NAM NGIEP1 POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

June 2017

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BBREVIATIONS / ACRONYMS

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

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

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

EXECUTIVE SUMMARY

During June 2017, the Environmental Management Office (EMO) of the Environmental and Social Division of NNP1PC received a total of 14 Site Specific Environmental and Social Management and Monitoring Plans (SS-ESMMP) and one working drawing for an improved camp waste water treatment system (WWTS). With five SS-ESMMP and one working drawing of the WWTS improvement at camps carried over from previous months, there were 19 SS-ESMMP and two working drawings for EMO review during the reported month. Out of these, three SS-ESMMP and two working drawings were cleared with conditions, twelve SS-ESMMPs were cleared with no conditions, one SS-ESMMP was returned for further improvement, two SS-ESMMPs were put on hold awaiting additional information from the contractors and one SS-ESMMP is being reviewed and will be carried over to July 2017.

A total of thirteen Observation of Non-Compliance (ONC), two Non-Compliance Report Level 1 (NCR1), two NCR2 and one NCR3 were active in June 2017. Out of these, one new ONC was issued, and twelve ONC, two NCR1, two NCR2 and one NCR3 were carried over from the previous month. During this month three ONC, one NCR1 and one NCR2 were resolved, and a total of ten ONC, one NCR1, one NCR2 and one NCR3 will be carried over into July 2017.

During the period 15 to 16 June 2017, the Provincial and Environmental Management Unit (EMU) of Bolikhan District and Bolikhamxay Province conducted a joint environmental monitoring mission together with NNP1PC covering the main construction sites and camps. After the wrap-up meeting, the EMUs submitted their mission report to NNP1PC on 26 June 2017. Key environmental issues of concern include the Waste Water Treatment System (WWTS) at Song Da 5 Camp No.2, high turbid water discharge at the RCC Plant and the Aggregate Crushing Plant and, floating logs and debris at the re-regulation dam.

A performance verification for analysis of Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD5) by NNP1PC Environmental Laboratory in collaboration with the United Analysis and Engineering Consultant Company Limited (UAE) continued in June 2017 and is expected to be completed by the end of July 2017. The NNP1PC Environmental Laboratory will then take over the TSS and (BOD5) analyses starting from August 2017 according to the water quality analysis service agreement between UAE Laboratory and NNP1PC.

The effluent monitoring results for June 2017 indicate that only the wastewater treatment systems at the Owner's Site Office and Village (OSOV) and Song Da 5 Camp No.1 comply with the Effluent Standard. However, the amount of total and faecal coliforms was significantly reduced at the V&K Camp, Obayashi Corporation Camp and Kenber Camp. The non-compliances with effluent standards are believed to be a result of inadequate dosage of chlorine. In order to further improve the chlorination processes, NNP1PC-EMO shared the results of field observations and discussed the adjustments of the system with the contractors. To avoid issues associated with the use of powder type chlorine such as blockage of the dosing tap and mixing, the Civil Works Contractor agreed to use the liquid type starting from July 2017.

Preparation of the NNP1 Watershed Management Plan continues. NNP1PC received the comments from ADB on 17 June 2017 followed by a tele-conference with representatives

of ADB on 19 June 2017. The revised version addressing some comments from ADB was submitted to NNP1PC for internal review on 29 June 2017.

Recruitment of a consultant for the development of the Biodiversity Offset Management Plan (BOMP) resumed in May 2017 after discussion with Bolikhamxay Provincial Authority and contract negotiations have started with the selected candidate and are expected to be completed in July 2017.

Biomass clearance continued to progress. The total progress of biomass clearance is around 974.99 ha in which around 32.37 ha are fully cleared as verified at the end of June 2017.

The fishery monitoring programme is progressing, and a database has been developed to support the future fish management programme as part of the Nam Ngiep 1 Watershed Management Plan. Two types of surveys were conducted during June 2017 including daily fish catch logbook monitoring and gillnet survey. The gathered information is being put into the database. The data from the daily fish catch logbook monitoring indicates that the mean daily fish catch in the Nam Ngiep River was 2.2 kg/household/day in May 2017. The estimated total fish catch in the Nam Ngiep basin for April 2017 is 59,400 kg. Around 32% of the catch was sold, 57% was consumed fresh, 5% processed and approximately 6% was used for other purposes.

1. INTRODUCTION

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

Figure 1-1: Location Map

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

This Environmental Monthly Monitoring Report (EMMR) provides a summary of environmental monitoring activities and mitigation actions in January 2017. The EMMR was prepared by the Project's Environmental Management Office (EMO). It has been internally reviewed and cleared by EMO senior technical staff and management prior to submitting the report to the Government of Lao PDR (GoL) related agencies.

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

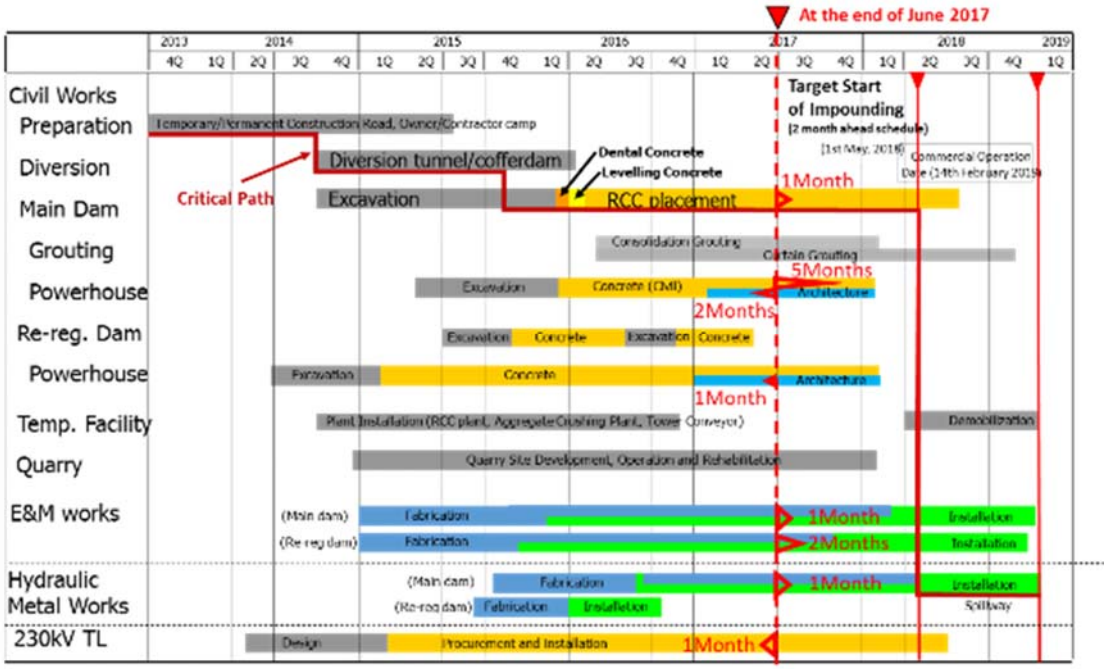
2. WORK PROGRESS OF PRINCIPAL CONTRACTORS

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

June 2017 was 73.6%[1] (compared to planned progress of 76.3%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments, varied works and other adjustments allowed under each Contract. In terms of the value of actual work done the percentage is understated since work completed, but not paid, is not included.

The overall construction schedule and progress curve (by achieved Milestone Payments) are shown in **Error! Reference source not found.**.

Figure 2-1: Overall Construction Schedule



2.1 Civil Work

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

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

[2] The progress to-date is calculated as (Cumulative Value Achieved for Completed Work by Variation Order or Other Adjustment) / (Total Budget Contingency Amount)

The cumulative actual work progress of the Civil Works until the end of June 2017 was 79.1 % (compared to planned progress of 78.7 %) calculated in the same manner as described above for the value of achieved Interim Milestone Payments excluding advance payment.

2.1.1 Main dam and power house

After starting the main dam excavation works in October 2014 on the left bank, the works were about one month advanced when diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes were 20% greater than expected and part of this additional work is necessary to construct a 'shear key' structure due to the weak layers of rock encountered in the dam foundation. Following the efforts on Site, the additional excavation work was completed at the end of February 2016.

Figure 2-2: Main Dam and Powerhouse from Overhead Looking Upstream

The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 88 % by achievement of total anticipated drilled length as of the end of June 2017 as a proportion of the total expected drilling

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

Item	Description	Total Drilling (m)	Completed (m)	Progress (%)
Consolidation Grouting	Anticipated Quantity	17,769	15,638	88
Curtain Grouting	Original Design Quantity	27,945	9,097	32
	Anticipated Final Quantity	58,400	9,097	15

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

Main powerhouse sub-structure excavation works were completed in January 2016 and levelling concrete works were started in coordination with installation of the grounding system. Overhead

travelling crane runway beam was installed in December 2016. Progress of the powerhouse concreting works is still proceeding well and is shown in **Error! Reference source not found.** below

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

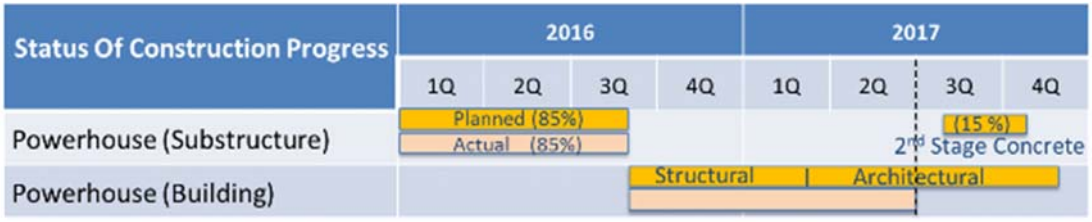
Location	Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
Main Powerhouse	32,600	25,184	77
Penstock Embedment	10,257	7,870	76

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 **Error! Reference source not found.** below

Figure 2-3: Progress of Re-regulation Dam Powerhouse Works to 30 June 2017



Powerhouse Building Works	Concrete Block Wall above El. 177.0 m	Plastering Block Wall First Layer	Plastering Block Wall Second Layer	Windows	Painting Inside and Outside	Siding Sheets above El. 189.5 m	Roofing	Switch Yard
	(m^2)	(m^2)	(m^2)	(No.)	(m^2)	(m^2)	(m^2)	(m^2)
Designed	1576	3126	3126	27	6135	510	1022	45,000
Completed	1576	3126	3126	26	4588	510	1022	45,000
Progress	100 %	100 %	100 %	96 %	75 %	100 %	100 %	100 %


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

2.1.3 Temporary work facility

2.1.3.1 DIVERSION TUNNEL INLET AND OUTLET

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

2.1.3.2 SECONDARY UPSTREAM COFFERDAM

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

2.1.3.3 PLANT YARDS

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

2.1.3.4 QUARRY

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

2.1.3.5 DISPOSAL AREAS

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

2.2 Electrical and Mechanical Works

The EMWC was executed between Hitachi-Mitsubishi Hydro Corporation and NNP1PC on 13 June 2014 and the NTP was issued on 03 October 2014. The cumulative work progress of the Electrical and Mechanical Works by value until the end of June 2017 was 62.7 % (compared to planned progress of 75.1 %).

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

Figure 2-5: Preparation for Installation of Stay Cone at the re-regulation powerhouse

2.3 Hydro-Mechanical Works

The HMWC was executed between IHI Infrastructure Systems (IIS) and NNP1PC on 18 April 2014 and the NTP was issued to the Contractor on 03 October 2014. The actual cumulative work progress of the Hydro-Mechanical Works until the end of June 2017 was 49 % (compared to planned progress of 49 %).

The latest progress of penstock pipe fabrication at IHI field shop and erection at main dam as of the end of June 2017 ***in Table*** 2-3 below

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

Item No.	Work Description	Work Progress (%)	Remarks
1.1	Assembly, Welding and Painting	89 %	Straight Pipes
1.1	Delivery to Main Dam Laydown Area	50 %	Straight Pipes
1.1	Site Erection at Main Dam	49 %	Inclined Part

2.4 230kV Transmission Line Works

The TLW Contract was executed between Loxley-Sri Consortium and NNP1PC on 11 July 2014 and the NTP was issued to the 230 kV TL Contractor on 03 October 2014. The cumulative work progress of the Transmission Line Works until the end of June 2017 was 86.1% (compared to planned progress of 86.2%).

In respect of the delay to commencement of most works the Contractor is studying its programme to ensure that sufficient resources are committed as the works progress to ensure that completion is achieved in good time. Onset of daily rains has made access to all areas difficult but the Contractor follows its revised acceleration schedule, after the progress for the construction of tower foundations slowed after May, 2016 (See **Error! Reference source not found.**6 below)

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

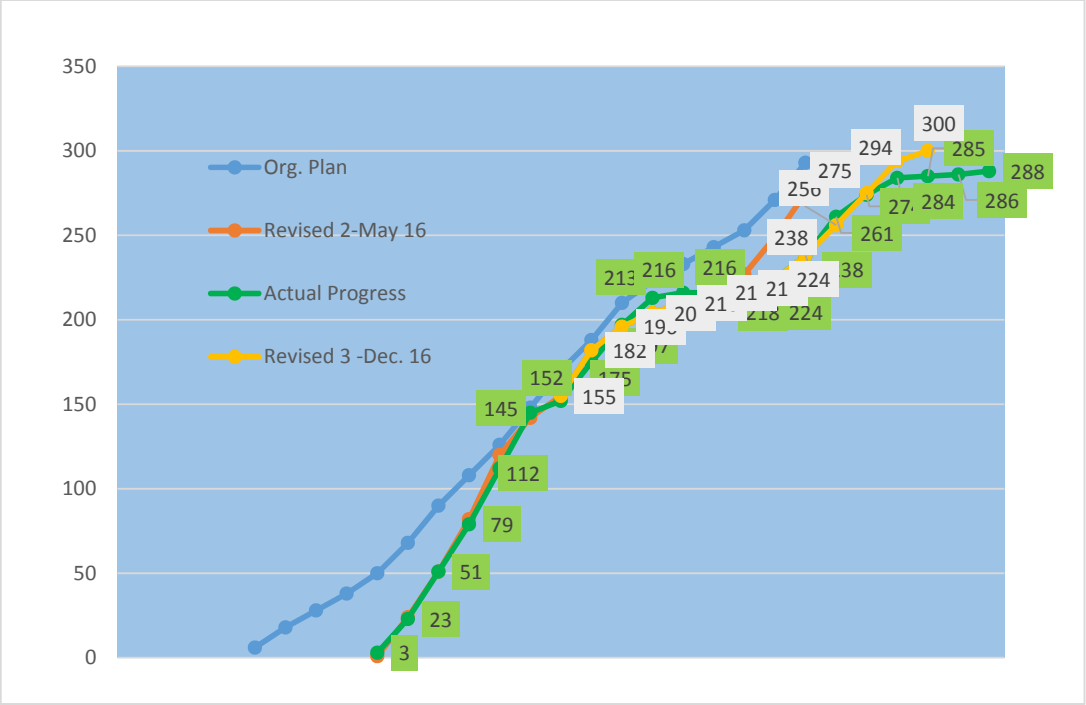


Figure 2-7: Cumulative Works Progress of tower foundation (Revised Planned & Actual)

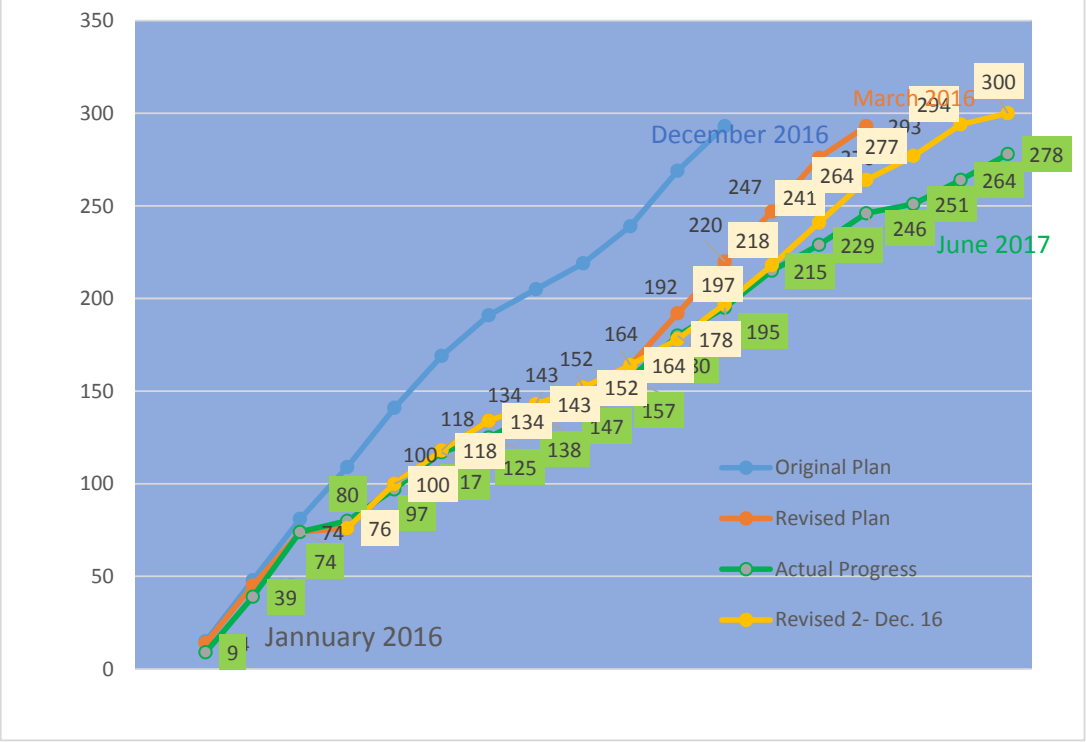


Figure 2-8: Revised Cumulative Works Progress of Tower Erection (Planned & Actual)

3. ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 ESMMP-CP Update 2017

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

3.1.2 Site Specific Environmental and Social Management and Monitoring Plans

During June 2017, the Environmental Management Office (EMO) of NNP1PC received a total of 14 Site Specific Environmental and Social Management and Monitoring Plans (SS-ESMMP) and one working drawing for an improved waste water treatment system (WWTS) at one of the camps. With five SS-ESMMP and one working drawing of improved WWTS carried over from previous months, there were 19 SS-ESMMP and two working drawings for EMO review during the month of reporting. Out of these, three SS-ESMMP and two working drawings were cleared with conditions, twelve SS-ESMMPs were cleared with no conditions, one SS-ESMMP was returned for further improvement, two SS-ESMMPs are on hold waiting for additional information from the contractors and one SS-ESMMP is pending a review which will be carried over to July 2017.

Table 3-1: **SS-ESMMP review status in June 2017**

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

Title	Date Received	Response Status	Comments
SS-ESMMP for RCC Operation and Maintenance Work	08 March 2017 (4th submission)	On hold	Revise the document to include new information from the drawing of the new sediment retention structure and ponds.
SS-ESMMP for Construction of Village Office and Hall at Zone 2UR	30 May 2017 (1st submission)	Responded with 'No objection with comments' on 09 June 2017	Provide construction site, camp and facilities Decommissioning Plan.
SS-ESMMP for Construction temporary accommodation for 44 HH from 2 LR	29 May 2017 (1st submission)	Responded with 'No objection with no further comments' on 07 June 2017	
SS-ESMMP for Construction of Primary and Secondary School in HSRA	30 May 2017 (1st submission)	Responded with 'No objection with comments' on 08 June 2017	Add Site Decommissioning Plan duration in the work schedule, revise detailed information on sanitation facilities and provide the Site Decommissioning Plan.
Working drawing of the Waste Water Treatment System Improvement at TCM & GFE Camp	30 May 2017 (2nd submission)	Responded with 'No objection with comments' on 12 June 2017	The construction was completed with some comment for additional improvement. Waiting for the As-built drawing.
SS-ESMMP for Re-regulating Pond Biomass Clearance	03 June 2017 (3rd submission)	Responded with 'No objection with no further comments' on 23 June 2017	
SS-ESMMP for Construction of Primary School 3 Units in 2UR Zone	05 June 2017 (1st submission)	Responded with 'No objection with comments' on 08 June 2017	Provide a Site Decommissioning Plan and detailed design of temporary sanitation facilities.
SS-ESMMP for 84 fish ponds in HSRA	06 June 2017 (1st submission)	Responded with 'No objection with no further comments' on 09 June 2017	
SS-ESMMP for Installation Work of Embedded Parts of Generator for Main Powerhouse Station	09 June 2017 (1st submission)	Responded with 'No objection with no further comments' on 29 June 2017	
SS-ESMMP for House Construction of seven (07) Units for 2LR Resettlement Site	09 June 2017 (3rd submission)	Responded with 'No objection with no further comments' on 12 June 2017	
Working drawing of WWTS at ZHEFU Camp	12 June 2017 (1st submission)	Responded with 'No objection with	Revise piping system and elevation.

Title	Date Received	Response Status	Comments
		comments' on 16 June 2017	
SS-ESMMP for 48 ha land paddy field development at HSRA	14 June 2017 (3rd submission)	Responded with 'No objection with no further comments' on 19 June 2017	
SS-ESMMP for Construction of 0.4 kV Distribution Line for 44 Temporary Households	14 June 2017 (1st submission)	Responded with 'No objection with no further comments' on 15 June 2017	
SS-ESMMP for Construction of Domestic Water Supply	15 June 2017 (1st submission)	Returned for improvement on 21 June 2017	
SS-ESMMP for Stay Cone Front Channel Line and Hatch Cover of Re-regulation Power Station	20 June 2017 (2nd submission)	Responded with 'No objection and no further comments' on 23 June 2017	
SS-ESMMP for Construction Work of Main Intake, Inlet, Outlet and canal at HSRA	06 June 2017 (2nd submission)	Returned for further improvement on 14 June 2017	Provide clear scope of work, methodologies for land/biomass clearance, identify proposed areas for topsoil, spoil management and provide related design drawings.
	26 June 2017 (3rd submission)	Responded with 'No objection with no further comments' on 27 June 2017	
SS-ESMMP for Intake Mouth of HSRA's Irrigation Canal	19 June 2017 (3rd submission)	Responded with 'No objection with comments' on 21 June 2017	Revise the environmental and social assessment checklist and add mitigation measures for SP08: Landscaping and Revegetation and SP09: Biodiversity Management.
	27 June 2017 (4th submission)	Responded with 'No objection with no further comments' on 29 June 2017	
SS-ESMMP for Irrigation Dam Reservoir Land Clearance at Houay Soup Resettlement Area	28 June 2017 (4th submission)	Responded with 'No objection and no further comments on 29 June 2017'	

Title	Date Received	Response Status	Comments
SS-ESMMP for Core Assembly and Winding of Generator Stator for Main Power Station	27 June 2017 (1st submission)	Responded with 'No objection with no further comments' on 29 June 2017	
SS-ESMMP for 3.1 Km Internal Road in HSRA	29-Jun-17	Under review	

3.1.3 Compliance Report

A total of thirteen Observation of Non-Compliance (ONC), two Non-Compliance Report Level 1 (NCR1), two NCR2 and one NCR3 were active in June 2017. Out of these, one new ONC was issued, and twelve ONC, two NCR1, two NCR2 and one NCR3 were carried over from the previous month. During this month three ONC, one NCR1 and one NCR2 were resolved, and a total of ten ONC, one NCR1, one NCR2 and one NCR3 will be carried over into July 2017.

The ONC and NCR carried over from June 2017 to July 2017 are summarized in **Error! Reference source not found.**2 below.

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

Site ID	Issues	Reporting	Actions
V&K Camp	Insufficient capacity of waste water treatment ponds to handle the operation of the V&K camp (ON_OC-0087). 1st inspection: 02 June 2015 latest inspection: 20 June 2017	ONC (Closure Pending)	The improved wetland ponds and new chlorination systems were completed and operated since the end of May 2017. The Civil Works Contractor was requested to revise and submit as-built drawing by 04 July 2017.
HM Hydro Subcontract Workers' Camp (LILAMA 10 Camp)	The construction of the Waste Water Treatment System (WWTS) was completed since the end of May 2017. However, the contractor has not yet responded to the NCR1 (NCR_HM-0001). 1st inspection: 28 September 2016 Latest inspection: 20 June 2017	NCR-1 (Closure Pending)	The EMW Contractor was requested to respond to the issued NCR1 based on the actual work completion and approved WWTS detailed drawing by early July 2017.
RCC Plant	Non-compliant Waste Water Discharge from the RCC Plant's Sediment Ponds on 5 May 2017 (NCR_OC-0018) First inspection: 05 May 2017 Latest inspection: 28 June 2017	NCR3 (Closure pending)	The Civil Contractor was required to submit an Operation Manual in May 2017 and provide regular sediment cleaning-up from the sediment ponds at least twice per day by end of July 2017;

Site ID	Issues	Reporting	Actions
Re-Regulation Dam (Borrow Pit Area)	The Contractor started operating a borrow pit with inadequate environmental management practices as indicated below: - Topsoil was stockpiled at an area sensitive to erosion; - The slope of the cut had no berm and cut-off drains; - No information and management measures on the excavation of this borrow pit was included in the two approved SS-ESMMP for the Re-Regulating Dam (ON_OC-0232). First inspection: 30 August 2016 Latest inspection: 20 June 2017	ONC (Closure Pending)	During the joint site inspection on 20 June 2017, the Contractor was asked to revise and resubmit the proposed Site Closure Plan of P1 & P1A by 04 July 2017.
Re-Regulation Dam (Spoil Disposal Area located at the junction of road P1 & P1A)	Spoil disposal activity from the Re-regulation Dam tailrace excavation (ON_OC-0236). First inspection: 11 October 2016 Latest inspection: 20 June 2017	ONC (Closure Pending)	During the Bi- Weekly Joint Site Inspection on 20 June 2017, the Contractor was asked to resubmit a revised Site Closure Plan of the P1 & P1A spoil disposal area by 04 July 2017 (final extension before progressing to NCR1).
Aggregate Crushing Plant	- Inadequate maintenance and implementation of agreed corrective actions on controlling the sediment pond at the Aggregate Plant below the Spoil Disposal Area No.7; - Improper monitoring and maintenance of the said sediment pond resulted in leakage of turbid water from the sediment pond into Nam Ngiep River. This is a serious non-compliance with CA Annex C and ESMMP-CP 2014 (NCR_OC-0013). First inspection: 08 November 2016 Latest inspection: 28 June 2017	NCR-2 (Closure Pending)	During the Bi-Weekly Joint Site Inspection on 20 June 2017, the Contractor was asked to respond to the NCR by incorporating additional work done and propose long term operation and management measures by 04 July 2017. A high-level management meeting between NNP1PC and the contractor will be held on 7 July 2017 to further discuss mitigation measures to close this pending issue.

Site ID	Issues	Reporting	Actions
Kenber Camp	The WWTS maintenance was not implemented properly: - Waste water could not flow smoothly from the first to the third pond; - The pipeline connecting between the third to last pond was blocked. This present a potential risk of waste water overflowing before being treated by chlorine (ON_OC-0260). First inspection: 23 May 2017 Latest inspection: 20 June 2017	ONC (Closure pending)	During the Bi-Weekly Joint Site Inspection and followed up inspection on 20 June 2017, the contractor was instructed to improve and maintain the wetland pond properly by 04 July 2017 to ensure a smooth flow of waste water from the wetland ponds to the chlorination tank.
Biomass Clearance Zone	A broken tractor was parked near a UXO temporary workers' camp without a rain protection and oil spill protection tray. As a result, oil has leaked from the broken engine/hydraulic parts of the tractor onto the ground (ON_UCC-0002). First inspection 04 May 2017 Latest inspection: 31 May 2017	ONC (Closure pending)	Because of the weather condition (rainy season), there is no inspection and follow-up during the reporting month due to the work suspension. However, this will be followed-up by the EMO team and it is assured that the issue can be resolved by July 2017.
Sand stockpile at the former RT camp	- Another sand stockpile area for material recovered from the RCC plant sediment pond (the first two sediment ponds) has been re-established at the former RT Camp, - It was observed from the latest Bi-weekly Joint Site Inspection on 20 June 2017 that more sand was accumulated without installing erosion and sediment control devices; (ONC_OC-0250) First inspection: 07 March 2017 Latest inspection: 20 June 2017	ONC (Closure pending)	The contractor was instructed to remove the sand stockpile completely. Otherwise, erosion and sediment control devices need to be installed by 04 July 2017 (3rd extension). A NCR1 will be issued in July 2017 if this is not resolved by the agreed deadline.
PK Camp	No proper hazardous material storage. Fuel drums were stored on the bare ground without spill protection facilities (ON_PK-0002). First inspection: 19 April 2017 Latest inspection date: 27 June 2017	ONC (Closure pending)	The construction was completed and a final inspection was conducted amongst the related parties. EMO will follow up on the site decommissioning closely on 11 July 2017.

Site ID	Issues	Reporting	Actions
Sand stockpile at a former Spoil Disposal Area No.8	Some sections of the wooden silt fence were broken which allowed the transportation of sand from the stockpile area into the adjacent road side drainage (ON_OC-0257). First inspection: 09 May 2017 Latest inspection: 20 June 2017	ONC (Closure pending)	The contractor was instructed to repair the existing wooden silt fences around the sand stockpile area and place sand bags to close the gaps at the base and around wooden silt fences by 04 July 2017.
Former Song Da 5 Batching Plant Yard	Piles of sand which dropped from the joints of the aggregate conveyor belt towers have not been completely removed after many verbal agreements since February 2017 (ON_OC-0258). First inspection: 09 May 2017 Latest inspection date: 20 June 2017	ONC (Closure pending)	The Contractor was required to completely clean-up and regularly remove the deposited sand under the aggregate conveyor belt towers from the Aggregate Plant to RCC Plant to a designated sand stockpile area or the Spoil Disposal Area No. 6 by 23 June 2017 (second extension). EMO will follow up on this issue during the next Bi-Weekly Site Inspection. A NCR1 may be issued if it is not resolved by the next extension.
KCP camp (HSRA)	Hazardous material storage (for oil drums) were placed on the plastic sheet without protective bund and floor as per the approved SS-ESMMP document. It is estimated that a total of 1,000 litres of fuel will be stored in this area for the next 3 months. This has a high potential risk of hazardous material contamination at the camp site (OC_KCP-0001) First inspection: 13 June 2017 Latest inspection: 27 June 2017	ONC (New)	Clean up the contaminated soil and store properly in the designated hazardous material storage for proper disposal/elimination by an authorized vendor; Build a 120% capacity hazardous material and waste storage with secure floor, bund and roof. The storage shall be equipped with oil trap and control valve; and Provide proper work procedures for hazardous material handling and spills responses. First extend deadline to 11 July 2017.

Photograph 1: EMU Inspected The RCC Plant's Sediment Ponds on 15 June 2017 	*Photograph 2: Joint Final Inspection At A Temporary Accommodation For 44 Households From 2LR (13 June 2017)* 
Photograph 3: Joint inspection of the new constructed WWTS of TCM/GFE Camps on 10 June 2017 	*Photograph 4: Joint LTA/ADB/IAP Mission on 06 June 2017* 

Figure 3-1: Site Inspection Locations

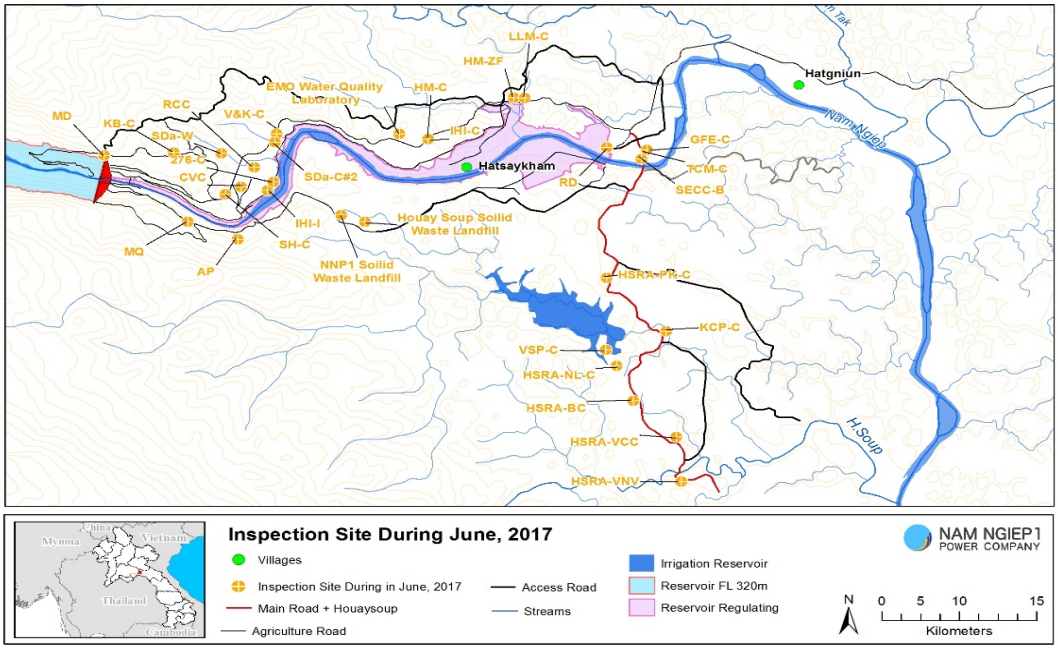


Figure 3-2: 230 kV Transmission Line Construction Monitoring

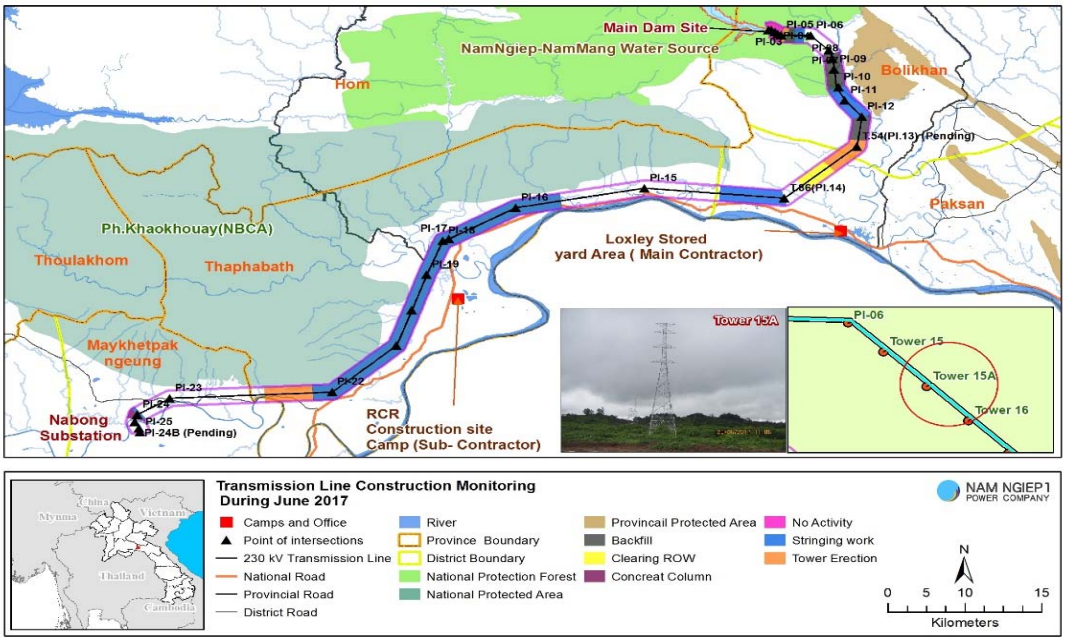
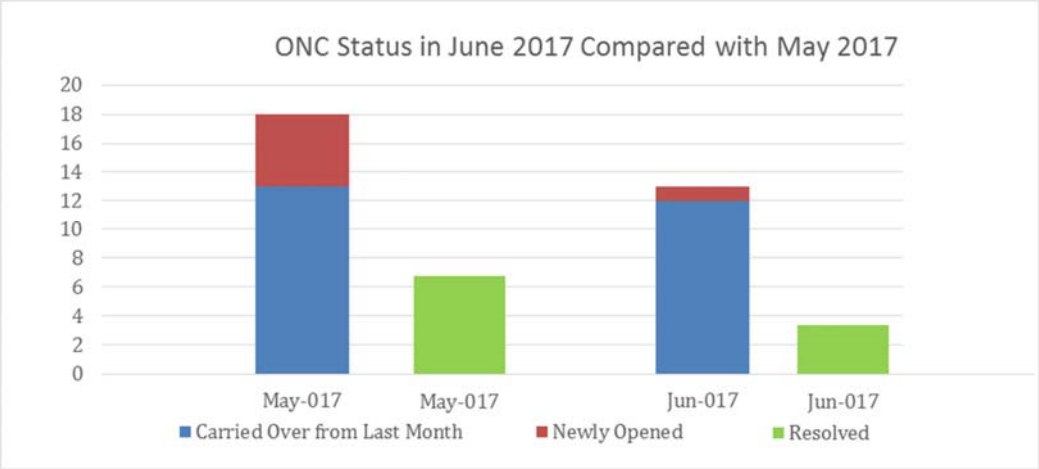


Table 3-3: Summary of ONC and NCR

Items	ONC	NCR-1	NCR-2	NCR-3
Carried Over from the Last Month (May 2017)	12	2	2	1
Newly Opened in this Month (June 2017)	1	0	0	0
Resolved in this Month (June 2017)	3	1	1	0
Carried over into next Month (July 2017)	10	1	1	1
Unsolved exceeding deadline	**10**	**1**	**1**	**1**

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



3.1.4 Inspection by Environmental Monitoring Units

During 15 to 16 June 2017, the Provincial and Environmental Management Unit (EMU) of Bolikhan District and Bolikhamxay Province conducted a joint environmental monitoring mission together with NNP1PC covering the main construction sites and camps, after the wrap-up meeting, the EMUs submitted their mission report to NNP1PC on 26 June 2017. They identified the following main environmental issues:

a) A valve of the chlorine tank was closed at the Waste Water Treatment System (WWTS) of Song Da 5 Camp No. 2;
b) EMU acknowledged the improvement of a sedimentation control system at the RCC Plant. However, the waste water discharge at the box culvert beside IHI Industrial Area was still very turbid;
c) The first pond at the aggregate crushing plant was full of sediment. The Contractor had used a short-arm excavator to clean-up, which can only reach some parts of the sediment pond. EMU was concerned that there is a potential risk that the structure of the sediment pond will collapse due to the filling of the re-regulation reservoir and requested NNP1PC to investigate the stability of the pond and any necessary prevention plan;
d) Floating logs and debris were observed in front of the re-regulation dam. They considered that floating debris need to be cleaned up and a barrier (log boom) be installed by NNP1PC to stop the floating debris from overflowing downstream.

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

3.2 Environmental Quality Monitoring

The NNP1PC Environmental Laboratory at the Owner's Site Office and Village performs analysis for TSS, BOD, total coliform, faecal coliform and E. Coli bacteria testing. A performance verification for the analysis of Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD_5) by the NNP1PC Environmental Laboratory in collaboration with the United Analysis and Engineering Consultant Company Limited (UAE) continued in June 2017 and is expected to be completed by the end of July 2017. The NNP1PC Environmental Laboratory will then take over the TSS and BOD_5 analyses starting from August 2017 as per an agreement between UAE Laboratory and NNP1PC.

After impounding of the re-regulation reservoir impounding, EMO department of ESD at NNP1PC has undertaken weekly water quality monitoring for physical parameters (pH, dissolved oxygen, conductivity, Total Dissolved Solids or TDS, temperature and turbidity) which complements the existing monitoring programme presented in the ESMMP-CP 2017 Volume III.

The environmental quality monitoring programme consists of the following components:

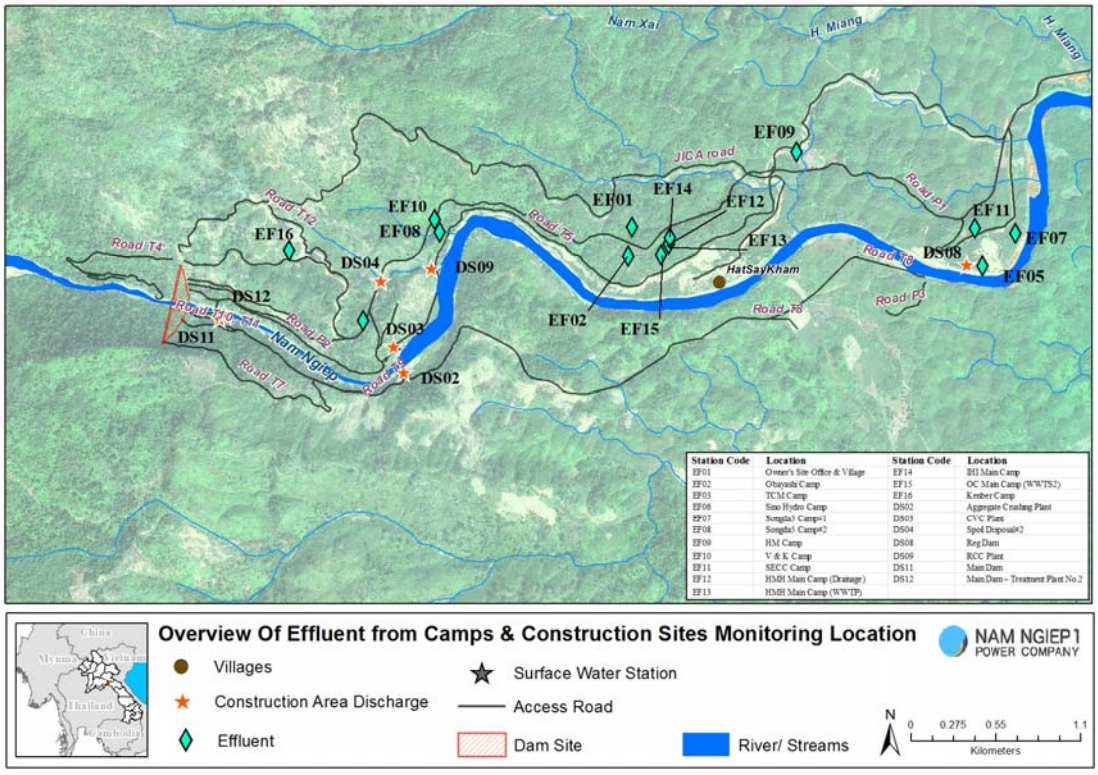
a) Effluent discharge from camps and construction sites;
b) Ambient surface water quality monitoring;
c) Groundwater and community water supply;
d) Reservoir water quality monitoring;
e) Landfill leachate;
f) Ambient noise and noise emission monitoring.

All environmental quality monitoring data are routinely reported to the Ministry of Natural Resources and Environment (MONRE) in the Monthly Environmental Management and Monitoring Reports (EMMR) and to ADB in the Quarterly Environment Monitoring Reports, which are also published on the NNP1PC website.

3.2.1 Effluent Discharge from Camps and Construction Sites

Since July 2016, the frequency of effluent monitoring has increased from monthly to fortnightly at all the camps, and from fortnightly to weekly at the construction sites. During June 2017, all camp effluents regardless of the discharge condition were monitored. Results of effluent monitoring from the camps and construction sites are presented in **Table 3-4**, and the monitoring locations are displayed on the map in Error! Reference source not found..

Figure 3-4: Map of Effluent Discharge Monitoring Locations



Detailed monitoring results are provided in **Annex 1** of this Report. The effluent monitoring results for June 2017 indicate that only the wastewater treatment systems at the Owner's Site Office and

Village and Song Da 5 Camp No. 1 comply with the Effluent Standards. However, the amount of total and faecal coliforms was significantly reduced at the V&K Camp, Obayashi Corporation Camp and Kenber Camp. The non-compliances with effluent standards are believed to be a result of inadequate dosage of chlorine. In order to further improve the chlorination processes, the EMO of NNP1PC shared the results of field observations and discussed adjustments of the system with the contractors. To avoid issues associated with the use of powder type chlorine such as blockage of the dosing tap and lack of mixing, the civil works contractor agreed to use a liquid type starting from July 2017. By the end of June 2017, all camps completed their WWTS improvements except at the Zhefu Camp, which was in the process of finalising the design drawing.

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

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

Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
Owner's Site Office and Village	EF01	Minor non-compliances for total nitrogen and total coliform.	No corrective actions are needed. The number of total coliforms reduced to compliant level in the last fortnight of June 2017. The amount of total nitrogen was still slightly higher than the standard but is not likely to cause major impacts on the ambient water quality of Nam Ngiep.
Obayashi Camp (WWTP1)	EF02	Minor non-compliances for ammonia nitrogen (NH_3-N), total nitrogen and total coliforms	NNP1PC-EMO will continue to monitor the chlorination process and train the contractor.
Sino Hydro Camp	EF06	Significant non-compliances for ammonia nitrogen (NH_3-N), total nitrogen and total coliforms	As above.
SongDa 5 Camp No. 1	EF07	Minor non-compliances for ammonia nitrogen (NH_3-N) and total nitrogen	As above. The total and faecal coliforms were much lower than the standard which indicated an effectiveness of the chlorine dosing system.
SongDa 5 Camp No. 2	EF08	Significant non-compliance for total coliform, BOD_5, NH_3-N, COD, and total nitrogen,	As above.
Zhefu Camp (Subcontractor of Hitachi-Mitsubishi Hydro)	EF09	Minor non-compliance of TSS, BOD_5 , NH_3-N, COD, total nitrogen and total coliforms	The Contractor must install an additional of 1 m^3 Chlorine Contact Tank and a 1 m^3 Chlorine Monitoring Tank according to the Owner's letter of instruction issued in November 2016.

Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
V&K Camp	EF10	Minor non-compliance of total nitrogen and total coliforms	NNP1PC will continue to monitor chlorination process and provide feedback to the contractor for adjusting and checking the system properly.
H-MH Main Camp (WWTS)	EF13	Minor non-compliance for COD, total coliforms, NH_3-N, BOD_5 and total nitrogen.	As above.
IHI Main Camp	EF14	Significant non-compliance: TSS, NH_3-N, BOD_5, COD, total nitrogen and total coliforms	As above.
Obayashi Camp (WWTS2)	EF15	Not applicable	This wastewater system was connected to Obayashi Camp's WWTS1 (EF02) thus the monitoring point has been combined with the WWTS1 (EF02) since June 2017.
Kenber Camp	EF16	Non-compliance for COD and total coliforms (13 June 17), BOD_5, NH_3-N and total nitrogen	NNP1PC will continue to monitor chlorination process and provide feedback to the contractor for adjusting and checking the system properly.
Main Dam Construction Area (Treatment Plant No.1)	DS11	Non-compliance for pH	The contractor was instructed to check the water quality before discharging and ensure that the treatment plant system operates properly. NNP1PC was informed that the import of sulphuric acid experienced delays as a result of the Master List approval process. This is expected to be delivered by July 2017.
Main Dam Construction Area (Treatment Plant No.2)	DS12	Non-compliance for pH and TSS	As above.
Re-Regulating Dam	DS08	No Sampling due to no discharged waste water.	No action is needed
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	Minor non-compliance for pH	No action is needed. The low pH is common for the surface and ground water in this area.
CVC Plant	DS03	Minor non-compliance for TSS	
RCC Plant (Discharge at lower ponds)	DS09	Minor non-compliance for pH and TSS	Refer to Table 1-2 for corrective action.
RCC Plant (Discharge nearby IHI Workshop)	DS13	Minor non-compliance for pH and TSS	Refer to Table 1-2 for corrective action.

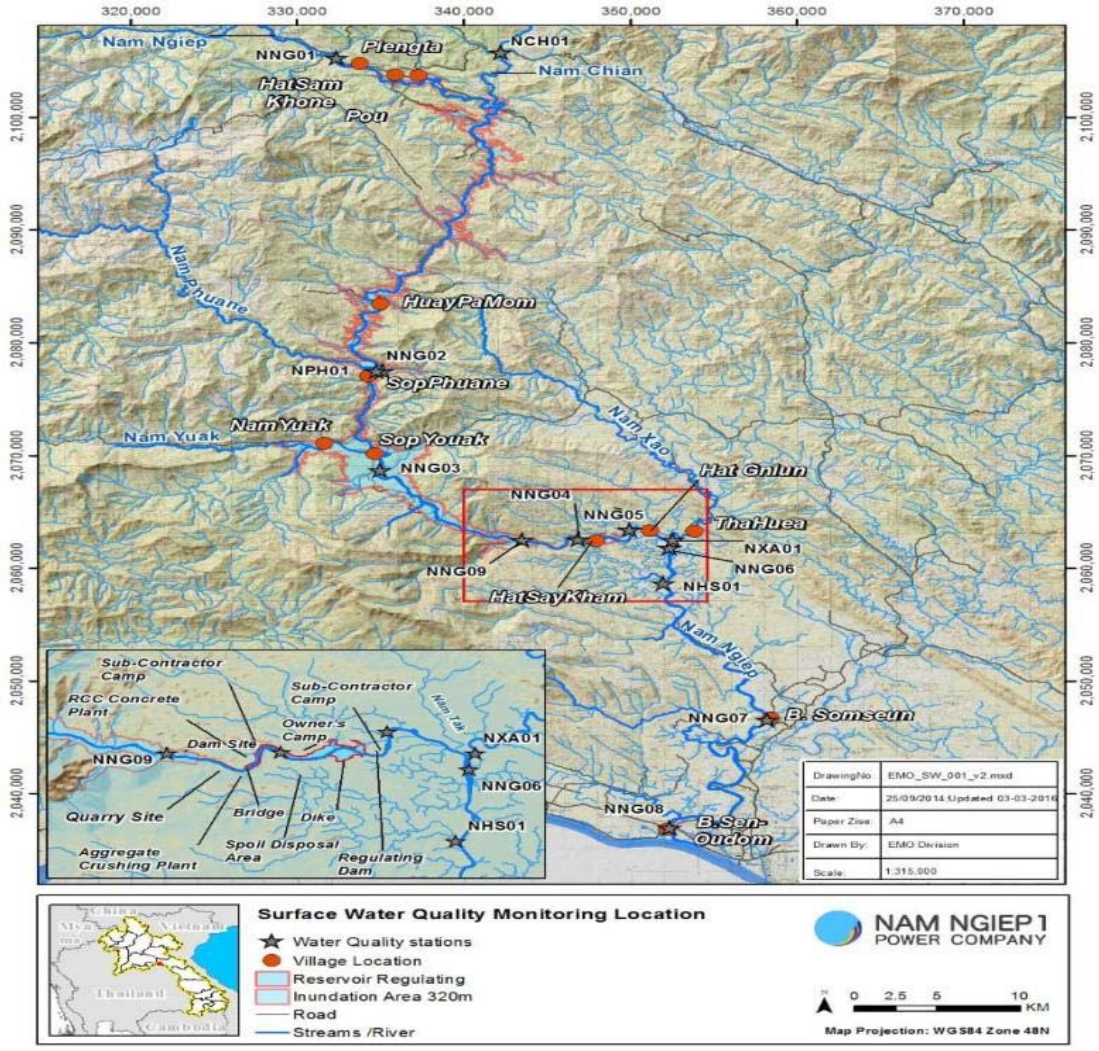
Site	Sampling ID	Non-Compliance with Applicable Effluent Standards	Corrective Actions
Aggregate Crushing Plant	DS02	Significant non-compliance for TSS	See Table 1-2 for corrective actions.

3.2.2 Ambient Surface 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). From 24 May 2017, weekly water quality monitoring in the re-regulation reservoir and Nam Ngiep has been undertaken for physical parameters only for four stations namely:

i) Nam Ngiep immediately upstream of the main dam (NNG09);
ii) re-regulation reservoir upstream of Hatsaykham Village (NNG04/R6);
iii) re-regulation reservoir located about 0.3 km upstream of the re-regulation dam (R7), and
iv) Nam Ngiep immediately downstream of the re-regulating dam (NNG05).

Figure 3-5: Surface Water Quality Monitoring Stations



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

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

	Name	Nam Ngiep and Re-Regulation Reservoir									
	Zone	Upstream				Within Construction Site/ Re-Regulation Reservoir		Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04/R6	R7	NNG05	NNG06	NNG07	NNG08
	Date	6-Jun-17	7-Jun-17	7-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17
Parameters (Unit)	**Guideline**										
pH	5.0 – 9.0	7.32	7.21	7.58	7.3	7.20	7.78	7.48	7.49	7.35	7.69
DO (%)		98.2	99.4	96.3	98.7	87.6	75.6	104	101.4	96.6	94
DO (mg/l)	>6.0	7.23	7.26	7.15	7.58	6.46	5.48	7.82	7.57	7.63	7.03
Conductivity (µs/cm)		140	136	99	117	118	177	121	120	112	109
TDS (mg/l)		70	68	50	58	59	88	61	60	56	54
Temperature (°C)		27.12	27.05	27.15	27.56	30.1	30.76	28.8	28.8	28.26	28.15

	Name	Nam Ngiep and Re-Regulation Reservoir									
	Zone	Upstream				Within Construction Site/ Re-Regulation Reservoir		Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04/R6	R7	NNG05	NNG06	NNG07	NNG08
	Date	6-Jun-17	7-Jun-17	7-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17
Parameters (Unit)	**Guideline**										
Turbidity (NTU)		67.5	56.00	75.61	42	16.08	8.31	29.4	32.5	38.2	31.6
TSS (mg/l)		146	176	126	65	14.2	ND[16]	45.3	45.9	139	80.2
BOD_5 (mg/l)	<1.5	ND[13]	ND[13]	ND[13]	ND[13]	1	N/A	ND[13]	ND[13]	1.1	ND[13]
COD (mg/l)	<5.0	6.1	8.4	9	7	5.3	N/A	8.2	10	15.8	10.9
NH3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	N/A	ND[12]	ND[12]	ND[12]	ND[12]
NO3-N (mg/l)	<5.0	0.07	0.1	0.15	0.08	0.03	N/A	0.11	0.11	0.13	0.12
Total Kjeldahl Nitrogen (mg/l)		ND[9]	ND[9]	ND[9]	ND[9]	ND[9]	N/A	ND[9]	ND[9]	ND[9]	ND[9]
Chloride (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]	N/A	ND[13]	ND[13]	ND[13]	ND[13]
Sulphate(mg/l)	<500	7.2	7.2	7.2	6.7	10.8	N/A	9	10.7	10.9	8.7
Alkalinity (mg/l)		70.9	50.8	44.6	47.7	41.9	N/A	42.6	44.6	32.6	36.1
Arsenic (mg/l)	<0.01	0.0017	0.0033	0.0021	0.0011	0.0007	N/A	0.0015	0.0013	0.0016	0.001
Calcium (mg/l)		15.3	10.4	10.2	11	10.4	N/A	9.88	10.5	7.72	7.61
Manganese (mg/l)	<1	0.106	0.105	0.09	0.061	ND[4]	N/A	0.04	0.053	0.106	0.082
Mercury (mg/l)	<0.002	ND[3]	0.0003	ND[3]	ND[3]	ND[3]	N/A	ND[3]	ND[3]	ND[3]	ND[3]
Magnesium (mg/l)		3.52	1.95	1.82	1.9	1.62	N/A	1.64	1.8	1.74	1.48
Lead (mg/l)	<0.05	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]	N/A	ND[10]	ND[10]	ND[10]	ND[10]
Potassium (mg/l)		1.66	1.65	1.75	1.36	1.07	N/A	1.22	1.35	1.53	1.22
Sodium (mg/l)		2.75	1.93	2.08	2.14	1.8	N/A	1.8	2.14	1.6	1.97
Total Iron (mg/l)		3.22	7.28	4.78	2.59	0.801	N/A	2.18	2.44	5.02	3.1
Total coliform (MPN/100 ml)	<5,000	35,000	3,300	28,000	7,900	780	N/A	3,300	4,900	3,500	3,100
Faecal coliform (MPN/100 ml)	<1,000	7,000	920	14,000	460	49.0	N/A	1,700	1,600	3,300	2,400
a-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
b-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
g-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
d-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
HAPTACHLOR (mg/l)		ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
ALDRIN (mg/l)	<0.1	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
HAPTACHLOR EXPOXIDE (mg/l)	<0.2	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
ENDOSULFAN I (mg/l)		ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
p,p,-DDE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
DIELDRIN (mg/l)	<0.1	ND[19]	ND[19]	ND[19]	ND[19]	ND[19]	N/A	ND[19]	ND[19]	ND[19]	ND[19]
ENDRIN (mg/l)	0	ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
ENDOSULFAN II (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
p,p-DDD (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
ENDRIN ALDEHYDE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
ENDOSULFAN SULFATE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]

	Name	Nam Ngiep and Re-Regulation Reservoir									
	Zone	Upstream				Within Construction Site/ Re-Regulation Reservoir		Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04/R6	R7	NNG05	NNG06	NNG07	NNG08
	Date	6-Jun-17	7-Jun-17	7-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17	8-Jun-17
Parameters (Unit)	**Guideline**										
p,p-DDT (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]	ND[8]	N/A	ND[8]	ND[8]	ND[8]	ND[8]
METHOXYCHLOR (mg/l)		ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	N/A	ND[3]	ND[3]	ND[3]	ND[3]

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)			

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

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

	River Name	Nam Ngiep			
	Zone	Location Refer to Construction Sites			
		Upstream	Within (Reservoir)		Downstream
	Station Code	NNG09	NNG04 / R6	R7	NNG05
	Date	14-Jun-17	14-Jun-17	14-Jun-17	14-Jun-17
Parameters (Unit)	**Guideline**				
pH	5.0 – 9.0	7.51	7.46	7.62	7.97
DO (%)		7.75	7.9	6.29	7.95
DO (mg/l)	>6.0	101.1	100.7	81.7	100.8
Conductivity (µs/cm)		87	145	166	86
TDS (mg/l)		44	73	83	43
Temperature (°C)		26.74	26.26	27.45	27.44
Turbidity (NTU)		65.79	55.21	41.37	77.16
TSS (mg/l)		132.9	72.6	36.2	98.3
BOD_5 (mg/l)	<1.5	ND[13]	ND[13]	1.3	ND[13]
Total Coliform (MPN/100 ml)	<5,000	3,300	7,900	2,600	3,300
Faecal Coliform (MPN/100 ml)	<1,000	1,600	1,100	130	1,700
	River Name	Nam Ngiep			
	Zone	Upstream and Downstream Refer to Construction Sites			
		Upstream	Within (Reservoir)		Downstream
	Station Code	NNG09	NNG04 / R6	R7	NNG05
	Date	21-Jun-17	21-Jun-17	21-Jun-17	21-Jun-17
Parameters (Unit)	**Guideline**				
pH	5.0 – 9.0	7.58	7.8	7.83	7.91
DO (%)		8.88	7.48	6.24	7.05
DO (mg/l)	>6.0	101.3	94.9	82.4	91.6
Conductivity (µs/cm)		101	144	142	112
TDS (mg/l)		51	72	71	56
Temperature (°C)		25.99	26.83	27.7	27.51
Turbidity (NTU)		87	43.75	30.11	43.31
TSS (mg/l)		169.1	90.6	22	45

BOD_5 (mg/l)	<1.5	2.5	ND[13]	1.4	ND[13]
Total Coliform (MPN/100 ml)	<5,000	N/A	N/A	N/A	N/A
Faecal Coliform (MPN/100 ml)	<1,000	N/A	N/A	N/A	N/A

	River Name	Nam Ngiep									
	Zone	Upstream and Downstream Refer to Construction Sites									
		Upstream				Within/Re-regulation Reservoir		Downstream			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04/ R6	R7	NNG05	NNG06	NNG07	NNG08
	Date	27-Jun-17	28-Jun-17	28-Jun-17	29-Jun-17	29-Jun-17	29-Jun-17	29-Jun-17	29-Jun-17	29-Jun-17	29-Jun-17
Parameters (Unit)	**Guideline**										
pH	5.0 – 9.0	7.6	7.53	7.87	7.53	7.8	7.86	7.77	7.74	7.12	7.03
DO (%)		100.2	115.3	96.4	103.5	101.6	107.6	105.5	100.3	96.2	93.5
DO (mg/l)	>6.0	7.84	8.93	6.89	8.22	8.02	8.34	8.25	7.84	6.96	6.86
Conductivity (µs/cm)		114	98	96	96	96	95	98	96	57	57
TDS (mg/l)		57	49	48	48	48	47	49	48	28	28
Temperature (°C)		25.46	26	26.51	25.3	25.1	25.6	26.6	26.7	25.83	25.94
Turbidity (NTU)		66.2	47.02	36.97	19.3	32.95	24.52	19.8	25.7	37.61	32.47
TSS (mg/l)		N/A	N/A	N/A	46.95	42.19	25.85	29.29	N/A	N/A	N/A

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

Nam Chiane (NCH01) is located about 66 km upstream of the Main Dam. The COD, faecal coliform and total coliform exceeded the Surface Water Quality Standard with values recorded of 73.7 mg/l, 3,500 MPN/100 ml and 35,000 MPN/100 ml respectively.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The COD and faecal coliform exceeded the Surface Water Quality Standard with values recorded of 9 mg/l, and 1,700 MPN/100 ml respectively.

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

Nam Xao has a confluence with the Nam Ngiep downstream of the NNP1 Project construction site. The COD, faecal coliform and total coliform exceeded the Surface Water Quality Standard with values recorded of 13.5 mg/, 1,600 MPN/100 ml and 24,000 MPN/100 ml respectively.

Houay Soup Nyai has a confluence with the Nam Ngiep River downstream of NNP1 Project construction site. The COD and total coliform exceeded the Surface Water Quality Standard with values recorded of 73.7 mg/ and 11,000 MPN/100ml respectively.

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

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	6-Jun-17	7-Jun-17	8-Jun-17	8-Jun-17
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.19	7.72	7.23	6.99
DO (%)		88.1	93.7	90.5	84.3
DO (mg/l)	>6.0	7.03	7.26	6.87	6.56

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	6-Jun-17	7-Jun-17	8-Jun-17	8-Jun-17
Parameters (Unit)	**Guideline**				
Conductivity (µs/cm)		41	97	160	119
TDS (mg/l)		20	48	80	59
Temperature (°C)		24.2	25.78	28.2	26.8
Turbidity (NTU)		3,175	13.3	42.1	89
TSS (mg/l)		1,978	29.9	51.3	211
BOD5 (mg/l)	<1.5	ND[13]	ND[13]	ND[13]	1.1
COD (mg/l)	<5.0	73.7	9	13.5	30.9
NH3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]
NO3-N (mg/l)	<5.0	0.18	0.08	0.18	0.12
Total Kjeldahl Nitrogen (mg/l)		ND[9]	ND[9]	ND[9]	ND[9]
Chloride (mg/l)		9.2	ND[13]	5.3	ND[13]
Sulphate (mg/l)	<500	9.9	6	8.9	12.4
Alkalinity (mg/l)		19.6	44.6	45	13.8
Arsenic (mg/l)	<0.01	0.0147	0.0004	0.0006	0.0006
Calcium (mg/l)		6.65	11.3	10.2	3.19
Manganese (mg/l)	<1	0.582	0.06	0.096	0.036
Mercury (mg/l)	<0.002	0.0008	ND[3]	ND[3]	ND[3]
Magnesium (mg/l)		2.73	1.29	1.94	1.45
Lead (mg/l)	<0.05	ND[10]	ND[10]	ND[10]	ND[10]
Potassium (mg/l)		8.28	1.29	1.83	1.84
Sodium (mg/l)		1.59	1.82	3.3	0.519
Total Iron (mg/l)		85	0.669	2.87	6.98
Total coliform (MPN/100 ml)	<5,000	35,000	4,900	24,000	11,000
Faecal coliform (MPN/100 ml)	<1,000	3,500	1,700	1,600	920
a-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]
b-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]
g-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]
d-BHC (mg/l)	<0.02	ND[19]	ND[19]	ND[19]	ND[19]
HAPTACHLOR (mg/l)		ND[19]	ND[19]	ND[19]	ND[19]
ALDRIN (mg/l)	<0.1	ND[19]	ND[19]	ND[19]	ND[19]
HAPTACHLOR EXPOXIDE (mg/l)	<0.2	ND[19]	ND[19]	ND[19]	ND[19]
ENDOSULFAN I (mg/l)		ND[19]	ND[19]	ND[19]	ND[19]
p,p,-DDE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
DIELDRIN (mg/l)	<0.1	ND[19]	ND[19]	ND[19]	ND[19]
ENDRIN (mg/l)	0	ND[8]	ND[8]	ND[8]	ND[8]
ENDOSULFAN II (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
p,p-DDD (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
ENDRIN ALDEHYDE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
ENDOSULFAN SULFATE (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
p,p-DDT (mg/l)		ND[8]	ND[8]	ND[8]	ND[8]
METHOXYCHLOR (mg/l)		ND[3]	ND[3]	ND[3]	ND[3]

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

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

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	27-Jun-17	28-Jun-17	29-Jun-17	29-Jun-17
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.37	8.18	7.71	7.64
DO (%)		100.2	114	95	83.7
DO (mg/l)	>6.0	7.99	9.09	7.43	7.76
Conductivity(µs/cm)		51	102	106	20
TDS (mg/l)		25	51	53	10
Temperature (°C)		23.93	24.74	26.6	24.9
Turbidity (NTU)		22.84	8.7	37.7	61.8

3.2.3 Groundwater Quality Monitoring

During June 2017, NNP1PC sampled and analysed the groundwater quality in six boreholes which were built by the Project for re-settlers at Houay Soup Resettlement Area (HSRA).

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

Houay Soup Resettlement Area (HSRA)

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

Figure 3-6: Groundwater Quality Monitoring Locations

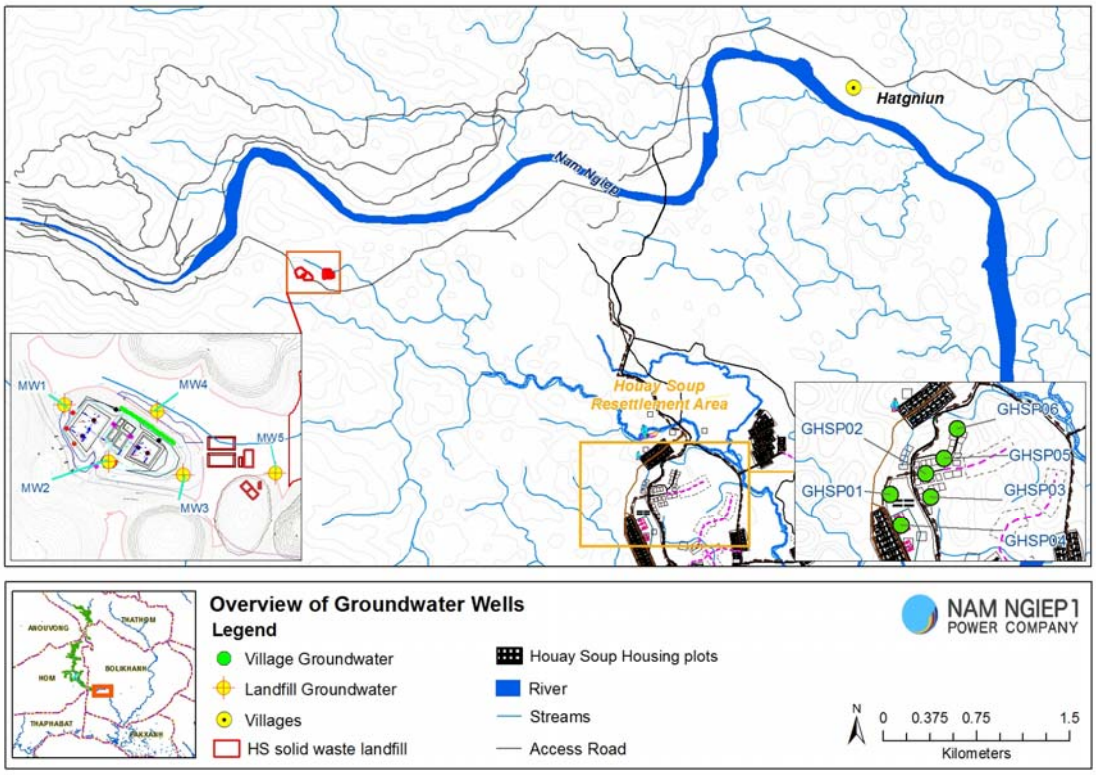


Table 3-9: Groundwater Quality Monitoring Results for Houay Soup Resettlement Area in May 2017

	Site Name	Houay Soup Resettlement Village					
	Station Code	GHSP01	GHSP02	GHSP03	GHSP04	GHSP05	GHSP06
	Date	2-Jun-17	2-Jun-17	2-Jun-17	2-Jun-17	2-Jun-17	2-Jun-17
Parameter (Unit)	**Guideline**						
pH	6.5-9.2	7.33	7.14	7.3	6.98	7.12	7.56
DO (%)		30	28.2	25.7	24.2	31.6	37.2
DO (mg/l)		2.32	2.19	1.99	1.86	2.41	2.88
Conductivity (µs/cm)		465	409	481	228	326	429
TDS (mg/l)	<1,200	232	205	240	114	163	215
Temperature (°C)		26.47	27.38	27.38	27.28	27.73	26.85
Turbidity (NTU)	<20	0.67	0.38	0.3	1.72	0.24	0.43
Nitrate nitrogen(mg/l)	<45	0.24	0.18	0.22	ND[7]	0.19	0.17
Total Hardness (mg/l)	<500	219	171	230	114	153	181
Nitrite nitrogen (mg/l)		ND[7]	ND[7]	ND[7]	ND[7]	ND[7]	ND[7]
Fluoride (mg/l)	<1	0.38	0.31	0.29	0.34	0.31	0.22
Arsenic (mg/l)	<0.05	0.0004	0.0003	0.0004	ND[2]	ND[2]	0.0004
Manganese (mg/l)	<0.5	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Magnesium (mg/l)		4.25	3.4	4.19	1.75	3.65	4.13
Cadmium (mg/l)	<0.01	ND[5]	ND[5]	ND[5]	ND[5]	ND[5]	ND[5]
Iron (mg/l)	<1	ND[10]	0.062	0.178	ND[10]	ND[10]	ND[10]
Faecal coliform (MPN/100 ml)	0	0	0	0	0	0	0
Ecoli Bacteria (MPN/100 ml)	0	0	0	0	0	0	0

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

NNP1 Solid Waste Landfill

Lead was detected in three of four boreholes at NNP1 Project Landfill (at MW1, MW3, and MW4) and one borehole at Houay Soup Landfill (MW5), higher than the standard, with range values recorded between 0.017 – 0.137 mg/l. In addition, the total coliform and faecal coliform contamination were found in the (MW1, MW3 and MW5). These lead results are similar to the levels found in the previous monitoring mission. It is unlikely that the levels of lead found in those boreholes are caused by seepage of leachate pond from the landfills - not least because lead has not been detected in the leachate.

Table 3-10 ***Results of the NNP1 Landfill Groundwater Quality Monitoring***

	Site Name	NNP1 Landfill				Houaysoup Landfill
	Station Code	MW1	MW2	MW3	MW4	MW5
	Date	16-Jun-17	16-Jun-17	16-Jun-17	16-Jun-17	19-Jun-17
Parameters (Unit)	**Guideline**					
pH		6.18	5.38	6.05	5.7	6.46
Sat. DO (%)		23.5	20.2	12	22.6	36.7
DO (mg/l)		1.79	1.57	0.95	1.73	2.87
Conductivity (µs/cm)		105	62	114	50	245
TDS (mg/l)		53	31	75	25	122
Temperature (°C)		26.17	26.11	26.34	26.6	25.82

Turbidity (NTU)		1.38	2.49	2.35	7.97	5.47
Biochemical Oxygen Demand (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]
Amonia-Nitrogen (mg/l)		ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
Total Nitrogen (mg/l)		0.42	1.73	1.74	0.76	2.05
Cadmium (mg/l)		ND[5]	ND[5]	ND[5]	ND[5]	ND[5]
Lead (mg/l)	<0.01	0.113	0.009	0.076	0.017	0.137
Total Phosphorus (mg/l)		0.02	0.03	0.09	0.1	0.09
Total coliform (MPN/100 ml)		460	0	33	0	540
Faecal Coliform (MPN/100 ml)		100	0	0	0	79
Total Petroleum Hydrocarbons (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]

ND[1] (<0.0005 mg/L)	ND[2] (<0.0003 mg/L)	ND[3] (<0.0002 mg/L)	ND[4] (<0.005 mg/L)	ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L)	ND[7] (<0.07 mg/L)	ND[8] (<0.00004 mg/L)	ND[9] (<0.02 mg/L)	ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L)	ND[12] (<0.2 mg/L)	ND[13] (<1.0 mg/L)	ND[14] (<1.5 mg/L)	ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)	ND[17] (<2.7 mg/L)	ND[18] (<25.0 mg/L)	ND[19] (<0.00002 mg/L)	

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

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

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

Thahuea All parameters complied with the National Drinking Water Standards except for faecal coliforms and E. Coli which were found to be 17 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN2): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E. Coli, which were found to be 79 MPN/100 ml for both parameters.

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

Table 3-11: Results of the Gravity Fed Water Supply Quality Monitoring

	Site Name	**Thaheua Village**	**Hat Gnuin Village**
	Station Code	**WTHH02**	**WHGN02**
	Date	**2-Jun-17**	**2-Jun-17**
	Guideline		
pH	6.5-9.2	7.21	7.3
DO (%)		30.4	37.2
DO (mg/l)		2.28	2.8
Conductivity (µs/cm)		88	122
TDS (mg/l)	<1,200	44	61
Temperature (°C)		29.03	28.84
Turbidity (NTU)	<20	1.77	0.86
Total Hardness (mg/l)	<500	52.3	55.7
Nitrate (mg/l)	<45	0.32	0.15
Fluoride (mg/l)	<1	0.23	0.25
Nitrite (mg/l)		ND[7]	ND[7]
Arsenic (mg/l)	<0.05	ND[2]	ND[2]
Manganese (mg/l)	<0.5	ND[4]	0.006
Mercury (mg/l)	<0.001	ND[3]	ND[3]
Magnesium (mg/l)		2.71	2.02

	Site Name	Thaheua Village	Hat Gnuin Village
	Station Code	WTHH02	WHGN02
	Date	2-Jun-17	2-Jun-17
	Guideline		
Selenium (mg/l)	<0.01	ND[1]	ND[1]
Cadmium (mg/l)	<0.01	ND[5]	ND[5]
Lead (mg/l)	<0.05	ND[10]	ND[10]
Iron (mg/l)	<1	0.016	0.052
Faecal coliform (MPN/100 ml)	0	17	79
Ecoli Bacteria (MPN/100 ml)	0	17	79

3.2.5 Landfill Leachate Monitoring

During June 2017, water samples were taken from the NNP1 Project Landfill's two last leachate ponds (LL3 & LL4) and discharge point (LL5), and from the final leachate pond (LL6) at the Houay Soup Landfill and discharge point (LL7). The location of the landfill leachate monitoring points is displayed in Error! Reference source not found. and Error! Reference source not found. below. The results indicate compliance with the relevant standards at discharge point of NNP1 Project Landfill and Houay Soup Landfill. Thus approximately 150 m^3 of the leachate in the last leachate pond (LL4) was pumped out and used to water newly grown grasses on the slope of the landfill at the end of June 2017.

Figure 3-7: *Landfill Leachate Monitoring Location*

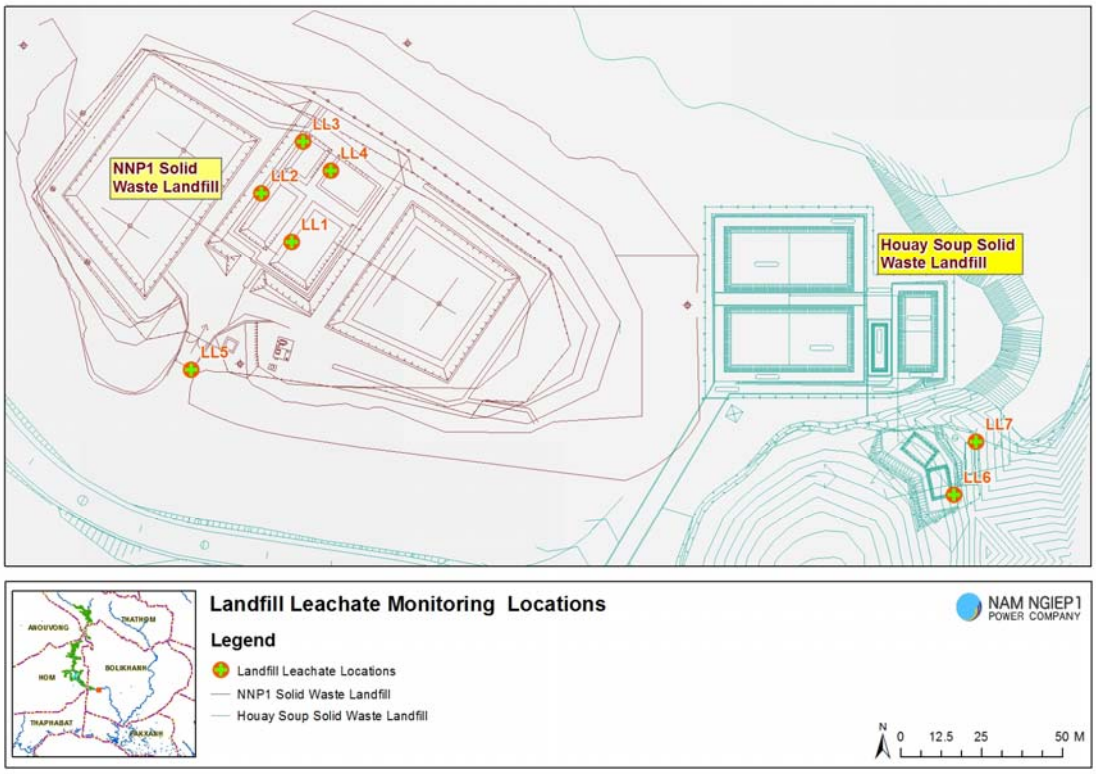


Table 3-12: Landfill Leachate Monitoring Results

	Site Name	NNP1 Landfill (Leachate Pond)		NNP1 Landfill Leachate Discharge	Houay Soup Landfill (Last Leachate Pond)	Houay Soup Landfill Leachate Discharge
	Station Code	LL3	LL4	LL5	LL6	LL7
	Date	15-Jun-17	15-Jun-17	15-Jun-17	15-Jun-17	15-Jun-17
Parameters (Unit)	Guideline					
pH	6.0 - 9.0	8.28	8.06	6.01	6.96	6.97
Sat. DO (%)		31.2	42.3	72.3	62.1	27.4
DO (mg/l)		2.29	3.16	5.27	4.62	2.06
Conductivity (µs/cm)		674	583	171	33	48
TDS (mg/l)		337	292	85	17	24
Temperature (°C)		28.65	28.89	28.09	29.17	28.73
Turbidity (NTU)		18.41	12.98	60.43	17.14	14.56
BOD_5 (mg/l)	<30	N/A	29.4	N/A	10.8	N/A
COD (mg/l)	<125	69.6	57.2	ND[18]	ND[18]	ND[18]
Total Nitrogen (mg/l)	<10	14	10.4	3.02	1.5	1.46
Arsenic (mg/l)		0.0028	0.0024	0.0011	ND[2]	ND[2]
Manganese (mg/L)		0.895	0.386	0.024	0.027	0.006
Mercury (mg/l)	<0.002	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]
Lead (mg/l)	<0.2	ND[10]	ND[10]	ND[10]	ND[10]	ND[10]
Total Iron (mg/L)	<2	1.73	0.596	3.28	0.461	0.505
Total Coliform (MPN/100ml)		N/A	79	N/A	170	N/A
Faecal Coliform (MPN/100ml)		N/A	79	N/A	170	N/A
Total Petroleum Hydrocarbons (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]

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

3.2.6 Dust Monitoring

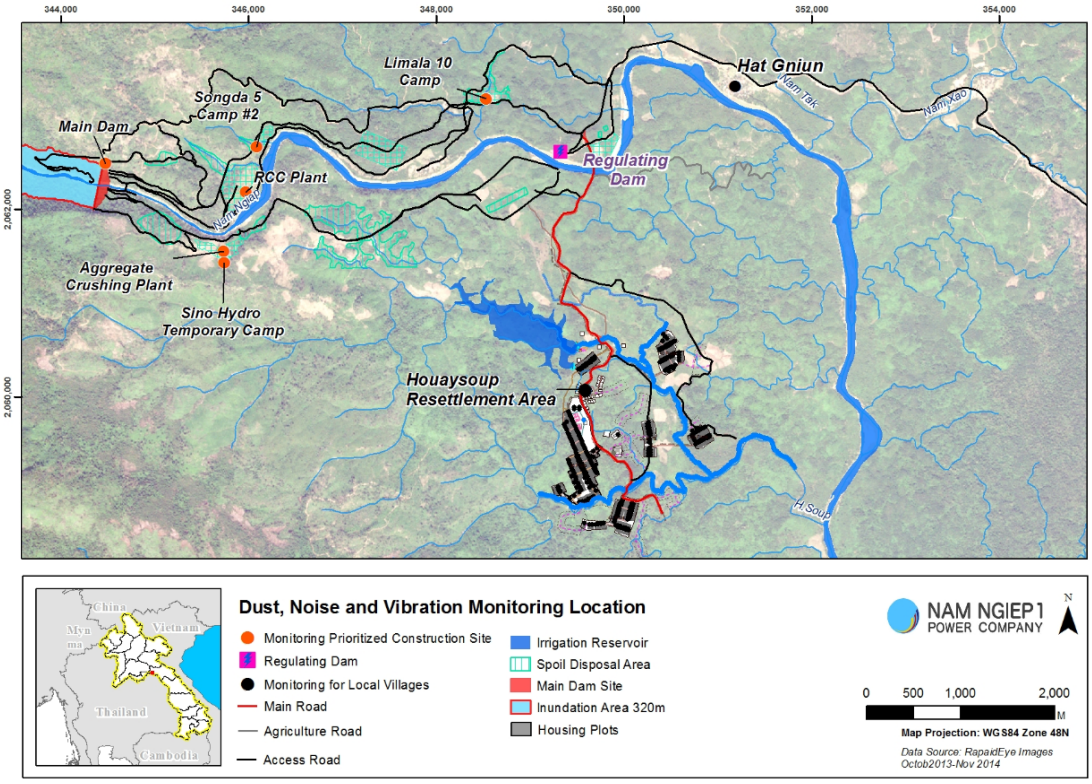
The monitoring points are indicated on the map in *Error! Reference source not found.*. Most of dust measurements complied with the National Standard, except at the Aggregate Crushing Plant, Sino Hydro Temporary Worker Camp and RCC Plant. Staff have been advised to wear dust masks while working in the areas at risk. The results are presented in ***Annex 2***.

3.2.7 Noise Monitoring

During June 2017, noise monitoring was conducted in Hat Gniun and Houay Soup Resettlement Area for at least 72 consecutive hours. Noise monitoring was also conducted at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Sino Hydro Temporary Workers' Camp and Lilama10 Camp (new) to assess possible impact on workers' health and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 consecutive hours.

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

Figure 3-8: Noise and Dust Emission Monitoring Locations



The noise levels recorded at the monitoring stations indicate full compliance with the National Standard for the period of 06:01-22:00. The noise levels during the period of 22:01-06:00 were slightly higher than the Standard at the Aggregate Crushing Plant, RCC Plant, Song Da 5 Camp No. 2, Lilama 10 Camp, Sino Hydro Temporary Workers' Camp and the Main Dam [between 54.83 – 62.65 dB(A) compared to the Standard of 50 dB(A)], and at Hat Gniun Village (during 11-12 June 2017) and Houay Soup Resettlement Village [46.04 – 54.46 dB(A)] compare to the Standard of 45 dB(A)]. The exceedance of noise level during the period of 22:01-06:00 is due to rain events overnight.

3.3 PROJECT WASTE MANAGEMENT

3.3.1 Solid Waste Management

In June 2017, approximately 175.4 m^3 of solid waste was disposed of at the NNP1 Project Landfill, an increase of 44.4 m^3 compared to May 2017. NNP1PC and the Landfill Contractor carried out a joint work completion inspection for Stage 2 Construction Works, which includes a second pit and slope stabilisation, on 08 June 2017. The Contractor will revise and submit a Detailed Work Programme and SS-ESMMP for Stage 2 including a Site Decommissioning Plan to NNP1PC for review and approval.

A total of 193 kg of recyclable waste were sold to Khounmixay Processing Factory by the Contractors as shown in **Table 3-13**

Table 3-13: *Amounts of Recyclable Waste Sold*

SOURCE AND TYPE OF RECYCLED WASTE		UNIT	SOLD	CUMULATIVE TOTAL BY JUNE 2017
Construction activity				
1	Scrap metal	kg	10,120	14,500
	Sub-Total 1	**kg**	**10,120**	**14,500**

SOURCE AND TYPE OF RECYCLED WASTE		UNIT	SOLD	CUMULATIVE TOTAL BY JUNE 2017
Operation camp				
2	Glass bottles	kg	68	479
3	Plastic bottles	kg	65	345
4	Paper/Cardboard	kg	48	180
5	Aluminium can	kg	12	213
Sub-Total 2		**kg**	**193**	**1,220**
Grand Total 1+2		**kg**	**10,313**	**15,720**

The food waste generated from the Owner's Site Office and Village (OSOV), selected camps of contractors and subcontractors continues to be collected by HSRA Villagers for use as animal feed (pig and poultry). A total of 8,934 kg was collected in June 2017 as shown in **Error! Reference source not found.** below

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

NO.	SITE NAME	UNIT	TOTAL
1	Song Da5 Camp No. 2	kg	3,800
2	Song Da5 Camp No. 1	kg	3,047
3	Obayashi Corporation Camp	kg	1,367
4	Owner's Village and Site Office (OSOV)	kg	501
5	LILAMA 10 Camp	kg	189
6	Kenber Camp	kg	30
Total		**kg**	**8,934**

In June 2017, NNP1PC produced a total of 250 kg of compost made from cut grasses, cow dung, rice husks, molasses, bio-effect (BE), water and discarded vegetables and fruits from the canteens of the Owner's Site Office and Village (OSOV), selected contractors and subcontractors (see ERROR! REFERENCE SOURCE NOT FOUND.). The compost will be used as organic fertilisers for fruit trees, plants and flowers in the OSOV and school at Houay Soup Resettlement Area (HSRA).

Photograph 5: NNP1PC Staff Made Compost from Organic Waste Collected Around the Camp Areas

Photograph 6: Houay Pamom Village Dismantling at 2LR

3.3.2 Hazardous Materials and Waste Management

In June 2017, joint hazardous materials and waste inventories were carried out at the main construction sites and subcontractors' camps. A monthly Hazardous Material and Waste Inventory is shown inError! Reference source not found..

Table 3-15: *Results of hazardous material inventory*

No.	Hazardous Waste Type	Unit	Total in June 2017 (A)	Disposal by Selling (B)	Remainder (A - B)
1	Used hydraulic and engine oil	Litre (L)	6,460	700	5,760
2	Used oil filters	Number	676	0	676
3	Empty paint and spray cans	Can	592	0	592
4	Empty used chemical drum/container	Drum (20 L)	1,036	0	1,036
5	Used tyre	No.	454	0	454
6	Ink cartridge	No.	338	0	338
7	Cement bag	Bag	300	0	300
8	Acid and caustic cleaners	Bottle	136	0	136
9	Empty used oil drum/container	Drum (20 L)	94	10 (Reuse)	84
10	Empty used chemical drum/container	Drum (200 L)	52	0	52
11	Empty used oil drum/container	Drum (200 L)	41	0	41
12	Halogen/fluorescent bulbs	No.	35	0	35
13	Contaminated soil, sawdust and concrete	Bag	28	0	28
14	Contaminated textile and material	Bag	25	0	25
15	Car battery	No.	13	0	13
16	Clinical waste	kg	14	0	14
17	Empty contaminated bitumen drum/container	Drum (200 L)	0	0	0
18	Used oil mixed with water	Litre (L)	0	0	0

3.4 Community Waste Management

3.4.1 Community Recycling Programme

In June 2017, a total of 412 kg of recyclable waste was recorded, a decrease of 556 kg compared to May 2017. This is partly due to the school holiday thus not much recyclable waste was sold by school children.

The types and amounts of waste recycled and remained in the Community Recycle Waste Bank in June 2017 are presented in **Table 3-16**

Table 3-16: *Types and amounts of waste traded*

Types of Waste	Unit	Remaining in May 2017	Additions in June 2017	Sold	Remaining in June 2017
Scrap metal	kg	1,169	116	0	1,285
Glass bottles	kg	549	219	0	768
Paper/cardboard	kg	268	22	0	290
Plastic bottles	kg	155	37	192	0
Aluminium cans	kg	88	18	91	15
Total	**kg**	**2,229**	**412**	**283**	**2,358**

During 21 – 22 June 2017, NNP1PC-ESD carried out a joint waste inspection and assessment prior to relocation in four villages Houaypamom, Sopphouane, Sopyouak (Nong) and Namyouak in Zone 2LR (Lower Reservoir), Hom District, Xaysomboun Province. It was estimated that approximately 260 units of septic tanks will need to be treated by lime and backfilled after the dismantling is completed. The waste cleaning-up will be commenced as soon as the wet season ends in late October 2017.

3.4.2 Houay Soup Resettlement Area Waste Management

NNP1PC is in process of hiring a contractor to work on the slope stabilisation and erosion control at the Houay Soup Landfill, and another contractor is being hired to collect waste at HSRA and two host Villages and operate the Houay Soup Landfill. The procurement is expected to be completed in July 2017.

Approximately 7 m^3 of solid waste from the local contractors and residents at HSRA was disposed of at the Houay Soup Landfill. In addition, on 30 June 2017, NNP1PC-ESD staff, local authorities of Borikhan District and new residents at HSRA carried out a joint social and environmental activities by raising the local resident's awareness on health, cleaning-up their own house areas and maintaining planted trees around the schools. A total of 4.5 m^3 of solid waste collected from this activity was disposed of at Houay Soup Landfill and about 35 kg of recyclable waste was separated and stored at the Community Recycle Waste Bank in Hat Gniun Village.

3.5 Watershed and Biodiversity Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligation[2]	Status by June 2017
Final NNP1 Watershed Management Plan is submitted to ADB will be satisfied with the following conditions: 1. NNP1 and ADB agree on the Watershed Management Plan (WMP) plus budget of WMP excluding endemic fish offset work by 21 July 2017 2. Confirmation of the workshop arrangement by Government of Lao by 15 August 2017	• Preparation of NNP1 WMP continues. NNP1PC received comments from ADB on 17 June 2017 followed by teleconference with ADB Team on 19 June 2017. The revised version addressing some comments from ADB was submitted to NNP1PC for internal review on 29 June 2017. • NNP1PC EMO will discuss the new workshop date with GOL.
Public hearing process for the provincial regulation commencement (to be informed by NNP1PC)	The draft provincial regulation will be discussed with GOL during WMP workshop including the expected date of sequence of the process.

Activities in June 2017	Results
Preparation for NNP1 Watershed Management Plan	• The comments from ADB focuses on Section 8 – Watershed Management Issues and Activity with the following key notes: o To provide further detail on the action plan for each of the five themes; o To improve the proposed table of activities; o To further clarify the discussion of Reservoir Management Plan; o To emphasize the need of collaboration between NNP1PC and Xieng Khuang Province to address the impacts from the upstream watershed; o To further improve the mitigation on the biodiversity specially to address No Net Loss; and o To further improve and clarify the design of WMP budget particularly on the additional funding, budget allocation, and proportion of funding for the two Provinces (Xaysomboun and Bolikhamxay). • The revised version addressing some comments from ADB was submitted to NNP1PC for internal review on 29 June 2017.

[2] New deadline of CP Watershed Management based on the agreement between NNP1PC and ADB on 25-26 June 2017

	• In parallel, the translation to Lao version of the WMP sections with no major revision is being finalized by NNP1 EMO team.
WRPO Activities	• NNP1 received an official letter from NNP1 Watershed and Reservoir Protection Committee (WRPC) (Ref. No. 033/WRPC.XSB) at the end of May 2017 on the proposal of pre-WMP activities for Xaysomboun WRPO from 1 May to 31 July 2017 with the total budget of USD 25,346. The budget covers the office operation/administration cost and implementation of participatory land use planning in three villages (Ban Thaviengxay, Ban Xiengkhong and Ban Viengthong) at Thathom District, Xaysomboun Province. • After internal discussion between NNP1 EMO and Xaysomboun WRPO, NNP1PC responded officially in the first week of June 2017 to request chairperson of WRPC to postpone the activity until WMP is approved. • In the third week of June 2017, Xaysomboun WRPO informed NNP1 EMO on the arrangement of Xaysomboun WRPC-WRPO as follow: o Minister of MONRE officially confirmed on 6 June 2017 that Xaysomboun PONRE will remain as implementing agency of NNP1 Watershed Management within Xaysomboun administration o Xaysomboun Provincial Authority officially confirmed on 7 June 2017 that the former Head of Xaysomboun WRPO moved to new Provincial Departments and the Deputy Head of Xasyomboun WRPO is assigned as Acting Head of Xaysomboun WRPO
Xaysomboun Intergraded Spatial Planning (ISP)	• Xaysomboun ISP team is finalizing the ISP and preparing it for final review and approval by the provincial and district leaderships. • NNP1 EMO followed up and collected the improved ISP from Xaysomboun ISP Team. NNP1 EMO completed the review of improved Xaysomboun ISP in the third week of June 2017 and noted that the plan has minor improvement because the comments addressed by NNP1 and MONRE DEQP in March 2017 were not completely addressed and clarified. • NNP1 EMO management plans to have discussion with MONRE DEQP Team to improve the situation and conclude the plan as soon as possible.

3.5.2 Biodiversity Offset Management

Obligation[3]	Status by June 2017
Consultant for BOMP is acceptable to ADB and in-house consultant is hired (instead of Summer Survey) will be satisfied with the official confirmation from NNP1 on the appointment of Consultant (Mr. Troy Hansel) by 30 June 2017	• Recruitment of a consultant for the development of the Biodiversity Offset Management Plan (BOMP) resumed in May 2017 after discussion with Bolikhamxay Provincial Authority. • NNP1PC has selected a preferred candidate and started contract negotiations, which are expected to be completed in July 2017
Draft BOMP, Consensus building workshop of BOMP, Final BOMP, and draft provincial regulation for BOMP will be satisfied when NNP1PC and ADB agreed on the Offset Option Paper by 20 October 2017	• Not relevant at this time
Public hearing process for the provincial regulation commencement to be informed by NNP1	• Not relevant at this time
Activities in June 2017	**Results**
Activities pre-BOMP period of 01 October 2016 – 31 September 2017	• Biodiversity Offset Management Committee (BOMC) have concluded the selection of a pre-BOMP Consultant in the second week of June 2017. The consultant will be officially on board starting from 1 July 2017. • BOMC and NNP1 EMO Team conducted community relationship building activity from 19 June - 02 July 2017 at six villages within Nam Chouane-Nam Xang (NC-NX) Offset Site. The main objectives of the activity are:

[3] New deadline of CP Biodiversity Management based on the agreement between NNP1PC and ADB on 25-26 June 2017

	o To inform the community on the importance of NC-NX and the role and responsibility of Local Coordination Unit at community level for their awareness and participatory on the on-going and future implementation of BOMP; o To increase community awareness on the current use of natural resources in the offset site; o To present the status of land use within six villages in NC-NX Offset Site based on the recent information from community mapping exercise. • BOMC will share with NNP1PC the second quarterly report (technical and financial) April – June 2017 including the report of community relationship building by middle of July 2017. • ADB Consultant conducted a mission to NC-NX Offset Site from 22-27 June 2017 to understand the overall progress of pre-BOMP activities and to get an impression of the situation within villages inside NC-NX Offset Site. Some of the key notes during the wrap-up on 27 June 2017: o ADB Consultant is pleased with the progress of pre-BOMP activities managed by BOMC team and recommended to focus on patrolling program as soon as possible o ADB Consultant suggested BOMC to consider hiring an expert for designing, training, and supervising the implementation of patrolling program taking the lesson learned from other projects such as Phou Sithone, Nam Et-Phoulouey, and Nam Kang in Bokeo Province. o BOMC noted that BOMP development will be delayed and the pre-BOMP activities for 2018 should be developed in August 2017 to be ready for implementation by October 2017.

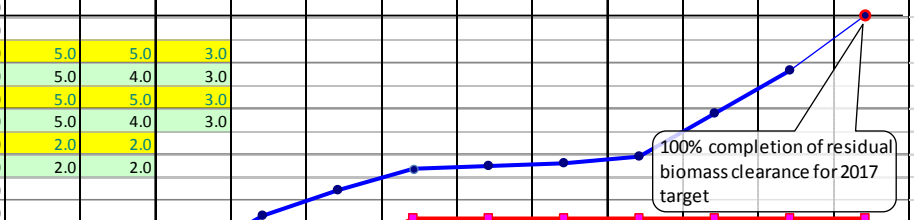
3.5.3 Biomass Clearance

Activities in June 2017	Results
Labour recruitment and machinery management	• 8 workers from Longsan were recruited intermittently for cutting remaining trees and piling logs in Block 1. • 5 Contractor Staff and 11-17 intermittent-recruited workers from Ban Nam Youak and Longsan cut the remaining trees and piled logs/debris in Block 2. • 4 Contractor Staff re-stockpiled logs/debris in Block 3. 7-11 workers from Ban Hat Ngiun and Longsan were recruited intermittently for cutting remaining trees and piling logs/debris. In addition, one tractor and one bulldozer were mobilized in late June 2017 for stockpiling log/debris. • 12 Contractor Staff piled residual logs/debris in Block 4. 23-58 workers from Longsan, Hat Ngiun, and Ban Nahan were recruited intermittently for re-stockpiling residual logs/debris. In addition, two mini tractors and one tractor were used for stockpiling logs/debris. • 3 Contractor Staff piled residual log/debris in Block 5. In addition, one excavator was used for clearing and stockpiling logs/debris. • 7 Contractor Staff re-stockpiled and burnt residual log/debris in Block 16 and Block 17. 7-10 workers from Ban Phonhom were mobilized on 30 June 2017 for re-stockpiling and burning residual log/debris in Block 16.
Perform biomass clearance	• The remaining trees within progress area for biomass burning of around 15 ha in Block 1 were cut and stockpiled. • Trees cutting and stockpiling of logs/debris of around 4.10 ha in Block 2 were completed. • Stockpiling log/debris of around 3 ha in Block 3 was completed. The burning of stockpiled log/debris is being progressed. • Stockpiling log/debris of around 21 ha in Block 4 was completed. The burning of stockpiled log/debris was carried out intermittently due to the rain. • Biomass cutting of around 1.5 ha and stockpiling log/debris of around 6 ha in Block 5 were completed. • Stockpiling log/debris is being carried out in Block 16. • Stockpiling log/debris in Block 17 was completed while burning log/debris was carried out intermittently due to the rain. • The field monitoring and verification of biomass clearance progress were conducted since late June 2017. The biomass clearance progress to date can be seen in **Table 3-17**. The biomass clearance progress in map could be seen from **Figure 3-10** to **Figure 3-28**.

The overall progress of biomass clearance programme is demonstrated in **Error! Reference source not found.**11 below.

Figure 3-9: Gantt Chart of Biomass Clearance Programme in 30 June 2017

	Task List / Steps of work		Weight (%)	YEAR 2017												% S-Curve
				Q1			Q2			Q3			Q4			
				01	02	03	04	05	06	07	08	09	10	11	12	
1	**UXO Search and Clearance**	**Planed**	0.0													100
		Actual	0.0													96
1.1	Perform UXO work for 549.20 ha (6 blocks) of priority biomass clearance on lower and central reservoir	**Planed**	13.0	5.0	5.0	3.0										93
		Actual	12.0	5.0	4.0	3.0										89
1.2	Perform UXO work for 334.03 ha (5 blocks) of priority biomass clearance on lower and central reservoir	**Planed**	13.0	5.0	5.0	3.0										86
		Actual	12.0	5.0	4.0	3.0										82
1.3	Perform UXO work for 84.58 ha (2 blocks) of priority biomass clearance on upper reservoir	**Planed**	4.0	2.0	2.0											79
		Actual	4.0	2.0	2.0											75
2	**Biomass Clearance**	**Planed**	0.0													71
		Actual	0.0													68
2.1	Perform biomass clearance for 593.61 ha (6 blocks) on lower and central reservoir	**Planed**	18.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	2.0	64
		Actual	9.0	3.0	2.0	1.0	1.0	1.0	1.0							61
2.2	Perform biomass clearance for 462.09 ha (5 blocks) on lower and central reservoir	**Planed**	18.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	2.0	57
		Actual	10.0	3.0	2.0	2.0	1.0	1.0	1.0							54
2.3	Perform biomass clearance for 212.66 ha (7 blocks) on central and upper reservoir	**Planed**	17.0	3.0	3.0	3.0	2.0	1.0					2.0	2.0	1.0	50
		Actual	12.0	3.0	2.0	3.0	1.0	2.0	1.0							46
3	**Preparation of Floating/Debris Removal**	**Planed**	0.0													43
		Actual	0.0													39
3.1	Procurement of service for floating logs/debris removal	**Planed**	5.0						2.5						2.5	36
		Actual	2.0						2.0							32
4	**Monitoring and Reporting**	**Planed**	0.0													29
		Actual	0.0													25
4.1	Field monitoring and inspection of biomass clearance and compliance to SS-ESMMP (weekly & Monthly)	**Planed**	10.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	1.0	1.0	1.0	21
		Actual	5.5	1.0	1.0	1.0	1.0	1.0	0.5							18
4.2	Coordination or Ad-hoc meeting to discuss the progress, concerns and problem solving	**Planed**	2.0		0.5				0.5			0.5			0.5	14
		Actual	0.5		0.5											11
	Total	**Planed**	100.0	**22.0**	**22.5**	**16.0**	**7.0**	**4.0**	**3.5**	**0.5**	**0.5**	**1.0**	**7.0**	**7.0**	**9.0**	7
		Actual	67.0	**22.0**	**17.5**	**13.0**	**4.0**	**5.0**	**5.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	4
	Planned Progress	monthly		22.0	22.5	16.0	7.0	4.0	3.5	0.5	0.5	1.0	7.0	7.0	9.0	
		Cumulative		22.0	44.5	60.5	67.5	71.5	75.0	75.5	76.0	77.0	84.0	91.0	100.0	
	Actual Progress	monthly		22.0	17.5	13.0	4.0	5.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	
		Cumulative		22.0	39.5	52.5	56.5	61.5	67.0	67.0	67.0	67.0	67.0	67.0	67.0	



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

Table 3-17: ***Biomass and UXO Clearance Progress in Each Priority Area as of 30 June 2017***

Target area		Biomass Clearance Progress (ha) as of 30 June 2017		Remaining area (Ha) Plan Oct-Dec 2017)	Remark
Block	Total	Total Progress	Completed Clearance		
B1	109.24	54.06		55.18	Verified on 30 June 2017
B2	158.63	87.19	8.54	71.45	Verified on 30 June 2017
B3	80.35	35.44		44.93	Verified on 30 June 2017
B4	163.74	137.83	10.33	25.92	Verified on 30 June 2017
B5	340.14	119.81	5.62	220.34	Verified on 30 June 2017
B6	31.92	3.33		28.59	To be verified
B7	39.65	2.03		37.61	Not yet start
B8	37.61	7.78		29.83	Not yet start
B9	52.75	1.26		51.49	Not yet start
B10	269.1	168.74		100.36	To be verified
B11	89.98	89.98			To be verified
B12	64.11	64.03		0.08	To be verified
B13	101.24	101.24			To be verified
B14	43.33	43.33			To be verified
B15	43.73	43.74	7.88		Verified as 30 June 2017
B16	3.32	3.32			To be verified
B17	7.96	7.96			Verified as 30 June 2017
B18	3.95	3.95			To be verified
Total	**1,640.76**	**974.99**	**32.37**	**665.78**	

Explanation notes

Completed clearance: - Complete burning residual logs/debris to ash and only stump remains

Verified / To be verified: - Verification by NNP1 and Biomass Contractor from field inspection plus areal drone record

Figure 3-10 Biomass clearance progress map of Block 1

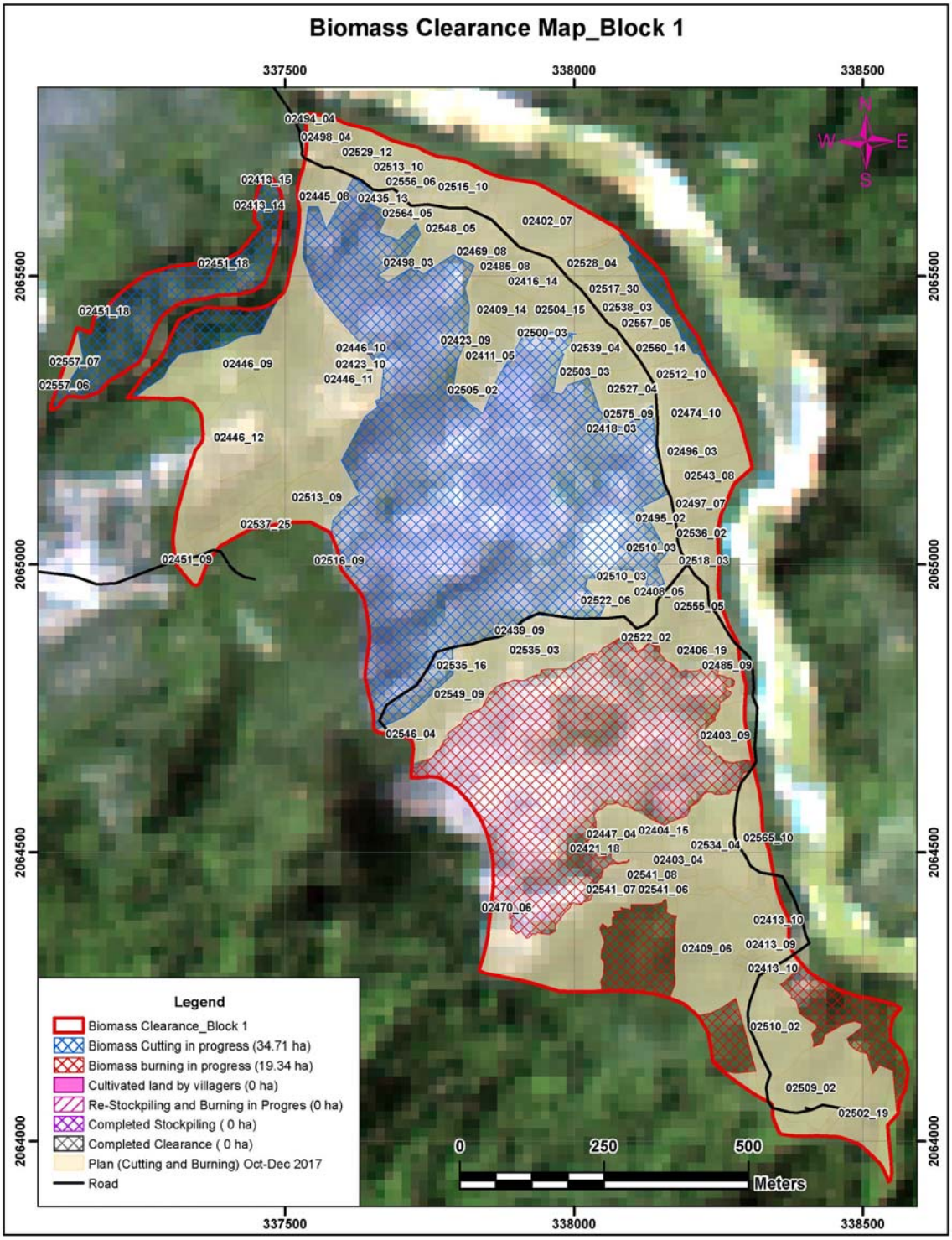


Figure 3-11 Biomass clearance progress map of Block 2

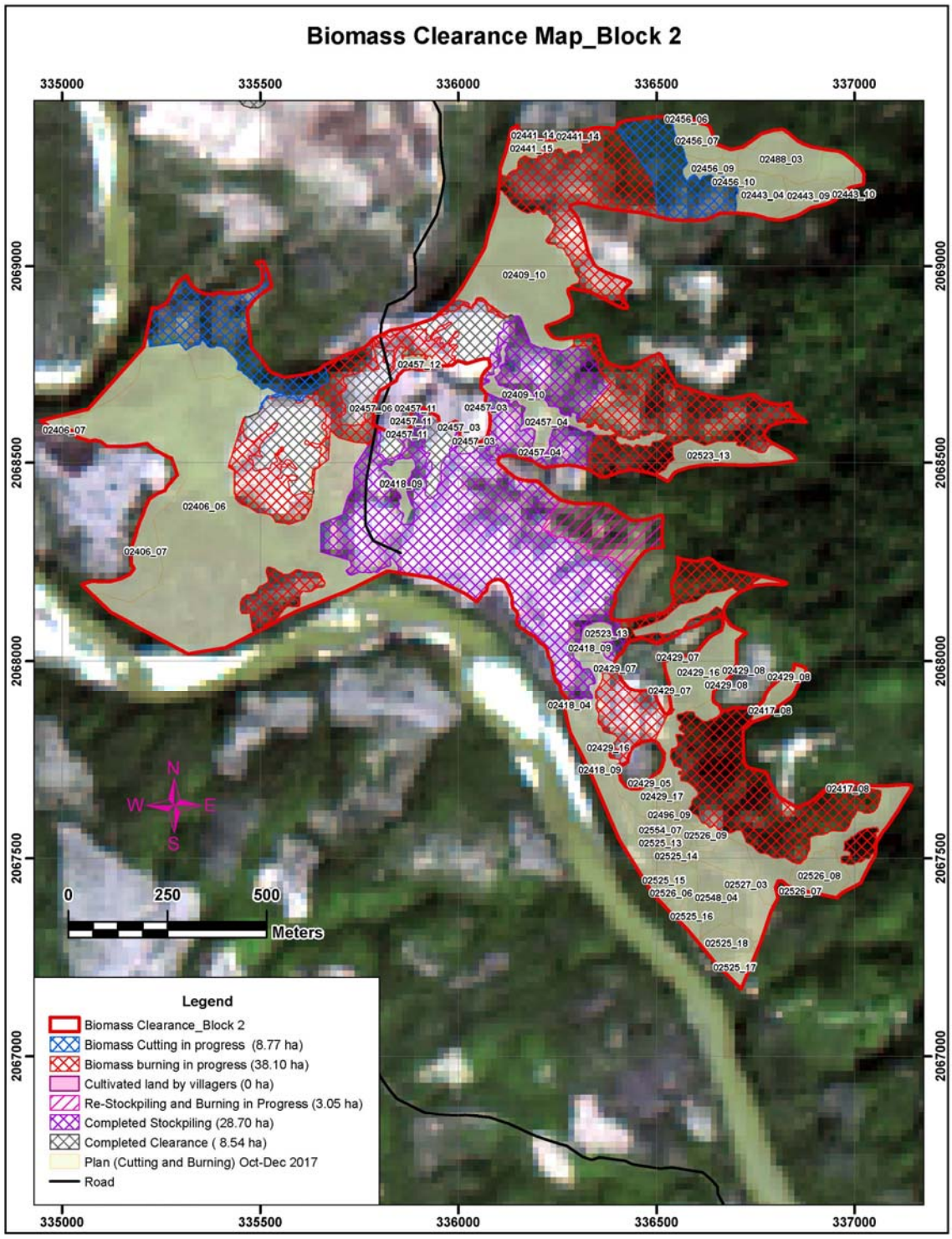


Figure 3-12 Biomass clearance progress map of Block 3

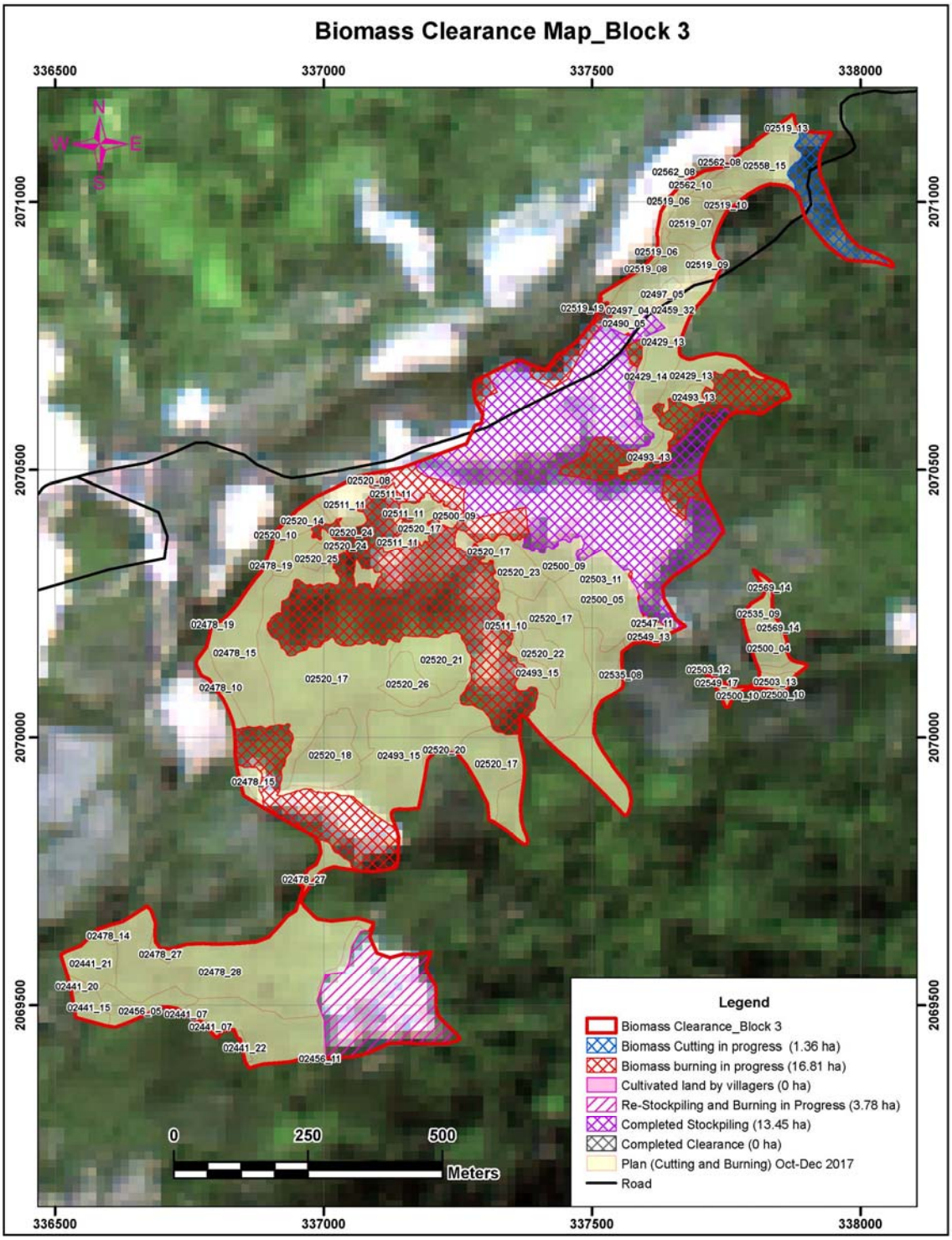


Figure 3-13 Biomass clearance progress map of Block 4

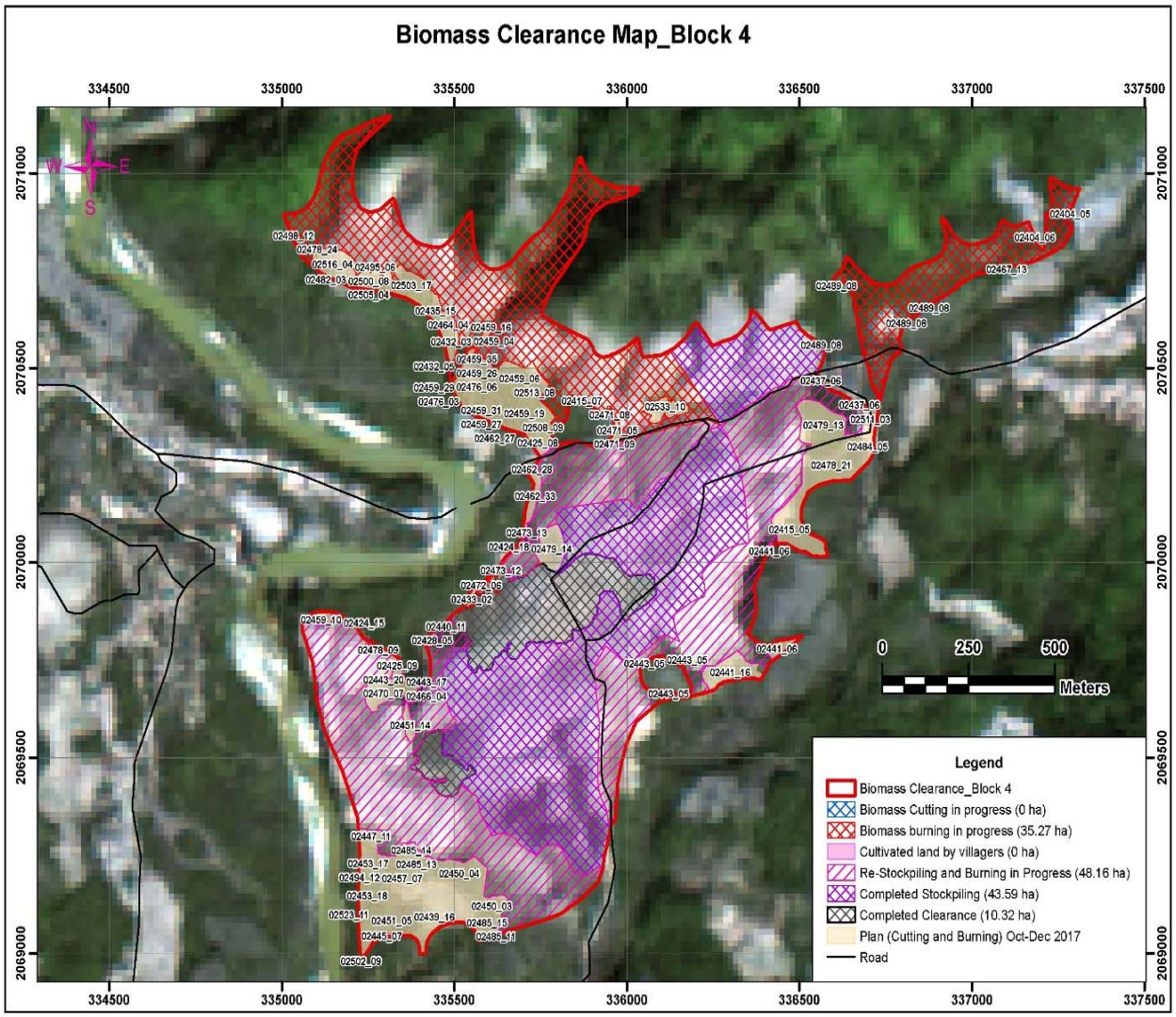


Figure 3-14 Biomass clearance progress map of Block 5

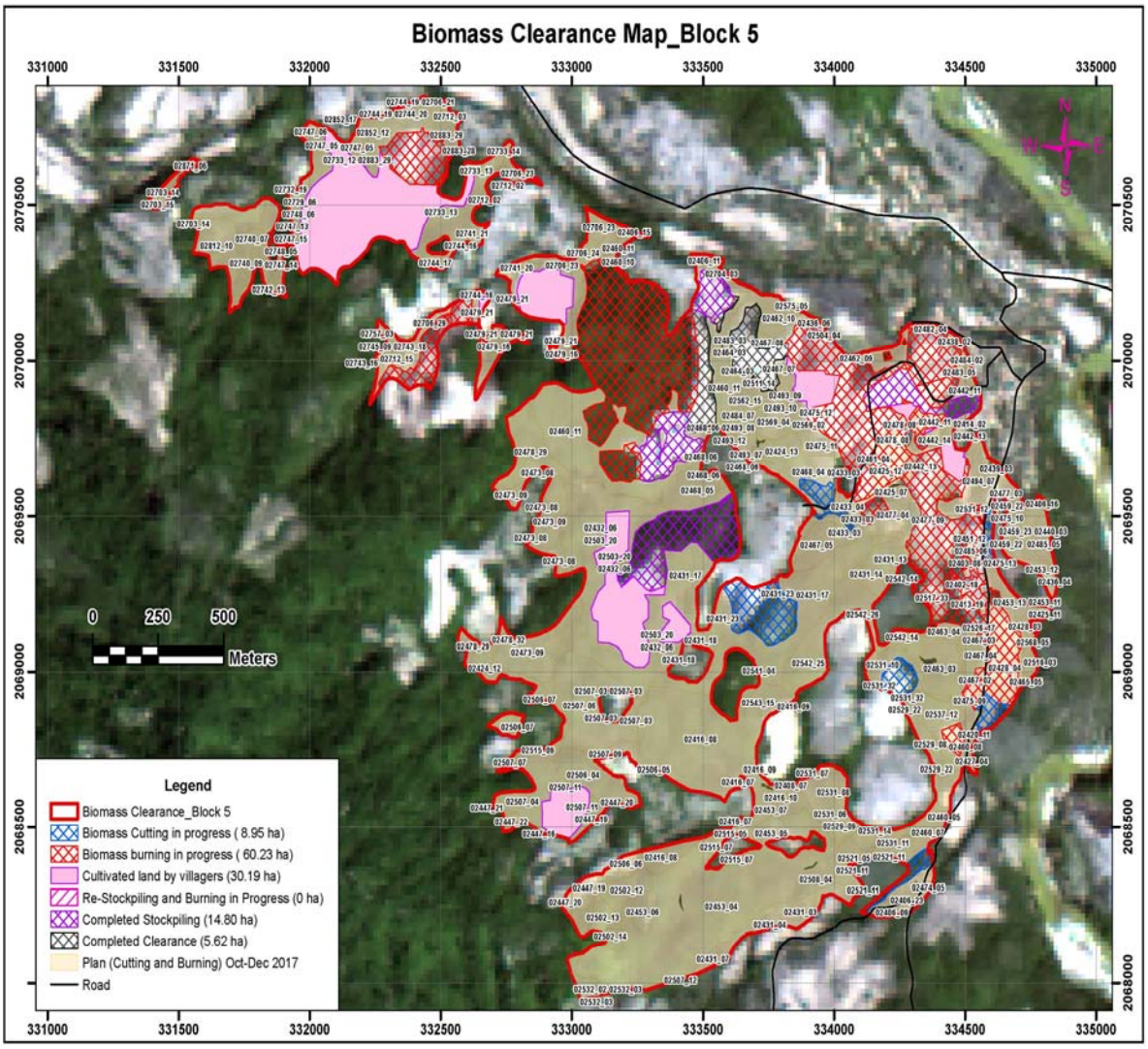


Figure 3-15 Biomass clearance progress map of Block 6

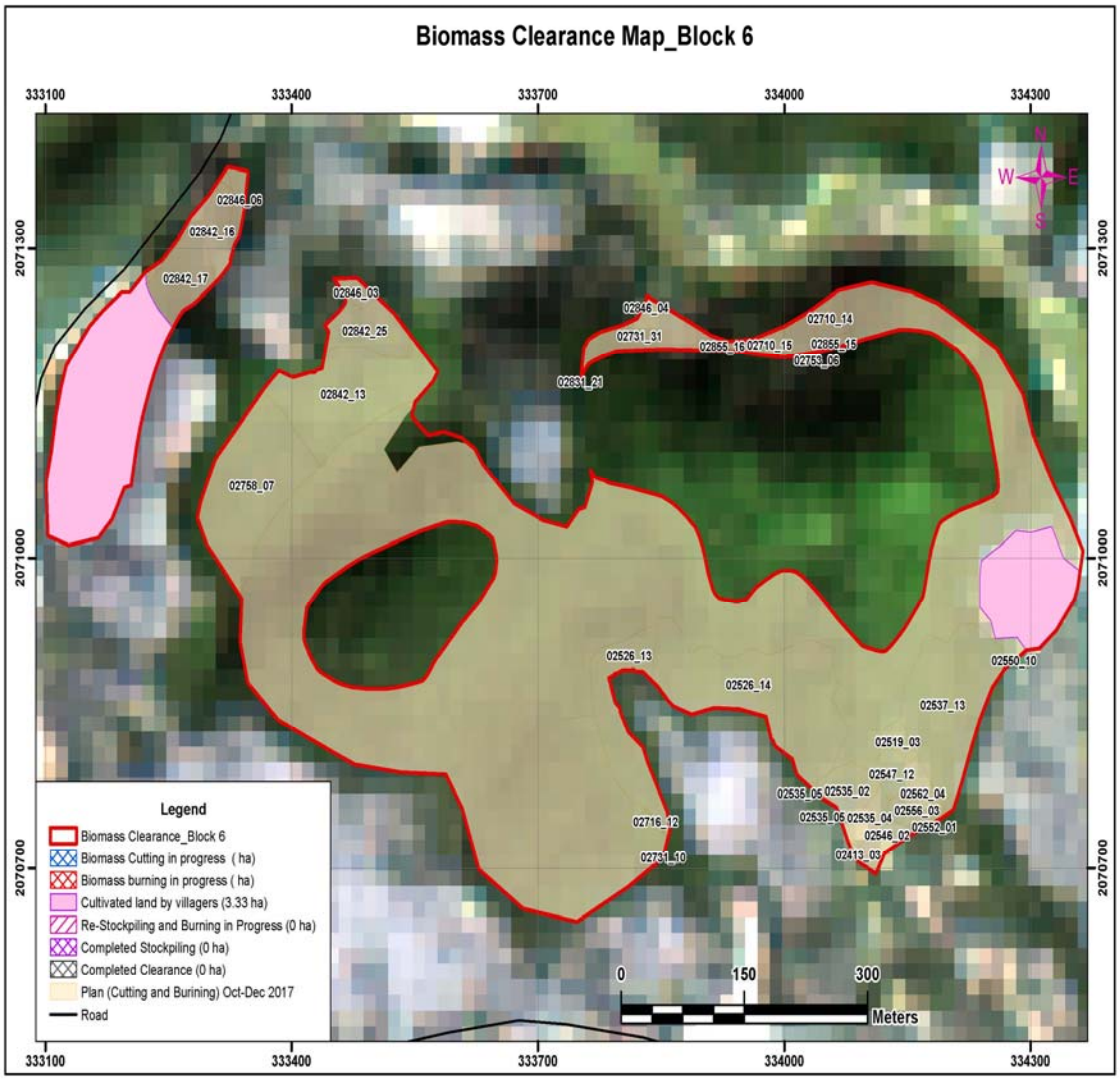


Figure 3-16 Biomass clearance progress map of Block 7

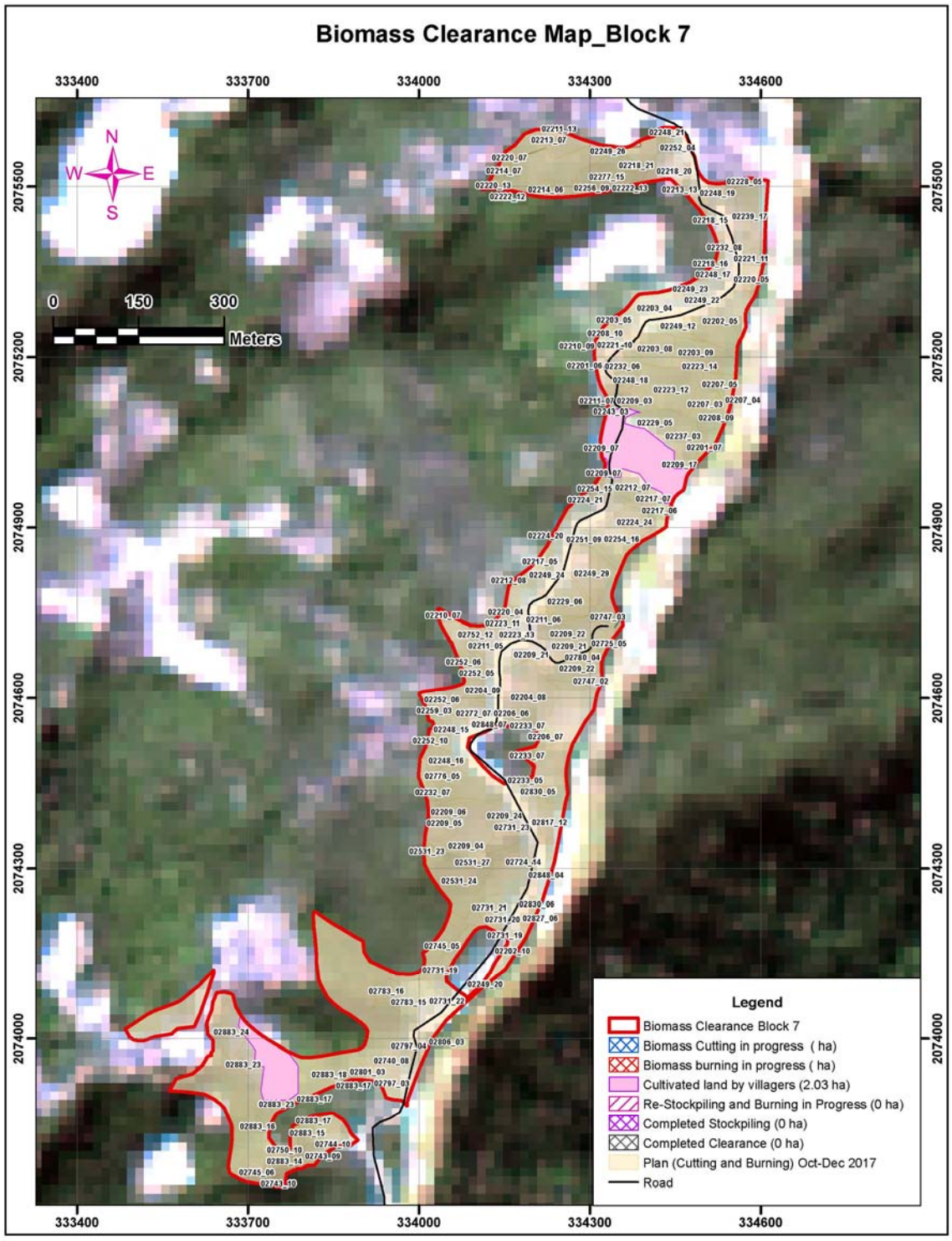


Figure 3-17 Biomass clearance progress map of Block 8

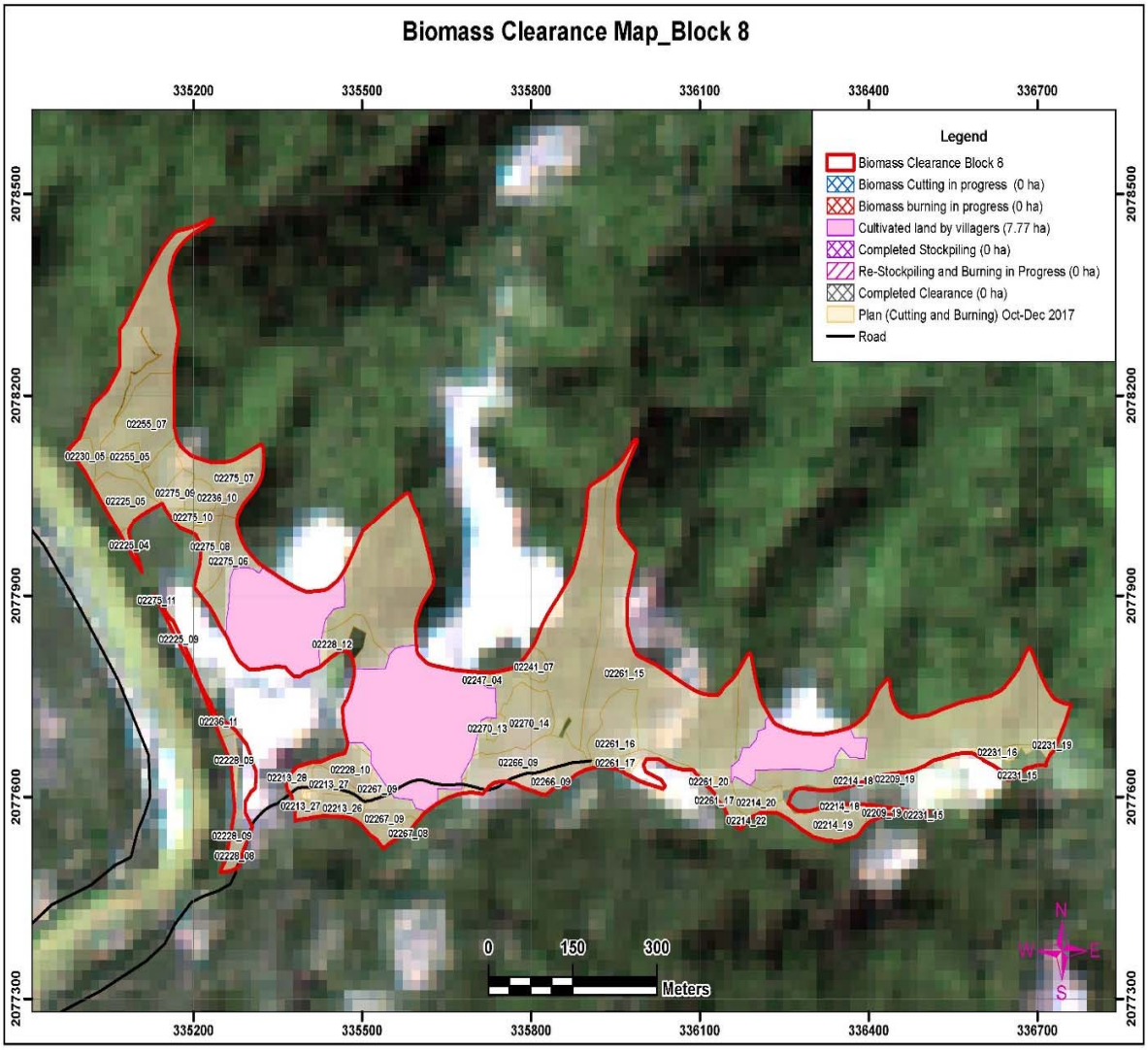


Figure 3-18 Biomass clearance progress map of Block 9

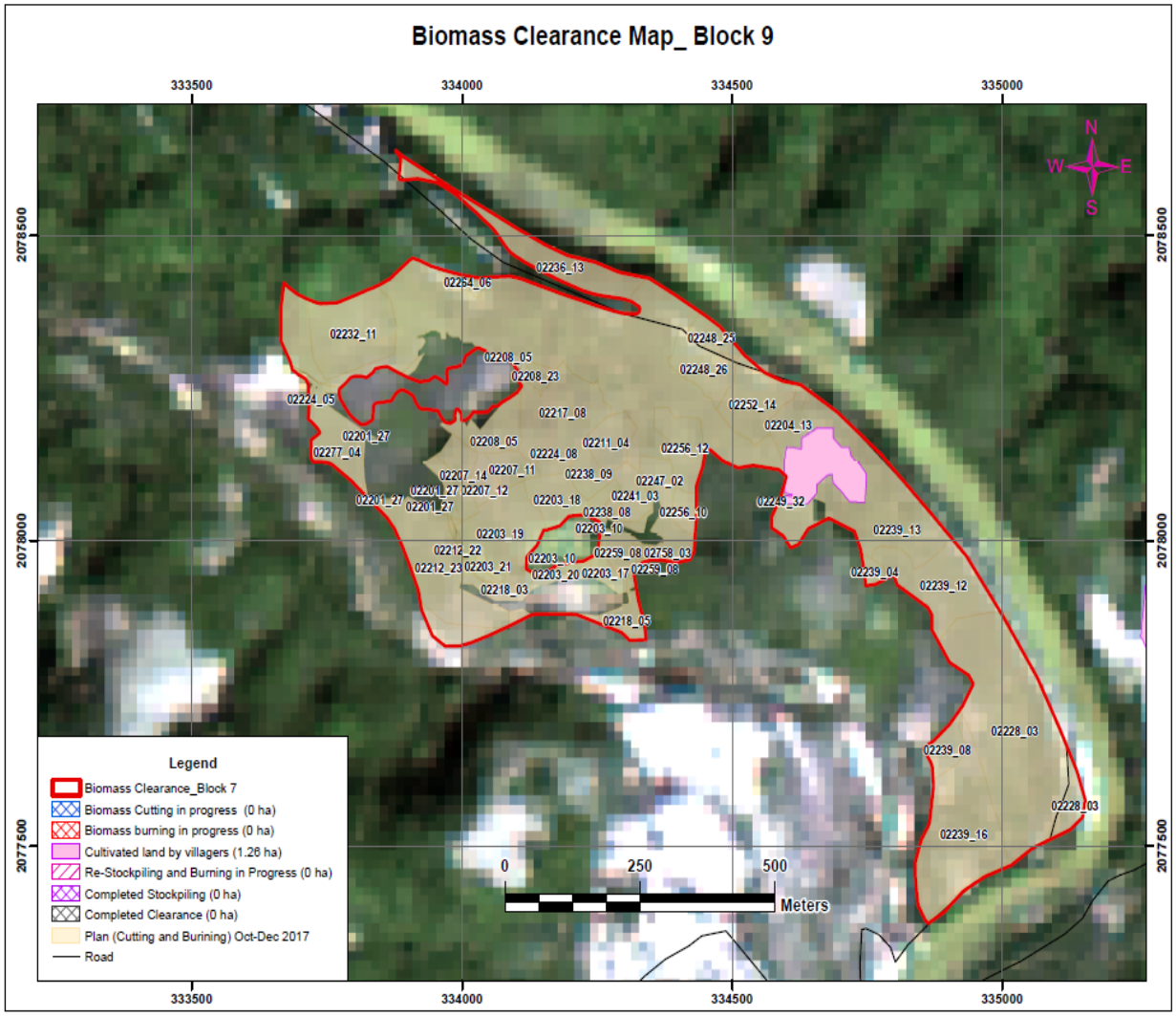


Figure 3-19 Biomass clearance progress map of Block 10

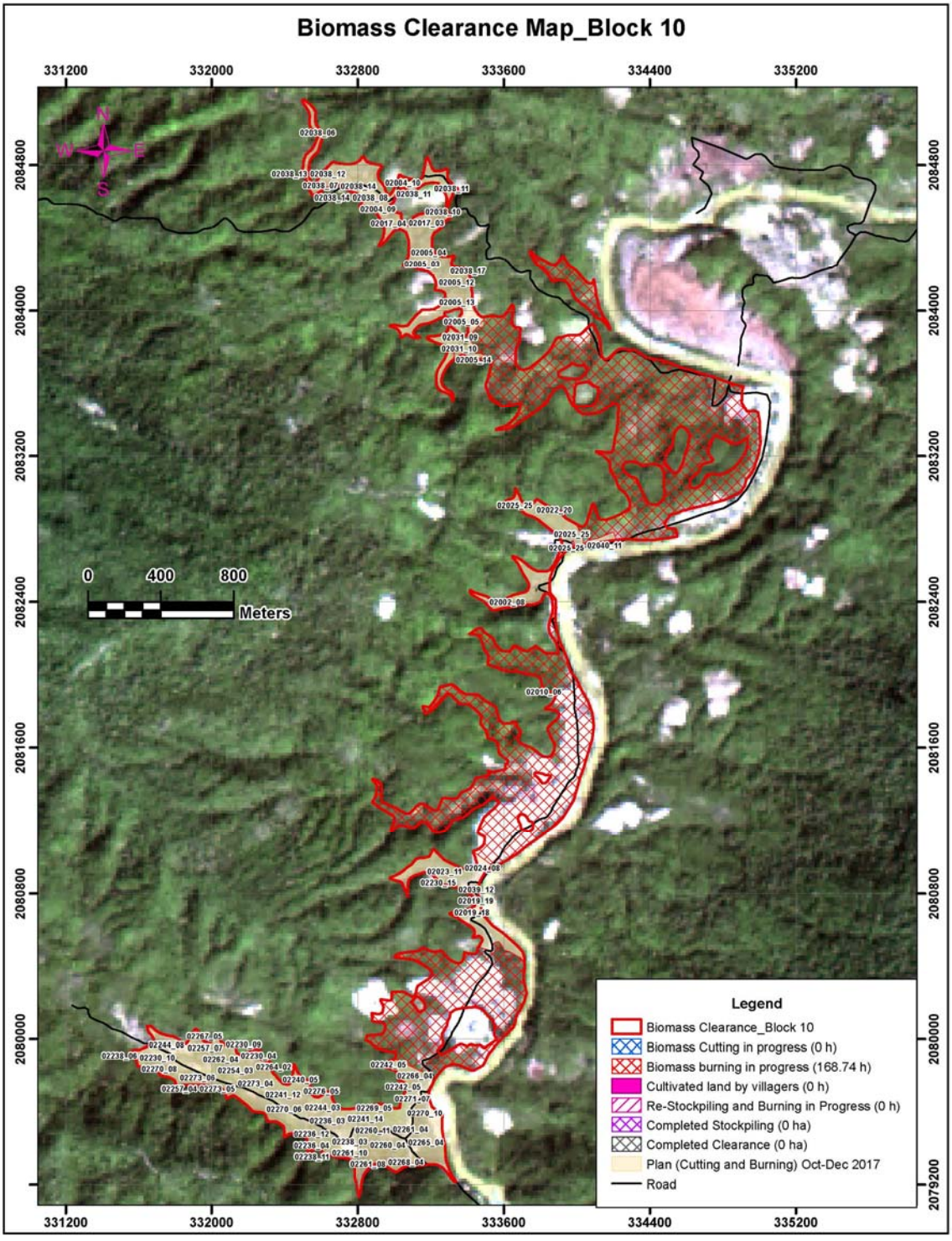


Figure 3-20 Biomass clearance progress map of Block 11

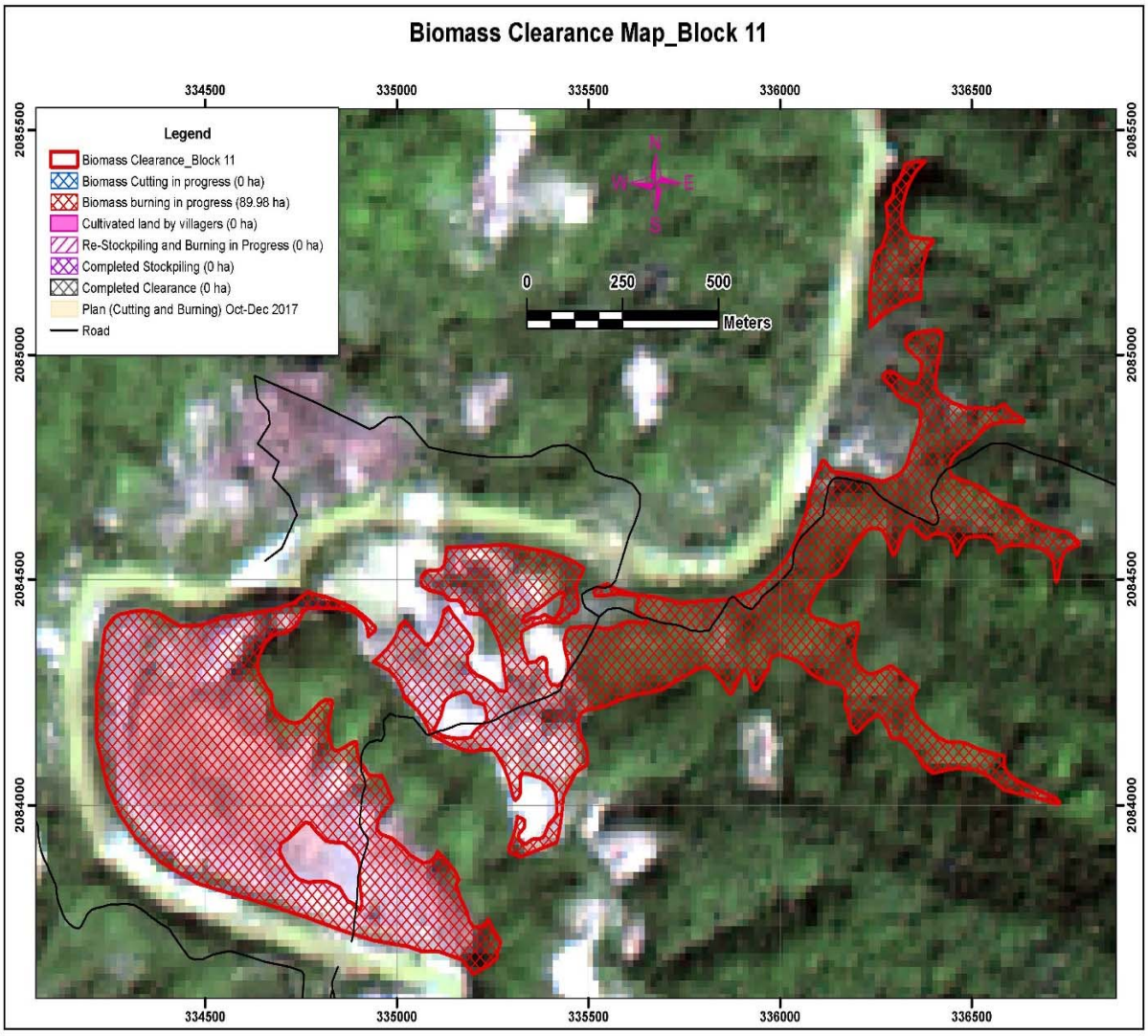


Figure 3-21 Biomass clearance progress map of Block 12

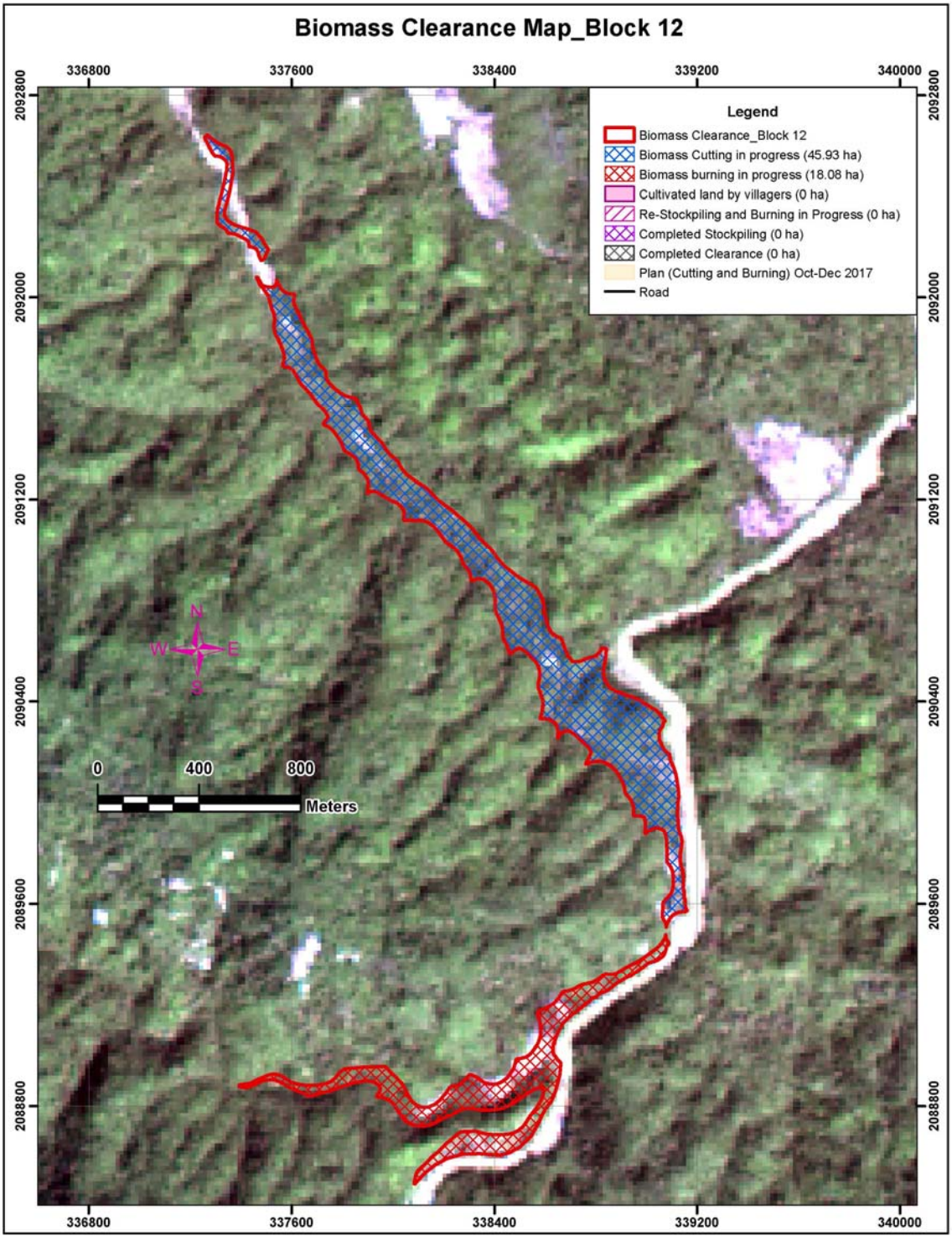


Figure 3-22 Biomass clearance progress map of Block 13

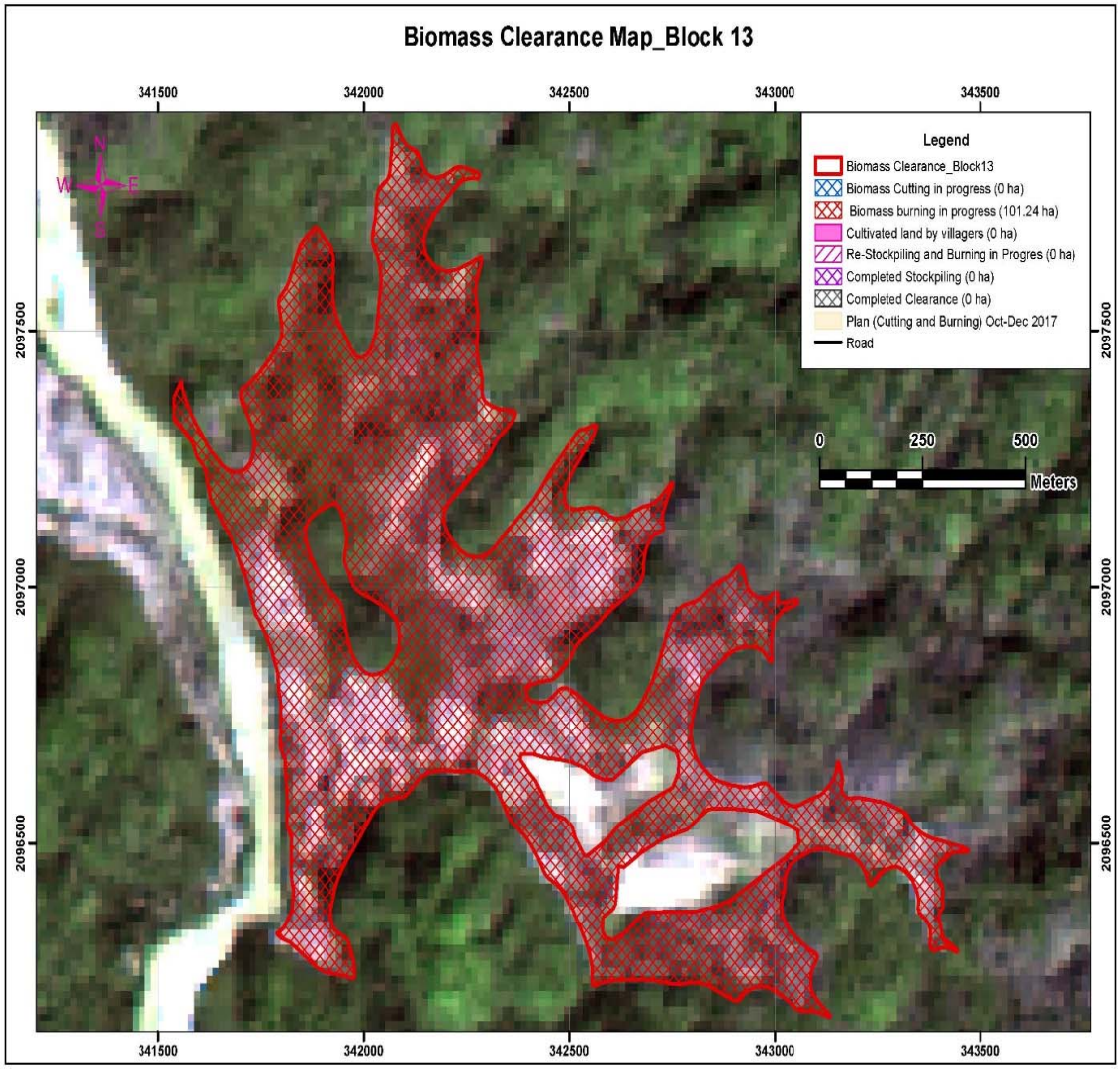


Figure 3-23 Biomass clearance progress map of Block 14

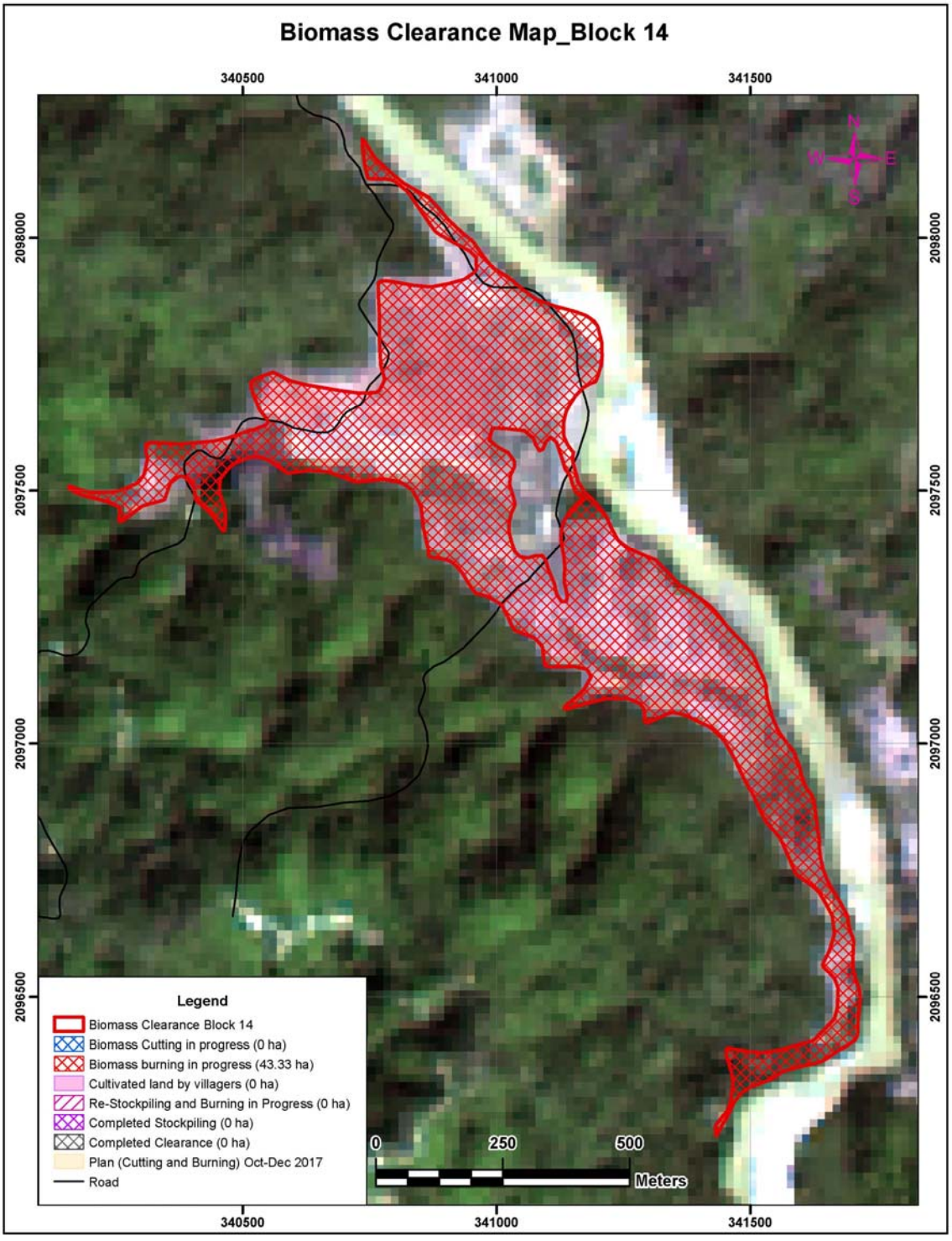


Figure 3-24 Biomass clearance progress map of Block 15-1

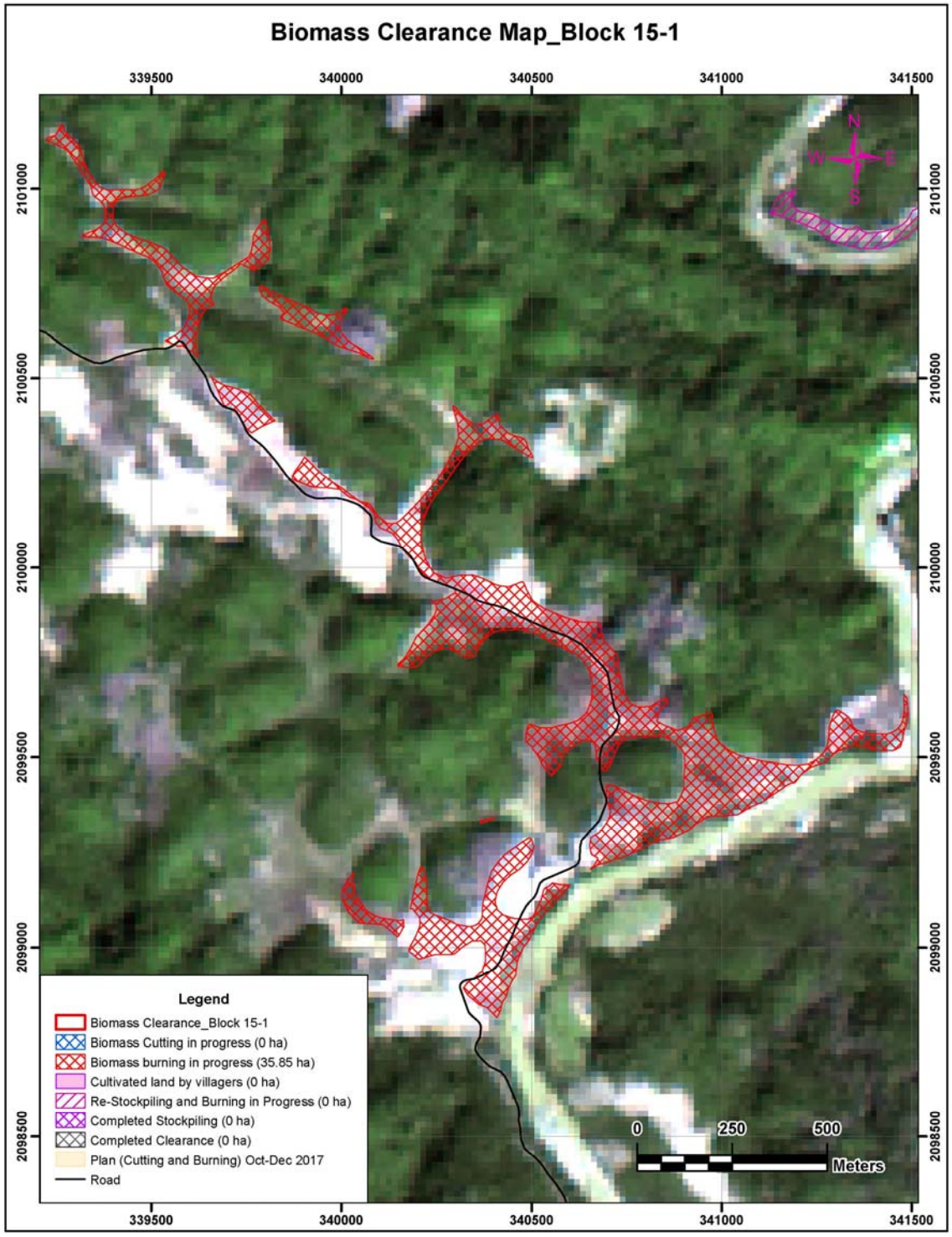


Figure 3-25 Biomass clearance progress map of Block 15-2

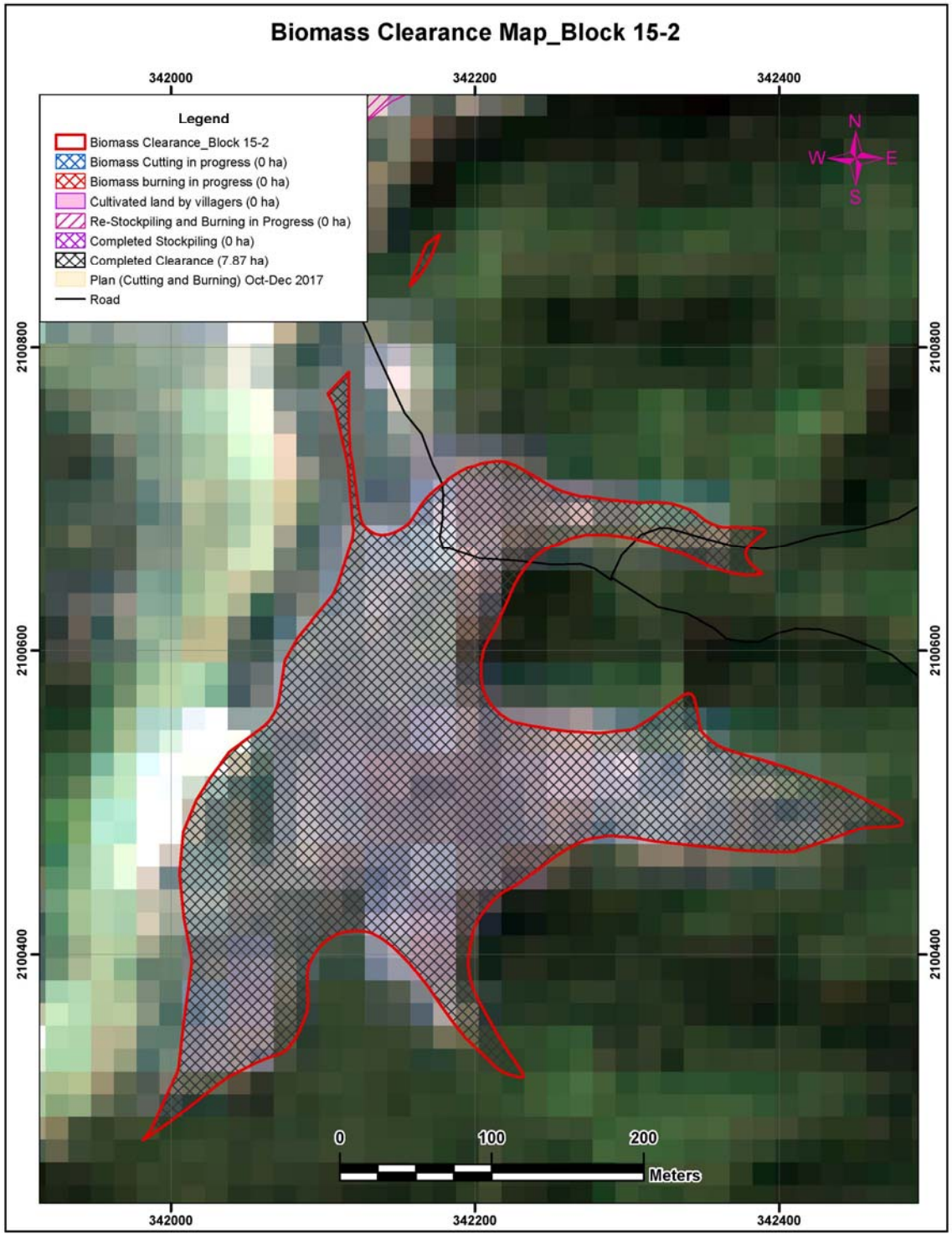


Figure 3-26 Biomass clearance progress map of Block 16

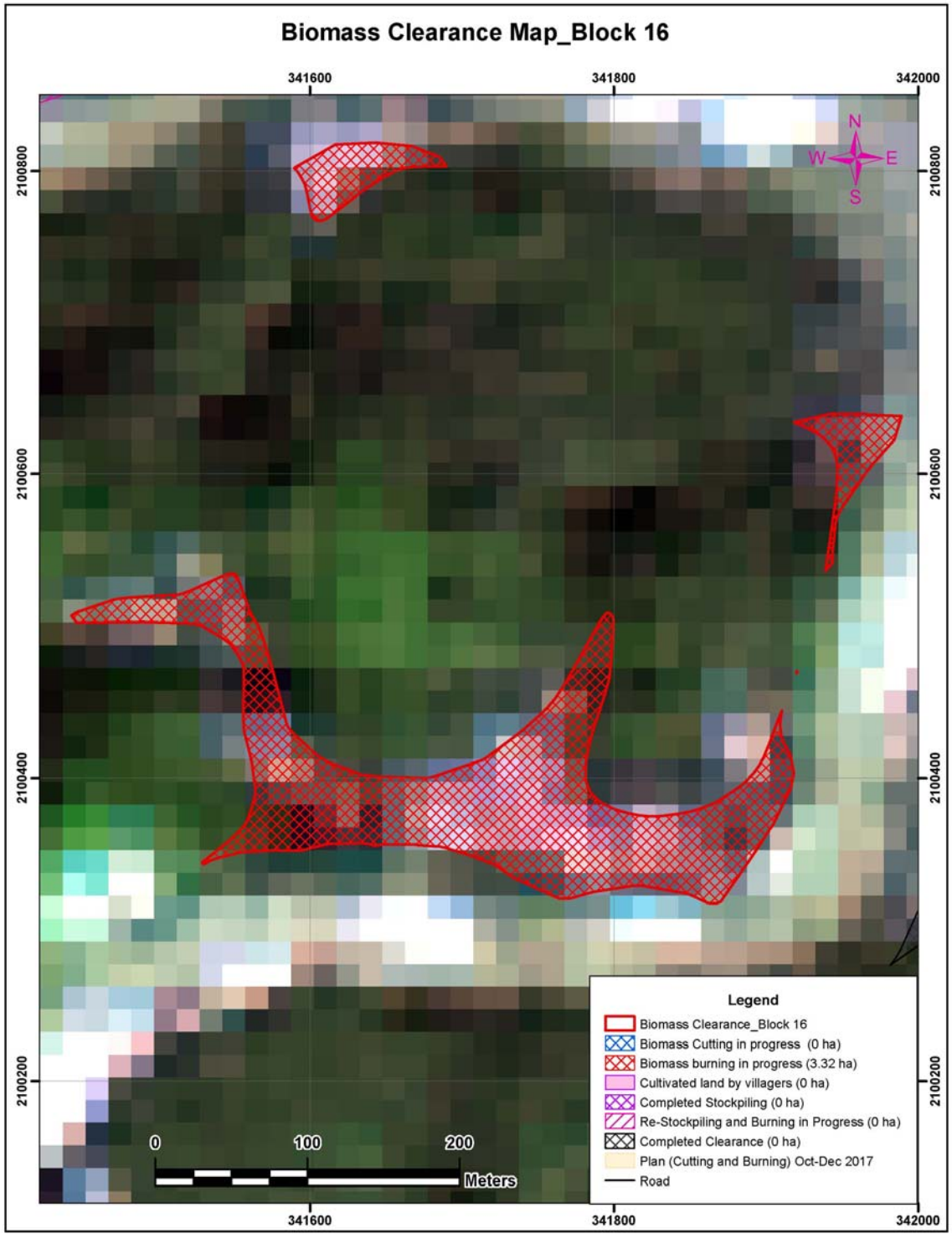


Figure 3-27 Biomass clearance progress map of Block 17

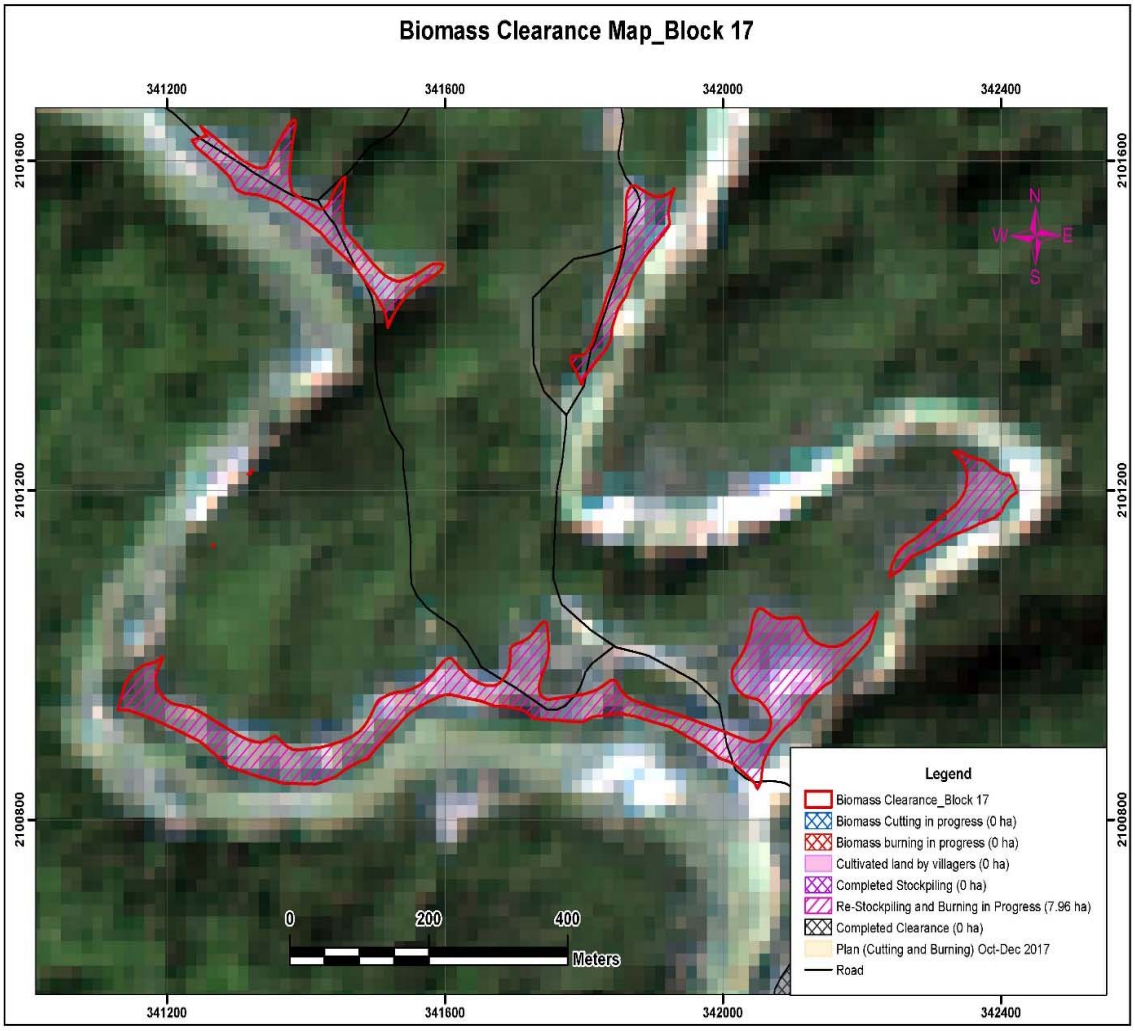
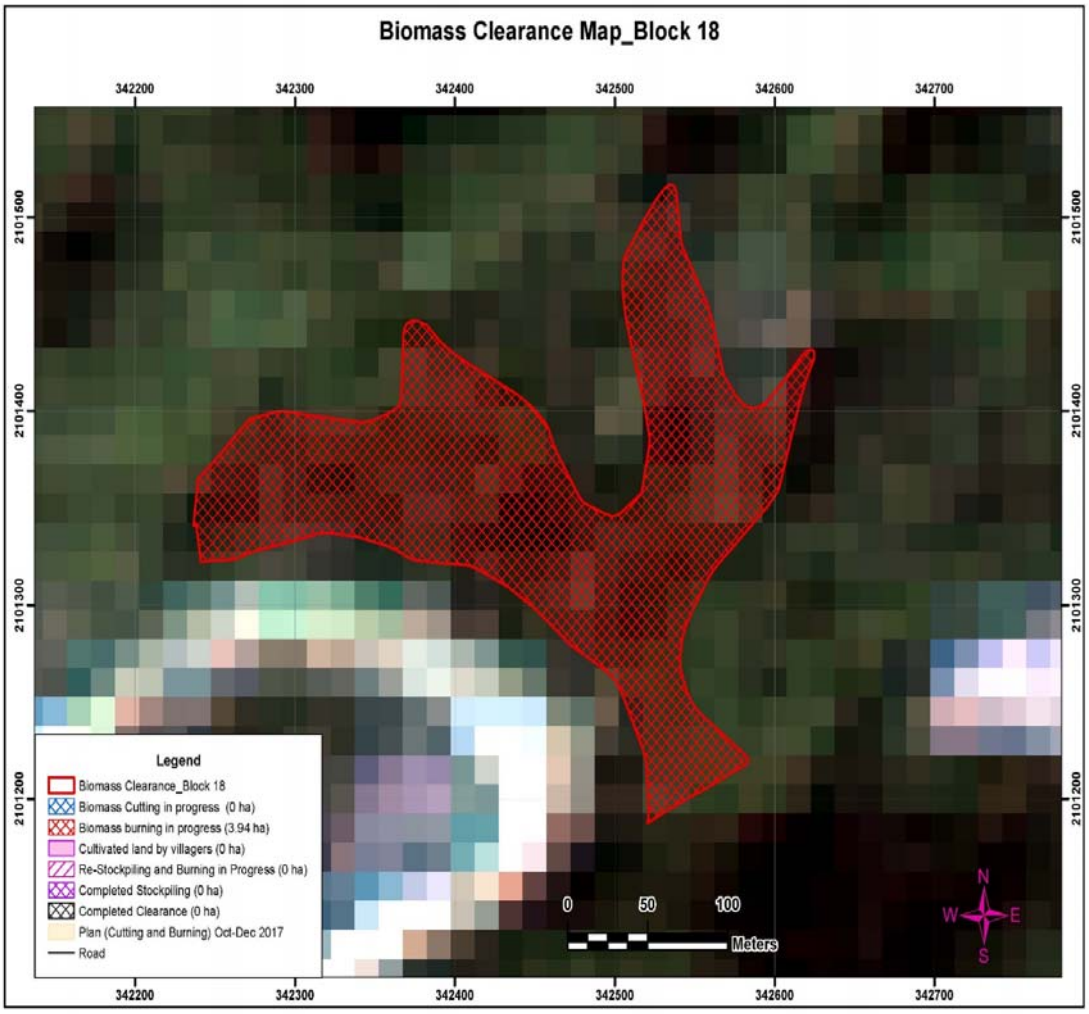


Figure 3-28 Biomass clearance progress map of Block 18



3.5.4 Fishery Monitoring

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

The data from the daily fish catch logbook monitoring indicates that the mean daily fish catch in Nam Ngiep River was 2.2 kg/household/day in May 2017. The estimated total fish catch in Nam Ngiep basin for April 2017 is 59,400 kg. Around 32% of the catch was sold, 57% was consumed fresh, 5% processed and approximately 6% was used for other purposes.

The overall progress of fish monitoring programme is illustrated in **Error! Reference source not found.** below.

The overall progress of fish monitoring programme is illustrated in *Error! Reference source not found.**1*** below.

Figure 3-29: *Gantt Chart of Fish Monitoring Programme as of 30 June 2017*

	Task List / Steps of work		Weight (%)	YEAR 2017												% S-Curve
				Q1			Q2			Q3			Q4			
				01	02	03	04	05	06	07	08	09	10	11	12	
1	**Daily catch logbook and Verification Survey**	Planed	-													100
		Actual	-													97
1.1	Daily catch logbook data collection on 108 HHs in 25 villages	Planed	24	2	2	2	2	2	2	2	2	2	2	2	2	94
		Actual	12.0	1.5	2.0	3.0	2.0	1.5	2.0							91
1.2	Daily catch logbook verification survey for Q2 2016 to Q1 2017 on 144 HHs	Planed	4	2		2										88
		Actual	4	2		2										85
1.3	GPS for Fishing location cover 25 villages	Planed	8				2	2	2	2						82
		Actual	-													79
1.4	Make the posters for fish species and fishing gear composition along Nam Ngiep River	Planed	2											2		76
		Actual	-													74
2	**Species Veification Survey**	Planed	-													71
		Actual	-													68
2.1	Survey design, interview form design, test and development	Planed	2		2											65
		Actual	2						2							62
2.2	Data collection and validation on 108 HHs	Planed	8		2	3	3									59
		Actual	6						6							56
3	**Fish Migration and Spawning Survey**															53
																50
3.1	Survey design, interview form design, test and development	Planed	2	2												47
		Actual	2	2												44
3.2	Data collection and validation on 88 experience fishers	Planed	12	6	6											41
		Actual	12	2	7	3										38
4	**Data management and report**															35
																32
4.1	Data input to database system	Planed	24	2	2	2	2	2	2	2	2	2	2	2	2	29
		Actual	11.5	1.0	2.0	2.0	1.5	3.0	2.0							26
4.2	Annual Data analysis and draft annual report for 2016-2017	Planed	5							5						24
		Actual	2						2							21
4.3	Disemination/presentation the report for 2016-2017	Planed	5							5						18
		Actual	-													15
4.4	Final Annual Report for 2016-2017	Planed	4								4					12
		Actual	-													9
	Total	Planed	**100**													6
		Actual	**52**													3

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

(a) S-Curve of fish catch monitoring programme

	Task List / Steps of work		Weight (%)	YEAR 2017												% S-Curve
				Q1			Q2			Q3			Q4			
				01	02	03	04	05	06	07	08	09	10	11	12	
1	Conduct quarterly gillnet survey	Planed	52	-	3	5	5		10	3	10	3		10	3	100
		Actual	13	-	2	-	3	8	-	-		-		-	-	95
2	Survey report	Planed	30	-				6		6		6	-	6	6	90
		Actual	2	-	-	-	-		2	-	-		-	-	-	85
3	Data analysis	Planed	12	-	-		-	-		-	-		-		12	80
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	75
4	Final report	Planed	12	-	-	-	-	-	-	-	-	-	-	-	12	70
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	65
5		Planed	-	-	-	-	-	-	-	-	-	-	-	-		60
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	55
6		Planed	-	-	-	-	-	-	-	-	-	-	-	-		50
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	45
7		Planed	-	-	-	-	-	-	-	-	-	-	-	-	-	40
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	35
8		Planed	-	-	-	-	-	-	-	-	-	-	-	-	-	30
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	25
9		Planed	-	-	-	-	-	-	-	-	-	-	-	-	-	20
		Actual	-	-	-	-	-	-	-	-	-	-	-	-	-	15
	Total	Planed	106													10
		Actual	15													5
	Planned Progress	monthly				5	5	6	10	9	10	9	-	16	33	
		Cumulative		-	3	8	13	19	29	38	48	57	57	73	106	

(a) S-Curve gillnet sampling

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

Activities in June 2017	Results
Daily Catch Logbook and Verification Survey	• Completed the daily fish catch logbook survey for all 108 targeted households. 2,852 forms were used in the survey. • A fishery database has been developed. • The daily household fish catch on average for Nam Ngiep in May 2017 is 2.2 kg/household/day. The median catch for all fishing zones is presented in Figure 1-12. • The estimated total fish catch for Nam Ngiep in May 2017 is approximately 59,400 kg as shown in Figure 1-13.
Household Catch Assessment Survey	• Draft report was submitted by fishery consultant.
Village Community Interview	• On progress for data analysis and reporting by fishery consultant.
Fish Migration and Spawning survey	• On progress for data analysis and reporting by fishery consultant.
Gillnet Sampling Survey	• Completed data collection at 7 stations including some water quality measurements, setting and retrieving gillnet and fish size measurement. • The report for the gillnet survey is being prepared by fishery consultant

Figure 3-30: *Median daily household catch by fishing zone and Nam Ngiep mean value for all fishing zones combined (Kg/HH/day)*

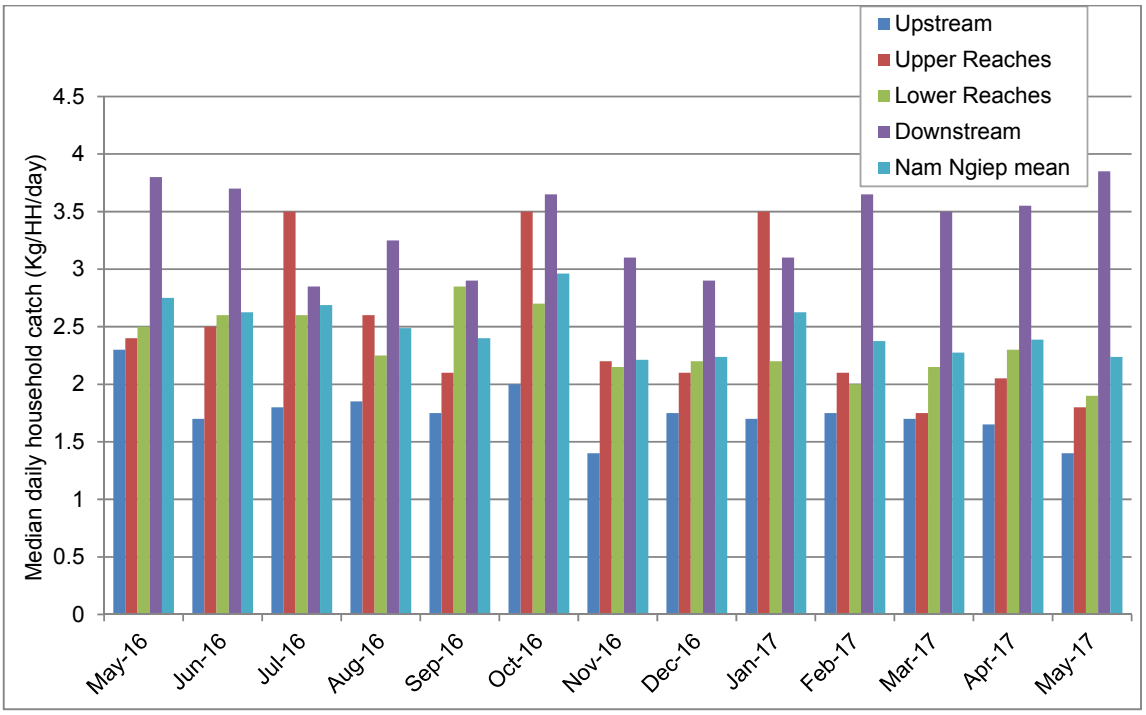
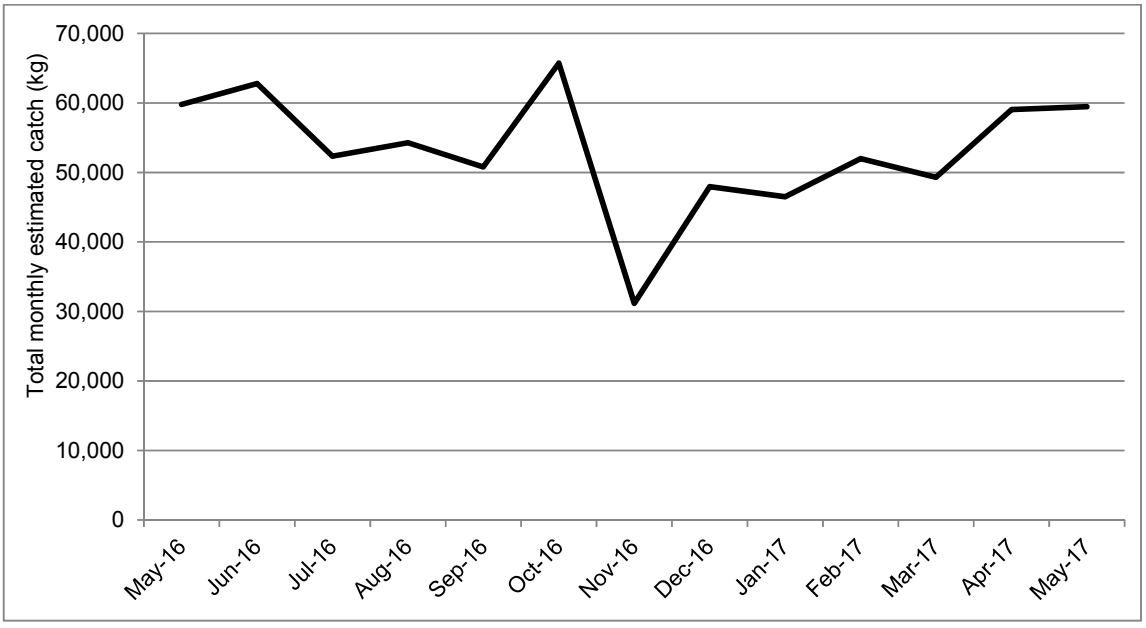


Figure 3-31: Total estimated fish catch for Nam Ngiep by month (Kg)



3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

EMO team completed another round of review of the revised EPF sub-project proposal of Xaysomboun and Xieng Khuang on 23 March 2017 for further improvement. After a long lag, the EPF team confirmed that the proposals of Xaysomboun and Xieng Khuang Province have been signed by Department of Forestry (DOF) of Ministry of Agriculture and Forestry (MOF) and are being further processed for approval of EPF Committee.

The Bolikhamxay team (sub-project implementation team) have considered the comments from NNP1 EMO on the detail info / documentation on the progress report and provided clarification notes on relevant topics such as detailed activities and updated GIS maps of the Houay Ngoua PPA boundary and village land use of the 5 villages within the PPA.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

The draft IEE that is currently being reviewed by EDL was shared with NNP1PC on 21 June 2017. EMO will start the review of the received draft IEE. The due diligence assessment (DDA) will be resumed once the IEE is confirmed by EDL and Bolikhamxay Province.

3.7 External Monitoring

There was no external monitoring during the reported period.

3.7.1 Biodiversity Advisory Committee

There was no BAC activity during the reported period.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

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

	Site Name	Owner Site Office and Village		Obayashi Camp WWT1		TCM Camp	
	Station Code	EF01		EF02		EF03	
	Date	12-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	7.13	7.13	8.24	7		
Sat. DO (%)		9.1	40.2	12.4	53		
DO (mg/l)		0.67	3.13	0.88	4.12		
Conductivity (µs/cm)		342	361	655	718		
TDS (mg/l)		171	180	328	359		
Temperature (°C)		28.33	26.04	30.24	27.15		
Turbidity (NTU)		0.74	1.64	8.43	6.22		
TSS (mg/l)	<50	ND[16]	ND[16]	10.1	9.6	No	No
BOD (mg/l)	<30	4.1	4.8	17.8	19.8	water	water
COD (mg/l)	<125	ND[18]	ND[18]	46.9	42.8		
NH3-N (mg/l)	<10.0	2	2	12	17		
Total Nitrogen (mg/l)	<10.0	10.5	7.64	13.3	18.6		
Manganese (mg/l)		0.086	0.068	2.48	1.46		
Total Iron (mg/l)	<2	ND[10]	ND[10]	1.16	0.701		
Total Phosphorus (mg/l)	<2	0.99	1.06	0.28	0.42		
Oil & Grease (mg/l)	<10.0	ND[13]	n/a	ND[13]	n/a		
Total coliform (MPN/100 ml)	<400	1,700	120	54,000	43,000		
Faecal Coliform (MPN/100 ml)		1,700	***93***	1,700	***41,000***		
Discharge Volume (m3/day)		***43.2***	28.8	***8.6***	21.6		

	Site Name	Sino Hydro Camp		V & K Camp		SongDa5 Camp No.1	
	Station Code	EF06		EF10		EF07	
	Date	13-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	8.31	7.54	8.55	7.6	7.62	7.59
Sat. DO (%)		4.7	21.8	13.1	20.2	21.9	32.1
DO (mg/l)		0.35	1.65	0.98	1.56	1.55	2.5
Conductivity (µs/cm)		636	653	404	425	634	744
TDS (mg/l)		318	327	202	213	314	372
Temperature (°C)		29.51	28.09	28.85	27.03	31.87	26.27
Turbidity (NTU)		22.86	13.9	24	7.77	18.53	30.94
TSS (mg/l)	<50	32.8	11.1	34.2	8.1	23.8	13.8
BOD (mg/l)	<30	25.7	25.4	23.3	17.6	ND[13]	ND[13]
COD (mg/l)	<125	53.1	40.7	39.4	ND[18]	55.2	56.7
NH3-N (mg/l)	<10.0	26	25	8	8	16	23
Total Nitrogen (mg/l)	<10.0	29.4	27.2	11.7	9.52	19.7	29
Manganese (mg/l)		0.292	0.245	0.584	0.65	0.139	0.129
Total Iron (mg/l)	<2	1.1	0.936	0.847	0.731	0.885	0.796
Total Phosphorus (mg/l)	<2	1.43	1.48	0.71	0.74	0.9	1.42
Oil & Grease (mg/l)	<10.0	ND[13]	n/a	ND[13]	n/a	ND[13]	n/a

	Site Name	Owner Site Office and Village		Obayashi Camp WWT1		TCM Camp	
	Station Code	EF01		EF02		EF03	
	Date	12-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17
Parameters (Unit)	Guideline						
Total coliform (MPN/100ml)	<400	160,000	160,000	160,000	54,000	13	0
Faecal Coliform (MPN/100ml)		160,000	***160,000***	160,000	***24,000***	0	***0***
Discharge Volume (m3/day)		***21.6***	21.6	***1.9***	4.3	***172.8***	17.3

	Site Name	Songda5 Camp No.2		Zhefu Camp		HMH Main Camp WWT	
	Station Code	EF08		EF09		EF13	
	Date	13-Jun-17	22-Jun-17	12-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	8.38	7.68	7.47	7.37	7.93	7.38
Sat. DO (%)		0	1.5	6.5	0	20.6	19.3
DO (mg/l)		0	0.11	0.47	0	1.5	1.48
Conductivity (µs/cm)		898	772	332	422	806	696
TDS (mg/l)		449	386	166	211	403	348
Temperature (°C)		28.71	27.55	29.62	28.54	28.89	27.22
Turbidity (NTU)		33.92	41.93	29.18	38.9	25.14	32.7
TSS (mg/l)	<50	39.2	25	64.3	95.2	20.4	7.7
BOD (mg/l)	<30	72.2	37.7	21.1	34.6	34.6	51.9
COD (mg/l)	<125	166	140	96.8	148	163	103
NH3-N (mg/l)	<10.0	55	38	17	23	18	21
Total Nitrogen (mg/l)	<10.0	39.6	34.8	29.3	31.1	28	23.6
Manganese (mg/l)		0.093	-	0.05	0.081	0.189	0.189
Total Iron (mg/l)	<2	0.479	0.336	1.15	1.74	0.473	0.554
Total Phosphorus (mg/l)	<2	0.67	1.46	0.81	1.51	1.38	1.39
Oil & Grease (mg/l)	<10.0	3	N/A	ND[13]	n/a	8	n/a
Total coliform (MPN/100 ml)	<400	160,000	170	160,000	160,000	2,300	24,000
Faecal Coliform (MPN/100 ml)		160,000	17	160,000	***160,000***	1,600	***700***
Discharge Volume (m3/day)		***43.2***	43.2	***0***	0	***6***	6

	Site Name	IHI Camp		Kenber Camp	
	Station Code	EF14		EF16	
	Date	13-Jun-17	20-Jun-17	12-Jun-17	20-Jun-17
Parameters (Unit)	Guideline				
pH	6.0 - 9.0	7.97	7.38	8.43	9.72
Sat. DO (%)		4.5	8.3	2.9	3
DO (mg/l)		0.31	0.63	0.21	0.23
Conductivity (µs/cm)		537	980	549	475
TDS (mg/l)		268	490	275	237
Temperature (°C)		29.47	27.71	28.66	27.05
Turbidity (NTU)		19.37	22.18	7.95	15.76
TSS (mg/l)	<50	12.8	18.6	22.7	19.3
BOD_5 (mg/l)	<30	29.9	85.5	76.6	30.9
COD (mg/l)	<125	65	93.5	160	91.9
NH3-N (mg/l)	<10.0	13	12	19	11
Total Nitrogen (mg/l)	<10.0	14.4	15.4	26.5	17.3

	Site Name	Owner Site Office and Village		Obayashi Camp WWT1		TCM Camp	
	Station Code	EF01		EF02		EF03	
	Date	12-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17	13-Jun-17	20-Jun-17
Parameters (Unit)	Guideline						
Manganese (mg/l)		0.208	0.252	0.99	0.327		
Total Iron (mg/l)	<2	0.439	0.502	0.537	0.38		
Total Phosphorus (mg/l)	<2	0.8	1.27	1.16	0.81		
Oil & Grease (mg/l)	<10.0	1	n/a	ND[13]	n/a		
Total coliform (MPN/100 ml)	<400	160,000	160,000	24,000	170		
Faecal Coliform (MPN/100 ml)		54,000	***2,400***	24,000	***70***		
Discharge Volume (m3/day)		***10.8***	4.3	0.7	0.7		

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

	Site Name	Aggregate Crushing Plant					CVC Plant			
	Station Code	DS02					DS03			
	Date	6-Jun-17	9-Jun-17	15-Jun-17	22-Jun-17	29-Jun-17	9-Jun-17	15-Jun-17	22-Jun-17	29-Jun-17
Parameter (Unit)	Guideline									
pH	6.0 - 9.0	N/A	7.97	7.27	7.84	8.00	No water discharged	No water discharged	No water discharged	8.04
Sat. DO (%)		N/A	31.4	59.7	58	63.4				93
DO (mg/l)		N/A	2.4	4.58	4.07	4.89				6.64
Conductivity (µs/cm)		N/A	125	159	103	127				213
TDS (mg/l)		N/A	63	79	51	64				106
Temperature (°C)		N/A	27.59	27.43	33.01	27.16				28.85
Turbidity (NTU)		9,260	28,490	9,400	104,400	27,530				126
TSS (mg/l)	<50	4,365.67	11,431	33,556	60,687	10,978				243
Oil & Grease (mg/l)	<10	N/A	ND[13]	N/A	N/A	N/A				N/A
Discharge Volume (m^3/day)		N/A	N/A	N/A	N/A	N/A				50

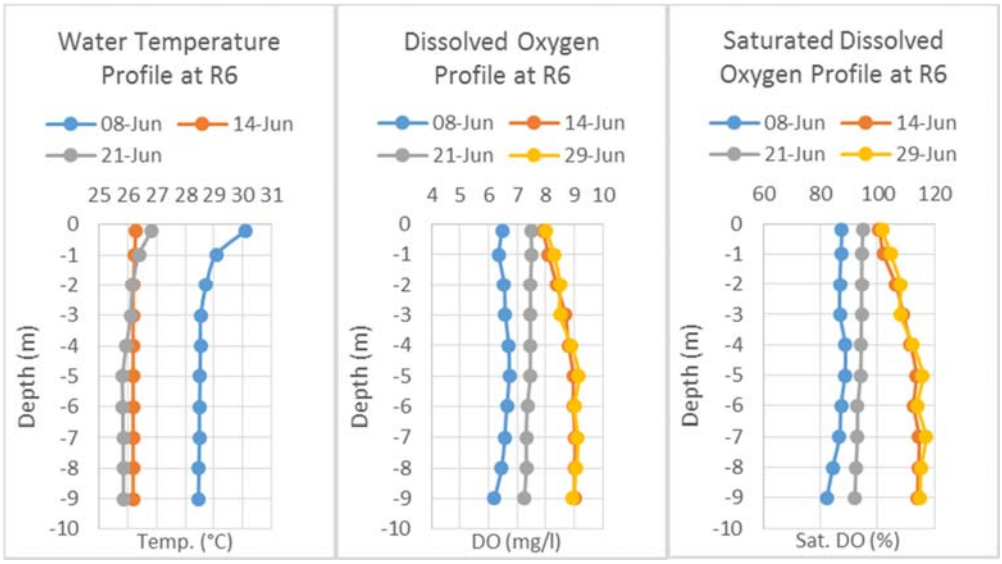
	Site Name	Spoil Disposal #2				RCC Plant Discharge at Lower Ponds				
	Station Code	DS04				DS09				
	Date	9-Jun-17	15-Jun-17	22-Jun-17	29-Jun-17	6-Jun-17	9-Jun-17	15-Jun-17	22-Jun-17	29-Jun-17
Parameter (Unit)	Guideline									
pH	6.0 - 9.0	5.84	6.85	6.81	6.55	N/A	No water discharged	8.01	8.12	10.14
Sat. DO (%)		26	71.8	55.2	42.1	N/A		55.3	49.1	77.5
DO (mg/l)		1.89	5.79	4.09	3.32	N/A		4.15	3.63	5.67
Conductivity (µs/cm)		64	68	74	49	N/A		221	284	234
TDS (mg/l)		32	34	36	25	N/A		111	142	114
Temperature (°C)		26.71	25.74	26.38	27.77	N/A		27.36	28.54	28.47

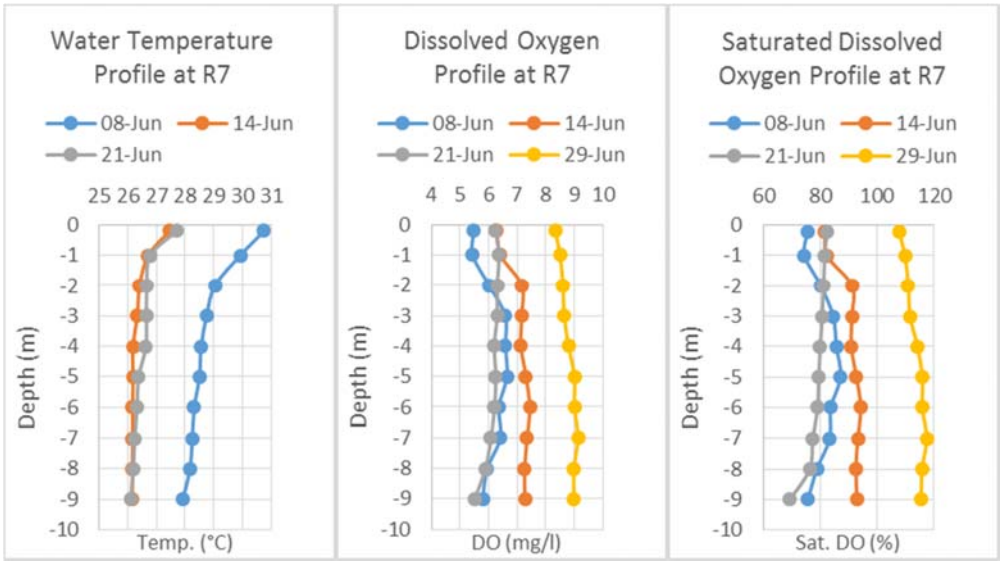
Turbidity (NTU)		71.12	21.65	19	30	186		612	118	105.06
TSS (mg/l)	<50	27.7	11.3	12	24.34	142.46		8.6	337	134
Oil & Grease (mg/l)	<10	ND[13]	N/A	N/A	N/A	N/A		N/A	N/A	N/A
Discharge Volume (m^3/day)		*86.40*	*864.00*	*1728.00*	N/A	N/A		259.2	*172.80*	N/A

	Site Name	**RCC Plant Discharge Nearby IHI Workshop**					**Regulating Dam**			
	Station Code	**DS13**					**DS08**			
	Date	**6-Jun-17**	**9-Jun-17**	**15-Jun-17**	**22-Jun-17**	**29-Jun-17**	**9-Jun-17**	**15-Jun-17**	**22-Jun-17**	**29-Jun-17**
Parameter (Unit)	**Guideline**									
pH	6.0 - 9.0		7.19	7.58	9.3	8.23	No water discharged			
Sat. DO (%)		n/a	42.5	61.8	67.9	54.3				
DO (mg/l)		n/a	3.2	4.67	4.58	4.4				
Conductivity (µs/cm)		n/a	219	187	180	135				
TDS (mg/l)		n/a	110	94	90	67				
Temperature (°C)		n/a	28.57	28.16	33.39	28.88				
Turbidity (NTU)		923.00	156.00	148.00	720.00	101.46				
TSS (mg/l)	<50	511	n/a	294	372	122				
Oil & Grease (mg/l)	<10	n/a		N/A	N/A	N/A				
Discharge Volume (m^3/day)		n/a	36	259.2	172.8					

	Site Name	**Main Dam (Treatment Plant No.1)**				**Main Dam (Treatment Plant No.2)**			
	Station Code	**DS11**				**DS12**			
	Date	**9-Jun-17**	**15-Jun-17**	**22-Jun-17**	**29-Jun-17**	**9-Jun-17**	**15-Jun-17**	**22-Jun-17**	**29-Jun-17**
Parameter (Unit)	**Guideline**								
pH	6.0 - 9.0	9.61	3.81	12.31	7.54	10.21	No water discharged		11.62
Sat. DO (%)		49.2	56.1	73.3	55	55.1			65.7
DO (mg/l)		3.69	4.29	5.20	4.26	4.1			4.92
Conductivity (µs/cm)		694	891	696	413	191			415
TDS (mg/l)		347	446	348	207	95			207
Temperature (°C)		27.67	27.36	30.43	27.45	27.66			28.46
Turbidity (NTU)		0.06	6.68	6	10.2	120			10.08
TSS (mg/l)	<50	13.2	11	13	27	285			40.3
Oil & Grease (mg/l)	<10	ND[13]	N/A	N/A	N/A	ND[13]			N/A
Discharge Volume (m^3/day)		*6,000*	*6,000*	*6,000*		172.8			

Table A- 3: *Temperature and Dissolved Oxygen Depth Profile Results of the Re-regulation Reservoir Monitoring in June 2017*





ANNEX B: AMBIENT DUST QUALITY

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

Hat Gnuin Village - 24 Hours Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	09-June-17 18:00	10-June-17 18:01	11-June-17 18:01
End Time	10-June-17 18:00	11-June-17 18:00	12-June-17 18:00
Average Data Record in 24h (mg/m^3)	0.03	0.02	0.02
Guideline Average in 24h (mg/m^3)	***0.12***	***0.12***	***0.12***

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

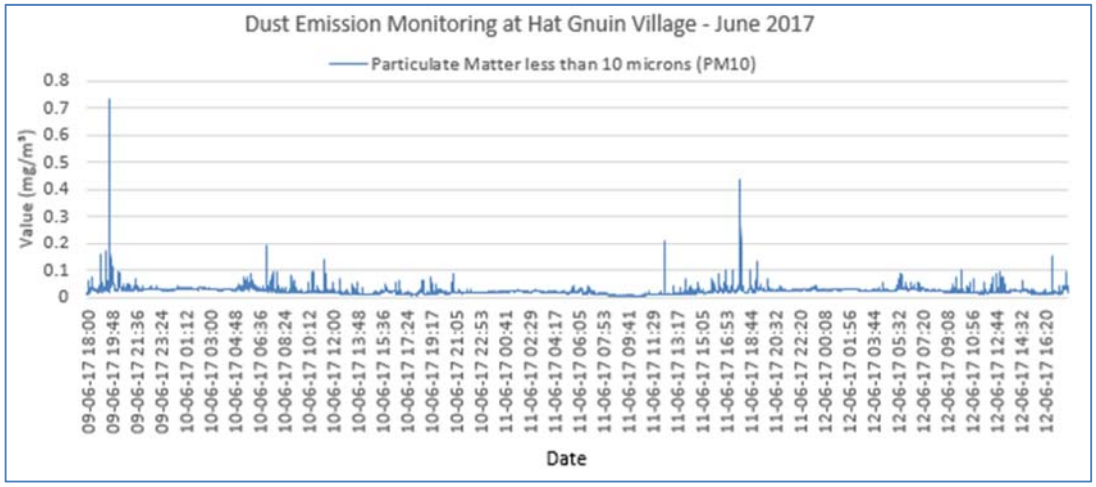


Table B- 2: 24-hour Average Dust Concentrations Measured in Houay Soup Resettlement Area

Houay Soup Resettlement Area - 24 Hours Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	13-June-17 18:00	14-June-17 18:01	15-June-17 18:01
End Time	14-June-17 18:00	15-June-17 18:00	16-June-17 18:00
Average Data Record in 24h (mg/m^3)	0.02	0.02	0.03
Guideline Average in 24h (mg/m^3)	***0.12***	***0.12***	***0.12***

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

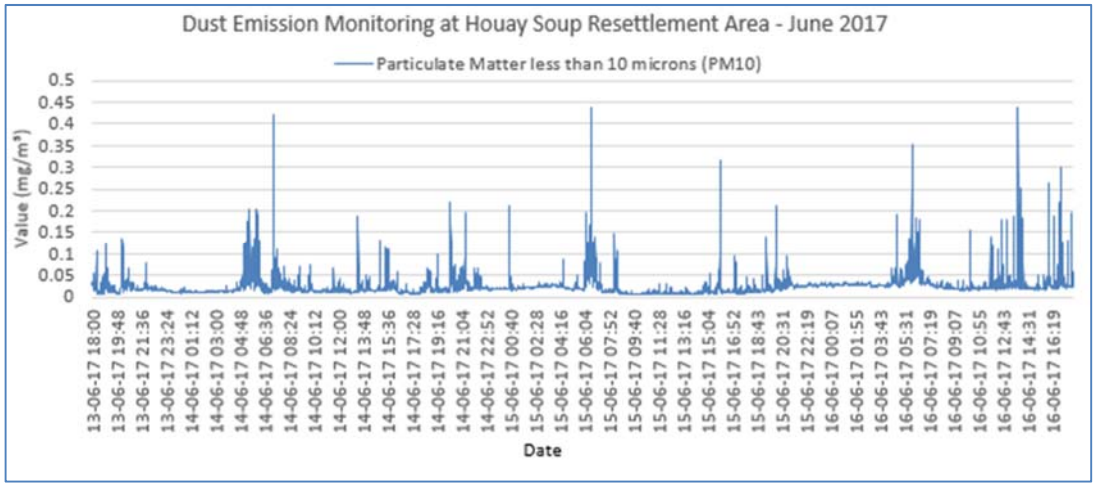


Figure B- 3: Dust Monitoring Results at the Aggregate Crushing Plant in June 2017

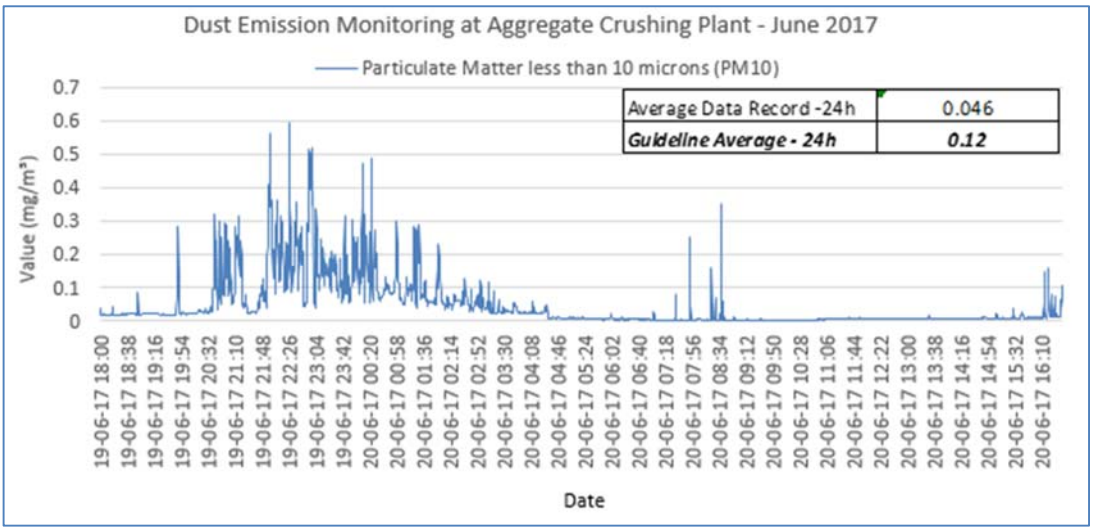


Figure B- 4: Dust Monitoring Results at the RCC Plant in June 2017

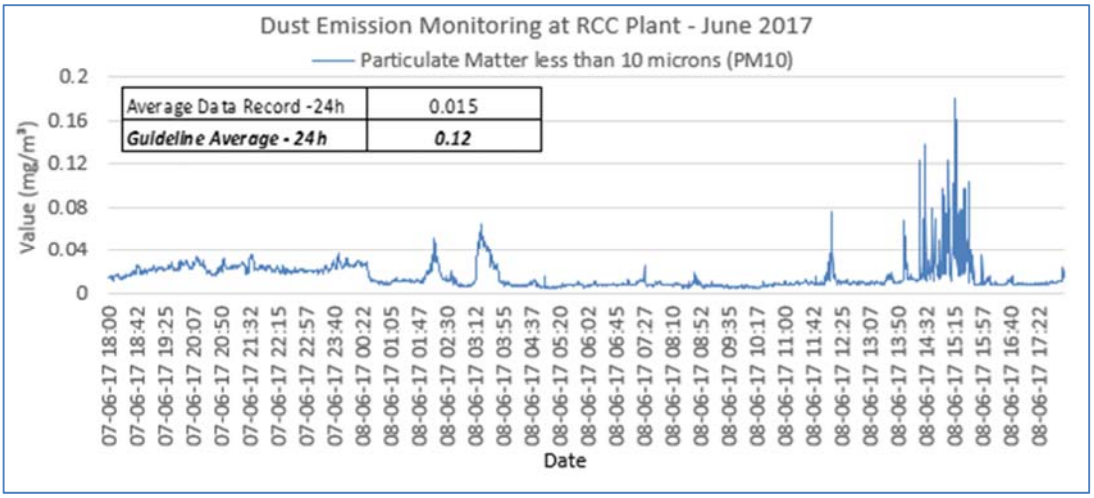


Figure B- 5: Dust Monitoring Results at the Sino Hydro Temporary Camp in June 2017

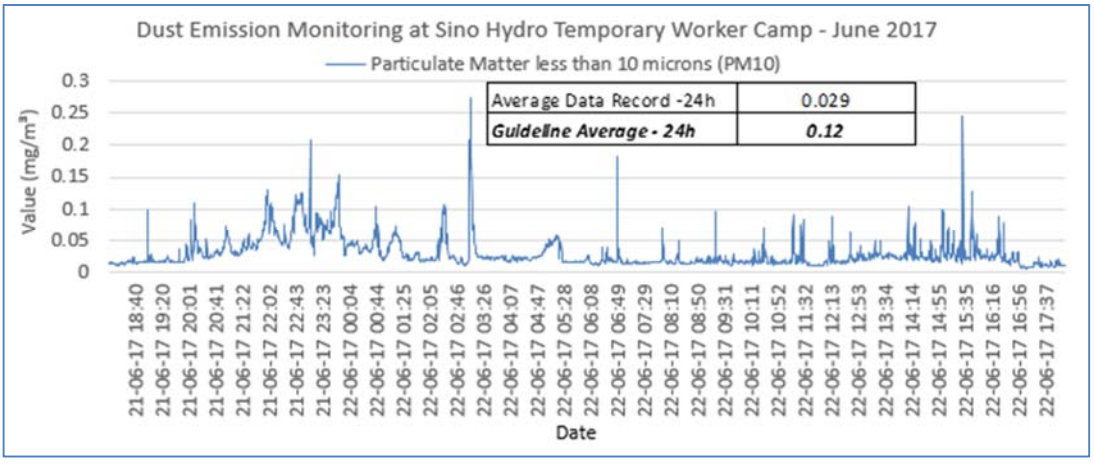


Figure B- 6: Dust Monitoring Results at the SongDa5 No.2 Camp in *June 2017*

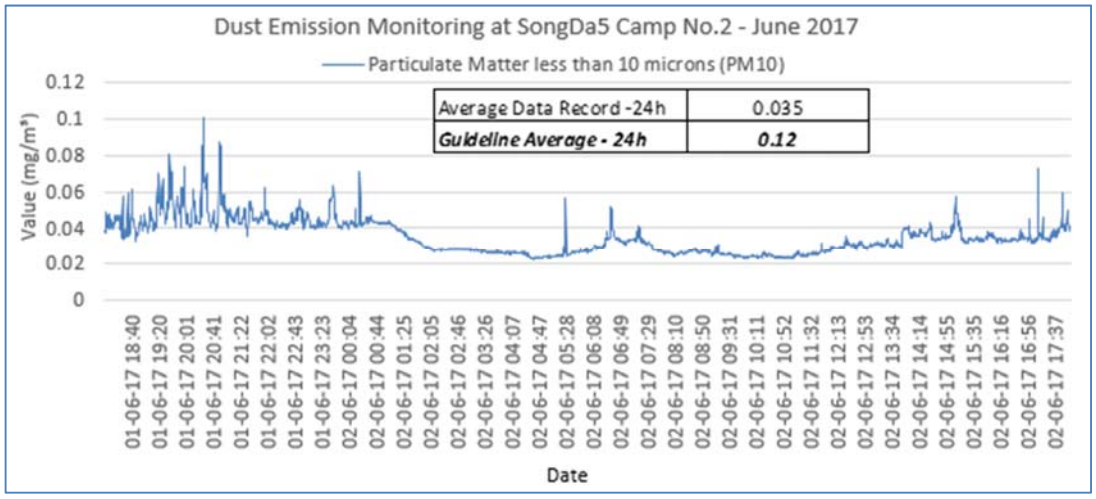


Figure B- 8: Dust Monitoring Results at Main Dam in June 2017

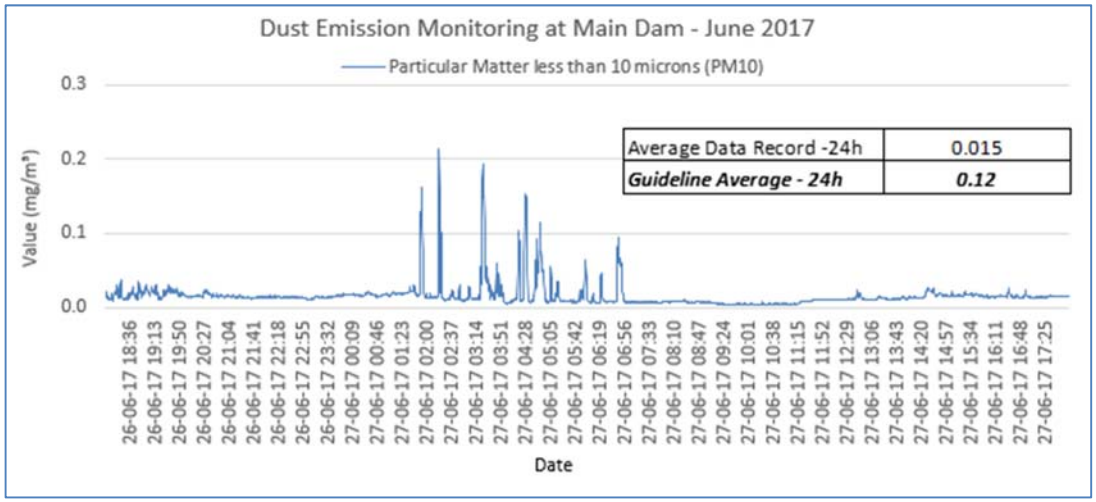
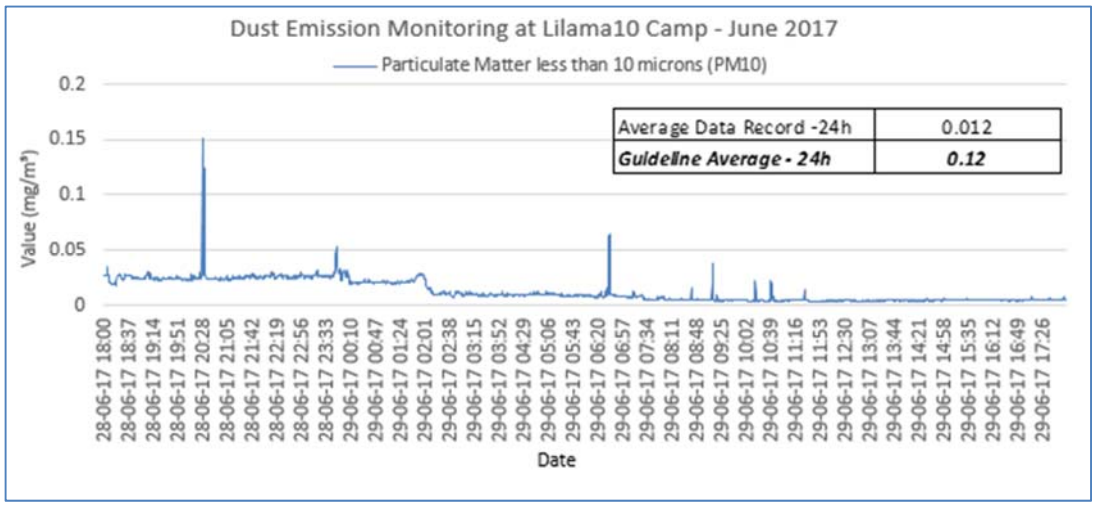


Figure B- 9: Dust Monitoring Results at the Lilama10 Camp in June 2017



ANNEX C: AMBIENT NOISE DATA

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

Noise Level (dB)	09-10/June/17			10-11/June/17			11-12/June/17		
	18:00-22:00	22:01 – 06:00	06:01 – 18:00	18:00-22:00	22:01 – 06:00	06:01 – 18:00	18:00-22:00	22:01 – 06:00	06:01 – 18:00
Maximum Value Recorded	61.60	63.90	68.70	63.00	67.50	69.40	54.60	60.60	71.50
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	49.74	42.56	44.84	46.79	43.89	48.12	46.40	46.04	47.86
Guideline Averaged	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

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

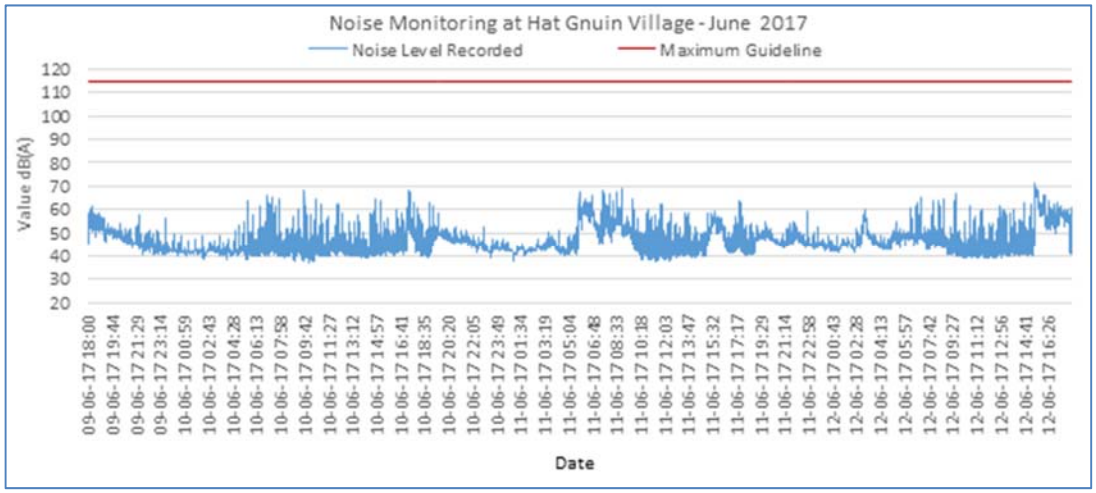


Table C- 2: Average Results of Noise Monitoring at Houay Soup Resettlement Area in June 2017

Noise Level (dB)	13-14/June/17			14-15/June/17			15-16/June/17		
	18:00-22:00	22:01 – 06:00	06:01 – 18:00	18:00-22:00	22:01 – 06:00	06:01 – 18:00	18:00-22:00	22:01 – 06:00	06:01 – 18:00
Maximum Value Recorded	61.40	59.90	79.20	68.70	70.60	90.40	73.00	60.00	74.80
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	46.79	48.83	48.58	51.69	54.46	52.40	50.73	46.71	43.38
Guideline Averaged	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

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

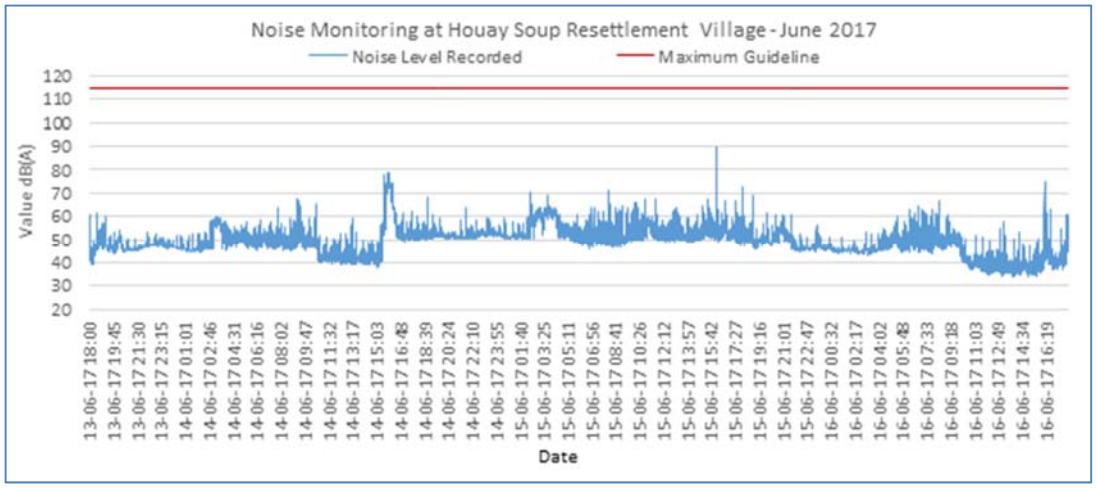


Table C- 2 and Table C-3: Average Results of Noise Monitoring at Aggregate Crushing Plant and RCC Plant in June 2017

Aggregate Crushing Plant ***RCC Plant***

Noise Level (dB)	19-20/June/17		20/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Maximum Value Recorded	84	83.9	83.7
Guideline Max	***115***	***115***	***115***
Average Data Recorded	66.93	59.13	62.08
Guideline Averaged	***70***	***50***	***70***

Noise Level (dB)	07-08/June/17		08/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Maximum Value Recorded	65.7	77.9	81
Guideline Max	***115***	***115***	***115***
Average Data Recorded	62.21	61.57	59.82
Guideline Averaged	***70***	***50***	***70***

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

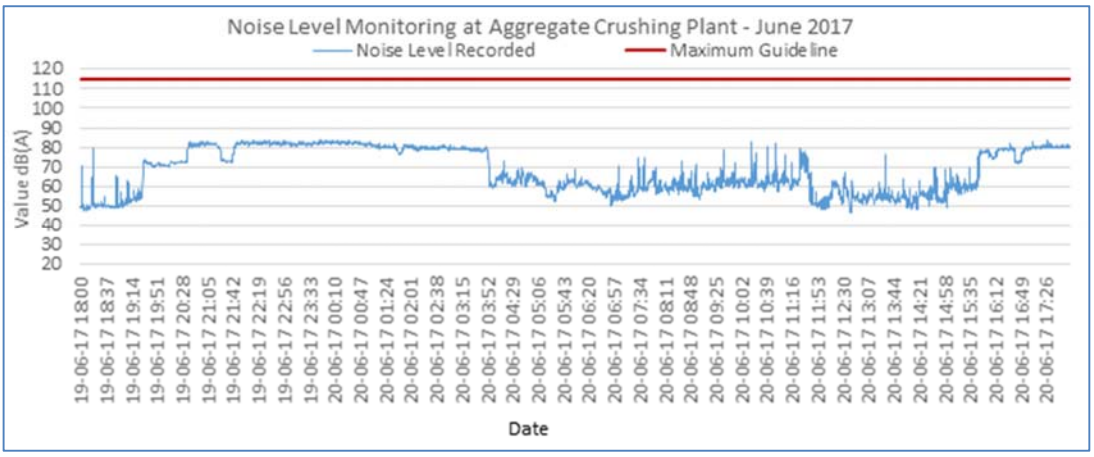


Figure C- 4: Results of Noise Level Monitoring at the RCC Plant in June 2017

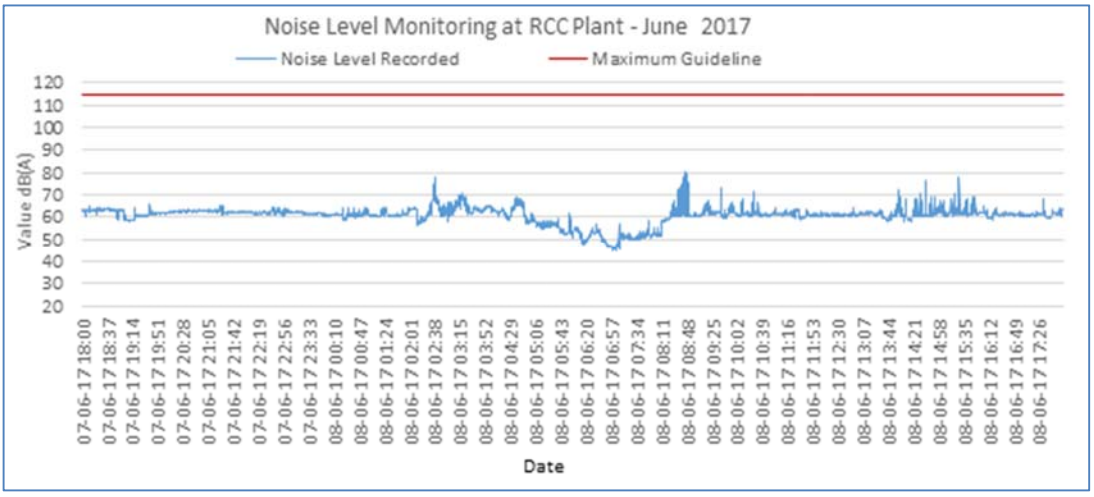


Table C- 5 and Table C- 6*: Average Results of Noise Monitoring at SongDa Camp#2 and Sino Hydro Camp in June 2017*

Song Da 5 Camp No.2

Noise Level (dB)	01-02/June/17		02/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Maximum Value Recorded	65.7	65.1	71
Guideline Max	***115***	***115***	***115***
Average Data Recorded	58.07	57.01	53.88
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Temporary Worker Camp

Noise Level (dB)	21-22/June/17		22/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Maximum Value Recorded	76.5	81.8	79.1
Guideline Max	***115***	***115***	***115***
Average Data Recorded	56.86	62.65	55.74
Guideline Averaged	***70***	***50***	***70***

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

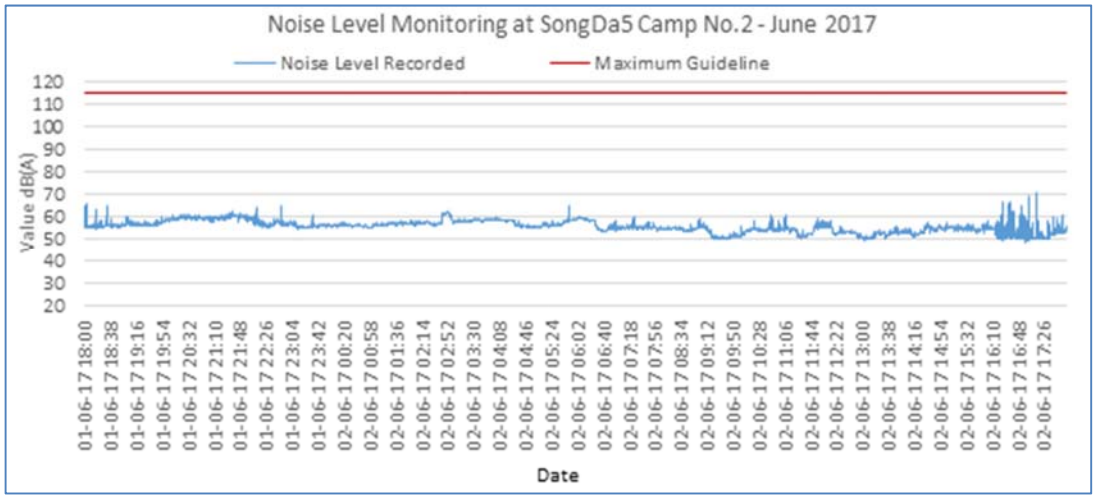


Figure C- 6: Results of Noise Level Monitoring at Sino Hydro Temporary Worker Camp in June 2017

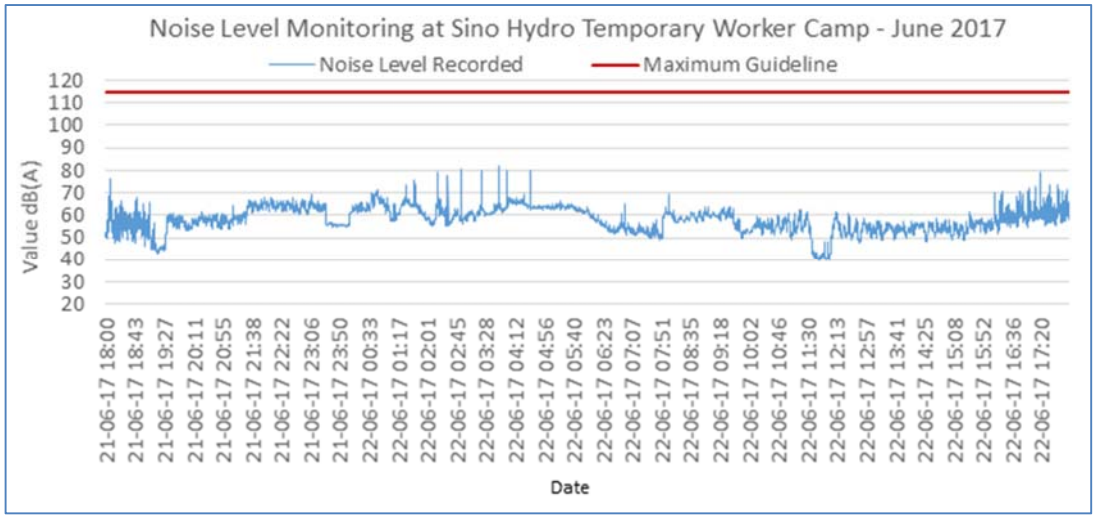


Table C- 7 and Table C- ***8: Average Results of Noise Monitoring at Main Dam, and Lilama 10 Camp in June 2017***

Main Dam

Noise Level (dB)	26-27/June/17		27/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Data Record Max	73	86.4	83.1
Guideline Max	***115***	***115***	***115***
Data Record Average	61.57	59.05	58.85
Guideline Averaged	***70***	***50***	***70***

Lilama 10 Camp

Noise Level (dB)	28-29/June/17		29/June/17
	18:00 – 22:00	22:01 – 06:00	06:01-18:00
Maximum Value Recorded	69.6	82.6	76.9
Guideline Max	***115***	***115***	***115***
Average Data Recorded	51.15	54.83	52.13
Guideline Averaged	***70***	***50***	***70***

***Figure C-7: Results of Noise Level Monitoring at Lilama10 Camp* in June 2017**