

# Environmental Management Plan

---

Project 41456-043  
March 2019

Viet Nam: Water Sector Investment Program –  
Tranche 3

Water Supply System Development in Thai Nguyen  
City, Thai Nguyen Province

Prepared by Thai Nguyen Water Joint Stock Company for the Asian Development Bank.

This environmental management plan is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the [“terms of use”](#) section on ADB's website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.



**THE PEOPLE'S COMMITTEE OF THAI NGUYEN PROVINCE**  
**THAI NGUYEN WATER SUPPLY JOINT STOCK COMPANY**

**LOAN 3251-VIE: VIET NAM WATER SECTOR INVESTMENT  
PROGRAM-PFR3**

**Project: Water supply system development  
in Thai Nguyen city**

**UPDATED ENVIRONMENTAL MANAGEMENT PLAN**

**Thai Nguyen - January 2019**

Prepared by Thai Nguyen Water Joint Stock Company for the Asian Development Bank.

## LIST OF ACRONYMS

PMU	Project Management Unit
BTNMT	Ministry of natural resources and environment of the socialist republic of Vietnam
CSC	Construction Supervision Consultant
DONRE	Department of Natural Resources
EIA	Environmental Impact Assessment
EMP	Environmental Monitoring Plan
QCVN	Standards of Vietnam
TOR	Terms of Reference
PPC	Provincial People's Committee
SMR	Safeguards Monitoring Report
USD	US dollar
VND	Vietnamese Dong
ADB	The Asian Development Bank
WHO	The World Health Organization

This updated environmental management plan is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the “terms of use” section of this website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

## **TABLE OF CONTENTS**

<b>LIST OF ACRONYMS .....</b>	<b>i</b>
<b>TABLE OF CONTENTS.....</b>	<b>ii</b>
<b>LIST OF TABLES.....</b>	<b>iii</b>
<b>LIST OF FIGURES.....</b>	<b>iii</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 Project Overview .....	1
1.2 Main work items.....	1
1.2.1 Overall water supply solution .....	1
1.2.2 The investment work items of the project include: .....	2
1.3 Main Activities relevant to environmental aspect.....	6
1.4 Construction schedule.....	7
1.5 EMP Aims and Structure .....	7
<b>2 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS .....</b>	<b>9</b>
<b>3 MITIGATION MEASURES .....</b>	<b>15</b>
<b>4 ENVIRONMENTAL MONITORING.....</b>	<b>25</b>
4.1 Project Performance Monitoring .....	26
4.2 Monitoring of environmental impacts .....	42
<b>5 PUBLIC CONSULTATION PROCESS AND INFORMATION PUBLICATION</b>	
<b>43</b>	
5.1 PUBLIC CONSULTATION PROCESS .....	43
5.2 PUBLIC CONSULTATION RESULTS .....	44
5.3 INFORMATION PUBLICATION .....	44
<b>6 INSTITUTIONAL STRENGTHENING AND TRAINING .....</b>	<b>48</b>
6.1 Activities during construction phase .....	48
6.2 Activities during operational phase .....	48
<b>7 RESPONSIBILITIES AND AUTHORITIES FOR IMPLEMENTATION OF</b>	
<b>MITIGATION MEASURES AND MONITORING REQUIREMENTS.....</b>	<b>49</b>
<b>8 MECHANISM OF INCOMPLIANCE REDRESS (Grievance Redress</b>	
<b>Mechanism).....</b>	<b>51</b>
<b>9 RESPONSIBILITIES FOR REPORTING AND REVIEW.....</b>	<b>54</b>
<b>10 ENVIRONMENTALLY RESPONSIBLE PROCUREMENT PLAN.....</b>	<b>55</b>
10.1 Procurement of Equipment for EMP Implementation.....	55

10.2 Integration of Environmental Considerations into the Procurement/Bidding Process.....	55
<b>11 PRELIMINARY COST ESTIMATES FOR ENVIRONMENTAL MONITORING</b>	<b>56</b>
<b>12 APPENDICES.....</b>	<b>57</b>
Appendix 1: Cost estimation for environmental supervision and monitoring .....	58
Appendix 2: Proposed formats for environmental reporting.....	59
Appendix 3: Location of Environmental Quality Monitoring.....	67
Appendix 4: Community Consultation .....	68
Appendix 5: The legal basis of the production forest land acquired by the subproject....	69

## LIST OF TABLES

<i>Table 1: Construction Material Demand and Its Sources .....</i>	<i>6</i>
<i>Table 2: Reviewing and updating from IEE of the project .....</i>	<i>8</i>
<i>Table 3. Summary of Potential Environmental Impacts .....</i>	<i>9</i>
<i>Table 4. Summary of the proposed mitigation measures .....</i>	<i>15</i>
<i>Table 5. Monitoring .....</i>	<i>26</i>
<i>Table 6. Monitoring of environmental impacts .....</i>	<i>42</i>
<i>Table 7. Public Consultation.....</i>	<i>45</i>
<i>Table 8. Time, location and participants of the public consultation .....</i>	<i>46</i>
<i>Table 9. The Results of The Public Consultation .....</i>	<i>46</i>
<i>Table 10. Responsibilities for implementation .....</i>	<i>49</i>
<i>Table 11. Responsibility for Reporting .....</i>	<i>54</i>
<i>Table 12. The method for ensuring integration of environmental considerations .....</i>	<i>55</i>

## LIST OF FIGURES

<b>Figure 1. Overall Diagram of Thai Nguyen water supply system .....</b>	<b>2</b>
<b>Figure 2. Position of Nui Coc Water Supply Plant <math>Q=50,000</math> m<sup>3</sup>/day and Raw pumping station .....</b>	<b>3</b>
<b>Figure 3. General Plan of water treatment plant.....</b>	<b>4</b>
<b>Figure 4. General of water supply system.....</b>	<b>5</b>
<b>Figure 5. Land slot for construction of Nui Coc WTP .....</b>	<b>7</b>

# 1 INTRODUCTION

## 1.1 Project Overview

1. Thai Nguyen Provincial People's Committee (PPC) and Thai Nguyen Water Supply Joint Stock Company (JSC) are implementing Thai Nguyen City Water Supply System Development Project under Asian Development Bank (ADB)'s Loan 3251-VIE to meet a fast-increasing demand for clean water. Until 2020 there will be a clean water shortage of about 120,000 m<sup>3</sup> per day for Thai Nguyen city and its neighborhood. The Project includes two phases aiming at upgrading the supply capacity with additional 100,000m<sup>3</sup> of clean water per day (each phase will supplement 50,000m<sup>3</sup> per day). Thai Nguyen Provincial People's Committee signed Decision No. 3050 QD-UBND dated 03/12/2008 on the adjustment of the detailed plan on the construction of the tourism area in the South of Nui Coc Lake in general and at Voi Phun Hill in particular in order to build a water supply plant with a capacity of 100,000m<sup>3</sup> per day. The subproject presented in this uEMP will be for Phase I of the above the mentioned project.

2. The direct benefactors of this subproject are customers who use clean water for purposes of daily living, production and business activities. They include local residents, government officers, students, and production as well as business units that use clean water in Thai Nguyen city, in the South of Dai Tu and Phu Luong districts and in the tourism area in the North of Nui Coc Lake. In addition, this project will create jobs for local people through the process of recruiting workers for implementation and operation project. When the project is completed it will expand the clean water company's capacity in production and business and attract more technical engineers as well as enhance the company's market competitiveness. Furthermore, the project will contribute considerably to the province's socio - economic development.

3. Upgrading environmental management plans (EMP) for Thai Nguyen city water supply system development project have been up as part of the preparations of the project. The original EMP was developed with the initial environmental evaluations (IEE) cleared and approved by ADB in 2014. An EIA following Government of Vietnam regulations were prepared and approved in Dec 2018. The IEE and EIA are found under separate cover.

4. Updated Environmental Management Plan has been prepared for Thai Nguyen Water Supply System Development Project. The environmental management plan is updated based on the original EMP to maintain the initial impact assessment reported in the IEE. The goal is not to create a new EMP but to supplement the content and scope required, and to synthesize the next project information.

5. A secondary, important objective of upgrading the EMPs is to develop specific but consistent EMP for the project which will assist the overall implementation of environmental safeguards

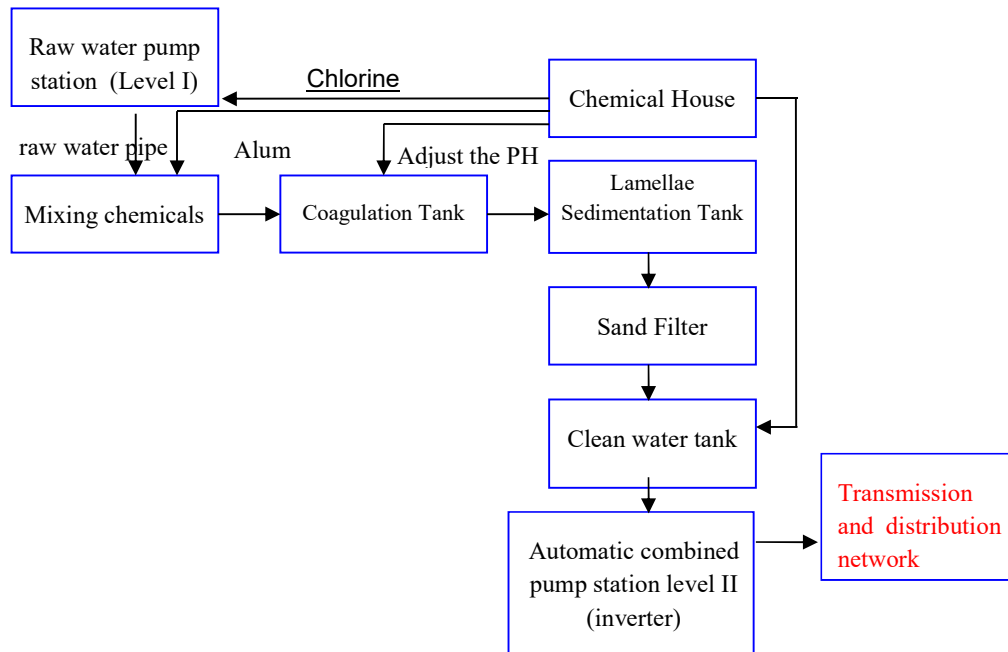
## 1.2 Main work items

### 1.2.1 Overall water supply solution

6. Construction of Nui Coc WTP with a capacity of 50,000 m<sup>3</sup>/day, including:
- Water intake facility; raw water pumping station; raw water pipeline DN800 to provide 55.000m<sup>3</sup>/day.
  - Reaction tank; Settling tank; Filter tank; Reservoir
  - Sludge pond;
  - Clean water pumping station;
  - Administrative house and Laboratory;
  - Guardhouse;
  - Costs of leveling, constructing bulkheads, building roads and plant fence;
  - Transformer station and power system: install two 250 KVA transformers for the water treatment plant area and install one 560 KVA and one 250 KVA transformers for raw water pumping station
  - Plant fence; yard, internal roads;
  - Internal water supply pipeline system;

- Drainage system.

7. Overall Diagram of Thai Nguyen water supply system is presented in figure below:

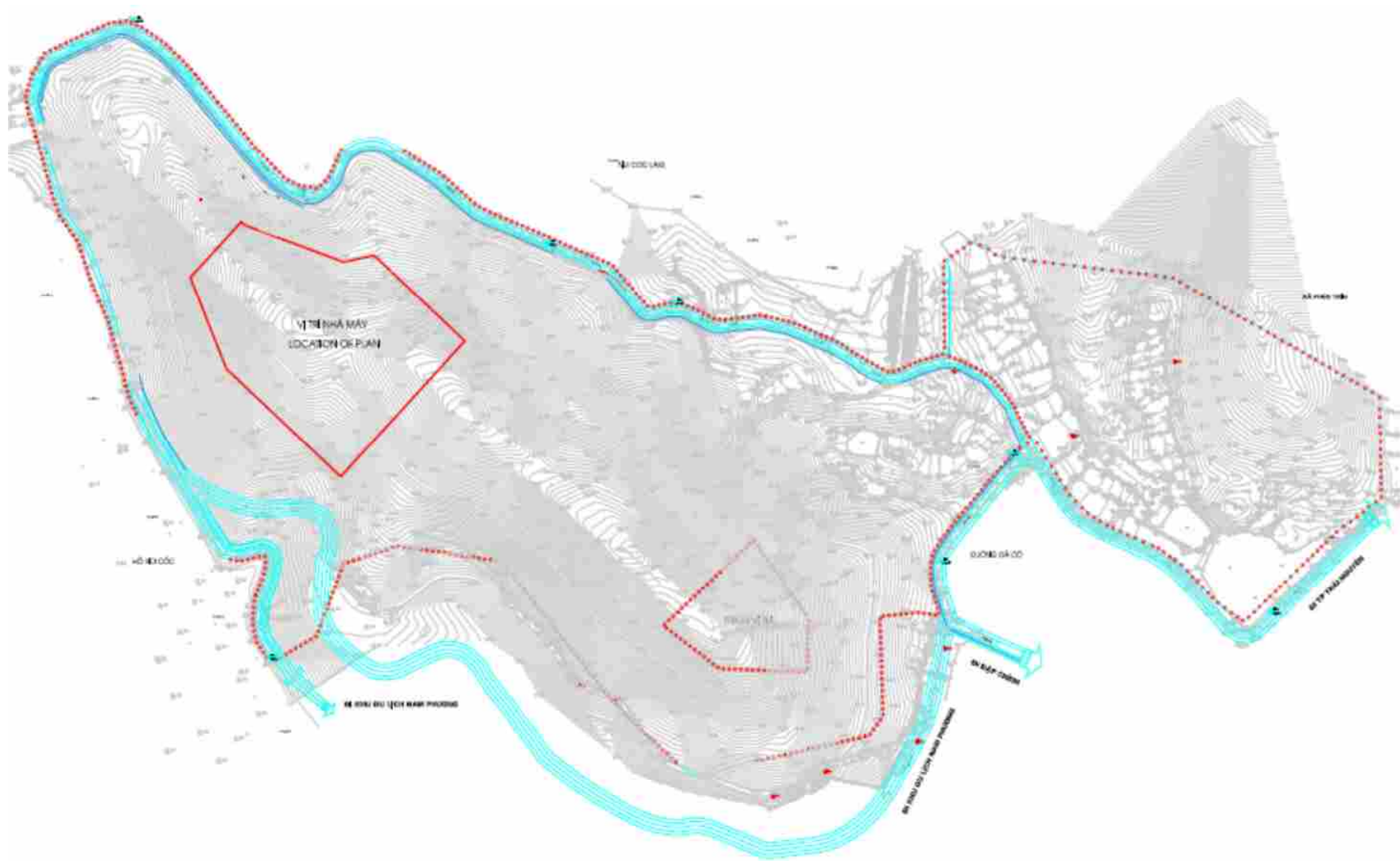


**Figure 1. Overall Diagram of Thai Nguyen water supply system**

### 1.2.2 The investment work items of the project include:

- Construction of Nui Coc Water Supply Plant with a capacity of 50,000 m<sup>3</sup>/day, including:
  - Intake structures, raw water pumping station, raw water pipeline DN800.
  - Clean water treatment technology includes: Reaction tank, settling tank, filtering tank, clean water tank.
  - Sludge tank and water filtering intake tank.
  - Clean water pumping station.
  - Administration house, Testing house, Chemical house, Repairing factory, Material warehouse, Permanency house.
  - Transformer station and electric system.
  - Levelling, stone embankment, access road to the Plant.
  - Gate, Fence, Yard, Internal road, Internal Drainage and Water Supply System.
- Installation of pipeline network
  - Transmission pipeline DN 800: 8,149m.
  - Transmission pipeline DN 600: 4,201m
  - Transmission pipeline DN 400: 4,632m
  - Transmission pipeline DN 225: 1,739m
  - Distribution pipeline D225mm: 11,035m.
  - Distribution pipeline D160: 9,276m
  - Distribution pipeline D110: 10,602m
  - Service pipeline: 49,344km
  - Household connection: 5,713 HHs





**Figure 2.**      **Position of Nui Coc Water Supply Plant  $Q=50,000 \text{ m}^3/\text{day}$  and Raw pumping station**

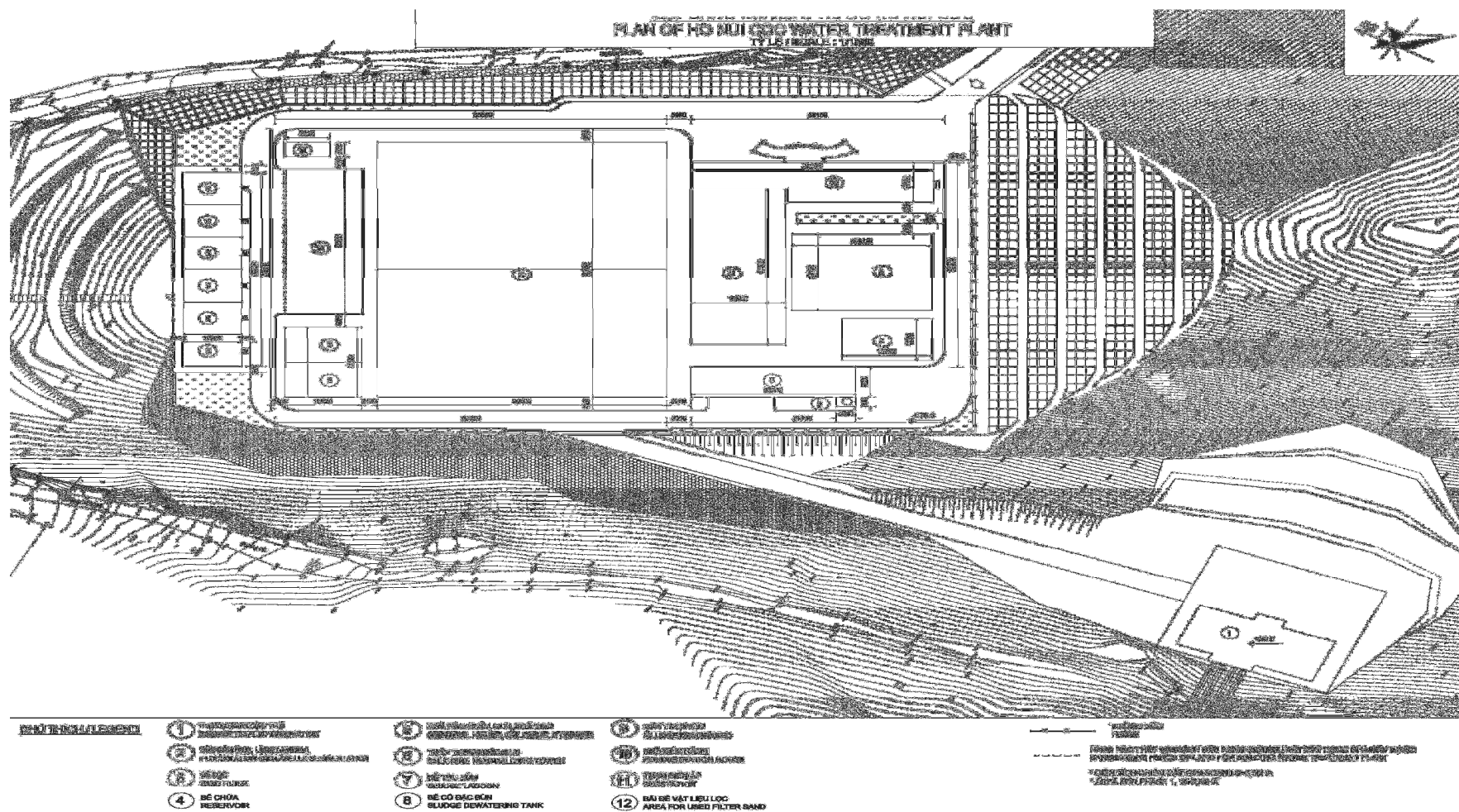


Figure 3. General Plan of water treatment plant

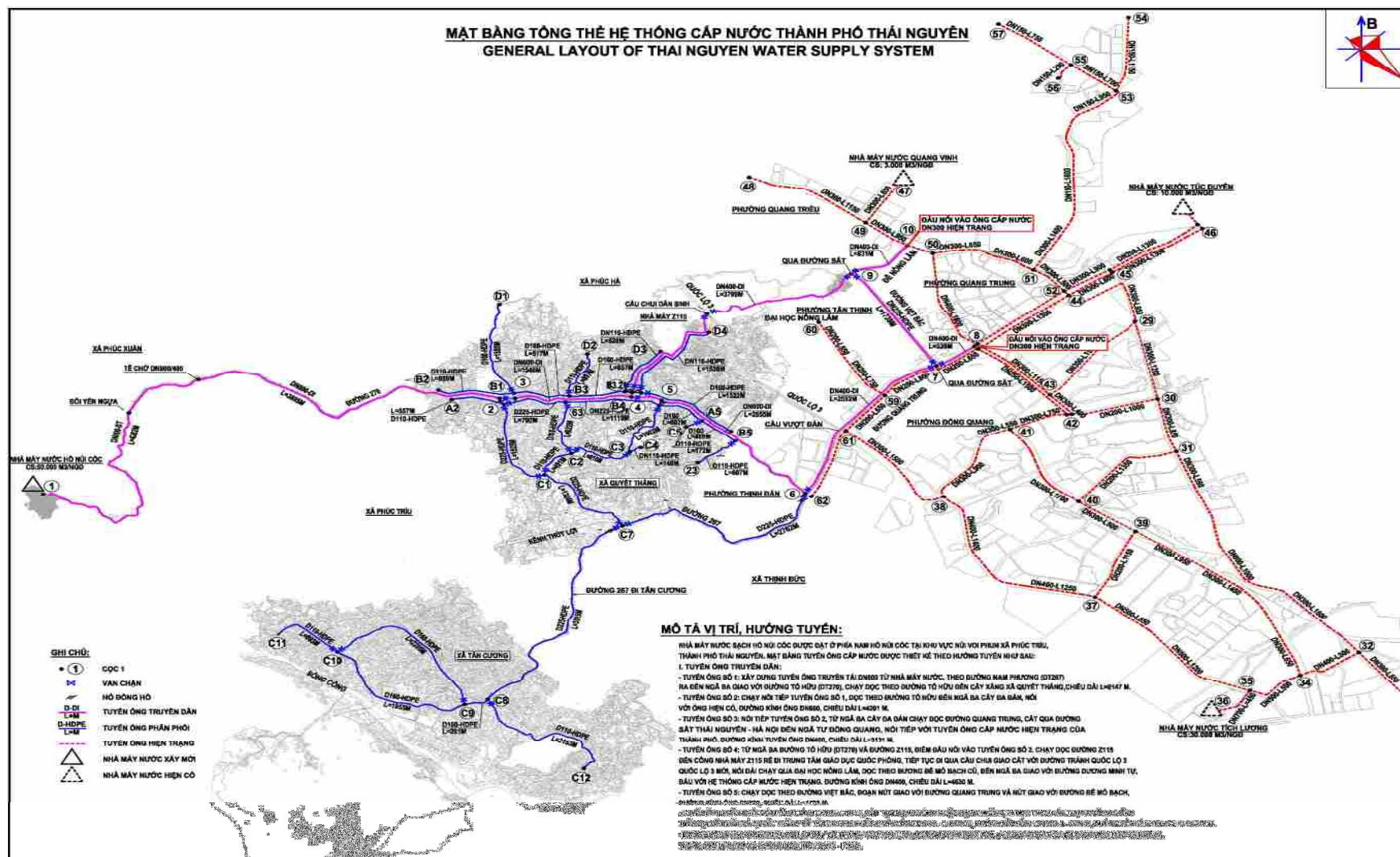


Figure 4. General of water supply system

## Demand for construction activities

8. **Construction materials:** According to the Survey Profile of construction materials quarries by the TWACO, sources of construction materials include sand, leveling soil, stone materials, which are extracted from mines in the area surrounding construction area and transported to the site by 15-ton trucks. Location of quarries and transport routes are described in the following table:

**Table 1: Construction Material Demand and Its Sources**

No.	Parameter	Soil and Sand Quarries	
		Sand mine	Rock and stone
1	Location	Sand mine, Cu Van commune, Dai Tu district, Thai Nguyen province	Nui Chuong quarry, Yen Lac commune, Phu Luong district, Thai Nguyen province.
2	Transport distance	12.2 – 16.5 km.	40 – 50 km
3	Quality	Suitable for normal	Suitable for project
4	Operation condition	Is being managed by Mountain Mining Joint Stock Company	Is being managed by Mountain Mining Joint Stock Company
5	Exploitation capacity	On demand	On demand
6	Exploitation by the project	40,650 m <sup>3</sup>	14,867 m <sup>3</sup>
7	License	Approval by of Thai Nguyen PC	Approval by of Thai Nguyen PC

Concrete: Concrete will be purchased in these local stations near project area.

Other materials: The construction supplies will be sourced from areas within the Dai Tu district, Phu Luong district and transported to the construction site by trucks for a distance of 20 -25 km.

Fuel: Fuel is bought at petroleum retails, transported in big casks to tent sites and stored in depots /stores, which are equipped with fire prevention facilities and environmental hygiene;

Disposal area: The remaining volume of construction waste will be used for leveling purposes in Soi Mit landfill in Soi Mit village, Phuc Triu commune with the remaining capacity of 300,000 m<sup>3</sup> out of 300,000 m<sup>3</sup>. The written agreement on the disposal of the construction waste has been obtained by the PMU signing with the local government.

## 1.3 Main Activities relevant to environmental aspect

### (i) Pre-construction activities:

- (a) Detailed design
- (b) Land clearance

### (ii) Construction activities:

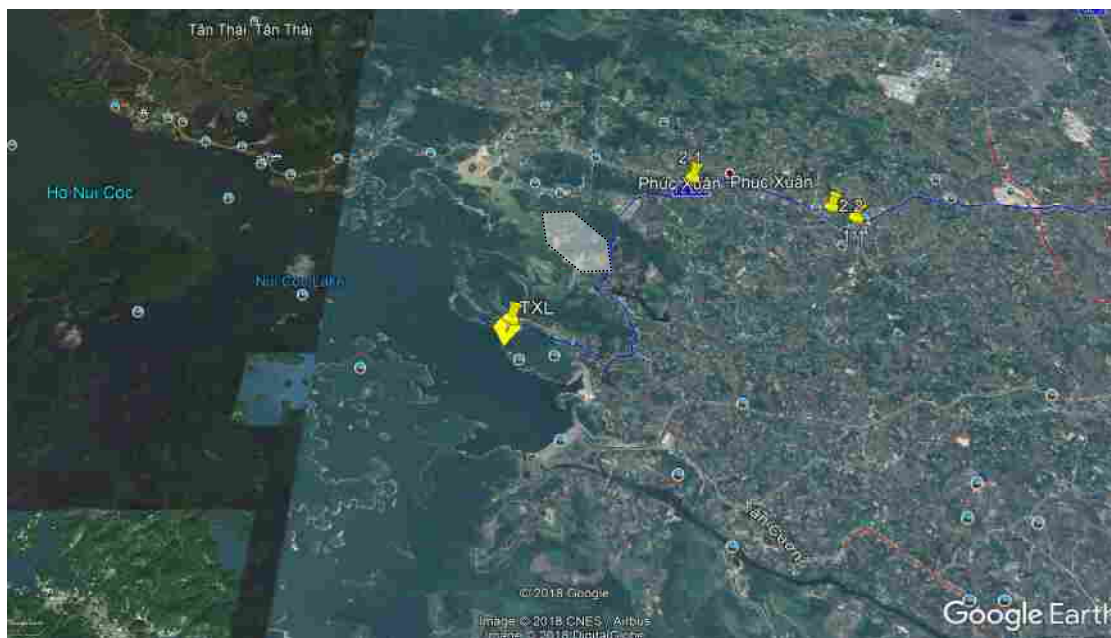
- (a) Construction works (Nui Coc WTP): water intakes, storage lake, raw water pumping stations, treatment cluster, treated water reservoir, treated water pumping stations, chemical house, sludge collecting chamber and auxiliary works such as: administrative house, store, guardhouse, yard, fence, trees ...
- (b) Construction works: Treated water reservoir, treated water pumping station, administration house, assembly house, warehouse, guard house, garage; motor garage, technical pipes in WTP and drainage discharge, leveling, Fence, gate, inner road and trees



- (b) Installation of network pipelines;
- (c) Concreted access road, Road surface completion
- (d) Sand back filling;
- (iii) Activities during Operational Phase:**
  - (a) Operation of the Nui Coc WTP, raw water pumping station, network;
  - (b) Maintenance activities: Nui Coc WTP, raw water pumping station, network

## 1.4 Construction schedule

9. Construction activities will be started in March of 2019 and completed in March 2021. Total construction time will be around 24 months.



**Figure 5. Land slot for construction of Nui Coc WTP**

## 1.5 EMP Aims and Structure

10. This Environmental Management Plan (EMP) has been prepared to document the environmental management commitments and obligations that will be implemented throughout the pre-construction, construction and operational phases of the Subproject. The EMP specifies the commitments and obligations, documents the responsibilities and timing for implementation and provides detailed costs estimates for implementation.

**Table 2: Reviewing and updating from IEE of the project**

<b>Major environmental impact consideration</b>	<b>Included in IEE report</b>	<b>Update status in EMP</b>
<b><i>Pre-construction phase</i></b>		
Land acquisition	Yes	Updated for more detail information
Unexploded Ordnance (UXO) remove	Yes	Yes
<b><i>Construction phase</i></b>		
Noise generation	Yes	Updated for detail information
Dust and exhaust emission	Yes	Updated for detail information
Water quality impacts	Yes	Updated for detail information
Impacts by solid waste management	Yes	Updated for detail information
Use of hazardous substances and hazardous waste disposal	No	Yes
Traffic disturbance	Yes	Updated for detail information
Public and Worker Health and Safety	Yes	Updated for detail information
Public infrastructure encroachment	Yes	Updated for detail information
<b><i>Operation phase</i></b>		
Noise generation	Yes	Updated for detail information
Water pollution	Yes	Updated for detail information
Water pollution	Yes	Updated for detail information
Soil erosion on segments pipeline	Yes	Updated for detail information
Effect of sludge from the sedimentation tank, waste water from filter washing	Yes	Updated for detail information

## 2 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

11. Study and assessment of environmental impacts have predicted a series of potential impacts due to the Project activities. Selection of the potential impacts for assessment is based on analyzed impacts in the IEE report which was prepared during FS preparation, site investigation, discussions with TWACO, Provincial DONRE and reference to the relevant documents including ADB's Safeguard Policy Statement (2009), annual provincial environmental assessment reports, the Detail Design Report, the environmental protection commitment reports specifically prepared for the Project and references. Table 3 below provides a summary of potential environmental impacts that can be occurred due to the Project's activities, which are described in detailed in the environmental assessment reports.

*Table 3. Summary of Potential Environmental Impacts*

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
<i>Pre-construction phase</i>		
Land acquisition	Medium Negative	<p>The main transmission pipeline will be placed along the existing route, only temporarily requisitioned land during construction.</p> <p>In order to build Nui Coc water treatment plant needs permanently acquired 99,938.3 m<sup>2</sup> of land owned by 8 households in Phuc Triu commune, of which:</p> <ul style="list-style-type: none"> <li>- Affected forestry land: 91,804.8 m<sup>2</sup>.</li> <li>- Affected perennial land: 7,733.5 m<sup>2</sup></li> <li>- Affected rural residential land: 400 m<sup>2</sup>.</li> </ul> <p>All opted for cash compensation and assistance for their lost. This is also quite consistent with the results of socio-economic survey of households: agriculture is not a main income source of the households and they all have better jobs.</p> <p>The compensation activities will be completed in April 2019.</p>
Unexploded Ordnance (UXO) remove	Minor Negative	<p>In addition to the land clearance process, it is necessary to pay attention to the risks of UXOs. Since excavation related infrastructure development is one of the main causes of the sudden explosion UXO in Vietnam, and habits of pipe installation roadwork closed to densely populated areas, it is needed to be vigilant to ensure that the pipeline construction area was surveyed for the presence of UXOs before any excavation takes place. although the risk is very low, the contractor will be responsible for ensuring the safety for the construction and can hire the army to disarm the bombs and mines before the land clearance</p>

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts																																																																																																																		
		activities. If such explosives are detected and verified, the demining work would need to be made, and be subject to the procedures established by the competent bodies, before performing any civil work.																																																																																																																		
Construction phase																																																																																																																				
Noise generation	Minor Negative	<p>The noise is generated from construction activities, machinery and vehicle such as trucks, bulldozers, tillers, and pile drivers at construction areas of WTP and raw water pumping station and household connection a long on water pipelines.</p> <p>Based on the main activities of the project, it is estimated that at the location within 80m from the source noise levels of most construction machinery and equipment will exceed the permitted limits during the period from 6am to 9pm (the noise level ranges from 70 to 88dBA). The level of noise is presented as follow:</p> <table><tr><th rowspan="2">No</th><th rowspan="2">Name of engines and equipment</th><th rowspan="2">Noise at 15,24 m*</th><th colspan="6">Spreading the noise (dB)</th></tr><tr><th>50 m</th><th>80 m</th><th>100 m</th><th>120 m</th><th>150 m</th><th>200 m</th></tr><tr><td>1</td><td>Crane</td><td>88</td><td>77.68</td><td>73.60</td><td>71.65</td><td>70.08</td><td>68.14</td><td>65.64</td></tr><tr><td>2</td><td>Bulldozer</td><td>85</td><td>74.68</td><td>70.60</td><td>68.66</td><td>67.08</td><td>65.14</td><td>62.64</td></tr><tr><td>3</td><td>Elevators</td><td>85</td><td>74.68</td><td>70.60</td><td>68.66</td><td>67.08</td><td>65.14</td><td>62.64</td></tr><tr><td>4</td><td>Pile stuffing machine</td><td>98</td><td>87.68</td><td>83.60</td><td>81.66</td><td>80.08</td><td>78.14</td><td>75.64</td></tr><tr><td>5</td><td>Tiller</td><td>83</td><td>72.68</td><td>68.59</td><td>66.66</td><td>65.08</td><td>63.14</td><td>60.64</td></tr><tr><td>6</td><td>Roller</td><td>74</td><td>63.68</td><td>59.59</td><td>57.66</td><td>56.08</td><td>54.14</td><td>51.64</td></tr><tr><td>7</td><td>Truck</td><td>88</td><td>77.68</td><td>73.60</td><td>71.65</td><td>70.08</td><td>68.14</td><td>65.64</td></tr><tr><td>8</td><td>Cutting machine</td><td>93</td><td>82.68</td><td>78.60</td><td>76.66</td><td>75.08</td><td>73.14</td><td>70.64</td></tr><tr><td colspan="2">QCVN 26- 2010/ BTNMT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">6h – 21h</td><td>70</td><td>70</td><td>70</td><td>70</td><td>70</td><td>70</td><td>70</td></tr><tr><td colspan="2">21h – 6h</td><td>55</td><td>55</td><td>55</td><td>55</td><td>55</td><td>55</td><td>55</td></tr></table> <p>According to calculations, the use of trucks transporting materials will generate noise beyond the regulations in the National Regulated standards QCVN 26-2010/BTNMT. In particular, according to the regulation on the permitted noise levels for residential areas from 21h-6 in the standards, the use of the construction machines in this period will generate noise beyond the permitted levels within the distance of 200m.</p>	No	Name of engines and equipment	Noise at 15,24 m*	Spreading the noise (dB)						50 m	80 m	100 m	120 m	150 m	200 m	1	Crane	88	77.68	73.60	71.65	70.08	68.14	65.64	2	Bulldozer	85	74.68	70.60	68.66	67.08	65.14	62.64	3	Elevators	85	74.68	70.60	68.66	67.08	65.14	62.64	4	Pile stuffing machine	98	87.68	83.60	81.66	80.08	78.14	75.64	5	Tiller	83	72.68	68.59	66.66	65.08	63.14	60.64	6	Roller	74	63.68	59.59	57.66	56.08	54.14	51.64	7	Truck	88	77.68	73.60	71.65	70.08	68.14	65.64	8	Cutting machine	93	82.68	78.60	76.66	75.08	73.14	70.64	QCVN 26- 2010/ BTNMT									6h – 21h		70	70	70	70	70	70	70	21h – 6h		55	55	55	55	55	55	55
No	Name of engines and equipment	Noise at 15,24 m*				Spreading the noise (dB)																																																																																																														
			50 m	80 m	100 m	120 m	150 m	200 m																																																																																																												
1	Crane	88	77.68	73.60	71.65	70.08	68.14	65.64																																																																																																												
2	Bulldozer	85	74.68	70.60	68.66	67.08	65.14	62.64																																																																																																												
3	Elevators	85	74.68	70.60	68.66	67.08	65.14	62.64																																																																																																												
4	Pile stuffing machine	98	87.68	83.60	81.66	80.08	78.14	75.64																																																																																																												
5	Tiller	83	72.68	68.59	66.66	65.08	63.14	60.64																																																																																																												
6	Roller	74	63.68	59.59	57.66	56.08	54.14	51.64																																																																																																												
7	Truck	88	77.68	73.60	71.65	70.08	68.14	65.64																																																																																																												
8	Cutting machine	93	82.68	78.60	76.66	75.08	73.14	70.64																																																																																																												
QCVN 26- 2010/ BTNMT																																																																																																																				
6h – 21h		70	70	70	70	70	70	70																																																																																																												
21h – 6h		55	55	55	55	55	55	55																																																																																																												



Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		Workers at the construction site will be constantly exposed to high-intensity noise. According to calculations, within the range of 15m, the intensity of noise is higher than 85dB. This threshold of noise will make people feel tired when exposed continuously the noise; the threshold of 90dB or higher will affect hearing.
Dust and exhaust emission	Moderate Negative	<p>Dust and exhaust emission gases are identified that the main sources from the construction activities. Dust generated from construction activities is forecasted by the rapid assessment coefficient of World Health Organization (WHO) as follow: Concentration of dust generated from excavation and leveling activities is 1-100 mg/m<sup>3</sup> (corresponding to 0.3 mg/m<sup>3</sup> on QCVN 05/2013/BTNMT), dust generated from material loading is 0.1-1 mg/m<sup>3</sup> and from truck is 0.1-1 mg/m<sup>3</sup>. The detail analysis for subproject activities could be listed as follow:</p> <ul style="list-style-type: none"> <li>- Dust and exhaust emission gases generated from the construction activities in WTP and raw water pump station such as leveling, compaction, excavation, embankment, transport and material gathering. Dust swept up from material storage area as cement, soil and graves. The construction area of WTP is far from residential area so its impacts to resident is minor. Dust affects mainly to the workers in construction site.</li> <li>- Dust and noise generated from the construction activities of water pipelines. The main impacted areas are a long on distribution pipeline on main roads as To Huu road, Quang Trung road, provincial road no. 267, 270, De Nong Lam road, Z115 road and at the communes/wards such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, Thinh Dan. At these areas, it is very easy to the households will feel uncomfortable caused by dust. The scope of construction area is large but the construction time for each pipe section is short, so the impacts caused by dust and exhaust emission are moderate negative.</li> </ul>
Causing local flooding	Minor Negative	There may be flooded on construction area of WTP and raw water pumping station during heavy rain caused by stagnant water in the pits. Since the construction site location in the vacant area which closed to the beg lake and construction duration will be very short, therefore, the risk of localized flooding is quite minor.
The phenomenon of land subsidence	Minor Negative	The phenomenon of land subsidence may be happened during construction of facilities, which need be deepened. However, the concordant construction method will be solved these issues and the most important is these construction sites area far from residential area so the impacts area minor negative.
Water quality	Minor Negative	The water pollution sources which would impact on ambient water quality in the project area include: i) runoff water from WTP construction site; ii) discharged wastewater from workers' camps; and iii) wastewater from maintenance activities of construction machinery. Affected area is surface water source at

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		<p>Nui Coc lake in Phuc Triu commune.</p> <p>Regarding to water pipelines: because the construction site is narrow, and the scale of works is small, the workers do not stay on site and there is no domestic wastewater. The impact of domestic wastewater is inconsiderable.</p>
Solid waste	Minor Negative	<p>Solid waste from construction activities includes: i) Construction refuse: soil, sand, stone, which are usually non-toxic; ii) Domestic waste and garbage: generated from workers' camps,</p> <p>On construction site of WTP and raw water pumping station, a large amount of solid waste generated in the process of construction is gravelly soil, cement, iron and steel scrap.</p> <p>Domestic waste: It is estimated that there are 150 workers on site per day at the construction area of Nui Coc WTP. On average, each worker releases 0.5 kg of waste. Thus, the amount of daily waste is about 75kg. The pipelines will be constructed in section and number of 100 workers is forecasted for each section, so the domestic waste is estimated about 50 kg/day.</p> <p>Generally, it is difficult to calculate the amount of solid waste. It needs a suitable management, however, to avoid the waste dispersing in surrounding environment such as cause water pollution, insanitation condition and communal disease.</p>
Hazardous waste	Minor Negative	<p>Hazardous wastes in the construction process are mainly oil, lubricant from engines, machinery, trucks transporting construction materials. According to the technical documentation, the average lubricant emission from construction machinery is about 30 liters every change in the period of 3 - 4 months. Waste is generated mainly at the construction site of WTP and raw water pumping station because of the large area and focus of machinery and workers. Although the large construction area of the pipeline, the pipelines with the small diameter (D50-D400) are constructed in section by hand. The impact of hazardous waste is minor given its small amount.</p>
Traffic disturbance	Moderate Negative	<p>Traffic disturbance could be potential impacted due to operation of transport vehicles, construction machines and equipment near by the transport routes and improvement of access road. These areas are major transport routes with a large volume of traffic or travel so the increase of vehicle and machinery for construction, excavation and material gathering will cause the impacts to traffic or traffic jams on rush hours. Besides, the installation of pipes on the road surface or at the intersection points will need to temporary occupy the road surface. The traffic accident risks may increase. The road may be affected as follow:</p> <ul style="list-style-type: none"> <li>- The area a long on To Huu road;</li> </ul>

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		<ul style="list-style-type: none"> <li>- The area a long on Quang Trung road;</li> <li>- The area a long on provincial road no. 267;</li> <li>- The area a long on provincial road no. 270;</li> <li>- The area a long on De Nong Lam road;</li> <li>- The area a long on Z115 road</li> </ul>
Public and Worker Health and Safety	Moderate Negative	<p>Labor safety accidents in the construction phase may occur due to the following reasons:</p> <ul style="list-style-type: none"> <li>- Not train labor safety for commanders and workers;</li> <li>- Not equip well of labor protection facilities for workers;</li> <li>- Not comply with labor safety measures;</li> <li>- Lack of supervision of the commander in the process of construction;</li> <li>- Not follow the right technical process</li> </ul> <p>Risk to the workers could occur during the construction stage such as electric shock and electrocution, crane accidents, workers being run-over by operating equipment, explosions. Accidents and risks in construction site would have ended up in the loss of a life for one of these workers. The construction site in deep pit (treatment tanks) may be happened accident risks to the workers. However, these risks can be reduced by the compliance of construction rules, so the impact is minor negative.</p> <p>For communication: Without the scope of construction site, the scale of construction is not big, and the pipeline is small (D50-D400) so the impacts to communication health is minor negative.</p>
Public infrastructure encroachment	Minor Negative	<p>The increase of vehicle output due to activities of transporting material, gathering construction materials and wasted ones is the main reason for obstruction. The affected objects are To Huu road, Quang Trung road, provincial road no. 267, 270, De Nong Lam road, Z115 road and at the communes/wards such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, Thinh Dan. However, the impact is just temporary as mobilizing vehicles.</p> <p>Internal traffic on the way will be affected as transport vehicles are gathered. The gathering of materials also affects the movement of people. In addition, the system of internal roads can be damaged when the number of heavy transport vehicles and machinery increase.</p> <p>The excavation activities for pipe laying pits also affect to damages of existing facilities such as power lines, drainage pipes, and communication lines.</p>
Social disturbance	Moderate Negative	<p>The focus of the work force in construction area increases the risks arising public order, social evils and diseases issues; arising job conflicts among employees, conflicts between workers and local people. In</p>

Potential Environmental Impacts	Significance of Impacts	Discussion of Impacts
		<p>addition, some types of unhealthy services, social evils can also appear. Therefore, the implementation of managing workers needs to be strict to avoid disorder in the area.</p> <p>During construction, valuable equipment, raw materials will increase the risk of theft, robbery or vandalism. Therefore, the management has to be closed, the guard force has to be strong enough and need to cooperate with the local authorities and residents to minimize the unfortunate loss</p>
<b><i>Operation phase</i></b>		
Water quality	Moderate Negative	<p>Water in culvert network of water-supply system commonly has no effect on the natural environment.</p> <p>Water in the pipeline will be polluted by pollutions from environment penetrated into the pipeline though the leakage, or when the pipe breaks. The pipeline is not washed regular causes to settle as sediment and pollute water supplied to people. In case of remaining chlorine in the pipeline is not enough, the microorganism can grow again in the water.</p>
Breakdown risk of water pipe	Minor Negative	The reason of pipe breakdown may be caused by external effects such as destruction, impacts by vehicles or internal effects such as surged pressures, corrosion of pipe. The breakdown of pipe effects to daily activities of the people in the service area (including communes/wards as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Tinh, Tinh Dan).
Loss of water	Minor Negative	Loss of water due to leaking or broken pipes due to acts of vandalism, stealing water. Water loss causes to waste water, economic losses and reduce water supply capability.
Operational risks (chemical leak, fire incidents etc.)	Minor Negative	<p>The disinfection of water using chlorine. During operation, there are risks of gaseous chlorine leakage caused to dangers to operators. Exposure to chlorine gas at a concentration of 250ppm in 30 minutes can lead to be fatal</p> <p>Fire incidents can happen caused by electrical short-circuit, lightning, human activities such as flammable material storage, smoke, fire. The fire incidents in the WTP area will cause to damages to people and property.</p>
Sludge	Minor Negative	Sludge wastes from water treatment process need to discharge according to current regulations. The sludge is forecasted about 30 m3 per day.
Domestic wastewater and solid wastes	Minor Negative	It is estimated that there are 20 workers on site per day. The domestic wastewater flow is about 20 m3/day and the amount of daily waste is about 10kg. The impact is insignificant.

### 3 MITIGATION MEASURES

12. Mitigation measures proposed for negative impacts identified in Table 3 will be summarized in Table 4 below. Mitigation measures for construction phase shall be included in the bidding documents for the Contractor to implement. The related costs that would be borne by the Contractor are not presented in this table - these costs will become part of the civil works contracts.

*Table 4. Summary of the proposed mitigation measures*

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
<b>Pre-construction phase</b>				
Designing	Land subsidence	<ul style="list-style-type: none"> <li>▪ Prior to construction, survey and investigation must be carried on the geology of relevant areas to work out appropriate construction plans</li> </ul>	Thai Nguyen Water Joint Stock Company	1,556,762,000 VND
Land acquisition	<p>Land acquisition at location of WTP and raw water pump station has been done.</p> <p>The construction of network pipeline has no land acquisition but temporarily recovery of land is required.</p>	<ul style="list-style-type: none"> <li>- The compensation payment will be completed in April 2019, an DDR report was also prepared to confirm the procedures of compensation activities strictly follow the approved RP.</li> <li>- After the production forest land (9.18 ha in total) is acquired for the project, Thai Nguyen Water Joint Stock Company will pay a sum of money to the State budget for payment of replanting.</li> <li>- This forest area was designated as a “production forest” from 1993 by the request of people and with the approval of local authorities (please see in Appendix 5) to develop new economic zones following a key plan of the Government at that time.</li> <li>- The production forest land acquired by the subproject is under management of 8 local households. All of these affected households have adequately legal land use certificates.</li> <li>- PMU and consultant team cooperating with the leaders of Phuc Triu commune conducted a public consultation on 26th September 2017. All the AHs were invited to attend. Consulted attendants wanted the project to be implemented as quickly as possible, avoiding project delays.</li> <li>- All the affected households have cooperated with the local authorities and project owner to proceed Detailed Measurement Survey (DMS.). Please see more detail in uRP report.</li> </ul>	Thai Nguyen Water Joint Stock Company	Completed Included in RP

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		<ul style="list-style-type: none"> <li>- Mitigation measures: Compensation for land, structures, crops and livestock; Support to stabilize production life; Support for job transition; Support for Vulnerable Aps.</li> <li>- During the project preparation, land requisition is minimized and conformable to the general urban development plan of the city, in accordance with the legitimate aspirations of the affected people. Specifically, as follows: <ul style="list-style-type: none"> <li>• There are meetings between local leaders with clusters of population, analyzing and resolve any questions before proceeding for compensation.</li> <li>• A notice in writing or on the news or through meetings to individual households about compensation clearance plans.</li> <li>• The clearance works need to perform after the harvest in order to avoid influencing the use of land and arable of the people and limiting compensation costs.</li> <li>• Calculation exactly amount of compensation and policies adequate compensation of rice and fish shrimp for farmers.</li> <li>• Clearance each part, construction where, clearance there. This is necessary to avoid wasting the people, to avoid traffic jams.</li> </ul> </li> </ul>		
Unexploded Ordnance remove	Accidents due to UXO	<ul style="list-style-type: none"> <li>• Currently, demining and removal of unexploded ordnance haven't implemented at the WTP, raw water pumping station and network pipelines.</li> <li>• PMU will be hiring a specialized army unit to clear UXO before construction commences.</li> </ul>	Thai Nguyen Water Joint Stock Company	605,000,000 VND – TWACO fund
<b>Construction phase</b>				

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
Construction: Nui Coc WTP; raw water pumping station combined as the company office, Network pipelines	Noise and vibration generation	<ul style="list-style-type: none"> <li>▪ Limiting construction during the period from 9pm – 6am at residential areas such as To Huu road, Quang Trung road, provincial road no. 267, 270, De Nong Lam road, Z115 road and at the communes/wards such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, Thinh Dan.</li> <li>▪ Regularly maintenance of construction machines, quality registration and washing machinery complying with manufacturer's requirements.</li> <li>▪ Provision noise protection equipment for worker;</li> <li>▪ In case of construction at night in populated areas such as To Huu road, Quang Trung road, provincial road no. 267, 270, De Nong Lam road, Z115 road and at the communes/wards such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, Thinh Dan, the information has to be informed to community at least 2 day.</li> <li>▪ Local communities must be informed about construction schedules</li> <li>▪ Using of machinery with periodically quality registration</li> </ul>	Contractor	Include in construction cost of the contractor
	Dust and exhaust generation	<ul style="list-style-type: none"> <li>▪ Transporting vehicles must be covered carefully and before leaving the construction site as WTP and raw water pumping station they have to be washed and brushed sticky soil.</li> <li>▪ On hot and dry days, regularly watering on the transportation routes and on the construction site 2 times per day to reduce dust especially the populated areas where the tertiary pipes are constructed such as the communes/wards such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, Thinh Dan.</li> <li>▪ The leveling materials poured from transporting vehicles need to be bulldozed and compacted to avoid the spread of wind and being pulled over by other vehicles running on the construction site as WTP and raw water pumping station at Phuc Triu commune ward and especially the populated areas where the tertiary pipes is constructed such as Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang.</li> <li>▪ Setting barriers in the construction site of WTP and raw water pumping station (Phuc Triu commune), fence 2.5 meters in height.</li> </ul>	Contractor	Include in construction cost of the contractor

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		<ul style="list-style-type: none"> <li>Covering carefully the areas gathering materials and waste.</li> <li>Machineries, construction vehicles must be ensured in term of registration certificate of environment and technique</li> </ul>		
	Land subsidence	<ul style="list-style-type: none"> <li>Reinforcements must be performed with piles and steel piles at the construction sites for large-size pipelines and with great depths;</li> <li>In case of incident, construction must be immediately suspended, and repairs and compensation must be made for local people.</li> </ul>	Contractor	Include in construction cost of contractor
Flood on construction site by heavy rain	Causing local flooding	<ul style="list-style-type: none"> <li>Redundancy drainage pump at construction site of WTP and raw water pumping station (Phuc Triu commune).</li> <li>Dredging canals/trench on construction site of WTP and raw water pumping station (Phuc Triu commune)</li> </ul>	Contractor	Include in construction cost of contractor
Excavation activities during construction of raw water pump station and WTP	The phenomenon of land subsidence	<ul style="list-style-type: none"> <li>Checking the current condition of soil before construction of raw water pump station and WTP</li> <li>In case of land subsidence, the contractor has to take reinforcement measures immediately</li> </ul>	Contractor	Include in construction cost of contractor
Excavate activities and worker camp establish on sites	Water quality impacts	<ul style="list-style-type: none"> <li>Worksite, camps, material storage areas and load/unload construction material/waste activities must be located far from watercourse such as Nui Coc lake at Phuc Triu commune to ensure that materials will not be disposed into water,</li> <li>Collecting and tidying up waste at the construction site everyday</li> <li>Digging soil canal around construction site of raw water pump station and WTP with width 30 cm and height 40 cm for drainage, sewerage and pre-settle before discharging to receive sources in the region as Nui Coc lake.</li> <li>Propagating and educating workers about awareness of protecting environment.</li> <li>Provide adequate facilities in the site including latrines, holding areas and garbage cans.</li> <li>Waste from latrines will be collected and treated properly through an economic contract with local environmental co-operatives/companies.</li> </ul>	Contractor	Include in construction cost of contractor



Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		<ul style="list-style-type: none"> <li>▪ Equipping the dustbins and mobility septic tanks to work sites (it is proposed that there will be 2 dustbins and 1 mobility septic tanks provided at construction site)</li> </ul>		
<ul style="list-style-type: none"> <li>• Daily life of workers</li> <li>• Transporting waste and materials</li> <li>• Building the treatment plant</li> </ul>	Generation of solid waste	<ul style="list-style-type: none"> <li>▪ Arranging 2 trash bins with a capacity of 200 liters on each construction site</li> <li>▪ Collecting waste on the construction site every day, setting rules of place to gather waste to avoid littering. Hiring the environmental sanitation services or local environmental cooperation</li> <li>▪ There has been disposal area at construction site, waste will be transported every day to the disposal areas at Tan Cuong landfill site, Tan Cuong commune.</li> <li>▪ Construction waste materials such as broken bricks, concretes, waste steel, soil should be gathered and sorted into groups to process and transport to Tan Cuong landfill site;</li> <li>▪ Waste fuel emitted by machinery should be put into a separated tank and should not discharge into the environment</li> <li>▪ Educating workers' awareness of environmental protection for, the proposing regulations on disposal on building site.</li> </ul>	Contractor, Thai Nguyen Water Joint Stock Company	Included in construction cost of contractor
	Generation of Hazardous waste	<ul style="list-style-type: none"> <li>▪ Arranging trash bins covered and labeled with a capacity of 200 liters to store Hazardous waste.</li> <li>▪ Ensure that the storage of safe fuels, other hazardous substances under the current law is under the supervision of TWACO.</li> <li>▪ Equipment/vehicle maintenance and refuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels.</li> <li>▪ Fuel and other hazardous substances shall be stored in areas provided with roof.</li> <li>▪ Conduct daily records on use of hazardous substance and waste generation</li> <li>▪ Hiring a unit with treatment function as prescribed at Circular no 36/2015/TT-BTNMT on management of hazardous waste</li> </ul>	Contractor	Included in construction cost of contractor
Mobilizing trucks for waste	High risks of traffic	<ul style="list-style-type: none"> <li>▪ Placing construction signs, speed limit sign and temporary fence and mobilizing transportation instructors for traffic management at the routes</li> </ul>	Contractor	Included in construction

<b>Project Activity</b>	<b>Potential impacts</b>	<b>Proposed Mitigation Measure</b>	<b>Responsibility</b>	<b>Cost Estimate</b>
transportation	disturbance, congestion and accident	<p>with pipeline construction</p> <ul style="list-style-type: none"> <li>▪ Regulating the transport vehicle speed will not be over 20km when circulating on the road near the construction site of WTP, raw water pumping station, and water pipelines.</li> <li>▪ Barriers around WTP, raw water pumping station construction area</li> <li>▪ At the populated areas such as the area along on To Huu road, Quang Trung road, provincial road no. 267, 270, De Nong Lam road and Z115 road. It needs to place construction signs, speed limit sign and temporary fence and mobilize transportation instructors for traffic management at the routes with pipeline construction.</li> <li>▪ Construction materials shall be stored tidily at the required locations.</li> <li>▪ Temporary access shall be provided in along the pipe lines which high household density streets at identified above for the affected households;</li> <li>▪ Reinstate access to affected households upon completion of the works items and road surface at the sections need to be excavated by construction activities</li> <li>▪ The Contractor must always maintain security fences for the construction sites which are close to residential areas if needed. The fences must define clearly the site boundaries.</li> </ul>		cost of contractor
Focus of workers, accident risks and impacts on dust in construction site	Public and Worker Health and Safety	<ul style="list-style-type: none"> <li>▪ Equipping fully labor protection tools for workers</li> <li>▪ Training workers in labor safety.</li> <li>▪ Preparing first aid facilities on the construction site</li> <li>▪ Ensuring living conditions for workers, preparing camps for workers in the construction site.</li> <li>▪ Periodically inspecting safety equipment, operation mode of devices.</li> <li>▪ Direct workers at construction site or operating officials must be trained and practiced proper operation rules when having problems.</li> <li>▪ Rules and safety warning signs at construction site</li> <li>▪ Full lighting system if constructing at night</li> </ul>	Contractor	Included in construction cost of contractor

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		<ul style="list-style-type: none"> <li>Periodically checking workers' health</li> </ul>		
	Fire, Electric Shock	<ul style="list-style-type: none"> <li>Power lines in offices and construction sites must be safely installed. Power connectors must not be left on the ground and must have plugs and sockets. Outdoor electrical panels must be securely placed in protective boxes/cabinets;</li> <li>Safety rules must be posted at construction sites;</li> <li>Warning signs on areas prone to fire and explosion must be installed;</li> <li>Construction sites must be equipped with fire extinguishers;</li> <li>Install appropriate lighting system;</li> <li>Install automatic fire equipment for the whole area;</li> <li>Install fire extinguishing system inside the wall;</li> <li>Arrange fire and explosive rescue system;</li> <li>Inspect the fire and explosive prevention on a regular basis;</li> <li>Regularly communicate, train officials, workers on fire protection methods;</li> <li>Design and construct water supply systems with a sufficient storage capacity to ensure the fire prevention and protection in the entire subproject area;</li> <li>Fully comply with fire protection and prevention regulations, such as fire protection and prevention Act, TCVN 2622-1995 on fire protection and prevention for houses and buildings - design requirements; TCVN 5738-2000: automatic fire alarm systems - technical requirements, TCVN 5760-1993: Fire prevention system - General requirements for the design, installation and usage. TCVN 5040-1990: group fire protection and prevention equipment - symbols on the diagram of fire prevention - technical requirements;</li> <li>Regularly check the equipment on the probability of fire and explosives such as electrical appliances for daily activities;</li> </ul>		
Mobilization of vehicles and machinery	Occupational and community safety	<ul style="list-style-type: none"> <li>When automobiles are mobilized, brake and safe navigation system must be inspected, transportation vehicles must have wide lights and signboard;</li> <li>When it is foggy or smoky affecting visibility less than 30m, turn yellow</li> </ul>	Contractor	Included in construction cost of

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		lights or taillights. When the visibility is less than 30m or it is rainy or has thunderstorms which are dangerous, automobiles must be stopped running; <ul style="list-style-type: none"> <li>Transportation vehicles to/from the construction sites must not generate dust and mud on the routes.</li> </ul>		contractor
	Public infrastructure encroachment	<ul style="list-style-type: none"> <li>The vehicles for transportation need to be operated with registration load and covered carefully.</li> <li>The contractor does not excavate outside the construction area. Filling soil and ground restore need to be conducted immediately after pipe laying.</li> <li>An investigation for the location of underground facilities along the pipeline alignment, including site survey and consultation from competent authorities such as water supply agency, electricity Power Company, Communication Company, local PCs and communities will be carried out prior to the commencement of construction activities. The results of the investigation will be input for the construction method and plan in order to avoid the damages of the existing underground facilities</li> <li>A plan for possible contingencies will be set up in which there is any broken facilities will be compensated by Contractor if any</li> <li>In case of road is broken, Contactor has responsibility to repair existing condition of the road.</li> </ul>	Contractor	Included in construction cost of contractor
Construction activities Concentration of workers and equipment	Social disturbance	<ul style="list-style-type: none"> <li>Avoid prolonging construction: focus on construction, ensure the schedule for the pipeline constructed in section.</li> <li>Coordinating with the local authority to strictly manage with labors from other areas such as staying temporary absent registration procedures.</li> <li>Set up rules on work hours, workers must have the cards to enter the area of the project to facilitate the management</li> <li>Announcing the progress and schedule of construction, aggregating material in the construction area</li> <li>There must be electric lighting on the site</li> <li>Construction materials shall be stored tidily at the required locations.</li> <li>Installation of barriers (temporary fence) at construction areas to prevent</li> </ul>	Contractor	Include in construction cost of contractor

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		<p>people access to the construction site of WTP and raw water pumping station (Phuc Triu commune)</p> <ul style="list-style-type: none"> <li>▪ The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation).</li> <li>▪ Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority.</li> <li>▪ Educate workers on appropriate behavior for interactions with local community and risks of communicable diseases</li> </ul>		
<b>Operational phase</b>				
Impacts of treatment machinery, pressure affected to wall pipe, broken pipe by external forces	Quality of the input and output water	<ul style="list-style-type: none"> <li>• Control of the input and output water quality of the treatment station, testing periodically to ensure the quality of treated water getting standard at least 3 months per time.</li> <li>• Assigning staffs for regularly checking water pipelines and facilities of project;</li> <li>• Handling and repairing timely of water leaking pipe, broken pipe cause by natural accident, human activities to avoid water loss and flooding which can affect to local people;</li> <li>• Testing influent raw water and treated water periodically</li> </ul>	Management Unit	Include in operation cost
external forces crack and break pipe, increase of internal pressure	Pipe breakdown incidences, Loss of water	<p>By technical solutions such as removal of old dust-iron pipe and valves by the new HDPE pipe and valves, the project reduces water loss into environment. So, environment incidents cause by water loss and broken pipe is reduced.</p> <p>Besides, project owner must do the following measures to reduce environment incidents:</p> <ul style="list-style-type: none"> <li>- Assigning staffs for regularly checking water pipelines and facilities of project;</li> <li>- Handling and repairing timely of water leaking pipe, broken pipe cause by natural accident, human activities to avoid water loss and flooding which can affect to local people;</li> </ul> <p>Signing and recommendation symbol for people to know what the water pipes</p>	Management Unit	Include in operation cost

Project Activity	Potential impacts	Proposed Mitigation Measure	Responsibility	Cost Estimate
		go through residential areas to avoid damaging pipes		
Chlorine leakage, electrical short-circuit, lightning	Operational risks (chemical leak, fire etc.)	<ul style="list-style-type: none"> <li>• Need quantitative check of proper concentration of chemicals (chlorine) coming into a tank.</li> <li>• Checking the chemicals storage regularly to avoid chemical leakage into environment</li> <li>• Arranging backup generator</li> <li>• Training operation procedures to entire workers</li> <li>• Labor protection has to be equipped fully</li> <li>• The equipment for fire prevention and fighting such as fire extinguishers and fire hydrant has to be equipped fully</li> <li>• Proposal of fire prevention and fighting measures, gaseous chlorine leakage measures</li> <li>• Chlorine detecting equipment, spays at the chlorine room</li> </ul>	Management Unit	Include in operation cost
Water treatment activities	Sludge	<ul style="list-style-type: none"> <li>• Dredging periodically,</li> <li>• Shipping disposal in accordance with provincial regulations</li> <li>• Transport vehicles should be carefully covered, not overloaded to avoid spillage of mud on the road through the village causing to unsanitary environment.</li> </ul>	Management Unit	Include in operation cost
Activities of Operators	Domestic wastewater, solid waste	<ul style="list-style-type: none"> <li>• Arrange barrels at the WTP, pumping station area</li> <li>• Wastewater is treated in septic tank before discharging to environment</li> </ul>	Management Unit	Include in operation cost
General operation	Fire, Electric Shock	<ul style="list-style-type: none"> <li>▪ Inspect the fire and explosive prevention on a regular basis;</li> <li>▪ Regularly communicate, train officials, workers on fire protection methods;</li> <li>▪ Regularly check the equipment on the probability of fire and explosives such as electrical appliances for daily activities;</li> <li>• Manage the use of electrical equipment in the offices and operating rooms of wastewater treatment plant properly. Avoid using overloaded electrical equipment that may affect the electrical system of whole works.</li> </ul>	Management Unit	Include in operation cost

## 4 ENVIRONMENTAL MONITORING

13. Environmental monitoring activities of the project include: (1) monitoring the EMP compliance, and (2) monitoring of environmental impacts caused by the Project activities. Environmental effect monitoring will be implemented with major concentration on the construction phase.

(i) Environmental Performance Monitoring is conducted to evaluate compliance with standard operating procedures, national standards on environment and technical specifications. The main purpose of environmental performance monitoring is to ensure that all proposed mitigation measures will be complied by contractors during the construction time.

(ii) Environmental Effect Monitoring is conducted to evaluate the impacts by the project activities on ambient environmental quality.

14. Responsibilities and budget for environmental effect monitoring during the construction and operation phases are identified as follows.

### **Construction phase**

15. All mitigation measures will belong to the Contractor's responsibilities, which shall be implemented by the Contractor. The costs are included in the contract between Construction Contractor and Thai Nguyen Water Joint Stock Company.

16. Both environmental performance monitoring and environmental effect monitoring will be mainly conducted by Construction Supervision Consultant (CSC) and the TOR and cost for these tasks will be included under contract of CSC and Thai Nguyen Water Joint Stock Company (see Appendix 1 for the cost estimate of environmental effect monitoring). PMU under Thai Nguyen Water Joint Stock Company will also be responsible for the environmental performance monitoring through periodic or random site inspection. The contractors will be responsible for conducting performance monitoring for their subcontracts, suppliers in implementing technical specifications of relevant mitigation measures.

### **Operation phase:**

17. During the operation and maintenance phase, the works operation and management unit will provide budget for implementing mitigation measures, capacity strengthening training, and staff salary.

18. There is no cost estimate for environmental monitoring during the operation and maintenance phase is included in this EMP.

19. Obligations and responsibilities to undertake mitigation measures and monitoring activities are presented in Section 7 of the EMP

## 4.1 Project Performance Monitoring<sup>1</sup>

**Table 5. Monitoring**

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
<b>Pre-construction Phase</b>						
<p>Land acquisition at location of WTP and raw water pump station will be completed in April 2019.</p> <ul style="list-style-type: none"> <li>• There are meetings between local leaders with clusters of population, analyzing and resolve any questions before proceeding for compensation.</li> <li>• A notice in writing or on the news or through meetings to individual households about compensation clearance plans.</li> <li>• The clearance works need to perform after the harvest in order to avoid influencing the use of land and arable of the people and limiting compensation costs.</li> <li>• Calculation exactly amount of compensation and policies adequate compensation of rice and fish shrimp for farmers.</li> <li>• Clearance each part, construction where, clearance there. This is necessary to avoid wasting the people, to avoid traffic jams</li> </ul>	<p>Properly relocation of all affected facilitates</p> <p>Permanent land acquisition was compensated</p> <p>Monitoring parameters:</p> <ul style="list-style-type: none"> <li>- Public consultations and monitoring activities related to land acquisition;</li> <li>- Complains from affected people;</li> <li>- Cash compensation.</li> </ul>	Phuc Triu commune	Community consultation was performed at area of the project as Phuc Triu commune during detailed design preparation	Before construction phase	RAP consultant	In a separate contract with Thai Nguyen Water Joint Stock Company
<b>UXO remove</b>						

<sup>1</sup>Implementation of monitoring activities of project to evaluate Contractor's conformity of activities procedures, specifications and/ or technical requirements to EMP.



<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
Demining at the project area is not performed yet	Agreement document with relevant agency in carrying out UXO remove	In all construction sites under civil work	Contract with a specialized army unit to clear UXO		PMU (under Thai Nguyen Water Joint Stock Company)	Not performed yet
<b>Construction Phase</b>						
<b><i>Generation of noise and vibration</i></b>						
All noise and vibration generation activities shall be restricted to the hours of 9pm – 6am	Construction time, noise level	In all construction sites under network pipelines and WTP	Observation and public consultation, worker interview	Every week	Construction Supervision Consultant (CSC); PMU (under Thai Nguyen Water Joint Stock Company)	In a contract with Thai Nguyen Water Joint Stock Company
Regularly maintenance of construction machines, use of qualified mechanic and equipment periodically	Construction machines and equipment must be maintained frequently (every 3 months)	In all construction sites under network pipelines and WTP	Document review and worker interview	Every 3 months	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Provision noise protection equipment for worker	Noise protection equipment for worker	In all construction sites under network pipelines and WTP	Observation and worker interview	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
In case of construction at night the contractor has to informed to community at least 2 days	Method and notifications of the contractor	In all construction sites under network pipelines and WTP	interview	Construction at night	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Local communities should be informed about	Meeting minutes	In all	Observation	Every week	CSC, PMU	In a contract

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
construction schedules people meetings and notice board	Notices Information dissemination methods	construction sites under network pipelines and WTP	and public consultation		under Thai Nguyen Joint Stock Company	of CSC with Thai Nguyen Water Joint Stock Company
<b><i>Dust and exhaust generation</i></b>						
Transporting vehicles must be covered carefully and regularly washed and cleaned after being used.	Checking the covers of vehicles and sticky soil of each vehicle	In all construction sites under civil work	Observation and interview worker	Every week	CSC, under Thai Nguyen Joint Stock Company	PMU Water Stock In a contract of CSC with Thai Nguyen Water Joint Stock Company
Keeping machineries from idle operation	Activities of machineries in the construction site	In all construction sites	Observation and interview worker and public consultation	Every week	CSC, under Thai Nguyen Joint Stock Company	PMU Water Stock In a contract of CSC with Thai Nguyen Water Joint Stock Company
On hot and dry days, regularly watering on the transportation route and on the construction site 2 times per day to reduce dust	Water spraying in the construction site	In all construction sites	Observation and interview worker and public consultation	Every week	CSC, under Thai Nguyen Joint Stock Company	PMU Water Stock In a contract of CSC with Thai Nguyen Water Joint Stock Company
The leveling materials poured from transporting vehicles need to be bulldozed and compacted to avoid the spread of wind and being pulled over by other vehicles running on the construction site	Checking the excavation activities and cover of vehicles	In all construction sites	Observation and interview worker and public consultation	Every week	CSC, under Thai Nguyen Joint Stock Company	PMU Water Stock In a contract of CSC with Thai Nguyen Water Joint Stock Company
Setting barriers in the construction site, tole fence 2.5 meters in height	Checking fence and barriers	In WTP construction sites	Observation		CSC, PMU under Thai Nguyen Water	In a contract of CSC with Thai Nguyen

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
					Joint Stock Company	Water Joint Stock Company
Limiting construction in the period time from 9. p.m. to 6.a.m.in order not to disturb local people's life	Checking construction diary, construction time	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Covering carefully the areas gathering materials and waste.	Checking recovered activities	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Machineries, construction vehicles must be ensured in term of registration certificate of environment and technique	Construction machines and equipment must be maintained frequently (every 3 months)	In all construction sites	Document review and worker interview	every 3 months	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b><i>Causing local flooding</i></b>						
Redundancy drainage pump	Checking duty pumps	In all construction sites	Observation	during testing pumping	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Discharging to existing canal/trench or constructed canals/trench	Checking condition of canal, trench for drainage on the site	In all construction sites	Observation	during testing pumping	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
<b><i>The phenomenon of land subsidence</i></b>						
Checking soil before construction	Note and information to related agencies in case of the phenomenon of subsidence is happened during construction	In all construction sites	Observation	During construction	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
In case of land subsidence, the contractor has to take reinforcement measures immediately	Piles reinforcement, finish of the phenomenon of subsidence	In all construction sites	Observation	During construction	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b><i>Water quality impacts</i></b>						
Worksite, camps, material storage areas and load/unload construction material/waste activities must be located far from watercourse to ensure that materials will not be disposed into water	Checking position compared to other surface water in the area	In all construction sites under civil work	Observation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Collecting and tidying up waste at the construction site everyday	Waste collection activities, trash bins in construction site	In all construction sites under civil work	Observation, construction diary	Every day	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Building a temporary drainage system on the construction site to reduce waste water or rain water on the construction site which sweeps away contaminants into the lake, river	Checking drainage system in the work site	In all construction sites under civil work	Observation, questionnaire to contractor, construction documents of contractor	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Propagating and educating workers about	Education and	In all	Interview	In every	CSC, PMU	In a contract

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
awareness of protecting environment	communication activities	construction sites under civil work	worker, contractors	weekly meeting	under Thai Nguyen Water Joint Stock Company	of CSC with Thai Nguyen Water Joint Stock Company
Ensuring construction progress	Check the construction schedule	In all construction sites under civil work	Observation, Construction diary	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Provide adequate facilities in the site including latrines, holding areas and garbage cans. Waste from latrines will be collected and treated properly through an economic contract with local environmental co-operatives/companies	latrines, holding areas, garbage cans at the sites and waste collection	In all construction sites under civil work	Observe and interview worker	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Equip dustbins and mobility septic tanks to work sites ((it is proposed that there will be 6 dustbins and 3 mobility septic tanks provided at each construction site)	Number of dustbins and mobility septic tanks at work site	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b><i>Solid waste</i></b>						
Arrangement of barrels and trash bins	Volume of waste, trash bins in construction site	In all construction sites under civil work	Observation interview worker, public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Discharging waste soil to landfill according to regulation	Volumn of waste, condition of receiving source, Discharging contract	In all construction sites under civil work	Check the trash bins, the discharging contracts	Once at the beginning of the civil construction	CSC, PMU under Thai Nguyen Water Joint Stock	In a contract of CSC with Thai Nguyen Water Joint

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
				phase	Company	Stock Company
Collecting waste on the construction site every day, setting rules of place to gather waste to avoid littering. Hiring the environmental sanitation services or local environmental cooperation	Volumn of waste, condition of receiving source, Discharging contract, trash bins in construction site	In all construction sites under civil work	Observation, Take interview with local public, workers	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Construction waste materials such as broken bricks, concretes, waste steel, soil should be gathered and sorted into groups to process and transport to Tan Cuong landfill.	Volumn of waste, condition of receiving source, Discharging contract, trash bins in construction site	In all construction sites under civil work	Check the discharging contracts, public consultation	Once at the beginning of the civil construction phase and Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Construction waste which is mainly damaged building materials should be gathered and sorted into groups to process	Volumn of waste, condition of receiving source, Discharging contract, trash bins in construction site	In all construction sites under civil work	Observation public consultation Supervision diary	Monthly	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Waste fuel emitted by machinery should be put into a separated tank and should not discharge into the environment	Check trash bin and barrels on the site	In all construction sites under civil work	Observation interview worker, public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Educating workers' awareness of environmental protection for, the proposing regulations on disposal on building site	Education and communication activities	In all construction sites under civil work	Interview worker, contractors	Every weekly meetings	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b>Hazardous waste</b>						
Collecting to separated trash bin	Checking trash bin on the	In all	Observation	Every week	CSC, PMU	In a contract

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
	site	construction sites under civil work	interview worker, public consultation		under Thai Nguyen Water Joint Stock Company	of CSC with Thai Nguyen Water Joint Stock Company
Ensure that safe storage of fuel, other hazardous substances are agreed by Thai Nguyen Water Joint Stock Company	Storage locations and safety specifications	In all construction sites under civil work	Site observation, document review	Every week	CSC, under Thai Nguyen Water Joint Stock Company	PMU Thai Water Stock Company In a contract of CSC with Thai Nguyen Water Joint Stock Company
Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels	Equipment/vehicle maintenance and refueling locations and safety specifications	In all construction sites under civil work	Site observation, document review	Every week	CSC, under Thai Nguyen Water Joint Stock Company	PMU Thai Water Stock Company In a contract of CSC with Thai Nguyen Water Joint Stock Company
Fuel and other hazardous substances shall be stored in areas provided with roof	Storage locations and safety specifications	In all construction sites under civil work	Site observation, document review	Every week	CSC, under Thai Nguyen Water Joint Stock Company	PMU Thai Water Stock Company In a contract of CSC with Thai Nguyen Water Joint Stock Company
Conduct daily records on use of hazardous substance and waste generation	Records and content on the records	In all construction sites under civil work	Site observation, document review	Every week	CSC, under Thai Nguyen Water Joint Stock Company	PMU Thai Water Stock Company In a contract of CSC with Thai Nguyen Water Joint Stock Company
Hiring a unit with treatment function as prescribed at Circular no 36/2015/TT-BTNMT on management of hazardous waste	Status of hazardous storage	In all construction sites under civil work	Observation and document inspection Treatment Hiring contract	Every week	CSC, under Thai Nguyen Water Joint Stock Company	PMU Thai Water Stock Company In a contract of CSC with Thai Nguyen Water Joint Stock

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
						Company
<b>Traffic disturbance</b>						
Place sign boards near construction sites to direct traffic means to slow down at the section close to existing road	Status of sign boards and method to direct traffic means at the construction sites	In all construction sites under civil work network pipelines	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Regulating the transport vehicle speed will not be over 20km when passing above areas	Status of regulation and notices Speed of transport vehicles	In all construction sites under civil work network pipelines	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Barriers around construction area	Checking fence and barriers	In WTP, Pumping station construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Regarding to the construction of intersections to pipeline and railway, highway, pipe jacking method will be performed to minimize impacts to transport	Checking sign, notification boards	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Construction materials shall be stored tidily at the required locations	Location for material gathering, storage	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Temporary access shall be provided in along the pipe lines which high household density streets at	Status of access roads; number of access roads;	Along the pipe line	Observation and public	Every week	CSC, PMU under Thai	In a contract of CSC with



<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
identified above for the affected households	improvement of traffic status;	installation	consultation		Nguyen Water Joint Stock Company	Thai Nguyen Water Joint Stock Company
Reinstate access to affected households upon completion of the works items and road surface at the sections need to be excavated by construction activities	Level of compensation; level of completion; responsibility; satisfaction of affected households	Along the pipe line installation	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
The Contractor must always maintain security fences for the construction sites which are close to residential areas if needed. The fences must define clearly the site boundaries	Checking fence and barriers	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b><i>Public and Worker Health and Safety</i></b>						
Equipping fully labor protection tools for workers	The quantity and kinds of work protection	In all construction sites under civil work	Observation and public consultation worker interview	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Training workers in labor safety	Interview about work insurance	In all construction sites under civil work	Worker interview	Before construction	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Preparing first aid facilities on the construction site	Check the first aid box and telephone number of health center	In all construction sites under civil work	Observation and worker interview	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
						Company
Ensuring living conditions for workers, preparing camps for workers in the construction site	Checking sanitation condition in camps	In all construction sites under civil work	Observation and worker interview	Every week	CSC, PMU under Thai Nguyen Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Periodically inspecting safety equipment, operation mode of devices.	Number and categories of safety equipment, fire extinguishers and first-aid kits	In all construction sites under civil work	Observation and worker interview	Every 3 months	CSC, PMU under Thai Nguyen Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Direct workers at construction site or operating officials must be trained and practiced proper operation rules when having problems	Construction rules, the contents of training program and duration	In all construction sites under civil work	Observation and worker interview	Every week	CSC, PMU under Thai Nguyen Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Rules and safety warning signs at construction site	Checking Rules and safety warning signs at construction site	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Full lighting system if constructing at night	Lighting, lighting activities at night	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Periodically checking workers' health	Worker's health	In all construction sites	worker interview	Every 6 months	CSC, PMU under Thai Nguyen Water	In a contract of CSC with Thai Nguyen

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
					Joint Stock Company	Water Joint Stock Company
<b>Public infrastructure encroachment</b>						
The vehicles for transportation need to be operated with registration load and covered carefully	Record of vehicle load	In all construction sites	Document review and observation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
An investigation for the location of underground facilities along the pipeline alignment, including site survey and consultation from competent authorities such as water supply agency, electricity Power Company, Communication Company, local PCs and communities will be carried out prior to the commencement of construction activities. The results of the investigation will be input for the construction method and plan in order to avoid the damages of the existing underground facilities	Records of agencies consultation; Results of investigation written in the work-plan; damages of existing structures	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
A plan for possible contingencies will be set up in which there is any broken facilities will be compensated by Contractor if any	Availability of contingency plan; Affected facilities; status of compensation; present facilities compensated;	In all construction sites	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
In case of road is broken, Contactor has responsibility to repair existing condition of the road.	Checking status of pipe	In all construction sites under civil work	Observation and public consultation	Road is broken	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b>Social disturbance</b>						

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
Avoid prolonging construction	Construction plan of the Contractor	In all construction sites under civil work	Observation and On site Checking	Weekly	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Coordinating with the local authority to strictly manage in the aspect of law as for the labor which is not local people	Checking staying temporarily absent registration of entire workers, access card (if any) and construction site rules	In all construction sites under civil work	Checking staying temporarily absent registration of entire workers, access card (if any) and construction site rules	Monthly	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
There are rules on work hours, workers must have the cards to enter the area of the project to facilitate the management	Checking access card (if any) and construction site rules	In all construction sites under civil work	access card (if any) and construction site rules	Every day	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Announcing the progress and schedule of construction, aggregating material in the construction area	Issued documents and reports	In all construction sites under civil work	Public consultaion		CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
There must be electric lighting on the site	Keep light on during the night time	Areas: Nui Coc WTP, raw water pumping station. Area under	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company

Mitigation measures	Monitoring parameter	Location	Method	Frequency	Responsibility	Cost
		construction pipeline				
Construction materials shall be stored tidily at the required locations	Management of materials and location of storage areas	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Install barriers (temporary fence) at construction areas to deter people access to the site	Availability of fences and suitability of fence used	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation)	Provision of any warning signals in the sites	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority	Status of workers: Registration to local authorities and conflicts available in the areas between local residents and workers	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
Educate workers on appropriate behavior for interactions with local community and risks of communicable diseases	Understandings of workers on local cultures and behaviors; time of training held by construction contractor;	In all construction sites under civil work	Observation and public consultation	Every week	CSC, PMU under Thai Nguyen Water Joint Stock Company	In a contract of CSC with Thai Nguyen Water Joint Stock Company
<b>Operation phases</b>						
<b>Water pollution</b>						

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
Control the quality of the input and output water of the treatment station, checking regularly to ensure the quality of treated water getting standard	Monitoring surface water according to QCVN 01, 02/2009/BYT	Before and after treatment	Hiring monitoring contract with fully capacity	Every month	Thai Nguyen Water Joint Stock Company	including in operation cost
Assigning staffs for regularly checking water pipelines and facilities of project	Operating condition of pipelines	Water pipeline	Observation and public consultation	Every week	Thai Nguyen Water Joint Stock Company	including in operation cost
Handling and repairing timely of water leaking pipe, broken pipe cause by natural accident, human activities to avoid water loss and flooding which can affect to local people	Operating condition on each region	Breakdown area	Checking diary	After incidents	Thai Nguyen Water Joint Stock Company	including in operation cost
<b><i>Pipe breakdown incidents, Loss of water</i></b>						
<ul style="list-style-type: none"> <li>- Assigning staffs for regularly checking water pipelines and facilities of project;</li> <li>- Handling and repairing timely of water leaking pipe, broken pipe cause by natural accident, human activities to avoid water loss and flooding which can affect to local people;</li> <li>- Signing and recommendation symbol for people to know what the water pipes go through residential areas to avoid damaging pipes</li> </ul>	Checking signs Operating condition on each region	Water pipeline	Observation and public consultation	Every week	Thai Nguyen Water Joint Stock Company	including in operation cost
<b><i>Operational risks (chemical leak, fire etc.)</i></b>						
<ul style="list-style-type: none"> <li>• Need quantitative check of proper concentration of chemicals (chlorine) coming into a tank.</li> <li>• Checking the chemical storage regularly to avoid chemical leakage into environment</li> <li>• Arranging backup generator</li> <li>• Training operation procedures to entire workers</li> <li>• Labor protection has to be equipped fully</li> <li>• The equipment for fire prevention and fighting</li> </ul>	Monitoring the concentration of chlorine Checking labor protection of workers, fire extinguishers, first-aid kits	At the high-risk areas especially at the chlorine room	Chlorine leakage detector Checking actual condition and operation procedures	Every day	Thai Nguyen Water Joint Stock Company	including in operation cost

<b>Mitigation measures</b>	<b>Monitoring parameter</b>	<b>Location</b>	<b>Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Cost</b>
such as fire extinguishers and fire hydrant has to be equipped fully <ul style="list-style-type: none"> <li>• Proposal of fire prevention and fighting measures, gaseous chlorine leakage measures</li> <li>• Chlorine detecting equipment, spays at the chlorine room</li> </ul>						
<b><i>Sludge</i></b>						
<ul style="list-style-type: none"> <li>• Dredging periodically,</li> <li>• Shipping disposal in accordance with provincial regulations</li> </ul> Transport vehicles should be carefully covered, not overloaded to avoid spillage of mud on the road through the village causing environment unsanitary	Sludge volume	Treatment tanks	Count the number of transmission trips	Every 3 months per time	Thai Nguyen Water Joint Stock Company	including in operation cost
<b><i>Domestic wastewater, solid wastes</i></b>						
<ul style="list-style-type: none"> <li>• Arrangement of barrels and trash bins</li> </ul>	Number of trash bins	At WTP, pumping station	table of quantity	Every day	Thai Nguyen Water Joint Stock Company	including in operation cost
<ul style="list-style-type: none"> <li>• Discharging waste soil to landfill according to regulation</li> </ul>	Waste volume, discharging location	At WTP	Checking discharging contract, operation diary	Every week	Thai Nguyen Water Joint Stock Company	including in operation cost

## 4.2 Monitoring of environmental impacts<sup>2</sup>

*Table 6. Monitoring of environmental impacts*

Mitigation Measures	Monitoring parameters	Location	Method	Frequency	Responsibility	Cost
<i>Pre-construction phase</i>						
No need to implement monitoring except for land acquisition and resettlement monitoring. Monitoring requirements relate to resettlement is provided in Resettlement Action Plan of project.						
<i>Construction phase</i>						
Monitoring of dust and noxious fumes	TSP, and meteorological indicators	<ul style="list-style-type: none"> <li>- 1 point in Nui Coc WTP</li> <li>- 1 point in No. 270 road (pipeline network).</li> <li>- 1 point in network pipelines (No. 267 road) (pipeline network).</li> </ul>	Take air sample for analysis and compare result with related Vietnam Standards QCVN 05:2013/BTNMT	Every quarter in 24 months	Under contract of CSC with Thai Nguyen Water Joint Stock Company	As specified in <b>Error! Reference source not found.</b>
Monitoring of noise	Leq, L50 and Lmax	As the same ambient air monitoring locations as above	Measure at site and compare results with relevant standards (QCVN 26: 2010)	Every quarter in 24 months	Under contract of CSC with Thai Nguyen Water Joint Stock Company	As specified in <b>Error! Reference source not found.</b>
Surface water quality	pH, TSS, DO, COD, BOD 5, ammonium (NH <sub>4</sub> ) by N, nitrite, nitrate (NO <sub>3</sub> <sup>-</sup> ), Phosphate, Floating oil, Coliform	- 1 point within a radius of 20 m of the collection work in Nui Coc lake (for water supply treatment plant)	Take water sample for analysis and compare result with related Vietnam Standards (QCVN 08-MT:2015/BTNMT)	Every quarter in 24 months	Under contract of CSC with Thai Nguyen Water Joint Stock Company	As specified in <b>Error! Reference source not found.</b>

Note: Monitoring requirements related to resettlement are provided in Resettlement Plan of Project.

<sup>2</sup>Environmental effects monitoring is conducted to estimate the impacts of the project on ambient environmental conditions



## **5 PUBLIC CONSULTATION PROCESS AND INFORMATION PUBLICATION**

### **5.1 PUBLIC CONSULTATION PROCESS**

20. Public consultation is used to help identify opportunities and risks, improved subproject design and implementation, and increase subproject ownership and sustainability. Public consultation is specifically required by the ADB's SPS. A meaningful public consultation was used for the subproject. This is a two-way process in which beneficiaries provide advice and input on the design of the proposed subproject that affect their lives and environment, promotes dialogue between governments, communities, NGOs and implementing agencies to discuss all aspects of the proposed subproject. The feedbacks from consultations were incorporated into the original Environmental Management Plan (EMP) and this uEMP has been updated by consultation activities taking place during the detailed design.

21. Those affected by the subproject include those resettled and those in the nearby communities affected by subproject impacts, intended beneficiaries of the subproject, key interest groups – depends upon the subproject, local NGOs/Mass organizations, including women's unions, local authorities and other stakeholders.

22. The objectives of public consultation were as follows:

- To share all information on the items and tentative activities of the Subproject with local community and stakeholders;
- To gather opinions/comments and concerns from local authorities and the community on local particularities and environmentally sensitive matters in the subproject area, especially matters that the environmental assessment impact group has not been aware of. On such basis, the concerns of the local community may be proposed for proper settlement during the selection of subproject design options;
- To collect opinions/comments from the local community on the Subproject's tasks in the preparation of the updated EMP as well as comments on the draft EIA to adequately and precisely assess environmental impacts and propose the most effective and feasible mitigation measures for negative environmental impacts.

23. Information disclosure and public consultations are conducted during the subproject preparation and implementation processes to ensure that affected households and key stakeholders are timely informed about land acquisition, compensation and resettlement. This is also an opportunity for the affected people to participate and express their opinions with regards to resettlement implementation programs. The resettlement preparation in coordination with the representatives of the CPCs in the subproject area, and leaders of the villages organizes public meetings and consultations in order to inform and guide about the next steps in a timely manner. Organizations and individuals concerned about land acquisition and impacts, and resettlement had and will take part of the public meetings and consultations. Representatives of mass organizations in the subproject that area attended the meetings and consultations included the Vietnam Women's Union, and Fatherland Front and Vietnam.

24. Key topics covered in the public consultations are as followings:

- i. Disseminate key information related to policies of the ADB, the Government and the subprojects.
- ii. Provide locals with subproject on resettlement, environment, gender as well as ethnic minority issues through village loudspeaker system and subproject information brochures/leaflets;
- iii. Collect opinions and feedback of the local communities regarding the subproject implementation;
- iv. In the community consultation, needs to introduce and public all information of subproject and ADB's safeguard policies, collect opinions and comments of the residents

- on design and resettlement options as well as their aspirations and expectations are recorded;
- v. Respond questions to local communities concerning the subproject and safeguard policies;
- vi. CPCs and PMU provided answers to questions to local residents related to subproject and local policies;
- vii. Local communities, representatives of the CPC's and other stakeholders' contributions.

## **5.2 PUBLIC CONSULTATION RESULTS**

The results of the public consultations are summarized in Table 7, Table 8 and Table 9.

## **5.3 INFORMATION PUBLICATION**

25. The updated EMP had been disclosed at the offices of TWACO and the People's Committee of subproject wards and communes. Information on the disclosure date was posted on the website of TWACO. Basing themselves on the contents of the updated EMP, the local people could get the subproject information and contribute their opinions/comments on environmental issues of the subproject.

26. The updated EMP will also be submitted to ADB for disclosure on ADB website.

**Table 7. Public Consultation**

<b>Activity</b>	<b>Participant</b>	<b>Result</b>	<b>Schedule</b>	<b>Cost</b>
<i>Pre-construction phase</i>				
Survey team conducts surveys and interviews with local residents of 2 Wards (Tan Thinh ward, Thinh Dan ward) and 4 communes (Phuc Triu commune, Phuc Xuan commune, Quyet Thang commune, Tan Cuong commune) of Thai Nguyen city of the project area from 19 <sup>th</sup> May to 2 <sup>nd</sup> June, 2017	PMU (Thai Nguyen Water Joint Stock Company), local affected people, local authorities and relevant agencies	Results show that the project gains enthusiastic support among people interviewed. Six (6) community leaders were interviewed in more details on their concerns over potential impacts of the project.	Community Consultant during period of FS updating and detailed design preparation	Cost are covered in Consultant package
<i>Construction phase</i>				
Disseminate information to local community via public loudspeakers, announcements on newspapers	Community, PMU (Thai Nguyen Water Joint Stock Company), local environmental officers, Contractors	Informing communities about construction activities, works schedules, potential negative impacts on environment, environmental management measures and how to use the community grievance line	During the construction phase	Covered by the counterpart fund (PMU is responsible for payment). Estimated costs for four times of publication through loudspeakers and in the newspapers is: VND 15.000.000
Community grievance redress mechanism is established by the PMU (Thai Nguyen Water Joint Stock Company).	Community, PMU (Thai Nguyen Water Joint Stock Company), Contractors	PMU and Contractors shall have to reply to all complaints, questions or concerns of local communities, faculties and students about the works.	During the construction phase	

**Notes:** Consultation activities relating to resettlement and compensation are presented in Resettlement Plan for the Project, therefore, these activities shall not be described in this report.

**Table 8. Time, location and participants of the public consultation**

Date	Location	Participants
19/05/2017	Phuc Xuan commune	<ul style="list-style-type: none"> <li>• Representative of PMU;</li> <li>• Representative of local government;</li> <li>• Representatives of local mass organizations;</li> <li>• Households in the project area;</li> <li>• Representative of consultant.</li> </ul>
19/05/2017	Thinh Dan ward	
18/05/2017	Tan Thinh ward	
16/06/2017	Quyet Thang commune	
24/05/2017	Tan Cuong commune	
10/05/2017	Phuc Triu commune	
02/06/2017	Quang Trung ward	

**Table 9. The Results of The Public Consultation**

No.	Participant's opinion	Feedback of PMU
1	<b>Phuc Triu commune</b> <ul style="list-style-type: none"> <li>○ The project will change the natural environment</li> <li>○ Affect the livelihood of households with land acquisition</li> <li>○ Impact on social order and safety of the area if management is not good</li> <li>○ Incorporation of green trees after project completion</li> <li>○ Create jobs for families affected by the project</li> <li>○ Coordinate well with local authorities and communities in the project area</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>
2	<b>Phuc Xuan commune</b> <ul style="list-style-type: none"> <li>○ Agree with the environmental impact assessment of the project.</li> <li>○ Apply dust minimization measures during construction such as regular irrigation</li> <li>○ Clean up when construction is stopped, do not empty solid waste in the ward.</li> <li>○ It is strongly recommended to take measures to protect the environment during the construction process</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>
3	<b>Tan Cuong commune</b> <ul style="list-style-type: none"> <li>○ Agree with the environmental impact assessment of the project</li> <li>○ Propose the PMU to implement the mitigation measures in the EIA report</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are</li> </ul>

No.	Participant's opinion	Feedback of PMU
	<ul style="list-style-type: none"> <li>○ In the course of construction and use of the site, it does not affect the people's life, property and crops around the construction area.</li> </ul>	mentioned in Chapter 5 on mitigation measures
4	<p><b>Quyet Thang commune</b></p> <ul style="list-style-type: none"> <li>○ Quyet Thang Commune People's Committee completely agreed with the contents (in the document sent by the project owner) about the adverse impacts of the project on the natural and socio-economic environment.</li> <li>○ Fully agreed with mitigation measures, the PMU is requested to strictly enforce these measures to minimize the adverse impacts on the environment and human health.</li> <li>○ Especially not used construction equipment expired, no longer ensure technical safety</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>
6	<p><b>Quang Trung ward</b></p> <ul style="list-style-type: none"> <li>○ When installing pipeline through the ward area, it is necessary to have a permit and plan to return the ground to the Ward People's Committee for co-ordination.</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>
7	<p><b>Thinh Dan ward</b></p> <ul style="list-style-type: none"> <li>○ Ensure traffic safety for people and vehicles</li> <li>○ Transporting materials must be promoted shielding</li> <li>○ The environmental sanitation of garbage collection must be good</li> <li>○ Strictly follow local regulations during the construction process. To carry out the commitments in the project. Adequate compensation for the violation cases contractors. Ensure that local people are not disadvantaged by the impact of the contractor.</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>
8	<p><b>Tan Thinh ward</b></p> <ul style="list-style-type: none"> <li>○ Recommend contractors implement waste minimization.</li> <li>○ Minimize dust, noise, vibration during construction</li> </ul>	<ul style="list-style-type: none"> <li>○ PMU receives opinions from residents to contribute for the subproject.</li> <li>○ All opinions of local authorities and people are mentioned in Chapter 5 on mitigation measures</li> </ul>

## **6 INSTITUTIONAL STRENGTHENING AND TRAINING**

### **6.1 Activities during construction phase**

27. Experiences in other projects in Vietnam indicate that appointment of an Environmental Staff under PMU (PMU-ES) whose role is to monitor and coordinate environmental management activities with the Project activities is very important.

28. A PMU-ES should be assigned by the PMU to be responsible for co-ordination of environmental activities of all components of the project. Such a position should be mobilized at the PMU. The main activities of the PMU-ES are as follows:

- (i) To ensure that the PMU are in compliance with the guidelines included in the Projects' Environmental Management Plan
- (ii) To prepare and submit semi-annual Safeguards Monitoring Reports (SMRs) to ADB and DONRE.
- (iii) To ensure the disclosure of the relevant information of SMRs to affected people upon submission to ADB.
- (iv) To act as the liaison between DONRE and other governmental authorities in terms of environmental issues
- (v) To ensure that all environmental considerations will be the PMU's fully understand their roles in integrating environmental concerns into procurement processes.

29. The PMU-ES should have environmental qualifications with experience in the environmental management. Dependent on his/her skills, the PMU-ES will be further trained by attending external training events. Expenses for these training activities are taken from the overall environmental management budget allocated for the Project.

30. Collaboration between PMU and CSC is needed to organize training courses to strengthen knowledge and experiences in environmental supervision and management. In TOR of CSC, detailed plan and training documents for relevant objects in environmental supervision and management need to be included. These documents are prepared in the early stage and then approved by PMU.

31. The CSC will provide environmental trainings to the PMU and the contractors. The schedule and content of each course will be discussed with PMU depending on scale, level and project progress.

### **6.2 Activities during operational phase**

32. Building of suitable capacities for Owners of infrastructure works is very important to continuously act environmental management during operation phase. TWACO has 01 staff in this section. However, all the construction works under this project are small scale and with lower environmental sensitivity, environmental issues can be implemented by existing staffs. The existing staff do not need to improve their knowledge on implementing EMP during operation phase.

33. Regarding to management of water supply system after completion of construction period, the Thai Nguyen Water Joint Stock Company needs to upgrade management capacity for existing staffs and add more human and equipment to ensure the operation and maintenance of addition water supply treatment plant, raw water pumping station and water network.

## 7 RESPONSIBILITIES AND AUTHORITIES FOR IMPLEMENTATION OF MITIGATION MEASURES AND MONITORING REQUIREMENTS

*Table 10. Responsibilities for implementation*

Agency	Responsibilities for implementation of environmental management
Thai Nguyen Water Joint Stock Company (PMU under Thai Nguyen Water Joint Stock Company)	<ul style="list-style-type: none"> <li>- Overall responsibility for EMP implementation during the pre-construction and construction phases</li> <li>- Ensure that contract documents include environmental documents/requirements including this updated EMP</li> <li>- Ensure that sufficient funds are available in project budget for EMP implementation</li> <li>- Allocate adequate resources for environmental requirements. In order to be effective in the implementation process, PMU will assign an environmental staff (PMU-ES) to help with the environmental aspects of the subproject</li> <li>- Undertake inspections and monitoring of environmental issues during construction phase</li> <li>- Prepare semi-annual Safeguards Monitoring Reports (SMRs) and submit to ADB for disclosure as well as to Thai Nguyen DONRE</li> </ul>
Construction Supervision Consultant (CSC)	<ul style="list-style-type: none"> <li>- The CSC will assign a qualified environmental staff (CSC-ES) with adequate knowledge on environmental protection and construction project management. The CSC-ES will be responsible for routine supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts.</li> <li>- Review and approve the Site-specific EMP (SEMP) prepared by the contractors.</li> <li>- Prepare a detailed plan and training documents for relevant objects in environmental supervision and management, within one month after the mobilization, to be approved by PMU.</li> <li>- Provide environmental training(s) to PMU and contractors.</li> <li>- Carry out environmental effect monitoring (see Appendix 1)</li> <li>- Periodical implementation of onsite compliance monitoring to Construction Contractor;</li> <li>- Periodically complete snap-shot reports on SEMP and send to PMU, giving proposals for improvement.</li> <li>- CSC will also be responsible to support PMU to prepare semi-annual SMRs</li> </ul>
Construction contractor	<ul style="list-style-type: none"> <li>- Assign an environmental staff (Contractor's ES)</li> <li>- Prepare detailed SEMP to meet general requirements in EMP and train workers in environmental issues;</li> <li>- Fulfill assigned tasks under the SEMP and other issues related to EMP of the Project. If the Contractors find that mitigation measures in SEMP have been ineffectively implemented, they should recommend new or improved mitigation measures;</li> <li>- Allocate adequate resources to meet the requirements and obligations of</li> </ul>

Agency	Responsibilities for implementation of environmental management
	<p>Project's EMP;</p> <ul style="list-style-type: none"> <li>- The SEMP must be approved by the Monitoring Engineer and PMU's environmental team before construction commencement.</li> <li>- Actively communicate with local residents and take actions to prevent disturbance during construction.</li> <li>- Ensure that all staff and workers understand the procedure and their tasks in the environmental management program.</li> <li>- Report to the PMU and CSC on any difficulties and their solutions.</li> <li>- Report to local authority and PMU and CSC if environmental accidents occur and coordinate with agencies and keys stakeholders to resolve these issues</li> </ul>
Local community	<ul style="list-style-type: none"> <li>- The community has the right and responsibility to routinely monitor environmental performance during construction to ensure that their rights and safety are adequately protected and that the mitigation measures are effectively implemented by contractors and the PMU. If unexpected problems occur, they will report to the CSC and PMU.</li> </ul>
Thai Nguyen DONRE	<ul style="list-style-type: none"> <li>- Provide consultancy service and inform the project about any violation related to environmental management and protection policy of Vietnam, and provide technical support as required during Project implementation;</li> </ul>
Works Ownership and Operation Unit	<ul style="list-style-type: none"> <li>- Be responsible for environmental activities in operation phase including EMP implementation during operation;</li> <li>- Undertake inspections and monitoring of environmental issues during operation</li> </ul>
District Level Environment Staff <sup>3</sup>	<ul style="list-style-type: none"> <li>- Provide consultants and support as requested during the process of project implementation;</li> <li>- Implement monitoring and reporting as internal requirements.</li> </ul>

<sup>3</sup>Environmental Protection Law and regulations related to enhance roles of District level by taking part in verifying documents of "Environment Impact Assessment" and continuously monitor environmental aspects.



## **8 MECHANISM OF INCOMPLIANCE REDRESS (Grievance Redress Mechanism)**

34. A compliance framework, based on the environmental requirements established by the EMP and Environmental Specifications included in bidding documents, will be strictly enforced by Supervision engineers. The minor infringements will be identified as an incident which causes temporary but reversible damage, where the contractor will be given a reasonable period of time to remediate the problem and to restore the environment. If restoration is done satisfactorily during this period, no further actions will be taken. If it is not done during this period, the PMU will immediately arrange for another contractor to do the restoration and deduct the cost from the offending contractor's next payment. The major infringements will be identified as an incident where there is long-term or irreversible damage, there will be a financial penalty in addition to the cost for restoration activities. To minimize the damage, the restoration activities will be implemented without delay.

35. The compliance framework will be applied as follows:

- The CSC will identify or be notified of an infringement (community member, local government)
- The CSC in consultation with the PMU will assess whether it is a minor or major infringement.
- For minor infringements:
  - The CSC will establish the required mitigation measures, and the time period, which is a maximum of five days to remedy the situation.
  - The CSC will review the recommendation and confirm (i) the level of infringement (minor/major); (ii) the mitigation measures; and (iii) the mitigation time period. If they do not agree, they will work with the PMU to reach mutually acceptable recommendations.
  - The Contractor will be informed of the infringement, the required mitigation measures, and time period for resolution.
  - The Contractor shall remedy the infringement in accordance with the recommendations within the agreed time period.
  - The CSC shall confirm the infringement is satisfactory remedied in the time period.
  - If the infringement is not remedied satisfactorily in the time period, the CSC shall inform the PMU. The PMU shall immediately arrange for a separate contractor to undertake the necessary works and the cost of this shall be deducted from the next payment to the offending contractor.
- For major infringements:
  - The CSC shall immediately inform the PMU of the incident
  - The PMU shall inform the appropriate provincial authorities if appropriate
  - The PMU, in consultation with the CSC and other provincial authorities as appropriate, shall agree upon mitigation and clean up measures to be undertaken immediately by the contractor or by specialists to be procured at the contractor's expense. To minimize environmental impacts the restoration activities should be completed within ten days.
  - The Project Office shall apply a financial penalty, not to exceed 1% of the contract cost, for each major infringement, in addition to any costs associated with the infringement not borne by the contractor.
  - The main objective will be to resolve an issue as quickly as possible by the simplest means, involving as few people as possible, and at the lowest possible level. Only when an issue cannot be resolved at the simplest level and/ or within 15 days, will other authorities be

involved. Such a situation may arise, for example, when damages are claimed, the to-be-paid amount cannot be resolved

**Complaint procedures and resolution will be performed as follows:**

- **The first level *People's Committee of ward / commune*.** An affected household is to take his/her complaint to any member of the People's Committee of the ward / commune, through the village head or directly to People's Committee of the commune / ward, in written or oral form. The People's Committee of Ward/Commune will work directly in person with the said affected household and will decide on the settlement of the complaint 5 days after receiving such complaint (this may take 15 days in mountainous or remote areas). The Secretariat of the People's Committee of the relevant commune/ward is responsible for documenting and recording all the complaints that it is handling.
- After the Ward/Commune People's Committee issues its decision, the relevant household can make an appeal within 30 days. In case a second decision has been issued but the said household is still not satisfied with such decision, such household can appeal to the municipal (city) People's Committee (CPC).
- **The second level *the CPC*.** Upon receiving a complaint from a household, the CPC will have 15 days (or 30 days in case of remote and mountainous areas) after receiving the complaint to resolve the case. The CPC is responsible for filing and storing documents on all complaints that it handles. When the CPC has issued a decision, the household can make an appeal within 30 days. In case a second decision has been issued and the household is still not satisfied with such a decision, they can appeal to the Provincial People's Committee (PPC).
- **The third level *the PPC*.** Upon receiving a complaint from the household, the PPC will have 30 days (or 45 days in case of remote and mountainous areas) after receiving the complaint to resolve the case. The PPC is responsible for filing and storing documents for all complaints to be submitted. After the PPC has issued a decision, the household can appeal within 45 days. In case a second decision has been issued and the household is still not satisfied with such decision, they can appeal to the court within 45 days. The PPC will then have to pay the compensation into an account.
- **The Forth level *Provincial Court*.** In case a complainant brings his/her case to a provincial court and the court rules in favor of the complainant, the provincial authorities will have to increase the compensation up to such a rate as may be ruled by the court. In case the court's ruling is in favor of the PPC, the complainant will be refunded the amount of money that has been paid to the court.

**Contractor and Construction Supervision Consultant (CSC)**

36. During construction, the GRM will also be managed by the contractors under supervision of the CSC. The contractors will inform the affected communities and communes about the GRM availability to handle complaints and concerns about the subproject. This will be done via the community consultation and information disclosure process under which the contractors will communicate with the affected communities and interested authorities on a regular basis. Meetings will be held at least quarterly, monthly information brochures will be published, announcements will be placed in local media, and notices of upcoming planned activities will be posted, etc.

37. All complaints and corresponding actions undertaken by the contractors will be recorded in subproject SMRs. Complaints and claims for damages could be lodged as follows:

- Verbally: direct to the CSC and/ or the contractors' environmental staff (Contractor's ES) or representatives at the site offices.
- In writing: by hand-delivering or posting a written complaint to specified addresses.
- By telephone, fax, e-mails: to the CSC, the Contractor's ES or representatives.

38. Upon receipt of a complaint, the CSC, the Contractor's ES or representatives will register the complaint in a complaint file and maintain a log of events pertaining to it thereafter, until it is resolved. Immediately after receipt, four copies of the complaint will be prepared. The original will be kept in the file, one copy will be used by the Contractor's ES, one copy will be forwarded to the CSC, and the fourth copy to the PPMU within 24 hours since receipt of the complaint.

39. Information to be recorded in the complaint log will consist of:

- The date and time of the complaint.
- The name, address and contact details of the complainant.
- A short description of the complaint.
- Actions taken to address the complaint, including contact persons and findings at each step in the complaint redress process.
- The dates and times when the complainants are contacted during the redress process.
- The final resolution of the complaint.
- The date, time and manner in which the complainant was informed thereof
- The complainant's signature when resolution has been obtained.

40. Minor complaints will be dealt with within one week. Within two weeks (and weekly thereafter), a written reply will be delivered to the complainant (by hand, post, fax, e-mails) indicating the procedures taken and progress to date.

41. The main objective will be to resolve an issue as quickly as possible by the simplest means, involving as few people as possible, and at the lowest possible level. Only when an issue cannot be resolved at the simplest level and/ or within 15 days, will other authorities be involved. Such a situation may arise, for example, when damages are claimed, the to-be-paid amount cannot be resolved, or damage causes are determined.

## 9 RESPONSIBILITIES FOR REPORTING AND REVIEW

*Table 11. Responsibility for Reporting*

Subproject phases	Type of report	Frequency	Responsibility	Submitted to whom
<i>Construction phase</i>	Site Environmental Performance Report indicating the compliance with SEMP	Every month	Civil Works contractor for internal monitoring report CSC for compliance monitoring report	PMU
	Periodically environment monitoring report to PMU	Quarterly during construction time depending on construction duration	CSC	PMU
	Periodically taking sample and testing in qualified laboratory	3 months per time	CSC	PMU
	Semi-annual Safeguards Monitoring Reports (SMRs) to ADB (Refer to Appendix 2 for content)	Twice a year during construction time and the completion of work construction	CSC, Thai Nguyen Water Joint Stock Company	ADB, DONRE,
<i>Operation phase</i>	EMP Compliance Report: Work operation must be in compliance with project's EMP commitments.	Once a year for the first two years of operation. Ongoing frequency is to be determined basing on evaluation results after 2 years.	Work management and operation unit	ADB, DONRE

## 10 ENVIRONMENTALLY RESPONSIBLE PROCUREMENT PLAN

### 10.1 Procurement of Equipment for EMP Implementation

42. No purchase of equipment for EMP implementation is needed.

### 10.2 Integration of Environmental Considerations into the Procurement/Bidding Process

43. Procurement for civil works and equipment and vehicle for the Projects will be carried out in accordance with Procurement Guidelines (April 2015). A combination of International Competitive Bidding, National Competitive Bidding, Shopping and Direct Purchasing/ Contracting methods will be implemented depending on costs and work items/ equipment being procured. The method for ensuring integration of environmental considerations into each of these procurement processes is described below.

**Table 12. The method for ensuring integration of environmental considerations**

International Competitive Bidding / National Competitive Bidding <sup>4</sup>	
<i>Steps in Procurement Process<sup>5</sup></i>	<i>Integration of Environmental Considerations</i>
1. Draft bidding documents prepared by PMU	<i>PMU incorporates relevant environmental requirements from EMP and standard environmental bidding clauses into draft bidding documents.</i>
2. Draft bidding documents submitted to ADB/PPC	<i>ADB verifies that environmental requirements adequately and appropriately incorporated into bidding documents.</i>
3. PMU issues bidding documents, receives and evaluates bids. PMU prepares bid evaluation report and submit to ADB/ PPC.	<i>PMU's bid evaluation process includes consideration of environmental criteria</i>
4. ADB issues NOL	<i>ADB verifies that environmental requirements have been considered in evaluation process</i>
5. Contract awarded	<i>PMU prepares draft contract that contains relevant environmental requirements/specifications</i>

<sup>4</sup>Competitive bidding applied for high cost items.

<sup>5</sup>Above procurement method applied for the first NCB only, it is not necessary for ADB submission with the following NCB.

## 11 PRELIMINARY COST ESTIMATES FOR ENVIRONMENTAL MONITORING

44. This section provides cost estimate for EMP implementation, including costs for mitigation measures, environmental monitoring. Costs for implementation of other project components (e.g. resettlement monitoring) will be not presented here.

### **During the construction phase**

45. All mitigation measures that belong to the Contractor's responsibilities shall be implemented by the Contractor. The costs are included in the contract between Construction Contractor and Thai Nguyen Water Joint Stock Company.

46. Both environmental performance monitoring and environmental effect monitoring will be mainly conducted by Construction Supervision Consultant (CSC) and the TOR and cost for these tasks will be included under contract of CSC and Thai Nguyen Water Joint Stock Company (see Appendix 1 for the cost estimate of environmental effect monitoring). PMU under Thai Nguyen Water Joint Stock Company will also be responsible for the environmental performance monitoring through periodic or random site inspection. The contractors will be responsible for conducting performance monitoring for their subcontracts, suppliers in implementing technical specifications of relevant mitigation measures.

47. Community consultation and information publication: the Thai Nguyen Water Joint Stock Company bear costs for these activities and the funds are covered by the project loan.

### **During the operation phase**

48. During the operation and maintenance phase, the works operation and management unit will provide budget for implementing mitigation measures. Therefore, there is no cost estimate for environmental monitoring during the operation and maintenance phase, so it's is not included in this EMP.

### **Summary of expenditures for EMP implementation:**

49. Costs for implementation of the projects EMP include:

- (i) Costs for implementation of mitigation measures during the construction phase will be the responsibility of the Contractor. These costs are included in the contract between Construction Contractor and Thai Nguyen Water Joint Stock Company.
- (ii) Costs for implementation of the environmental supervision and monitoring program during the construction phase include costs of labor, sample taking and analysis, report preparation, and other expenses: (136,240,000 VND (USD 5,923), including sampling program and public consultation cost, see **Error! Reference source not found.** for details) will be included under contract between Thai Nguyen Water Joint Stock Company and CSC.

50. Costs for community consultation and information publication: pre-construction phase has implemented and included in the cost of EMP report; cost for community consultation and information in the construction phase is estimated at VND 15,000,000 and will be covered in the direct cost of EMP.

## **12 APPENDICES**

## Appendix 1: Cost estimation for environmental supervision and monitoring

No	Parameter	Criteria	Number of positions	Frequency (time)	Total Samples	Unit price (VND)	Amount (VND)	
I. During Pre-construction and Operation								
	No need to implement monitoring							
II	During Construction							
1	Air Quality	TSP	3	8	24	91.000	2.184.000	
		CO	3	8	24	140.000	3.360.000	
		NO <sub>2</sub>	3	8	24	140.000	3.360.000	
		SO <sub>2</sub>	3	8	24	140.000	3.360.000	
		Equipment	3	8	24	250.000	6.000.000	
2	Noise	Leq	3	8	24	141.000	3.384.000	
3	Surface water quality	Temperature	1	8	8	4.000	32.000	
		pH	1	8	8	56.000	448.000	
		TSS	1	8	8	80.000	640.000	
		EC	1	8	8	70.000	560.000	
		DO	1	8	8	104.000	832.000	
		COD	1	8	8	120.000	960.000	
		BOD <sub>5</sub>	1	8	8	200.000	1.600.000	
		Nitrate (NO <sub>3</sub> <sup>-</sup> )	1	8	8	140.000	1.120.000	
		Ammonium (NH <sub>4</sub> ) to N	1	8	8	98.000	784.000	
		Chlorite (Cl <sup>-</sup> )	1	8	8	70.000	560.000	
		Fe	1	8	8	130.000	1.040.000	
		Mn	1	8	8	130.000	1.040.000	
		Pb	1	8	8	130.000	1.040.000	
		Cu	1	8	8	130.000	1.040.000	
		As	1	8	8	150.000	1.200.000	
		Zn	1	8	8	130.000	1.040.000	
		Floating oil	1	8	8	400.000	3.200.000	
		Coliform	1	8	8	112.000	896.000	
		Equipment	1	8	8	250.000	2.000.000	
		Total (Rounded)						41.680.000
			Total in USD					1.895



## **Appendix 2: Proposed formats for environmental reporting**

Template Safeguard Monitoring Report

### **Safeguards Monitoring Report**

Semiannual Report xxx {month} 20xx

**LOAN 3251-VIE: Viet Nam Water Sector Investment  
Program–PFR3**

**Project: Water supply system development in Thai  
Nguyen city**

## ABBREVIATIONS

## NOTE

(i) In this report, "\$" refers to US dollars.

This safeguards monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the “terms of use” section of this website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

## TABLE OF CONTENTS

## I. EXECUTIVE SUMMARY

{Read and delete: Provide short summary of the following items:

- Summary of EMP/RP Implementation
- Description of monitoring activities carried out (e.g. field visits, environment effect monitoring, survey questionnaire, public consultation meetings, focus group discussions, etc.)
- Key issues, any corrective actions already taken, and any grievances
- Key activities planned in the next reporting period
- Recommendations

Use the paragraph numbering format provided below throughout the report}

## II. PROJECT OVERVIEW, GENERAL SAFEGUARD MATTERS Project Overview

{Read and delete: Briefly describe project objectives, scope and components – can be taken from PAM or other relevant documents}

### Project Progress

{Read and delete: Using most recent project progress report, describe status of project implementation, including full list of contracts, status of contract awarding and implementation, name of contractor, Engineer, Project Supervision Consultant.}

**Table 1: Project Overview, Snapshot of Project Progress**

Project Number and Title:		
Safeguards Category	Environment	B
	Involuntary Resettlement	B
	Indigenous Peoples	C
Reporting period:	Regularly Monitoring Report in .... (From ... to....)	

Last report date:	"
Key sub-project activities since last report:	<p>{Read and delete: This section should include, among others, the following:}</p> <ul style="list-style-type: none"> <li>• Contract awarding</li> <li>• Progress of Work (% physical completion)</li> <li>• Status of Safeguard Approvals / Permits / Consents</li> </ul>
Report prepared by:	"

## III. Safeguard Plans Implementation Arrangements

{Read and delete: Describe institutional arrangements and responsibilities for EMP and RP implementation, internal and external monitoring, and reporting, defining roles of PMU, Construction Supervision Consultant, Loan Implementation Supervision Consultant, Contractors. (Table format as needed)}

#### IV. Updated EMPs and RPs, Incorporation of Safeguards Requirements into Project Contractual Arrangements

{Read incorporated into bidding documents, contracts. Indicate when updated EMPs and RPs were submitted for approval to ADB (Table format appropriate).}

#### V. ENVIRONMENTAL PERFORMANCE MONITORING

Status of EMP implementation (Mitigation Measures) Define manner by which EMP and RP requirements are

{Read and delete: Summarize main mitigation/protection measures implemented in the reporting period (narrative section). Structure in accordance to phases (detailed design, construction preparation, construction, and operation).}

{Read and delete: Include EMP table or updated EMP table if applicable. Assess compliance of environmental management activities with the original or updated EMP. For that purpose, include additional columns entitled "Compliance Status", "Comment or Reasons for Non- Compliance", and "Issues for Further Action". Example is provided below.}

**Table 2: Compliance with EMP Requirements (Environmental Performance)**

EMP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use environmental impact as main heading and EMP as listing (see example below)	Use EMP list as basis for rating/evaluating compliance (see example below)		
<p>Rise of employment opportunities:</p> <ul style="list-style-type: none"> <li>Job openings of the project should give priority to local communities.</li> <li>Recruitment of local laborers should be stipulated in the contract for construction</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Field inspections and interviews with communities - DONE</li> <li><input type="checkbox"/> Note each complaint case in the field – 3 COMPLAINTS RECEIVED</li> <li><input type="checkbox"/> Set up grievance center and report as part of monitoring action plan – NOT DONE</li> </ul>		

**Table 3: Issues for Further Action**

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of EMP measures or activities not completed (last column of previous table)			

New Issues from This Report			

## 2. Health and Safety

{Read and delete: Provide narrative of occupational and community health and safety issues that occurred during the reporting period. Any accident involving injury or death of workers or community members must be reported. Include investigation report of DOLISA as attachment to the report. Provide details in the Table below}.

**Table 4: Health and Safety Issues**

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

## 3. Environment Effect Monitoring

xx. Monitoring activities in the reporting period. Xxx {Read and delete: Describe the environment effect monitoring activities in the reporting period, including number of monitoring campaigns, number of samples, etc. Confirm compliance with the monitoring plan, or justify any deviation from the plan}

**Table 5: Environment Effect Monitoring Results in the Reporting Period responsibilities}**

Location	Parameter	Date	Monitoring value	Relevant government standard, standard value

{Read and delete: Present monitoring result in a Table 5 (see example below, adjust as needed). Any non-compliance should be highlighted for attention and follow-up.}

xx. Assessment. Xxx {Read and delete: Compare monitoring results with baseline conditions (if baseline data is available) and relevant government standards in qualitative terms. Additional explanatory comments should be provided as necessary. Possible reasons for non-compliance should be identified.}

## VI. INVOLUNTARY RESETTLEMENT PERFORMANCE MONITORING

{Read and delete: Provide narrative of status of implementation of the RP(s), including but not limited to status of RP or Resettlement Framework updating; number of households relocated during the reporting period; outstanding resettlement activities; etc.}.

**Table 6: Summary of Compliance with RP Requirements**

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non- Compliance	Issues for Further Action <sup>25</sup>
Establishment of personnel in PMU/PIU		{Read and delete: This section should include, among others, the following: Identify position and name of Safeguards/Resettlement staff of the PMU/PIU	
Public consultation and socialization process		{Read and delete: This section should include, among others, the following: Provide information on: <ul style="list-style-type: none"> <li>Public consultation, participation activities carried out</li> <li>Inclusive dates of these activities</li> </ul> To be elaborated on in Item 5	
Land area to be acquired is identified and finalized		{Read and delete: This section should include, among others, the following: Provide information on: <ul style="list-style-type: none"> <li>Land area (of each parcel to be acquired)</li> <li>Current land use (residential, agriculture, etc.)</li> <li>Current ownership status (private, state)</li> </ul> Provide attachments on land titles/user rights certificates,	
Resettlement plan(s) updated after detailed design			
Land acquisition completed			
Establishment of Resettlement Site(s)		Please state: <ul style="list-style-type: none"> <li>Number of AHs to be relocated as per agreed RP</li> <li>Number of AHs already relocated</li> <li>Number of houses built</li> </ul> Status of installation of community facilities to be provided as per agreed RP	
Compensation payments for affected assets is completed		Please state: <ul style="list-style-type: none"> <li>Total Number of Eligible AHs and APs (as per agreed RP)</li> <li>Number of AHs and APs compensated as of this monitoring period</li> <li>Total Budget allocation as per agreed RP</li> <li>Total budget disbursed to AHs as of this monitoring period</li> </ul>	
Transport assistance for relocating affected households		As above	

Additional assistance to vulnerable affected household		Please state: <ul style="list-style-type: none"> <li>• Total Number of vulnerable AHs and APs (as per agreed RP)</li> <li>• Agreed forms of assistance as per RP</li> <li>• Number of AHs and APs assisted as of this monitoring period</li> </ul>	
Income Restoration Program		Please state progress per income restoration feature/activity and actual period of implementation	
Temporary impacts have been addressed (affected properties restored to at least pre-project conditions)		Please state: <ul style="list-style-type: none"> <li>• Total Number of AHs affected by temporary impacts as per agreed RP</li> <li>• Actual Number of AHs and total area affected by temporary impacts (if this differs from the projected number, such as in cases of unforeseen project impacts)</li> <li>• Status of restoring affected property</li> </ul>	
Capacity building activities			

**Table 7: Issues for Further Action**

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of RP activities not completed (last column of previous table)			
New Issues from This Report			

## VII. COMPLIANCE WITH SAFEGUARDS RELATED PROJECT COVENANTS

{Read and delete: List all environment and resettlement related loan covenants, and assess project's compliance with the covenants (Table format is appropriate, with concluding statement on compliance, partial compliance or non-compliance, and corrective actions as needed)}

**Table 8. Compliance with safeguards related project covenants**

Schedule	Para No.	Covenant	Remarks/Issues (Status of Compliance)
Schedule 5	xxx		Complied with / Partially complied with / Not complied with. {Identify reason for partial or non-compliance}

## VIII. PUBLIC CONSULTATION, INFORMATION DISCLOSURE, CAPACITY BUILDING

{Read and delete: Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the IEE/EMP and the RP(s) or justify deviation from these plans. Present planned consultation activities in next reporting period. Use Tables as appropriate.}

- Field Visits (sites visited, dates, persons met)
- Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)
- Information disclosure

## IX. GRIEVANCE REDRESS MECHANISM

{Read and delete: Describe mechanisms established to address and redress public complaints and grievances related to social and environment safeguards. Summarize grievances received, if any, and measures implemented to redress them.}

- Number of new grievances, if any, since last monitoring period: \_\_\_\_\_
- Number of grievances resolved: \_\_\_\_\_
- Number of outstanding grievances: \_\_\_\_\_

**Table 9. Issues regarding GRM for further actions**

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

## X. CONCLUSION

{Read and delete: Highlight important results from the implementation of EMP and RP monitoring; recommendations to improve EMP and RP management, implementation, and monitoring; key activities planned in next reporting period}.

## XI. ATTACHMENTS

Consents/permits   Monitoring data (water quality, air quality, etc.)   Inspection checklists  
 Photographs  
 Others





## **Appendix 4: Community Consultation**

### **1) Community Consultation during project preparation phase**

Information disclosure and public consultation activities were performed as part of the basic survey on local environment along pipelines and the WTP. The interviews were carried out using a questionnaire survey helped assess community awareness and concerns about the proposed project.

### **2) Community Consultant during period of FS updating and detailed design preparation**

In 2017, During FS updating and detailed design preparation, The Consultant conducted community consultant in project area.

The representation of Thai Nguyen Water Joint Stock Company and the Consultant presented the scale of the project and implementation schedule.

On the meeting, the representation discussed with community about issues of impacts on environment, the impacts to living of the people during construction on the road and pavements. The Consultant proposed the measures to reduce negative impacts during project Implementation. The rights and responsibilities of the parties, grievance redress mechanism and monitoring activities were presented.

On the meeting, main concerns of the people focused on issues about safe, surface ground cleaning and restoring after construction, the detailed construction method has to be presented and informed to the people before construction and impacts on business activities during construction.

After explanation of the Consultant and representation of Thai Nguyen Water Joint Stock Company, the households already have accepted project implementation and desired the project will be implemented early to supply clean water to people.

### **3) Future Consultation and Information Disclosure**

#### **a) Future consultation**

At least two future public consultations will be held right before construction, during construction following the general guidelines below:

- All stakeholders should be invited and encouraged to participate in the consultation workshops;
- The affected people are informed of progress of the Subproject;
- Suggestions from the general public may be sought, when necessary; and
- The PMUs and, when necessary, People's Committees (at relevant level) should be open to contact by the public on matters concerning the progress of the projects, adverse impacts and mitigation measures and environmental monitoring.

#### **b) Information Disclosure**

According to ADB's Safeguard Policy Statement 2009, for projects of Category B, environmental documents that need to be submitted and disclosed on ADB's website include:

- Draft IEE;
- Final IEE;
- Updated or corrective IEE during Subproject implementation; and
- Environmental monitoring reports.

A draft version of IEE was prepared by the PPTA in 2014. According to the Loan Agreement, this IEE document has to be reviewed and updated in compliance with the ADB's safeguard policy requirements. This updated IEE document will be submitted in the Subproject Appraisal Report for ADB's approval and disclosed on ADB's website. All of the IEE reports shall be prepared in both English and Vietnamese. The Vietnamese version of the summary IEE shall be attached in notification boards of Thai Nguyen Water Joint Stock Company. Other related documents shall also be attached for reference.

Appendix 5: The legal basis of the production forest land acquired by the subproject

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM  
Độc lập - Tự do - Hạnh phúc

**ĐƠN XIN**  
Tỉnh nguyện đi xây dựng vùng kinh tế mới.

Lính gửi : UBND xã Phúc triều !  
Đồng kính gửi : Phòng Lao động TB - TP Thái nguyên !  
Ben kinh tế mới sở Lao động - TB  
tỉnh Bắc Thái !

Họ và tên : Đặng Văn Dao Tuổi : 32  
Địa chỉ : Xã Phúc Triều TP. TT.  
Số khẩu trong hộ hiện có : 6  
Lao động chính : 3  
Lao động phụ : 3

Do điều kiện gia đình lao động đôi thừa, đất đai không đủ để phát triển kinh tế gia đình.

Sau khi cố chỉ tiêu theo tinh thần quyết định 143 của tỉnh nhằm phát triển rừng phòng hộ Núi Cốc, theo mô hình lâm nông thủy sản trong vùng đảo và bán đảo Hồ Núi Cốc, trên cơ sở có đăng ký có chủ hộ lập cư lâu dài và thắm kẻ

Vậy tôi làm đơn này xin tỉnh nguyện tách hộ, tách lao động để đi chuyên vào Hồ Núi Cốc với số khẩu là : 2  
Lao động chính : 1  
Lao động phụ : 1

Số diện tích đăng ký nhận đi lập cư và phát triển sản xuất là : 3 ha. ở tại khu vực : Đảo và bán đảo Hồ Núi Cốc.

Sau khi được đi chuyên tôi xin cam kết chấp hành mọi chính sách của Nhà nước đã ra và Luật đất đai cũng như ngành quản lý trên vùng đất thổ, xác định một phần tự bỏ vốn và công sức của gia đình, một phần xin Nhà nước trợ cấp thêm để gia đình giảm bớt khó khăn trước khi đi lao động.

Ngày 23 tháng 6 năm 1993  
NGƯỜI LÀM ĐƠN.  
Đặng Văn Dao

ĐẶNG VĂN ĐÀO  
LÝ PHƯỚC THÂN

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM  
Độc lập - Tự do - Hạnh phúc

**ĐƠN XIN**

Tình nguyện đi xây dựng vùng kinh tế mới.

Lính gửi : UBND xã Phúc triều !

Đồng kính gửi : Phòng Lao động TB - TP Thái nguyên !

Ban kinh tế mới sở Lao động - TB

tỉnh Bắc Thái !

Họ và tên : *Trần Văn Việt*

Địa chỉ : *Và Phúc Triều TP. TN.*

Số khẩu trong hộ hiện có : 6

Lao động chính : 4

Lao động phụ : 2

Do điều kiện gia đình lao động đôi thu, gia đình không  
để phát triển kinh tế gia đình.

Sau khi có chỉ tiêu theo tình thần quyết định của Đảng và Nhà nước  
nhằm phát triển vùng phong hộ Núi Cốc, theo mô hình làm  
thủy sản trong vùng đảo và bán đảo Hồ Núi Cốc, trên cơ sở  
đăng ký cơ chủ hộ lập cư lâu dài và thừa kế

Vậy tôi làm đơn này xin tình nguyện tách hộ, tách lao  
động để đi chuyên vào Hồ Núi Cốc với số khẩu là : 3


Lao động chính : 3

Lao động phụ : 0

Số diện tích đăng ký nhận để lập cư và phát triển sản xuất  
là : 3,5 ha. ở tại khu vực : *Đèo Vèo phía*

Hồ Núi Cốc.

Sau khi được đi chuyên tôi xin cam kết chấp hành mọi  
chính sách của Nhà nước đưa ra và Luật đất đai cũng như ngành  
quản lý trên vùng lãnh thổ, xác định một phần tự bỏ vốn và  
công sức của gia đình, một phần xin Nhà nước trợ cấp thêm để  
gia đình giảm bớt khó khăn trước khi đi lao động. /.

  
KAC NHAN CỦA UBND XÃ.

1) / Ngày 23 tháng 6 năm 1992

NGƯỜI LÀM ĐƠN.



  
*Trần Văn Việt*

CONG HOA XA HOI CHU NGHIA VIET NAM  
Độc lập - Tự do - Hạnh phúc

ĐƠN XIN

Tình nguyện đi xây dựng vùng kinh tế mới.

Lính gửi : UBND xã Phúc triêu !  
Đồng kính gửi : Phòng Lao động TB - TP Thái nguyên !  
Ban kinh tế mới sở Lao động - TB  
tỉnh Bắc thái !

Họ và tên : Trần Văn Sơn Tuổi : 47  
Địa chỉ : Xã Phúc triêu TP-TN  
Số khẩu trong hộ hiện có : 7 Lao động chính : 4  
Lao động phụ : 3

Do điều kiện gia đình lao động đôi thừa, đất đai không đủ  
để phát triển kinh tế gia đình.

Sau khi cố chỉ tiêu theo tinh thần quyết định của Đảng  
nhằm phát triển rừng phong hộ Múi Cốc, theo mô hình lâm nghiệp  
thủy sản trong vùng đảo và bán đảo Hồ Múi Cốc, trên cơ sở có  
đăng ký có chủ hộ lập cư lâu dài và thắm kẻ

Vậy tôi làm đơn này xin tình nguyện tách hộ, tách lao  
động để đi chuyên vào Hồ Múi Cốc với số khẩu là : 3  
Lao động chính : 2  
Lao động phụ : 1

Số diện tích đăng ký nhận để lập cư và phát triển sản xuất  
là : ... 3, 2 ha ở tại khu vực : Đảo Voi Phồn  
Hồ Múi Cốc.

Sau khi được đi chuyên tôi xin cam kết chấp hành mọi  
chính sách của Nhà nước và Luật đất đai cũng như ngành  
quản lý trên vùng lãnh thổ, xác định một phần tự bỏ vốn và  
công sức của gia đình, một phần xin Nhà nước trợ cấp thêm để  
gia đình giảm bớt khó khăn trước khi đi lao động.

BẢN SAO ĐÚNG VỚI BẢN GỐC  
Ngày: 10/7/2015 Ngày 23 tháng 6 năm 1993  
NGƯỜI ĐI ĐƠN.  
Kính gửi UBND xã Phúc triêu  
Kính gửi Phòng Lao động TB  
TP Thái Nguyên  
Kính gửi Ban kinh tế mới  
sở Lao động TB  
tỉnh Bắc Thái



viết

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM  
Độc lập - Tự do - Hạnh phúc

ĐƠN XIN

NHÂN ĐẤT, NHÂN RỪNG ĐỂ BẢO VỆ VÀ XÂY DỰNG RỪNG PHÒNG HỒ

Kính gửi: Ủy ban quản lý rừng phòng hộ

Tên tôi là: Lê Đình Việt Tuổi: 44  
Địa chỉ: Và Phúc Trư 712 Thôn Nguyễn  
Số khẩu: 7 Lao động chính: 5 LĐ phụ:

Lâm đơn xin nhận đất, nhận rừng để bảo vệ và xây dựng rừng phòng hộ cụ thể như sau:

- Về đất trống để trồng rừng:
  - Diện tích: 3,6 ha
  - Địa điểm: (ghi rõ đồi gò nào theo tên địa phương) Lô 7 Thôn Nguyễn
  - Mục đích để trồng loại cây gì? Trồng cây theo chương trình phòng hộ
- Về rừng: (Bao gồm rừng tự nhiên, rừng trồng, rừng gia đình)
  - Diện tích: Trồng mới 3,6 ha
  - Địa điểm: Lô 7 Thôn Nguyễn và Phúc Trư
  - Loại rừng: Trồng mới
  - Mục đích sử dụng: Lập rừng phòng hộ theo quy định của pháp luật

Sau khi được giao đất tôi xin cam đoan thực hiện nghiêm chỉnh các quy định và chính sách của Nhà nước về quản lý, bảo vệ, sản xuất, kinh doanh rừng.

- Tự bỏ vốn hoặc tiếp nhận vốn hỗ trợ, sức lao động để trồng cây và quản lý, bảo vệ rừng được giao.

- Tuân theo sự hướng dẫn kỹ thuật của các cơ quan chuyên môn.

Tôn trọng chủ quyền của các hộ khác.

Xác nhận của UBND xã  
(Ký tên, đóng dấu)

Ngày tháng năm 1993  
Chủ hộ ký tên



Lê Đình Việt

Lê Đình Việt

ĐƠN XIN

NHẬN ĐẤT, NHẬN RỪNG ĐỂ BẢO VỆ VÀ XÂY DỰNG RỪNG PHÒNG HỘ

Kính gửi:

Ban quản lý rừng phòng hộ Mũi Cốc

Tên tôi là Trần Văn Viên Tuổi 34  
Địa chỉ: Sơn Phai Thôn Thôn Khu IP. IV  
Số khẩu: 4 Lao động chính 2 LD phụ 2  
Làm đơn xin nhận đất, nhận rừng để bảo vệ và xây dựng rừng phòng hộ cụ thể như sau

1- Về đất trống rừng:

+ Diện tích: 5.85 ha gồm 7 lô số 21+22+17+18+20+31+30

+ Địa điểm: (ghi rõ đôi gò nào theo tên địa phương)

Đài Kim Bang + Voi phư  
+ Mục đích để trồng loại cây gì? Cây phòng hộ + chè + cây ăn quả

2. Về rừng: (Bao gồm rừng tự nhiên, rừng trồng, rừng gia đình)

+ Diện tích: 5.85 ha

+ Địa điểm: Đài Kim Bang + Voi phư

+ Loại rừng: Trên đồi Thôn Viên

+ Mục đích sử dụng: nhận làm đất trồng chè

Sản xuất theo quy trình rừng làm chè

Sau khi được giao đất tôi xin cam đoan thực hiện nghiêm chỉnh các quy định và chính sách của Nhà nước về quản lý, bảo vệ, sản xuất, kinh doanh rừng.

- Tự bỏ vốn hoặc tiếp nhận vốn hỗ trợ, sức lao động để trồng cây và quản lý, bảo vệ rừng được giao.

- Tuân theo sự hướng dẫn kỹ thuật của các cơ quan chuyên môn.

- Tôn trọng chủ quyền của các hộ khác.

Đã được UBND xã

Xác nhận của UBND Xã

(Ký tên, đóng dấu)

Ngày 24 tháng 4 năm 93

Chủ hộ ký tên

Trần Văn Viên

Trần Văn Viên  
Làng Ngọc Viên

Map Ty Do . . . Phuc

TỔ TRƯỞNG Đ. NGHỊ

Yêu cầu: UBND Tỉnh Bắc Thái

Hồng Khanh gửi: Lãnh đạo Sở lâm nghiệp, ban quản  
lý Rừng phòng hộ Núi Cốc. UBND xã Phúc Tiến.

- Căn cứ quyết định 143 của UBND Tỉnh Bắc Thái
- Căn cứ vào địa bàn được phân cho xã Phúc triã
- Căn cứ vào khả năng nhân lực lao động tính toán quyết của một số hộ trong địa phương.

[illegible]

Phúc triu ngày 26 tháng 4 năm 1993  
T/M UY BAN NHÂN DÂN XÃ PHÚC TRIU  
chữ tích

Phục tr  
T/M UY BA

1. An ALPH KHI CỐ  
rồng y cho UBND và Phạt t  
Đe tước SD h (nằm mướn) vào  
Sân bãi vào t trong công h thuộc  
vui với xã An ninh y  
Đ 103 của t

Lý Phúc Thân