (%)		98.7	101.6	104.9	104.6	99.8	99.4	98.4	102
DO (mg/L)		7.32	7.41	7.36	7.3	7.78	7.42	7.37	7.51
Conductivity (µs/cm)		256	194.5	176.5	179.7	703	317	1,055	493
TDS (mg/L)		128	97	88	80	351	158	527	246
Temperature (°C)		29.1	30	31.2	32.6	26.3	28.7	28.5	29.7
Turbidity (NTU)		6.47	32.1	49.8	23.4	19.4	13.22	56.4	8.72
TSS (mg/L)	<50	ND[5]	39	45.8	40	68.2	16.7	165	19.1
Oil & Grease (mg/L)	<10	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A
Discharge Volume (m^3/day)		***17.3***	***172.8***	***86.4***	***86.4***	***6,000***	***6,000***	***6,000***	***6,000***

ANNEX B: AMBIENT AIR QUALITY DATA

Table B- 1: Average of Noise Monitoring at Ban Hat Gniun

Noise Level (dB)	04-05/08/2016			05-06/08/2016			06-07/08/2016			07/08/2016
	11:09-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 10:48
Maximum Value Recorded	76.9	71.8	81.6	86.1	76.7	75.7	82.1	77.4	72.5	85.3
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	47.89	52.99	53.45	52.16	52.11	49.97	47.16	53.16	49.44	47.48
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

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

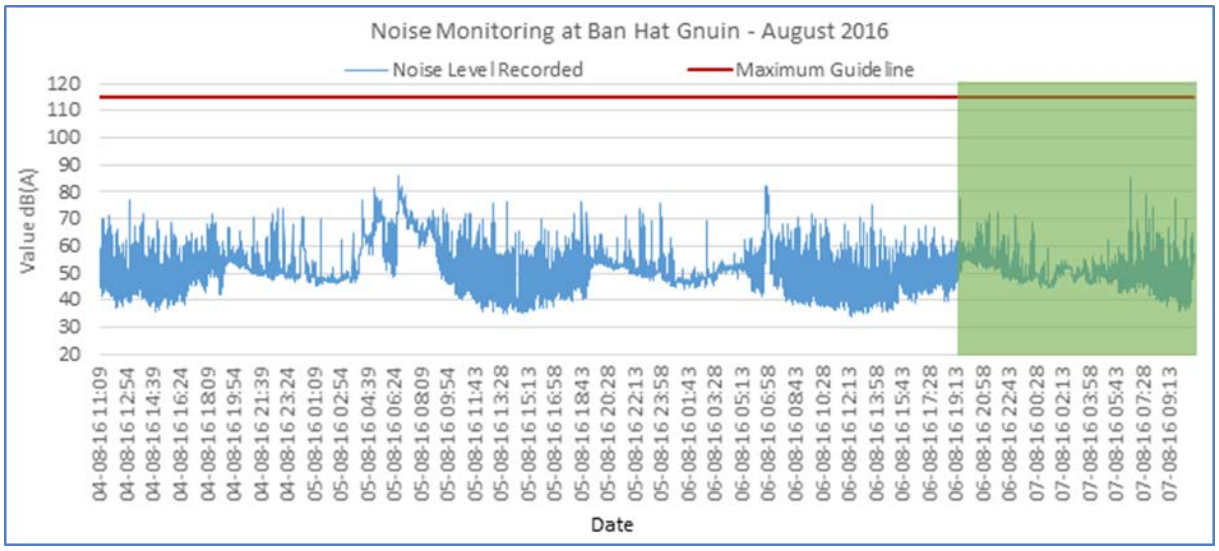


Table B- 2: Noise Monitoring Average Results at Ban Hatsaykham

Noise Level (dB)	07-08/08/2016			08-09/08/2016			09-10/08/2016			10/08/2016
	11:24-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 11:24
Maximum Value Recorded	71.60	60.90	70.60	91.30	72.40	66.30	85.70	81.20	62.00	73.70
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	47.86	52.24	51.93	50.29	53.07	52.43	50.47	54.39	55.50	50.20
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

Figure B- 2: Results of Noise Level Monitoring at Ban Hatsaykham August 2016

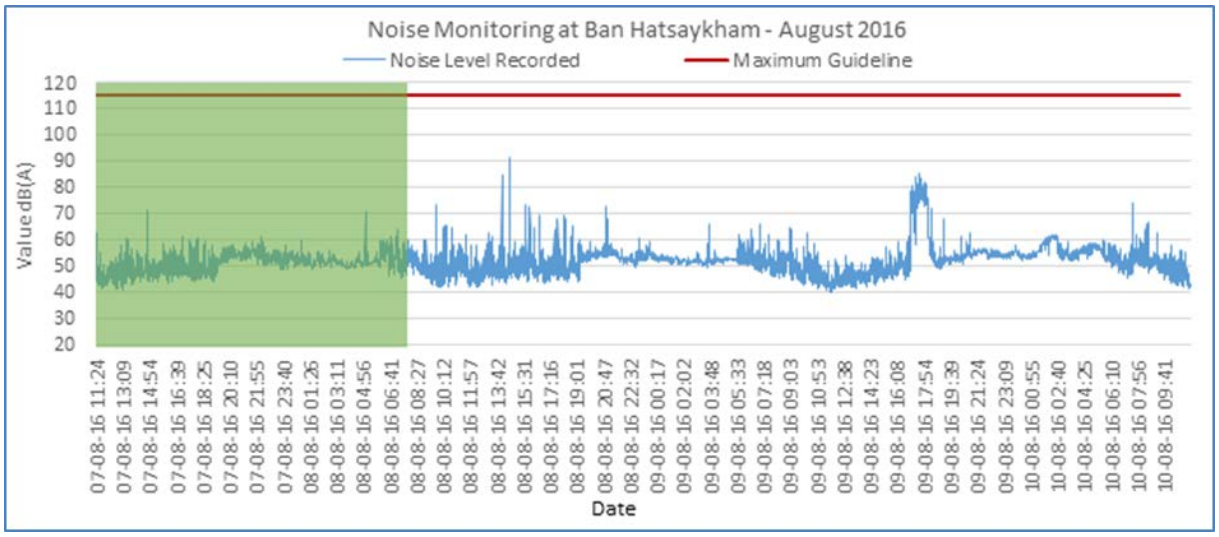


Table B- 3 and Table B- 4: Average Results Noise Monitoring at Aggregate Crushing Plant and RCC Plant in August 2016

Aggregate Crushing Plant

Noise Level (dB)	29-30/08/2016		30/08/2016
	10:51 – 22:00	22:01 – 06:00	06:01-10:51
Maximum Value Recorded	84.1	83.2	80.2
Guideline Max	***115***	***115***	***115***
Average Data Recorded	78.45	77.35	58.86
Guideline Averaged	***70***	***50***	***70***

RCC Plant

Noise Level (dB)	18-19/08/2016		19/08/2016
	14:38 – 22:00	22:01 – 06:00	06:01-14:30
Maximum Value Recorded	73.9	78.8	74.9
Guideline Max	***115***	***115***	***115***
Average Data Recorded	65.68	67.38	61.79
Guideline Averaged	***70***	***50***	***70***

Figure B- 3: Results of Noise Lavel Monitoring at Aggregate Crushing Plant in August 2016

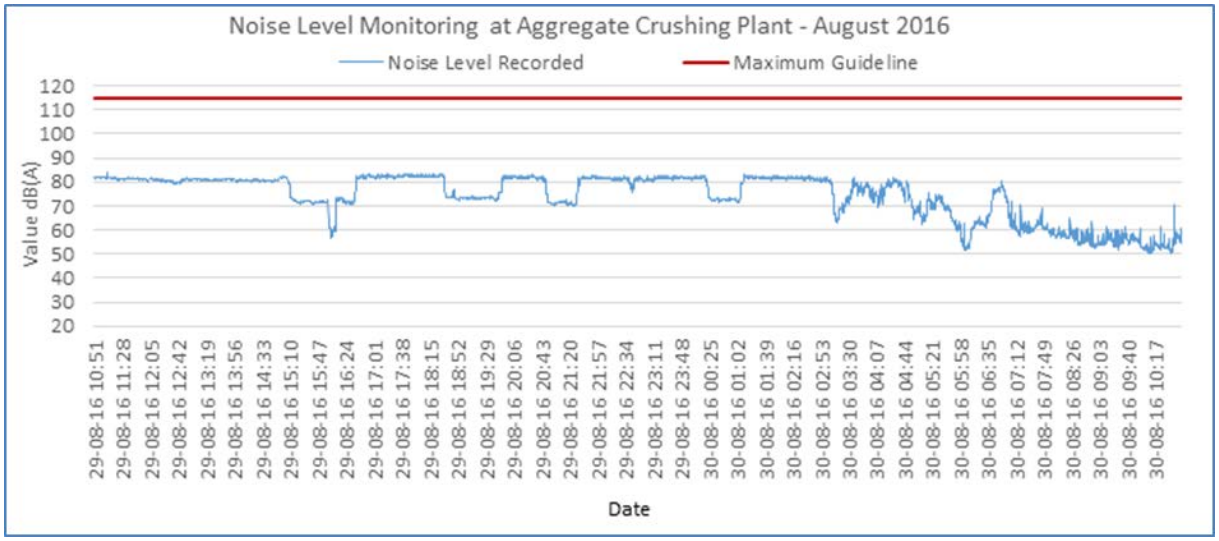


Figure B- 4: Dust Monitoring Results at RCC Plant in August 2016

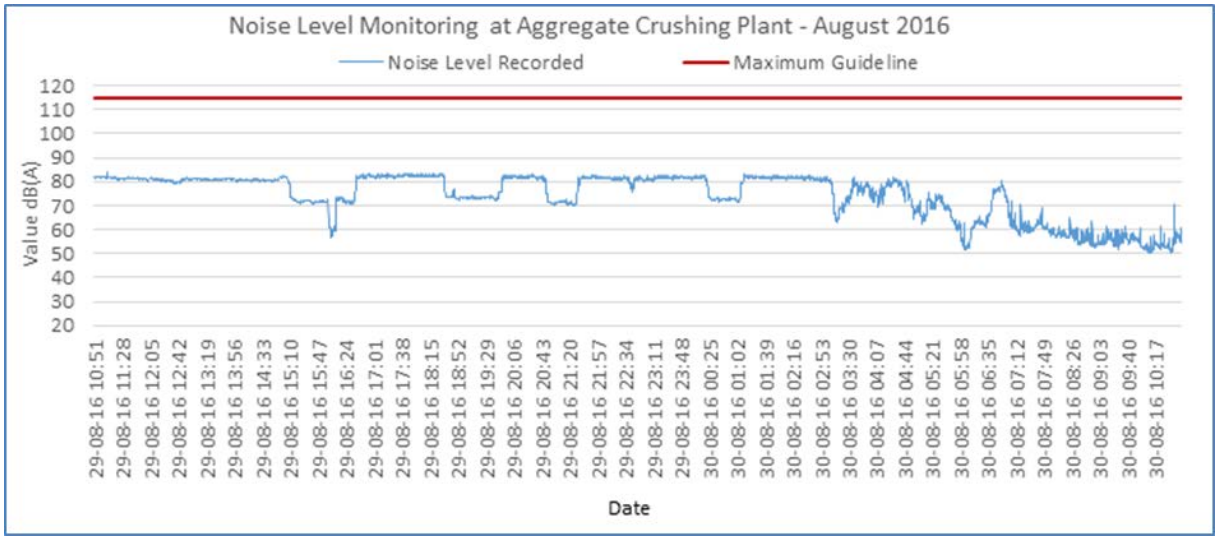


Table B- 5 and Table B- 6*: Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in August 2016*

Songda Camp#2

Noise Level (dB)	12-13/08/2016		13/08/2016
	15:02 – 22:00	22:01 – 06:00	06:01-15:02
Maximum Value Recorded	76.5	72.2	79.1
Guideline Max	***115***	***115***	***115***
Average Data Recorded	58.16	58.81	61.51
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Camp

Noise Level (dB)	17-18/08/2016		18/08/2016
	10:47 – 22:00	22:01 – 06:00	06:01-10:47
Maximum Value Recorded	70.2	68.9	67.6
Guideline Max	***115***	***115***	***115***
Average Data Recorded	59.92	62.36	57.52
Guideline Averaged	***70***	***50***	***70***

Figure B- 5: Dust Monitoring Results at Songd Da 5 Camp#2 in August 2016

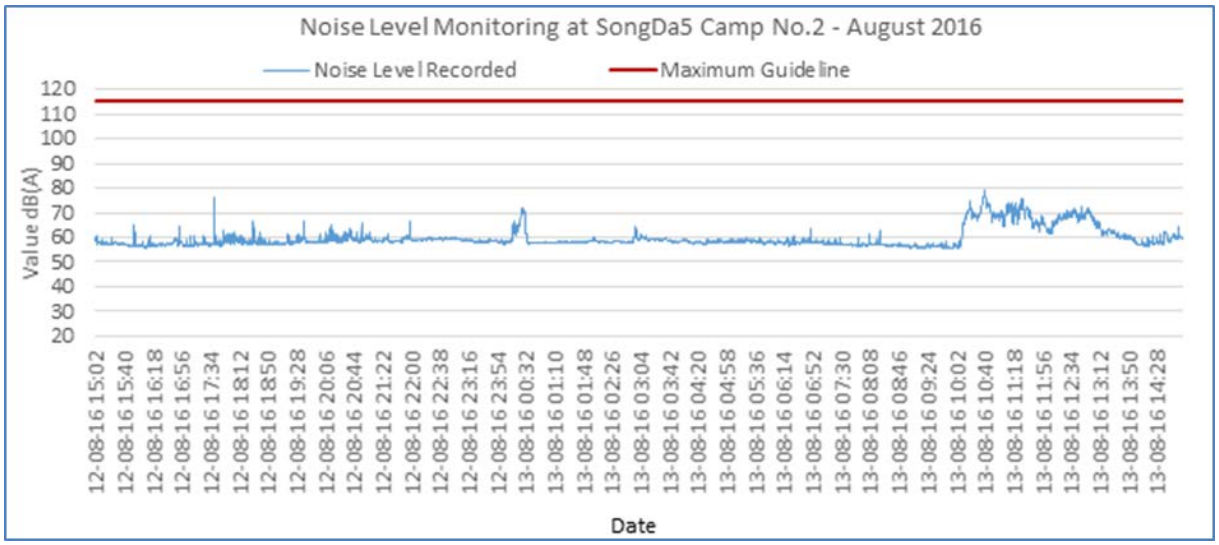


Figure B- 6: Dust Monitoring Results at Sino Hydro Camp in August 2016

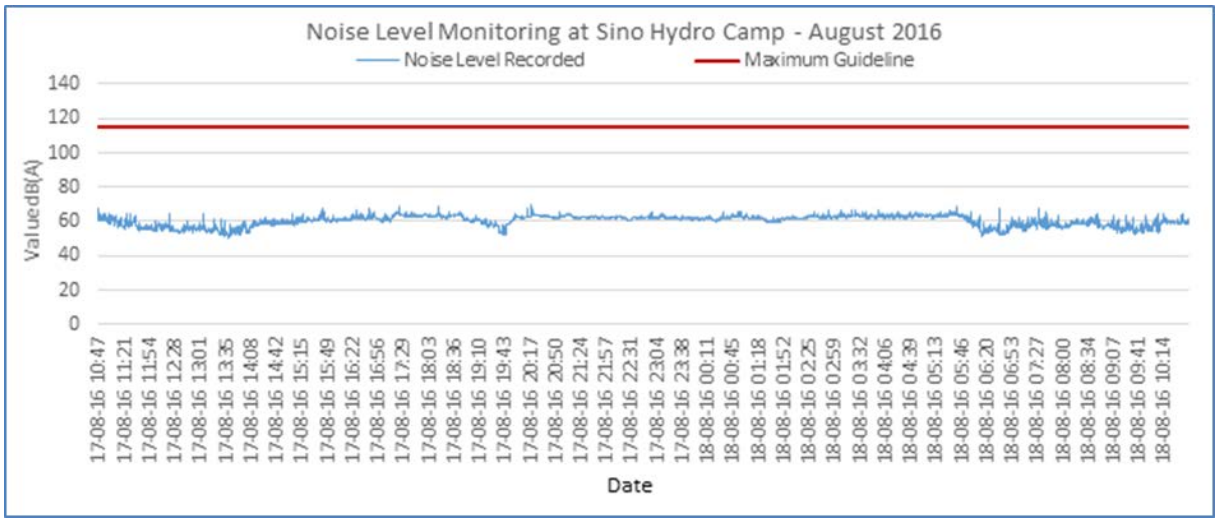


Table B- 7 and Table B- 8: *Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in August 2016*

Owner's Site Office and Village

Noise Level (dB)	11-12/08/2016		12/08/2016
	14:43 – 22:00	22:01 – 06:00	06:01-14:33
Maximum Value Recorded	65	78.8	76
Guideline Max	***115***	***115***	***115***
Average Data Recorded	45.89	58.68	52.27
Guideline Averaged	***70***	***50***	***70***

Main Dam

Noise Level (dB)	22-23/08/2016		23/08/2016
	14:22 – 22:00	22:01 – 06:00	06:01-14:22
Data Record Max	85.1	59.7	57.1
Guideline Max	***115***	***115***	***115***
Data Record Average	56.27	53.37	48.29
Guideline Averaged	***70***	***50***	***70***

Figure B- 7: Results of Noise Level Monitoring at Owner's Site Office and Village in August 2016

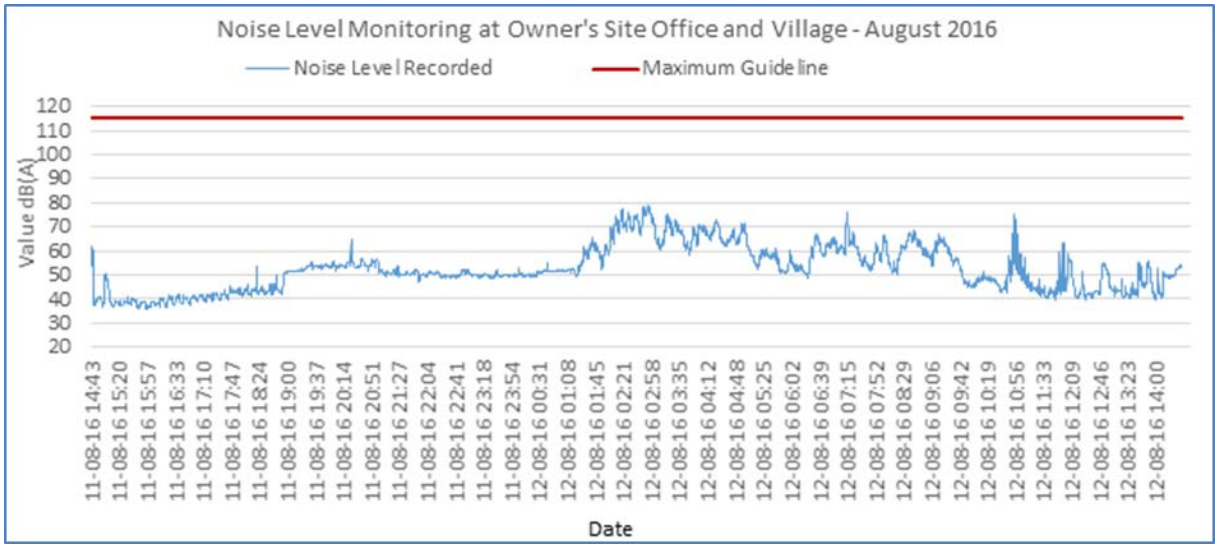


Figure B- 8: Results of Noise Level Monitoring at Main Dam in August 2016

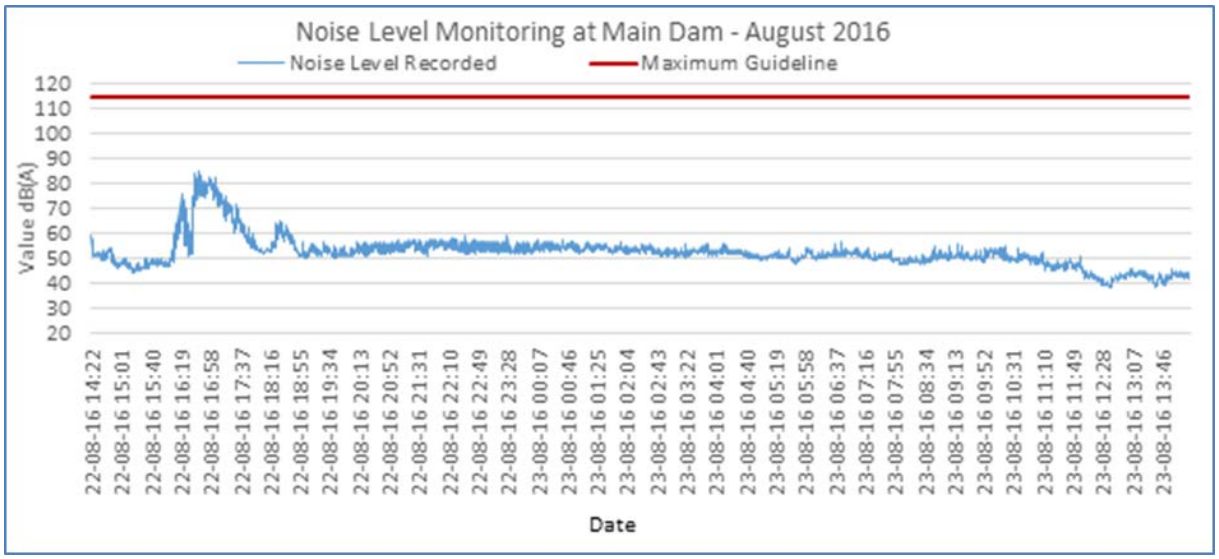


Table B-9: Average Results of Noise Monitoring at the Sino Hydro Temporary Worker Camp in August 2016

Noise Level (dB)	26-27/08/2016		27/08/2016
	10:42 – 22:00	22:01 – 06:00	06:01-10:42
Maximum Value Recorded	71	68.5	68.7
Guideline Max	***115***	***115***	***115***
Average Data Recorded	58.22	60.32	55.41
Guideline Averaged	***70***	***50***	***70***

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