



## Nam Ngiep 1 Hydropower Project

# Environmental Management Monthly Monitoring Report

January 2022

A	15 February 2022	Hendra WINASTU	Wanidaporn RODE	Khamlar PHONSAVAT	Final
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**TABLE OF CONTENTS**

**EXECUTIVE SUMMARY .....6**

**1. ENVIRONMENTAL MANAGEMENT MONITORING .....7**

1.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) .....7

1.2 COMPLIANCE MANAGEMENT .....8

    1.2.1 *Site Inspection by Environment Management Unit (EMU)*..... 10

    1.2.2 *Site Decommissioning and Rehabilitation*..... 10

1.3 WATER QUALITY MONITORING ..... 11

    1.3.1 *Effluent Discharge from Camps and Construction Sites*..... 11

    1.3.2 *Ambient Surface Water and Reservoir Water Quality Monitoring*..... 11

    1.3.3 *Groundwater Quality Monitoring* ..... 16

    1.3.4 *Gravity Fed Water Supply (GFWS) Quality Monitoring*..... 16

    1.3.5 *Landfill Leachate Monitoring* ..... 17

1.4 DISCHARGE MONITORING..... 17

    1.4.1 *Main Reservoir – Water Level, Inflow and Discharge* ..... 17

    1.4.2 *Re-regulation Reservoir – Discharge* ..... 18

    1.4.3 *Nam Ngiep Downstream Water Depth Monitoring*..... 18

1.5 PROJECT WASTE MANAGEMENT ..... 18

    1.5.1 *Solid Waste Management*..... 18

    1.5.2 *Hazardous Materials and Waste Management*..... 20

1.6 COMMUNITY WASTE MANAGEMENT ..... 21

    1.6.1 *Community Recycling Programme* ..... 21

    1.6.2 *Community Solid Waste Management* ..... 21

**2. WATERSHED AND BIODIVERSITY MANAGEMENT ..... 21**

2.1 WATERSHED MANAGEMENT ..... 21

    2.1.1 *Implementation of Annual Implementation Plan (AIP)*..... 21

        2.1.1.1 *Xaysomboun Watershed and Reservoir Protection Office (WRPO)* ..... 21

        2.1.1.2 *Bolikhamxay Watershed and Reservoir Protection Office (WRPO)*..... 22

        2.1.1.3 *NNP1PC EMO*..... 22

    2.1.2 *Preparation of Annual Implementation Plan (AIP) 2022* ..... 23

        2.1.2.1 *Xaysomboun WRPO*..... 23

        2.1.2.2 *Bolikhamxay WRPO and DOF-MAF* ..... 23

2.2 BIODIVERSITY OFFSET MANAGEMENT ..... 23

2.2.1 *Implementation of BOMP Annual Implementation Plan (AIP) 2021* ..... 23

2.2.2 *Preparation of Annual Implementation Plan (AIP) 2022* ..... 24

**3. FISHERY MONITORING**..... **24**

**4. EXTERNAL MISSIONS AND VISITS** ..... **24**

**ANNEX A: RESULTS OF WATER QUALITY MONITORING** ..... **26**

**TABLE OF TABLES**

**Table 1-1: Environmental Management System Work Plan-revised in January 2022 ..... 7**

**Table 1-2: Summary Status of Document Review in January 2022 ..... 8**

**Table 1-3: Summary of ONCs and NCRs ..... 8**

**Table 1-4: Summary of the NCR and ONC ISSUED to the contractor..... 9**

**Table 1-5: Status of Corrective Actions for Non-Compliances at WWTSs in January 2022..... 11**

**Table 1-6: Results of Surface Water Quality Monitoring for Dissolved Oxygen (mg/L) in the upper 0.2 m, National Water Quality Standard: >6.0 mg/L..... 15**

**Table 1-7: Results of Surface Water Quality Monitoring for Total Suspended Solids (mg/L) ..... 16**

**Table 1-8: Results of Surface Water Quality Monitoring for BOD<sub>5</sub> (mg/L) - Water Quality Standard: < 1.5 mg/L..... 16**

**Table 1-9: Amounts of Recyclable Waste Sold and collection ..... 19**

**Table 1-10: Record of Hazardous Material Inventory ..... 20**

**Table 1-11: Record of Hazardous Waste Inventory ..... 20**

**TABLE OF FIGURES**

<b>Figure 1-1: Photos of EMU mission on 19 January 2022 .....</b>	<b>10</b>
<b>Figure 1-2: DO Depth Profiles Time Series in R5 (Since September 2018 to January 2022) .....</b>	<b>12</b>
<b>Figure 1-3: Surface Water and Re-regulation Reservoir Water Quality Monitoring Stations .....</b>	<b>14</b>
<b>Figure 1-4: Concentration of Dissolved Oxygen (mg/L) in the upper 0.2 m since September 2019 to January 2022.....</b>	<b>15</b>
<b>Figure 1-5: Dissolved Oxygen (Mg/L) Long Profile In January 2022 (From Immediately Upper Main Dam to Lower Nam Ngiep River).....</b>	<b>15</b>
<b>Figure 1-6: Inflow to the Main Reservoir during January 2018 to January 2022 .....</b>	<b>17</b>
<b>Figure 1-7: Water Level for the Main Reservoir during January 2019 to January 2022 .....</b>	<b>17</b>
<b>Figure 1-8: Daily Discharge Monitoring at the Re-regulation Dam in November 2021 to January 2022.....</b>	<b>18</b>
<b>Figure 1-9: Waste management activities at NNP1 landfill during January 2022 .....</b>	<b>19</b>
<b>Figure 1-10: Waste management activities during January 2022 .....</b>	<b>21</b>

## EXECUTIVE SUMMARY

During January 2022, EMO received three documents for review and approval. EMO did not issue any Site Inspection Report of Observation of Non-Compliance to the Contractor.

Due to the COVID-19 pandemic and the measures announced by the GOL, as well as cases of infected project personnel, the regular joint site inspections were completely suspended at all restricted areas such as nearby villages and in Zone 2UR as well as at NNP1PC's operation sites during the reporting period. However, the EMO undertook their own site inspections of the Dam sites and NNP1PC's operation sites as normal.

The operation and adjustment of the newly constructed wastewater treatment systems were suspended in January 2022 due to the relevant staffs were in self-isolation after the New Year Holidays. EMO will need more time in Q1 2022 to analyse the results and the sampling schedule is now adjusted from fortnightly to weekly to get a better understanding of the wastewater treatment conditions.

The water quality monitoring in January 2022, only included DO, pH, temperature and conductivity, BOD<sub>5</sub>, TSS, faecal coliform and total coliform. The results of other parameters will be reported in February 2022.

At R05, the average DO concentration was 6.5 mg/L in the upper 19 m varying between 5.9 mg/L and 6.9 mg/L, and the oxycline was generally found at the depth between 20.0 and 22.0 m with DO concentrations abruptly decreasing from about 6 mg/L to below 3 mg/L. In the Re-regulation Reservoir, the mean DO concentration were 5.1 mg/L and 5.8 mg/L in R06 and R07 respectively.

The rather high DO concentrations at the level of the intake to the main powerhouse provided similar or slightly higher DO concentrations in the Re-regulation Reservoir and the discharge from the Re-regulation Reservoir - whether from the gate or from the turbine - has generally been about 5.5 mg/L. Further downstream the DO levels were above 7 mg/L thus complying with the National Surface Water Quality Standard. No dead fish was observed in Nam Ngiep downstream in this monitoring period. NNP1PC is still in the process of collecting information to assist in developing measures to improve the DO levels downstream.

In January 2022, the local waste collection contractors continued collecting waste from the NNP1PC's operation sites and the nearby villages, and operating the NNP1 Project Landfill and Houay Soup Landfill. The work included waste segregation and disposal, waste cover, grass cutting and repairing perimeter fences.

A total of 24.2 m<sup>3</sup> of solid waste was disposed of at the NNP1 Project Landfill, a decrease of 5.5 m<sup>3</sup> compared with December 2021. A total of 23.8 m<sup>3</sup> of solid waste from Phouhomxay, Thahuea and Hat Gniun villages was disposed of at Houay Soup Landfill, a decrease of 1.9 m<sup>3</sup> compared with December 2021. There was no trading of recyclable waste at the community recycle waste bank during the period of reporting.

The Watershed and Reservoir Protection Offices (WRPOs) did not carry out any activities in January 2022. Bolikhamxay Nam Chouan-Nam Xang Biodiversity Offset Management Unit (NC-NX BOMU) carried out activities in January 2022 including the patrolling and snare removal and the community outreach through radio broadcast at NC-NX districts and villages.

## 1. ENVIRONMENTAL MANAGEMENT MONITORING

### 1.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

EMO conducted a joint site inspection with ADM, TD and EGAT O&M team of the NNP1PC operation sites to check the implementation of the EMS and make recommendations for improvements. Some significant issues were observed and noted to be corrected within the second week of February 2022.

**TABLE 1-1: ENVIRONMENTAL MANAGEMENT SYSTEM WORK PLAN-REVISED IN JANUARY 2022**

Item	ISO14001:2015 Work Plan	Year 2020		Year 2021				Year 2022	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Continue to prepare EMS documents								
2	<b>NNP1PC Environmental Policy announcement</b>								
3	NNP1PC ISO Committee establishment								
4	Training relevant staff on: <ul style="list-style-type: none"> <li>- Requirement and Interpretation of ISO14001:2015</li> <li>- Organization Context and Risk Management for ISO14001</li> <li>- ISO14001:2015 Document Information</li> <li>- ISO14001:2015 Internal Audit</li> </ul>								
5	Implement the EMS procedures and processes								
6	ISO14001:2015 Internal Audit								
7	Implement the corrective actions and preventive actions according to the Internal Audit								
8	Management Review by NNP1PC Management								
9	ISO 14001:2015 Assessment and Certification Audit – <b>Stage 1 (remote audit on the documentation review)</b>								
10	Implement the corrective actions and preventive actions according to the Stage 1 Audit								
11	ISO 14001:2015 Assessment and Certification Audit – <b>Stage 2 (remote audit, 4 man-days)</b>								
12	Implement the corrective actions and preventive actions according to the Stage 2 Audit								
13	<b>Certify of ISO14001:2015 upon successful completion of the audit</b>								
	Completed activities per the plan								
	Plan to achieve the activities								

## 1.2 COMPLIANCE MANAGEMENT

In January 2022, EMO received three documents for review and approval. The status of the document review is shown on **Table 1-2** below.

**TABLE 1-2: SUMMARY STATUS OF DOCUMENT REVIEW IN JANUARY 2022**

Title	Date Received	Status
DWP SS-ESMMP for Remedial Right Bank Abatement of Main Dam	07 January 2022 (1 <sup>st</sup> submission)	No objection with comments on 10 January 2022
DWP SS-ESMMP for Monitoring Work	08 January 2022 (1 <sup>st</sup> submission)	No objection with no comments on 10 January 2022
DWP SS-ESMMP for Maintenance Works 2022	20 January 2022 (1 <sup>st</sup> submission)	No objection with comments on 20 January 2022

Due to the COVID-19 pandemic and the measures announced by the GOL, as well as cases of infected project personnel, the suspension of the regular joint site inspections has continued at all areas such as at nearby villages, in Zone 2UR and at NNP1PC's operation sites during the reporting period. However, the EMO undertook their own site inspections of the Dam sites and NNP1PC's operation sites as normal including at OSOV1, OSOV2, and at the Main Dam grouting work.

The operation and adjustment of the newly constructed wastewater treatment systems (WWTS) were suspended in January 2022 due to the relevant staffs were in self-isolation after the New Year Holidays. EMO will need more time to analyse the results and the sampling schedule has been adjusted from fortnightly to weekly to get a better understanding of the wastewater treatment conditions. In addition, the WWTS operation manual has been developed with support of the Contractor (SCC), and is now being reviewed by EMO management.

EMO did not issue any Non-Compliance Reports (NCR) or Site Inspection Reports (SIR) to the Contractor in January 2022. The status of compliance reports (Observation of Non-Compliance or ONC; and Non-Compliance Report or NCR) issued by NNP1PC is summarized in **Table 1-3** and **Table 1-4** below.

**TABLE 1-3: SUMMARY OF ONCs AND NCRs**

Items	ONC	NCR-1	NCR-2	NCR-3
Carried over from December 2021	2	1	0	0
Newly Opened in January 2022	0	0	0	0
<b>Total in January 2022</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>
Resolved in January 2022	0	0	0	0
Carried over to February 2022	2	1	0	0
Unsolved Exceeding Deadlines	2	1	0	0



**TABLE 1-4: SUMMARY OF THE NCR AND ONC ISSUED TO THE CONTRACTOR**

Document Number / Date of Issue	Subject Description	Current Status at the end of December 2021
<p>NC No. 04/21 Issued Date: 09-11-21  (NCR Level 1)</p>	<p>Lack of spill control at the KENBER’s temporary camp and workshop (rental house) at Hat Gniun Village.</p> <ul style="list-style-type: none"> <li>- No clean-up of the contaminated soil/sand on the ground that EMO previously instructed on NC No. 02/2021.</li> <li>- The contaminated sand and spilt oil inside of the bunding area of fuel station was cleaned up and disposed/dumped directly on the ground outside the bunding area without containing/storing properly.</li> <li>- New additional spillages on the ground were observed.</li> </ul>	<p>After EMO inspected and verified the status of corrective actions for the NC No. 02/21, EMO found that not all of required actions had been fully addressed and that oil spillage had occurred repeatedly.</p> <p>However, the NC No. 02/21 was closed with some unsolved issues transferred to the new NC No. 04/21 with a shorter deadline and enforcement.</p> <p>The deadline for the corrective actions in NC No. 04/21 was on 07 January 2022 but the inspection to follow up the issues was not carried out due to one COVID-19 infection case at the Contractor’s camp in the middle of January 2022.</p>
<p>ONC_KENBER-0007</p>	<p>The contractor has a lack of spill response and control on site.</p> <ul style="list-style-type: none"> <li>- Black oil and hydrocarbon spills from the generator and water pump to the ground and open ditch without appropriate countermeasures;</li> <li>- No cleaning up of absorbent sand/ contaminated sand for a proper storage.</li> </ul>	<p>EMO followed up on 10 January 2022, no actions have been taken.</p>
<p>ONC_KENBER-0008</p>	<p>Reference to previous NCR (NC No. 03/2021) pursuant the poor waste management at the temporary camp (rental houses).</p> <p>The scattered waste was collected and burned in the area surrounding the rental houses in contravention of EMO’s repeated instructions that no burning of solid waste is allowed</p>	<p>EMO followed up on 10 January 2022, no actions have been taken.</p>

**1.2.1 Site Inspection by Environment Management Unit (EMU)**

The monthly visit by the EMU of Bolikhan District was conducted on 19 January 2022 and EMO presented the progress of the Water quality Monitoring Programme, Wastewater Treatment Systems, the Rehabilitation of the Construction Sites, and the Solid Waste Management Programme.

During the mission, a consultation meeting among the EMU, EMO and the Head of the three villages (Phouhomxay, Hat Gniun and Thaheua) was organized to discuss handing-over of the community waste management and the Houay Soup Landfill to the GOL by Q1 2022.

No major comments from the EMU on the water quality programme and the rehabilitation of the construction sites. The EMU is preparing a report with detailed comments which will be submitted to EMO in February 2022.

**FIGURE 1-1: PHOTOS OF EMU MISSION ON 19 JANUARY 2022**

<p><b>EMU mission wrap-up meeting</b></p>	<p><b>EMU visited the Wastewater Treatment Systems</b></p>
	
<p><b>EMU visited the site rehabilitation of former LIALAMA10 camp</b></p>	<p><b>A consultation meeting with the three village’s chiefs for the target of community solid waste and HSL handing over</b></p>
	

**1.2.2 Site Decommissioning and Rehabilitation**

Considering that the EMU of Bolikhan District had no comments to the ongoing rehabilitation of the construction sites during their mission in January 2022, the EMO decided to change the frequency

of the regular site inspection from monthly to quarterly until the sites have been successfully handed over to the GOL.

### 1.3 WATER QUALITY MONITORING

The analyses of Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD<sub>5</sub>), Faecal Coliform Bacteria, Total Coliform Bacteria and *E. coli* have been carried out by NNP1PC's environmental laboratory since August 2017.

All data are reported to the Ministry of Natural Resources and Environment (MONRE) monthly, and quarterly to the ADB. The reports are also published on the Company's website at <https://namngiep1.com/resources/monitoring-reports/>.

Due to the rapid increase in COVID-19 infection cases in the project related communities during January 2022, the GOL imposed additional COVID-19 preventative measures, which meant that the community water supply (groundwater and gravity fed) monitoring had to be suspended.

In addition, there is still no turbidity measurement data reported in January 2022 due to the Turbidity Meter was broken. A new Turbidity Meter was received at end of January 2022.

#### 1.3.1 Effluent Discharge from Camps and Construction Sites

Detailed monitoring results are provided in the **Annex A** of this Report. The effluent camp monitoring results in January 2022 only include the pH, DO, Conductivity, Temperature, TSS and BOD<sub>5</sub> for OSOV1 (EF01), OSOV2 (EF13) and the Main Powerhouse (EF19). The results of other parameters (COD, Ammonia-nitrogen, total nitrogen, total phosphorus and oil & grease) are pending issuance of the analysis report by the laboratory.

The status of implementation of the corrective actions addressing non-compliances at the camps and key project facilities are summarized in **Table 1-5**.

**TABLE 1-5: STATUS OF CORRECTIVE ACTIONS FOR NON-COMPLIANCES AT WWTSS IN JANUARY 2022**

Site	Sampling ID	Status	Corrective Actions
OSOV1	EF01	Non-compliance for faecal coliform and total coliform.	In Q1 of 2022, the treatment conditions will be adjusted including the treatment time and the Chlorine dosing rate in the OSOV2 and the Main Powerhouse systems.
OSOV2	EF13	Non-compliance for faecal coliform and total coliform.	Cattle faeces was observed in the second wetland pond of OSOV1 and also in the surrounding areas, the preventive measures are under discussion to take action by the ADM team (such as fencing).
Main Powerhouse	EF19	Full compliance for the analysed parameters	

#### 1.3.2 Ambient Surface Water and Reservoir Water Quality Monitoring

The ambient surface water and reservoir water quality monitoring programme comprises five monitoring stations in the main reservoir (R01-R05), two stations in the Re-regulation Reservoir

(R06 and R07), five stations in the mainstream Nam Ngiep (NNG01 and NNG05 to NNG08) and four stations in the main tributaries to Nam Ngiep (Nam Chiane [NCH01], Nam Phouan [NPH01], Nam Xao [NXA01] and Nam Houay Soup [NHS01]).

Weekly depth profile monitoring (pH, DO, conductivity and temperature) has been undertaken since 18 September 2018 for stations located in the Re-regulation reservoir and the main reservoir. The locations of the monitoring stations are shown in **Figure 1-3**.

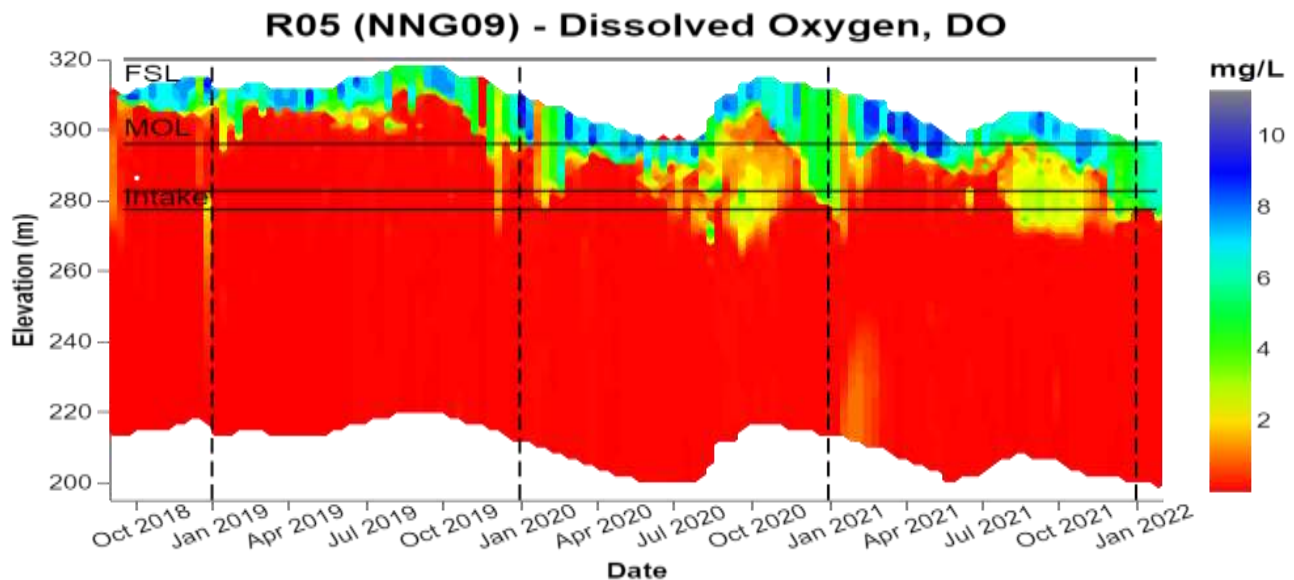
The monitoring results for key parameters (DO, TSS and BOD<sub>5</sub>) during January 2022 are presented in **Table 1-6, Table 1-7 and Table 1-8**. The full set of data for January 2022 is attached in **Annex A**. In addition, the results for DO timeseries are presented as line graphs in **Figure 1-4 and DO Long Profile graphs in Figure 1-5**.

**Main Reservoir**

From 01 to 31 January 2022, the main reservoir water level decreased with 1.78 m from El. 298.56 m asl to El. 296.78 m.

At R05, the average DO concentration was 6.5 mg/L in the upper 19 m varying between 5.9 mg/L and 6.9 mg/L, and the oxycline was generally found at the depth between 20.0 and 22.0 m with DO concentrations abruptly decreasing from about 6 mg/L to below 3 mg/L. DO concentrations below 0.5 mg/L (anoxic condition) were recorded at depths of 22 - 24 m which is just below the bottom sill of the intake. The cold weather observed in December 2021 has continued throughout most of January 2022 and the thermocline has remained at depths at or below the intake with a rather DO rich epilimnion.

**FIGURE 1-2: DO DEPTH PROFILES TIME SERIES IN R5 (SINCE SEPTEMBER 2018 TO JANUARY 2022)**



At R04, the DO levels in the upper 16.0 m varied between 3.9 mg/L and 7.4 mg/L with oxycline at depths of 14 m and 17 m below surface and DO concentrations generally less than 2 mg/L at depths below 19 m.

At R03, the DO levels in the upper 7.0 m varied between 6 mg/L and 7.5 mg/L gradually decreasing to around 3 mg/L down to a depth of about 30 m.

At R02, the DO levels in the entire water column varies between 3.9 mg/L and 6.5 mg/L with a mean of 5.1 mg/L.

At R01, the DO level at the water surface was 7.9 mg/L.

As expected, the TSS concentrations in the main reservoir have been consistently low since the start of impounding with a mean of 5 mg/L compared with the high flow season means of about 100 – 250 mg/L and low flow season means of 20 mg/L - 50 mg/L.

The BOD<sub>5</sub> measurements at R01, R02, R03, R04 and R05 in epilimnion were less than 1.0 mg/L and BOD<sub>5</sub> measurements in the hypolimnion at R03 and R04 were less than 1.0 mg/L and at R05 it was 6.5 mg/L.

### **Re-regulation Reservoir**

In January 2022, the turbine discharges from the Main Powerhouse varied between 26 and 231 m<sup>3</sup>/s usually interrupted by night-time periods with no discharge.

The mean DO concentration in the water surface were 5.1 mg/L and 5.8 mg/L in R06 and R07 respectively. No depth profiles monitoring was conducted during the month due to the limited access of the local boat driver according to the COVID-19 lockdown measures.

The BOD<sub>5</sub> concentrations in both R06 and R07 were less than 1.0 mg/L.

### **Nam Ngiep Downstream**

During January 2022, the discharge from the Re-regulation Dam was mainly turbine discharge and occasionally gate discharge.

The rather high DO concentrations at the level of the intake to the Main Powerhouse provided similar or slightly higher DO concentrations in the Re-regulation Reservoir and the discharge from the Re-regulation Reservoir - whether from the gate or from the turbine - has generally been about 5.5 mg/L. Further downstream the DO levels were above 7 mg/L thus complying with the surface water quality standard.

No dead fish was observed in Nam Ngiep downstream during this monitoring period. NNP1PC is still in the process of collecting information to assist in developing measures to improve the DO levels downstream.

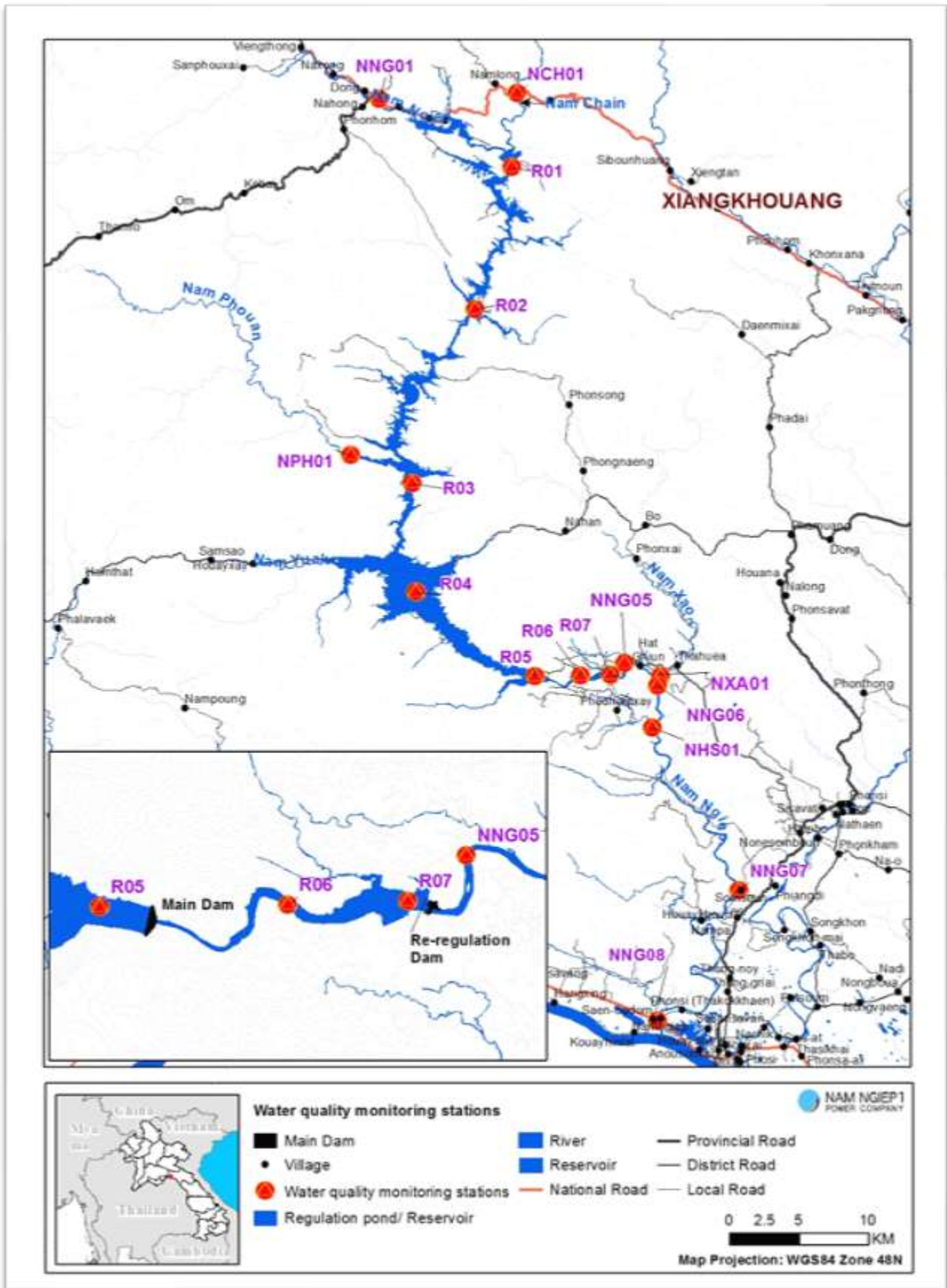
The BOD<sub>5</sub> in the downstream station (NNG05) was less than 1 mg/L and complied with the national surface water quality standard.

### **Main Tributaries to Nam Ngiep**

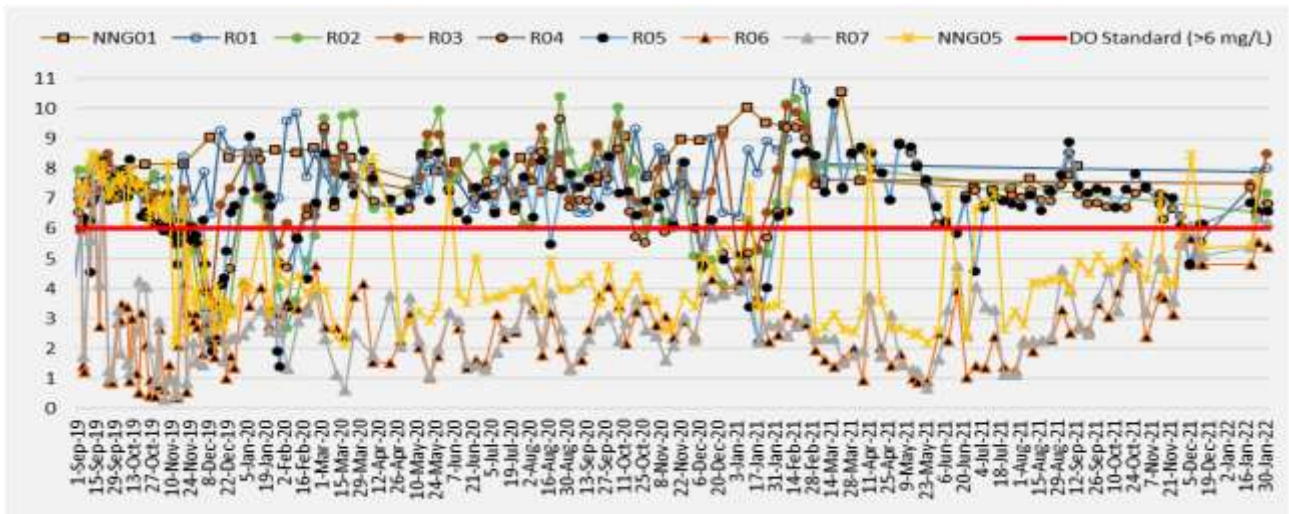
All monitored parameters in the Nam Phouan (NPH01), Nam Xao (NXA01) and Nam Houaysoup (NHS01) complied with the standards.



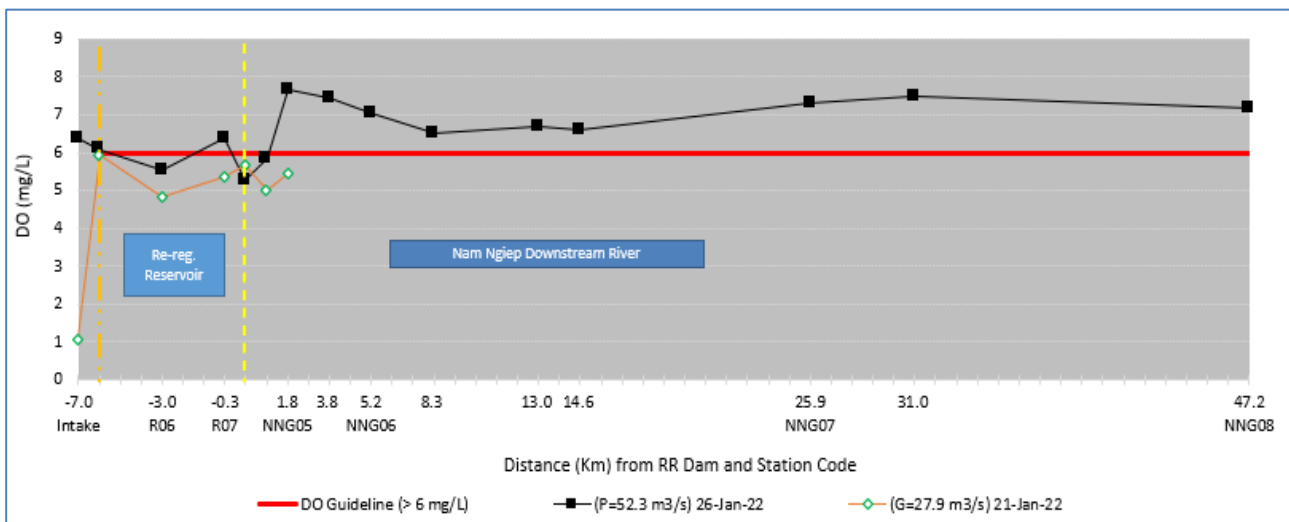
**FIGURE 1-3: SURFACE WATER AND RE-REGULATION RESERVOIR WATER QUALITY MONITORING STATIONS**



**FIGURE 1-4: CONCENTRATION OF DISSOLVED OXYGEN (MG/L) IN THE UPPER 0.2 M SINCE SEPTEMBER 2019 TO JANUARY 2022**



**FIGURE 1-5: DISSOLVED OXYGEN (MG/L) LONG PROFILE IN JANUARY 2022 (FROM IMMEDIATELY UPPER MAIN DAM TO LOWER NAM NGIEP RIVER)**



**TABLE 1-6: RESULTS OF SURFACE WATER QUALITY MONITORING FOR DISSOLVED OXYGEN (MG/L) IN THE UPPER 0.2 M, NATIONAL WATER QUALITY STANDARD: >6.0 MG/L**

DO (mg/L)	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NH501
20-Jan-22				7.52	7.39	6.87	4.82	5.38								
21-Jan-22									5.45							
24-Jan-22		7.9	6.55	6.57										9.1		
25-Jan-22					6.36	6.59	5.54	6.36								
26-Jan-22									7.68	7.06	7.31	7.18			7.07	6.41

**TABLE 1-7: RESULTS OF SURFACE WATER QUALITY MONITORING FOR TOTAL SUSPENDED SOLIDS (MG/L)**

Total Suspended Solids (mg/L)	NING01	R01	R02	R03	R04	R05	R06	R07	NING05	NING06	NING07	NING08	NCH01	NPH01	NXA01	NHS01
24-Jan-22		159		<5										14		
24-Jan-22 Bottom				<5												
25-Jan-22					<5	<5	<5	5.2								
25-Jan-22 Bottom					<5	<5										
26-Jan-22									<5	<5	<5	<5			<5	<5

**TABLE 1-8: RESULTS OF SURFACE WATER QUALITY MONITORING FOR BOD<sub>5</sub> (MG/L) - WATER QUALITY STANDARD: < 1.5 MG/L**

BOD <sub>5</sub> (mg/L)	NING01	R01	R02	R03	R04	R05	R06	R07	NING05	NING06	NING07	NING08	NCH01	NPH01	NXA01	NHS01
24-Jan-22		<1		<1										<1		
24-Jan-22 Bottom				<1												
25-Jan-22					<1	<1	<	<1								
25-Jan-22 Bottom					<1	6.5										
26-Jan-22									<1	<1	<1	<1			<1	<1

**1.3.3 Groundwater Quality Monitoring**

During January 2022, the groundwater quality monitoring in the communities was suspended due to a rapid increase in COVID-19 infection cases in the communities which meant that NNP1PC could not access the villages, and therefore there are no water quality monitoring results for the six wells located in Phouhomxay Village, Somseun Village, Nam Pa Village, Thong Noy Village and Pou Village to be reported in this month.

**1.3.4 Gravity Fed Water Supply (GFWS) Quality Monitoring**

Due to the rapid increase in COVID-19 infection cases in the communities, NNP1PC suspended the water quality monitoring of the community gravity fed water supply systems in Phouhomxay, Hat Gniun and Thahuea Villages in January 2022.



### 1.3.5 Landfill Leachate Monitoring

During January 2022, there was no landfill leachate monitoring at NNP1 Project Landfill (Last pond - LL4) and at Houay Soup Solid Waste Landfill (Last pond - LL6) due to the ponds dried out.

## 1.4 DISCHARGE MONITORING

### 1.4.1 Main Reservoir – Water Level, Inflow and Discharge

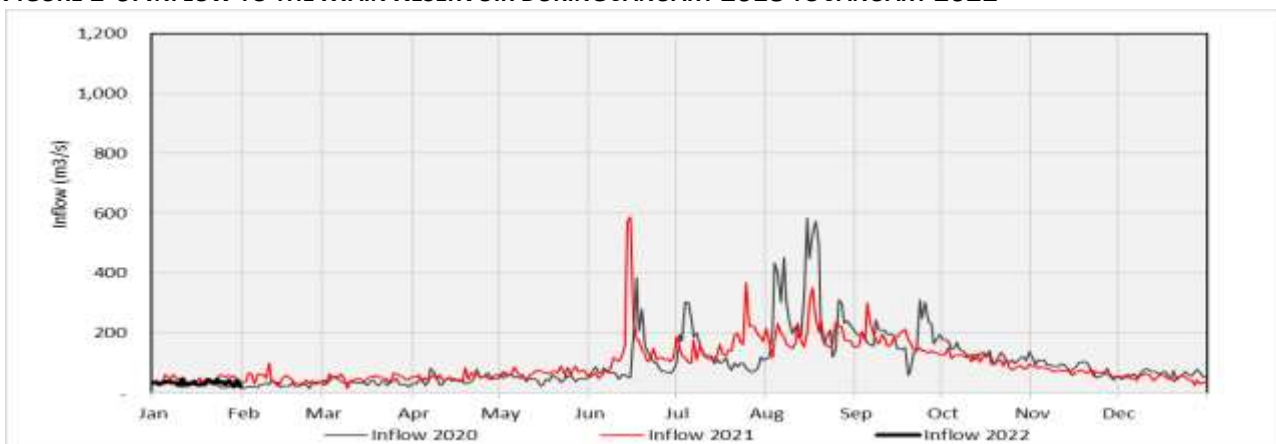
The water level in the main reservoir, inflow to the reservoir and discharge from the reservoir have been monitored since the start of the impounding on 15 May 2018. The graph in **Figure 1-6 and Figure 1-7** presents the values recorded since May 2018.

During January 2022, the mean inflow to the main reservoir was 34 m<sup>3</sup>/s. The minimum and maximum inflows were 21 m<sup>3</sup>/s (on 31 January 2022) and 46 m<sup>3</sup>/s (on 11 January 2022) respectively.

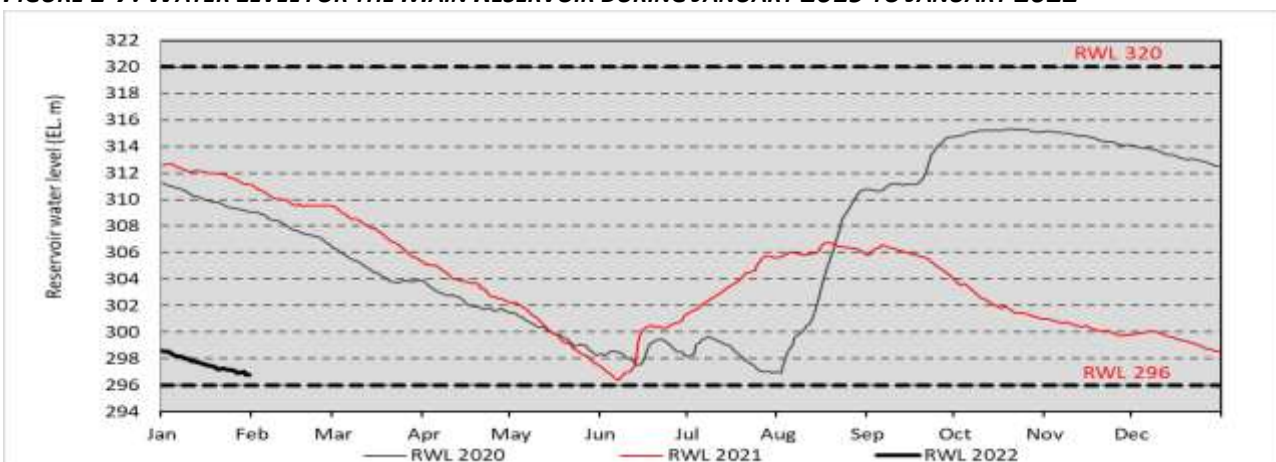
From 01 to 31 January 2022, the water level in the main reservoir decreased from El. 298.56 m asl to El. 296.78 m.

In January 2022, the hourly turbine discharges from the Main Powerhouse varied between 26 and 231 m<sup>3</sup>/s usually interrupted by night-time periods with no discharge.

**FIGURE 1-6: INFLOW TO THE MAIN RESERVOIR DURING JANUARY 2018 TO JANUARY 2022**



**FIGURE 1-7: WATER LEVEL FOR THE MAIN RESERVOIR DURING JANUARY 2019 TO JANUARY 2022**



**Note:** The 2018 and 2019 Reservoir Water Level represent the reservoir before the COD (05 September 2019)

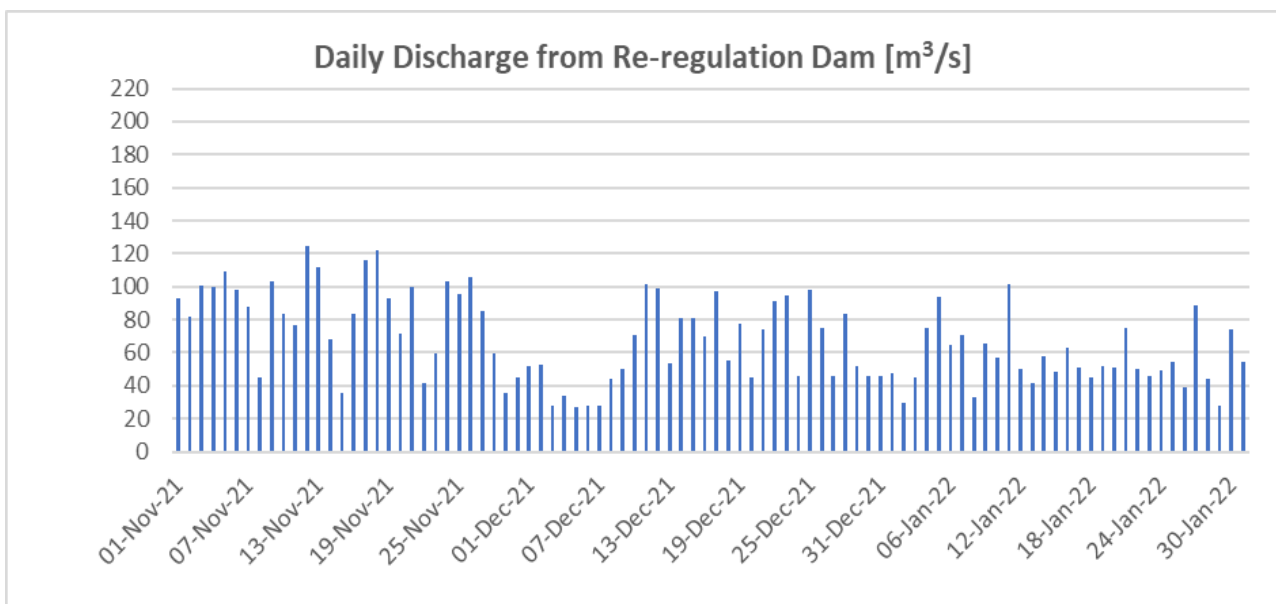
### 1.4.2 Re-regulation Reservoir – Discharge

The daily discharge monitoring data for the Re-regulation Dam during November 2021 to January 2022 is presented in **Figure 1-8**.

During January 2022, the mean daily discharge from the Re-regulation Dam was about 56 m<sup>3</sup>/s with hourly turbine discharges varying between 49 m<sup>3</sup>/s and 161 m<sup>3</sup>/s, hourly gate discharge varied between 27 m<sup>3</sup>/s and 271 m<sup>3</sup>/s, and hourly total discharge varying between 27 m<sup>3</sup>/s and 271 m<sup>3</sup>/s. The hourly discharge was kept above the minimum flow requirement of 27 m<sup>3</sup>/s at all times.

The changes in the discharge from the Re-regulation Dam were informed in advance to the RMU and to the heads of the downstream villages, who then announced the changes to the communities over the village speaker systems.

**FIGURE 1-8: DAILY DISCHARGE MONITORING AT THE RE-REGULATION DAM IN NOVEMBER 2021 TO JANUARY 2022**



### 1.4.3 Nam Ngiep Downstream Water Depth Monitoring

In January 2022, EMO carried out only one boat mission to monitor the water depth in the Nam Ngiep downstream of the Re-regulation Dam. A total of 19 sites have been identified with potential shallow water depths and none of the sites had talweg water depth less than 0.5 m.

## 1.5 PROJECT WASTE MANAGEMENT

### 1.5.1 Solid Waste Management

In January 2022, a total of 24.2 m<sup>3</sup> of solid waste was disposed of at the NNP1 Project Landfill, an increase of 5.5 m<sup>3</sup> compared with December 2021.

During this reporting period, the Contractor continued the regular waste collection from the NNP1PC’s operation sites and operated the project landfill for three days per week. The work included waste segregation and disposal, waste cover and compaction, grass cutting and repairing of perimeter fences.

**FIGURE 1-9: WASTE MANAGEMENT ACTIVITIES AT NNP1 LANDFILL DURING JANUARY 2022**



The total amount of recyclable waste selling and collection this month is summarized in **Table 1-9**.

**TABLE 1-9: AMOUNTS OF RECYCLABLE WASTE SOLD AND COLLECTION**

Source and Type of Recycled Waste		Unit	Sold	Cumulative Total by January 2022
1	Plastic bottles	kg	0	15
2	Aluminium	kg	0	31
3	Paper/Cardboard	kg	0	15
4	Glass	kg	0	20
5	Scrap Metal	Kg	0	0
<b>Total</b>		<b>kg</b>	<b>0</b>	<b>81</b>

In January 2022, while continuing observing the required COVID-19 precautions as well as infected cases among project personnel, the access to OSOV1 was restricted and the villagers were not allowed to collect food wastes from the OSOV1 canteen.

### 1.5.2 Hazardous Materials and Waste Management

The types and amounts of hazardous materials and hazardous waste stored on site in January 2022 are shown in **Table 1-10** and **Table 1-11**.

**TABLE 1-10: RECORD OF HAZARDOUS MATERIAL INVENTORY**

No.	Type of Hazardous Material	Unit	Total in January 2022 (A)	Used (B)	Remaining at the end of January 2022 (A – B)
1	Diesel	Litre	10,004	3,569	<b>6,435</b>
2	Gasoline	Litre	1,746	764	<b>982</b>
3	Lubricant (Turbine oil)	Litre	12,315	200	<b>12,115</b>
4	Colour Paint	Litre	242	0	<b>242</b>
5	Thinner	Litre	7	0	<b>7</b>
6	Grease Oil	Litre	785	0	<b>785</b>
7	Gear Oil	Litre	166	0	<b>166</b>
8	Chlorine Liquid	Litre	105	0	<b>105</b>
9	Chlorine Powder	kg	65	0	<b>65</b>
10	SIKA	Litre	7	0	<b>7</b>

**TABLE 1-11: RECORD OF HAZARDOUS WASTE INVENTORY**

No.	Hazardous Waste Type	Unit	Total in January 2022 (A)	Disposed (B)	Remaining at the end of January 2022 (A - B)
1	Used Oil (Hydraulic + Engine)	Litre	272.3	0	<b>272.3</b>
2	Used oil mixed with water	Litre	920	0	<b>920</b>
3	Empty used oil drum/container (drum 200L)	Unit	3	0	<b>3</b>
4	Contaminated soil, sawdust and textile material	m <sup>3</sup>	0.48	0	<b>0.48</b>
5	Used tyre	Drum	17	5	<b>12</b>
6	Empty used chemical drum/container (drum 20L)	Unit	8	0	<b>8</b>
7	Lead acid batteries	Unit	9	0	<b>9</b>
8	Empty paint and spray cans	Unit	138	0	<b>138</b>
9	Halogen/fluorescent bulbs	kg	233	0	<b>233</b>
10	Empty cartridge (Ink)	Unit	176	0	<b>176</b>
11	Clinic Waste	Kg	15.7	0	<b>15.7</b>



**1.6 COMMUNITY WASTE MANAGEMENT**

**1.6.1 Community Recycling Programme**

Due to the continuation of COVID-19 measures, many local recycling businesses and vendors have not yet resumed their recyclable waste trading in the community area. No recycle waste trade activities in the community recycle waste bank in January 2022.

**1.6.2 Community Solid Waste Management**

In January 2022, a total of 23.8 m<sup>3</sup> of solid waste from Phouhomxay, Thahuea and Hat Gnuin Villages was disposed of at Houay Soup Landfill, a decrease of 1.9 m<sup>3</sup> compared with December 2021.

During this reporting period, the local waste collection contractor conducted regular waste collection from the three villages and operated the Houay Soup Landfill for two days per week. The work included waste collection, segregation and disposal, waste cover and compaction, grass cutting and repairing the perimeter fences. The contractor also assisted on the big cleaning in the three villages.

**FIGURE 1-10: WASTE MANAGEMENT ACTIVITIES DURING JANUARY 2022**



**2. WATERSHED AND BIODIVERSITY MANAGEMENT**

**2.1 WATERSHED MANAGEMENT**

**2.1.1 Implementation of Annual Implementation Plan (AIP)**

**2.1.1.1 Xaysomboun Watershed and Reservoir Protection Office (WRPO)**

Xaysomboun Watershed and Reservoir Protection Office (WRPO) did not implement any activities under the approved Xaysomboun AIP of 2019 and 2020 during reporting period. The pending activities include the Participatory Land Use Plan (PLUP) training and PLUP improvement for Phonhom Village, relocation of staff and equipment to the newly built Xaysomboun WRPO sub-office, construction of reservoir access checkpoint at WRPO sub-office, construction of two ranger

stations and two reservoir TPZ checkpoints, producing TPZs protection handbook, installation of signs and poles for TPZs, as well as the organization of meeting on role and responsibilities on the reservoir fishery management and the annual meeting.

#### **2.1.1.2 Bolikhamxay Watershed and Reservoir Protection Office (WRPO)**

Bolikhamxay WRPO is planning to organize the annual meeting in February 2022 using the remaining budget of AIP2021.

#### **2.1.1.3 NNP1PC EMO**

EMO team organized the consultation meetings with village authorities and representatives of village producers on 18 January 2022 at Phou Ngou and Houayxai Villages. The consultation meeting was also attended by the Hom District Focal Point for Livelihood Activities under the NNP1 Watershed Management Plan (WMP). The topics that were discussed include the establishment of village producer groups particularly for cattle and orange production, group regulations particularly for cattle, pineapple and orange production, strengthening pineapple and orange production, and other capacity building activities for the 5-year action plan. The village authorities and representatives of village producers of the two villages acknowledged and confirmed their support and cooperation on the implementation of the activities.

EMO team also organized a working session on the 5-year action plan with Thathom District Agriculture and Forestry Office (DAFO) on 20 January 2022 at Thathom DAFO. The meeting was attended by the Head of DAFO and three staffs from the Agriculture Unit. The summary of discussion and agreement include the following:

- Thathom DAFO confirmed their support and cooperation for the implementation of activities under the 5-year action plan.
- Thathom DAFO will organize consultation meeting on the activities under the 5-year action plan at Phonhom and Nahong Villages.
- Thathom DAFO will review existing relevant documents about production group establishment and will organize the meeting on production group establishment at Phonhom and Nahong Villages.
- Thathom DAFO will appoint District Focal Point for coordination and implementation of the activities.
- EMO Team will share the detailed 5-year action plan for strengthening the capacity of local producers and market linkages for Ban Phonhom and Nahong.

EMO team also had a follow-up meeting to discuss and finalize the extension service plan of Thathom DAFO on 20 January 2022 at Thathom DAFO. It was agreed that the extension service plan 2022 will focus on the improvement of home garden production at Phonhom Village and Kai Noi rice production at Phonhom and Nahong Villages. EMO Team will further review the plan and provide feedback to Thathom DAFO so that the implementation could start in February 2022.

EMO received confirmation from Department of Forestry (DOF)-Ministry of Agriculture and Forestry (MAF) through an official letter No. 022/PAFO-Xaysomboun dated on 20 January 2022 that the Head of Xaysomboun PAFO and the Head of Xaysomboun WRPO accepted and have no objections on the NNP1 proposed allowances for field-office-based staffs, for local villagers who participate in field activity in the forest, and also for the pending issue on the patrolling works as discussed and agreed during the meeting on the Financial Management Manual (FMM) on 27 December 2021. In this regard, EMO team communicated with Xaysomboun PAFO for their internal arrangement and

cooperation on the biological monitoring surveys that are scheduled between 14 February – 22 March 2022 for the Lao Newt and Gecko and 27 February – 14 March 2022 for the camera traps.

The meeting between NNP1 Environment and Social Division (ESD) management and the Xaysomboun Provincial Governor related to the annual implementation activities was postponed to 07 February 2022.

## **2.1.2 Preparation of Annual Implementation Plan (AIP) 2022**

### **2.1.2.1 Xaysomboun WRPO**

Xaysomboun WRPO confirmed that they could not submit the draft AIP2022 in January 2022 because the Head of Xaysomboun WRPO is fully occupied with other assignments between the middle to end of January 2022. They requested to have another round of discussions with EMO and the Biodiversity Service Provider (BSP)-Wildlife Conservation Society (WCS) in the first week of February 2022.

### **2.1.2.2 Bolikhamxay WRPO and DOF-MAF**

EMO submitted the draft AIP2022 of DOF-MAF and Bolikhamxay WRPO to ADB, IAP and LTA on 21 December 2021 for their review and approval. EMO received the first comments from ADB and IAP for clarification on 10 and 24 January 2022 respectively. EMO has responded and provided additional supporting document as requested.

## **2.2 BIODIVERSITY OFFSET MANAGEMENT**

### **2.2.1 Implementation of BOMP Annual Implementation Plan (AIP) 2021**

The progress on the implementation of key activities by Component in January 2022 are described below:

#### **a. Component 1 - Spatial Planning and Regulation**

NC-NX Biodiversity Offset Management Unit (BOMU) shared the field report of Nam Chouan-Nam Xang (NC-NX) demarcation and the placement of NC-NX Totally Protected Zone (TPZ) boundary signs in Vangphieng Village in the first week of January 2022. BOMU continues to process with the recognition by District authorities of Viengthong and Xaychampone.

EMO, BOMU, and BSP-WCS will have discussions on the schedule for updating village land use plans in the second week of February 2022.

#### **b. Component 2 – Law Enforcement**

The patrol of January 2022 was implemented between 03 to 22 January 2022 focussing on TPZ highest priority area including Nam Xi, Houay Pong, Houay Xay Gnai and its mountain ridges, Nam San and Nam Pang Mountain ridges, Houay Phai and Houay Hee, the upstream of Nam Sone and Nam Chang as well as TPZ high priority area including Nam Ma, Nam Pang, Nam Sa Nga and mountain ridges. EMO, BOMU, and BSP-WCS organized discussion on the SMART database in the last week of January 2022 and so the results will be reported in February 2022.

#### **c. Component 3 – Conservation Outreach**

BSP-WCS shared the second draft of outreach strategy on 28 December 2021 and EMO provided comments for further improvement on 05 January 2022. The outreach activity through radio

broadcast in the two districts and six NC-NX villages started on 24 January 2022 and is expected to be completed in the second week of February 2022.

#### **d. Component 4 – Conservation linked livelihood development**

The activity under the approved Community Development Plan (CDP) that was scheduled in January 2022 could not be commenced yet due to unavailability of BOMU and DAFO.

BSP-WCS continues to improve the final draft of Community Conservation Agreement (CCA) and will share it to BOMU for their review.

The snare removal of December 2021 was implemented between 03 to 16 January 2022 focusing on the TPZ highest priority area including upstream of Nam San and its mountain ridges. The team did not observe any snares, but they heard the gun shot and found ammunition cartridges around the area.

#### **2.2.2 Preparation of Annual Implementation Plan (AIP) 2022**

NC-NX BOMU submitted the draft Biodiversity Offset Management (BOM) AIP2022 to EMO on 24 December 2021. EMO provided comments back to NC-NX BOMU on 29 December 2021. Due to unavailability of Head of NC-NX BOMU related with COVID-19 case, EMO and representatives of BOMU admin and finance sections organized an online discussion on 11 January 2022. EMO received the updated draft on 20 January 2022 but further discussions on the key issues such as field allowance, subsistence allowance, phone cards and etc are still needed and will be organized once the Head of BOMU return back to the office.

### **3. FISHERY MONITORING**

The fishery monitoring survey still could not be completed according to the schedule because of the extended enforcement of lockdown as part as the COVID-19 measures in Xaysomboun and Bolikhamxay Province. The results will be presented in the next monthly report.

### **4. EXTERNAL MISSIONS AND VISITS**

There was a monthly visit by the EMU of Bolikhan District on 19 January 2022, details of discussion and activities during the visit are presented in **section 1.2.1** in this report.



# ANNEXES

### ANNEX A: RESULTS OF WATER QUALITY MONITORING

**TABLE A-1: RESULTS OF MAIN RESERVOIR, RE-REGULATION RESERVOIR AND SURFACE WATER (NAM NGIEP RIVER, NAM PHOUAN, NAM CHIANE AND NAM XAO) QUALITY MONITORING**

		River Name	Nam Ngiep											Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup	
		Zone	Location Refer to Construction Sites											Location Refer to Construction Sites				
			Upstream/Main Reservoir					Within / Re-regulation Reservoir		Downstream				Tributaries Upstream		Tributaries Downstream		
		Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
Date	Parameters (Unit)	Guideline																
20-Jan-22	pH	5.0 - 9.0				6.88	7.13	6.97	6.79	6.89								
21-Jan-22	pH	5.0 - 9.0									6.84							
24-Jan-22	pH	5.0 - 9.0		6.82	7.24	7									7.03			
25-Jan-22	pH	5.0 - 9.0					7.05	7	6.62	6.68								
26-Jan-22	pH	5.0 - 9.0									6.9	7.07	6.74	6.62			6.98	6.82
20-Jan-22	Sat. DO (%)					90.3	88.7	82.2	59.3	66.8								
21-Jan-22	Sat. DO (%)										64.1							
24-Jan-22	Sat. DO (%)			92.9	79.2	78.4									97.7			
25-Jan-22	Sat. DO (%)						75.6	78.4	66.2	80.4								
26-Jan-22	Sat. DO (%)										90.3	81.1	86.2	85.5			81.3	72.6
20-Jan-22	DO (mg/L)	>6.0				7.52	7.39	6.87	4.82	5.38								
21-Jan-22	DO (mg/L)	>6.0									5.45							
24-Jan-22	DO (mg/L)	>6.0		7.9	6.55	6.57									9.1			
25-Jan-22	DO (mg/L)	>6.0					6.36	6.59	5.54	6.36								
26-Jan-22	DO (mg/L)	>6.0									7.68	7.06	7.31	7.18			7.07	6.41
20-Jan-22	Conductivity (µs/cm)					74	72	73	78	80								
21-Jan-22	Conductivity (µs/cm)										79							

		River Name	Nam Ngiep											Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup	
		Zone	Location Refer to Construction Sites											Location Refer to Construction Sites				
			Upstream/Main Reservoir					Within / Re-regulation Reservoir		Downstream				Tributaries Upstream		Tributaries Downstream		
		Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
Date	Parameters (Unit)	Guideline																
24-Jan-22	Conductivity (µs/cm)			84	80	74										75		
25-Jan-22	Conductivity (µs/cm)						73	73	82	77								
26-Jan-22	Conductivity (µs/cm)										75	78	77	80			162	59
20-Jan-22	Temperature (°C)				24.6	24.53	24.28	26.08	26.53									
21-Jan-22	Temperature (°C)									23.69								
24-Jan-22	Temperature (°C)			23.41	24.89	24.24										18.61		
25-Jan-22	Temperature (°C)						23.97	23.91	24.47	24.6								
26-Jan-22	Temperature (°C)										23.26	23.02	23.53	24.18			22.33	21.77
24-Jan-22	TSS (mg/L)			159.33		<5										14.56		
25-Jan-22	TSS (mg/L)					<5	<5	<5	5.2									
26-Jan-22	TSS (mg/L)									<5	<5	<5	<5			<5	<5	
24-Jan-22	BOD <sub>5</sub> (mg/L)	<1.5		<1		<1										<1		
25-Jan-22	BOD <sub>5</sub> (mg/L)	<1.5				<1	<1	<	<1									
26-Jan-22	BOD <sub>5</sub> (mg/L)	<1.5								<1	<1	<1	<1			<1	<1	
24-Jan-22	Faecal coliform (MPN/100 mL)	<1,000														130		
25-Jan-22	Faecal coliform (MPN/100 mL)	<1,000							14	49								
26-Jan-22	Faecal coliform (MPN/100 mL)	<1,000									5	2	8	17			33	27

		River Name	Nam Ngiep											Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup	
		Zone	Location Refer to Construction Sites											Location Refer to Construction Sites				
			Upstream/Main Reservoir					Within / Re-regulation Reservoir		Downstream				Tributaries Upstream		Tributaries Downstream		
		Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
Date	Parameters (Unit)	Guideline																
24-Jan-22	Total Coliform (MPN/100 mL)	<5,000													920			
25-Jan-22	Total Coliform (MPN/100 mL)	<5,000						49	70									
26-Jan-22	Total Coliform (MPN/100 mL)	<5,000								49	79	49	350			240	920	
24-Jan-22	TSS (mg/L)-bottom				<5													
25-Jan-22	TSS (mg/L)-bottom					<5	<5											
24-Jan-22	BOD <sub>5</sub> (mg/L)-bottom				<1													
25-Jan-22	BOD <sub>5</sub> (mg/L)-bottom					<1	6.54											

**TABLE A-2: RESULTS OF CAMP EFFLUENTS IN JANUARY 2022**

	Site Name	OSO V1 (Owner's Site Office and Village)	OSO V2 (ESD Camp)	Main Powerhouse
	Station Code	EF01	EF13	EF19
	Date	27-Jan-22	27-Jan-22	27-Jan-22
Parameters (Unit)	Guideline			
pH	6.0 - 9.0	6.75	7.73	6.97
Sat. DO (%)		44.7	70.4	86.1
DO (mg/L)		3.77	6.06	6.89
Conductivity (µs/cm)		429	610	981
TDS (mg/L)		214.5	305	490.5
Temperature (°C)		23.81	22.86	26.58
TSS (mg/L)	<50	<5	10.1	14.4
BOD <sub>5</sub> (mg/L)	<30	<6	6.18	8.34
COD (mg/L)	<125	Pending	Pending	Pending
NH <sub>3</sub> -N (mg/L)	<10.0	Pending	Pending	Pending
Total Nitrogen (mg/L)	<10.0	Pending	Pending	Pending
Total Phosphorus (mg/L)	<2	Pending	Pending	Pending
Oil & Grease (mg/L)	<10.0	Pending	Pending	Pending
Total coliform (MPN/100 mL)	<400	1,600	1,600	2
Faecal Coliform (MPN/100 mL)	<400	1,600	1,600	0
Residual Chlorine (mg/L)	<1.0		0.08	0.27