

ENVIRONMENTAL MONITORING REPORT

Completion report

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Viet Nam: WATER SECTOR INVESTMENT PROGRAM – TRANCHE 3

Thai Nguyen Sub-project

Prepared by Thai Nguyen Water Joint Stock Company (TWACO) for Thai Nguyen Provincial People's Committee and the Asian Development Bank (ADB).

NOTE

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

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ABBREVIATIONS

ADB	Asian Development Bank
AH	Affected Household
AP	Affected Person
CARC	Compensation, Assistance and Resettlement Committee
DMS	Detailed Measurement Survey
DOLISA	Department of Labor, Invalids and Social Affairs
EA	Executive Agency
EM	Ethnic Minority
GRM	Grievance Redress Mechanism
HH	Household
LFDC	Land Fund Development Center
LURC	Land Use Right Certificate
NGO	Non-Government Organization
PPC	Provincial People's Committees
RP	Resettlement Plan
SES	Socio-Economic Survey
USD	United State dollar
VND	Vietnam dong

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I. GENERAL INFORMATION

A. Overview

1. Thai Nguyen Sub-project (Thai Nguyen City Water Supply System Development Project) is a part of the seven water supply subprojects that formed the third Periodic Funding Request (PFR-3) of the Multi-tranche Financing Facility under Vietnam Water Sector Investment Program - Loan 3251-VE between the Government of Vietnam and the Asian Development Bank, November 19, 2015).

2. The project is implemented under Thai Nguyen Provincial People's Committee as the Executing Agency and Thai Nguyen Water Joint Stock Company (TWACO) as the implementing agency. A project management unit (PMU) has been established to carry out the implementation on behalf of TWACO.

3. The objective of the project is to provide a sustainable water supply to Thai Nguyen city both for short-term and long-term period, strengthen its water production capacity and improve service quality as well as expand the existing water supply network for Thai Nguyen city and neighbourhood and provide favourable conditions for local social-economic development.

4. The Project consists of two Contracts as follows: (i) Construction of a new WTP with capacity of 50,000 m³/day from surface water of Nui Coc Lake; and (ii) Constructing new water supply system with the following works: Supply material, installation, commissioning and completion of a water supply to supplement the existing network of Thai Nguyen city.

5. In terms of social safeguards under ADB's Safeguard Policy Statement (2009 SPS), the Project is categorized B for Involuntary Resettlement and environment and C for Indigenous peoples.

B. Objectives of Thai Nguyen city Water supply System Development Subproject

6. The objectives of Thai Nguyen city Water supply System Development Sub-project are to: (i) To timely supply sufficient clean water in terms of quantity and quality to those who have water needs, residents of 19 inner-city wards, and suburban communes of Thai Nguyen city ; and (ii) To improve water supply services, ensure safe water supply, and sustainable development by improving the capacity of clean water production, developing the water supply network, expanding the water supply scope of the whole system, and contributing to the improvement of living conditions and health of the people of Thai Nguyen city.

C. Summary of Packages in Thai Nguyen city Water supply System Development Subproject

7. The Thai Nguyen city Water supply System Development subproject includes 03 packages as described below:

Table 1: Packages in Thai Nguyen city Water supply System Development Subproject

No.	Items	Project location	Descriptions
I	Package 01: TN-CW01: Construction of a new water treatment plant 50.000 m³/day		
1	Raw water intake and pumping station	In the South of Nui Coc lake, Phuc Triu ward, Thai Nguyen city.	<ul style="list-style-type: none"> - Using an open channel about 51m long to collect raw water at cos +31.5m. - Suction compartment of raw water pumping station: 01 compartment, LxBxH=23.0mx2.5mx19.0m. - Raw water pumping station: AxBxH=12.7mx25.0mx19.0m; Specifications of raw water pump Q=900 m³/h, H=46m, portable slurry pump Q=20 m³/h, H=25m, leakage pump Q=10 m³/h, H=25 m; - In addition, also arrange an operator of raw water pumping station, anti-collision valve pit, electric flow meter from DN600, and substation supplying power to raw water pumping station.
2	Raw water pipeline	In the South of Nui Coc lake, Phuc Triu commune, Thai Nguyen city.	<ul style="list-style-type: none"> - Spiral welded steel pipe – DN800:180m
3	Construction of new WTP 50.000 m³/day	At Voi Phun hill in the southern tourist area of Nui Coc lake, Phuc Triu commune, Thai Nguyen city.	<ul style="list-style-type: none"> - Static mixing equipment: 1 set; - Lamella reaction and sedimentation facilities: 3 tanks; - Rapid Gravity filter tank: 8 tanks. The design of Rapid Gravity filter tank with compartment placing backwash pump. - Clean Water Reservoir W=20.000 m³: 1 reservoir (2 compartments); - Sludge collection tank: 1 tank; - Sludge thickening tank: 2 tanks; - Sludge drying bed: 2 beds (3 compartments each bed); - Substation: 2 substations 1000KVA;

No.	Items	Project location	Descriptions
			<ul style="list-style-type: none"> - Administration building combined with clean water pump compartment: Design combined with administration building and clean water pumping station with dimensions LxB=49.85mx12.2m. The administration building has 02 floors. The second floor has 03 working rooms in the central location, 02 self-contained rooms at the end, and 01 shared toilet. Due to the combined design of the administration building and the clean water pumping station, the wind machine will be soundproofed by a cover, started, and controlled by an inverter to reduce noise. The operation room and the pump room are soundproofed by uPVC doors, so noise will be minimized. - Auxiliary works: Drainage system with reinforced concrete ditch D400 - D800 and uPVC pipe D200; Internal roads and the access roads M250 concrete, 200mm thick.
II	Package 02: <i>Package TN-CW02: Construction of New Water Supply Network</i>		
1	18,721m of transmission pipelines	On the Phuc Triu commune, Phuc Xuan commune, Quyet Thang commune and Tan Thinh ward, Tân Long ward	<ul style="list-style-type: none"> - Total: DN800 = 8,149m; DN600 = 4,201m; DN400 = 4,632m; DN225 = 1,739m. - Ductile cast iron pipe with pressure level of C25 shall be used, flanged connection. Measures for protection of the pipeline from deformation by concrete supports shall be needed. - Black steel pipes for locations where the pipeline crosses ditches, rivers or special structures shall be used.
2	30,893m of distribution pipelines		<ul style="list-style-type: none"> - Total: DN225 = 11,035 m; DN160 = 9,636 m; DN110 = 10,222 m - HDPE pipes with PN10, PE100 shall be used and connected by heating method, it is necessary to take measures to protect the pipeline from deformation with concrete supports.

No.	Items	Project location	Descriptions
3	48,623m of service pipelines		<ul style="list-style-type: none"> - Total: D63 = 41,166 m; D50 = 7,457 m - HDPE pipes with PN10, PE100 pipes shall be used and connected by hot welding method.
4	5,713 house connections	On the Quyet Thang commune and Tan Thinh ward, Tân Long ward	<ul style="list-style-type: none"> - DN15÷DN40 using class C multi-ray meter, manufactured according to ISO 4064.

II. ENVIRONMENT SAFEGUARD IMPLEMENTATION

A. The EMP compliance monitoring during the first 6 months of the year 2022

8. According to the original contracts signed between the Employer and the contractors, Package TN-CW01 has a contract completion date of September 3, 2021 and Package TN-CW02 has a completion date on December 3, 2021. However, due to the impacts of the Covid-19 pandemic and a number of different subjective and objective reasons (such as: site clearance, adjustment of design documents, interruption of materials supply, limited capacity and qualifications of contractors, etc.), therefore, the contract performance of both packages is behind schedule.

9. After the 3rd contract extension for Package TN-CW01 (the first time until December 31, 2021; the second time to March 31, 2022; the third time until June 30, 2022) and adjust the contract extension for the second time for Package TN-CW02 (the first time to March 31, 2022; the second time to June 30, 2022), now, as of June 30, 2022, both TN-CW01 and TN-CW02 packages have been determined to have completed the contracts and moved to the warranty period. The project has officially operated commercially since July 15, 2022.

10. After June 30, 2022, a number of unfinished items of the project such as: Raw water channel for Package TN-CW01 and service network, connection for households (currently 2,305 households connected only, reaching a rate of about 40.35%) for Package TN-CW02 will be funded from other financing sources.

11. Contractors of package TN-CW01/TN-CW02 were implemented measures to reduce environmental impacts mentioned in uEMP and contractors of TN-CW01/TN-CW02 have solved the problems mentioned in the Report at the end of 2021 (From June 2021 to December

2021). Generally, in this period, the contractors of both packages TN-CW01/TN-CW02 environmental and safety performance are considered generally satisfactory.

B. Summary of potential environment impact and requested mitigation measures

12. At project preparation stage, an Initial Environmental Examination (IEE) including environmental management plan (EMP) was prepared for the project in compliance with ADB's Safeguard Policy Statement (SPS, 2009). The IEE was published on ADB's website in October 2014; and the EMP firstly updated and disclosed in March 2019. In August 2019, the EMP was updated and disclosed by the second time. The main purpose of the second update is to reflect the adjustment for the acquisition of 7.75 hectares of Coc Nui Lake protection forest and 1.916 hectares of production forest.

13. Prior to the construction phase, a domestic EIA was prepared in compliance with Decree No. 18/2015/ND-CP dated 14th February 2015 of the Government regulating the planning on environmental protection, environmental assessment strategy, environmental impact assessment and environmental protection plan and Circular No. 27/2015/TT-BTNMT of the Ministry of Natural Resources and Environment dated 29th May 2015 on environmental assessment strategy, environmental impact assessment. This EIA also includes an uEMP which was appraised by Thai Nguyen DONRE and approved by Thai Nguyen Provincial People's Committee under Decision No. 2535/QD-UBND dated 16th August 2019.

14. During the project preparation phase, the PMU was responsible for ensuring that all EMP requirements are included in the bidding documents and the work Contracts, and followed by the Contractors. In fact, the EMP was provided as a part of the bidding documents of the two work Contracts and the EMP requirements shall be included in the work Contracts. These documents have been submitted to ADB.

15. In December 2020, at ADB's request, the PMU with the support of CSC updated the project's uEMP and published it on ADB's website in May 2021. The newly updated uEMP has added "*Information on construction methods, possible impacts, mitigation measures and construction supervision plan for underground pipelines at road cut-offs of the TN Contract. - CW02*". This is an issue related to the Contractor's construction technique, considered by ADB to be an important bottleneck in the implementation of the Contract TN-CW02, which can have a great impact on the environment and social safety but has not yet been considered in previous project EMP documents.

16. Based on the uEMPs were approved for all components under the Project, table to summary of impacts and requested mitigation measures during construction (Table 2).

Table 2: Summary of impacts and requested mitigation measures

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
Pre-construction phase						
Land acquisition	<ul style="list-style-type: none">- Land acquisition at location of WTP and raw water pump station has been done.- The construction of network pipeline has no land acquisition but temporarily recovery of land is required.	<ul style="list-style-type: none">- The compensation payment will be completed in August 2019; a DDR report was also prepared to confirm the procedures of compensation activities strictly follow the approved resettlement plan.- 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. PMU and consultant team cooperating with the leaders of Phuc Triu commune conducted two public consultations on 26 September 2017 and 23 April 2019. All the AHs were invited to attend. Consulted attendants wanted the project to be implemented as quickly as possible, avoiding project delays.- All the affected households have cooperated with the local authorities and project owner to carry out Detailed Measurement Survey (DMS.)- Mitigation measures: Compensation for land, structures, crops and livestock; Support to stabilize production life; Support for job transition; Support for Vulnerable Aps.- 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">• There are meetings between local leaders with clusters of population, analyzing and resolve any questions before proceeding for compensation.• A notice in writing or on the news or through meetings to individual households about compensation clearance plans.• Calculation exactly amount of compensation and policies adequate compensation of rice and fish shrimp for farmers.• Clearance each part, construction where, clearance there. This is necessary to avoid wasting the people, to avoid traffic jams.	The whole project area	TWACO and Local governments	Local government and community	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
Protection forest acquisition	<ul style="list-style-type: none"> - Degradation of surface water. - Damage of landscape. 	<p>PPC has been aware of forest land acquisition for the WTP and its access road through two Reports made by DARD and Thai Nguyen water company and agreed that the forest acquisition would be complied with the Decree 156/2018/ND-CP issued by Prime Minister dated 16 November 2018 on detail regulation for implementing some items in Law of Forestry.</p> <p>However, during detailed design, some measures will be implemented to avoid the disturbance of the protection forest which are</p> <ul style="list-style-type: none"> - Reduction of tree loss by designing green zones within the WTP where existing trees should be kept for the landscape of WTP - Demarcation of forest to be cleared and remaining area of Protection forest will be clearly defined in the planning scale 1/500 of the Project area - Design of terraces to help slow down erosion - The design of WTP including green zones therein should be sent to Nui Coc lake protection forest management unit for consultation; all comments/concerns of this unit must be addressed adequately in the final design before it is approved. 	Water treatment plant area	Detailed design consultant/ TWACO	Local governments	Yes
		<p>Thai Nguyen water company will implement following measures</p> <ul style="list-style-type: none"> - Integrating the requirement of green zones, demarcation of forest to be cleared and remaining area of Protection forest for preventing soil erosion into the detailed planning scale 1/500 for the Project area; sending a draft of planning to the forest management unit for review before it is approved - Payment of VND 465,000,000 to PFDF for 7.75 ha re-plantation/forestation as a compensation for the forest area lost by the Project (by the end of August 2019). - Payment of the compensation for 8 affected households (by the end of August 2019). - Informing the forest management unit of the project schedule and progress during pre-construction phase - Initiate the monitoring of re-plantation/forestation progress 		Thai Nguyen Water Joint Stock Company (TWACO)	The Nui Coc Lake Protection Forest Management Unit, Local government and Community	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
Unexploded Ordnance removal	- Accidents due to UXO	<ul style="list-style-type: none"> - Demining and removal of unexploded ordnance need to implement at the water treatment plant, raw water pumping station and network pipelines. - PMU will be hiring a specialized army unit to clear UXO before construction commences. 	The whole project area	The specialized army unit	Thai Nguyen Water Joint Stock Company (TWACO)	Yes
Construction phase						
Construction activity in and around the forest area	- Loss of forest	<ul style="list-style-type: none"> - Establishment of barriers, fences to separate the areas for construction sites and the remaining forest area - Education and awareness of workers that the remaining forest area is not to be accessed for any purposes; - No materials to be used from the remaining forest area; 	Water treatment plant area	Contractors	TWACO, supervision consultants and local government	Yes
		<p>Thai Nguyen water company will pay an amount of money calculated based on the acquired area and type of removed trees to Provincial Forest Development and Protection Fund (PFDF) under management of DARD. Cost for the forest re-plantation/forestation is about VND 465,000,000 and the payment will be completed no later than August 2019. This cost will contribute to implement some reforestation projects in 2020 in Thai Nguyen province that are (i) protection and production forest plantation (<i>acacia</i> and <i>michelia mediocris</i> trees for both types of forest with total area of 60 ha) and strengthening forest fire protection capacity of Thai Nguyen province project in Dong Hy and Dai Tu districts; and (ii) forest protection and development in Vo Nhai district which will plant <i>acacia</i> trees on 40 ha of forest. This will ensure no net loss of the protection forest and production forest.</p>	in Dong Hy, Dai Tu and Vo Nhai districts	Provincial Forest Development and Protection Fund (PFDF)	Thai Nguyen Department of Agricultural and Rural Development and local government	Yes
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"> - 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. - Regularly maintenance of construction machines, quality registration and washing machinery complying with manufacturer's requirements. - Provision noise protection equipment for worker; 	The whole project area	Contractors	TWACO, supervision consultants and local government	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> - 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 days. - Local communities must be informed about construction schedules - Using of machinery with periodically quality registration 				
	- Dust and exhaust generation	<ul style="list-style-type: none"> - 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. - 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. - 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. - Setting barriers in the construction site of WTP and raw water pumping station (Phuc Triu commune), fence 2.5 meters in height. - Covering carefully the areas gathering materials and waste. - Machineries, construction vehicles must be ensured in term of registration certificate of environment and technique 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Partial (The TN-CW01 Contractor sometimes didn't wash and brush off the soil attached to the transport vehicle when leaving the WTP construction site).
Flood on construction site by heavy rain	Causing local flooding	<ul style="list-style-type: none"> - Redundancy drainage pump at construction site of WTP and raw water pumping station (Phuc Triu commune). - Dredging canals/trench on construction site of WTP and raw water pumping station (Phuc Triu commune) 	Water treatment plant area	Contractor	TWACO, supervision consultant, local government and community	Partial (The TN-CW01 Contractor sometimes did not dredge the sediments in the drainage ditches around the construction site.

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
						At raw pumping station construction site, the Contractor lacked frequent reinforce and renovate the temporary embankments and dykes to prevent infiltration into the foundation trenches of the intakes and raw water pumping stations, and at the same time arrange pumps with no enough sufficient capacity to dewater)
Excavation activities during construction of raw water pump station and WTP	Land subsidence	<ul style="list-style-type: none"> - Reinforcements must be performed with piles and steel piles at the construction sites for large-size pipelines and with great depths; - In case of incident, construction must be immediately suspended, and repairs and compensation must be made for local people. - Checking the current condition of soil before construction of raw water pump station and WTP - In case of land subsidence, the contractor has to take reinforcement measures immediately 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Yes
Excavate activities and worker camp establish on sites	Water pollution	<ul style="list-style-type: none"> - 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, - Collecting and tidying up waste at the construction site everyday 	The whole project area	Contractors	TWACO, supervision consultant, local government	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> - 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. - Propagating and educating workers about awareness of protecting environment. - 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. - 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) 			and community	
<ul style="list-style-type: none"> • Daily life of workers • Transporting waste and materials • Building the water treatment plant 	Generation of solid waste	<ul style="list-style-type: none"> ▪ Arranging 2 trash bins with a capacity of 200 liters on each construction site ▪ 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 ▪ 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. ▪ 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; ▪ Waste fuel emitted by machinery should be put into a separated tank and should not discharge into the environment ▪ Educating workers' awareness of environmental protection for, the proposing regulations on disposal on building site. 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Partial (The TN-CW01 Contractor did not immediately transport the generated construction waste to the disposal site)
	Generation of Hazardous waste	<ul style="list-style-type: none"> ▪ Arranging trash bins covered and labeled with a capacity of 200 liters to store Hazardous waste. ▪ Ensure that the storage of safe fuels, other hazardous substances under the current law is under the supervision of TWACO. 	Water treatment plant area and TN-CW02	Contractors	TWACO, supervision consultant, local government	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Fuel and other hazardous substances shall be stored in areas provided with roof. Conduct daily records on use of hazardous substance and waste generation Hiring a unit with treatment function as prescribed at Circular no 36/2015/TT-BTNMT on management of hazardous waste 	Contractor Depot		and community	
Mobilizing trucks for waste transportation	Traffic disturbance	<ul style="list-style-type: none"> Placing construction signs, speed limit sign and temporary fence and mobilizing transportation instructors for traffic management at the routes with pipeline construction 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. Barriers around WTP, raw water pumping station construction area At the populated areas such as the area a long 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. Construction materials shall be stored tidily at the required locations. Temporary access shall be provided in along the pipelines which high household density streets at identified above for the affected households; Reinstate access to affected households upon completion of the works items and road surface at the sections need to be excavated by construction activities 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. 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Yes
Construction for installation	Impact on local traffic activities	Applying appropriate technical solutions and construction methods to minimize impacts incurred for four important locations as follows:	TN-CW02 Package	TN-CW02 Contractors	TWACO, supervision	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
of underground pipelines crossing local traffic routes	and social safety	<p>a) For the location of the underground pipeline across National Road NO.3, from pole 4.63A to pole 4.64A: Construction by the method of jackhammering DN600 mm steel pipe across the foundation of National Road No.3 to make a treated water transmission pipeline. (Do not damage the road surface and still ensure normal traffic activities on the National Road No.3 during construction period);</p> <p>b) For the location of the underground pipeline acrossing Hanoi - Thai Nguyen railway, from pole 9A to pole 9B: The contractor will hire a specialized railway subcontractor to construct open excavations through the railway foundation to install precast reinforced concrete pipe DN600 mm on the concrete support as a conduit for treated water transmission pipes (the subcontractor must ensure adequate specialized equipment to ensure</p> <p>c) For the location of underground pipeline across new Bac Son road, from pole 1,181 to pole 1,182: Cooperate with the construction contractor of Bac Son road project to construct open excavation through the under-construction road foundation to install precast reinforced concrete pipe DN1200 mm on the concrete support to make the pipe for treated water transmission pipeline (the road is under construction so there is no traffic vehicle);</p> <p>d) For the location of underground pipeline across new Bac Son road, from pole C5.21 to pole C5.23: Cooperate with the Contractor of Bac Son Road Project to undertake open excavation through the under-construction road foundation for installation of reinforced concrete pipe DN1200 mm on the concrete support to make a treated water transmission pipeline (the road is under construction so there is no traffic vehicle);</p> <p>For underground pipe locations across alleys, urban roads (such as Quang Trung, To Huu, Z115 ...), Provincial roads (No. 267, No. 270, etc.), which will be constructed by open excavation, the following specific solutions are applied:</p> <ul style="list-style-type: none"> - Coordinating with local authorities to fully inform the construction plan to local residents before construction; - Investigating and carefully surveying the systems of underground utility works in the construction area; 	Construction sites		consultant, local government and community	

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> - Adequately arranging barriers, signs, signal lights, and lights for traffic warning; - Arranging personnel to control traffic and organize traffic flow throughout the construction period; - Organizing the construction in the form of rolling and finishing in the shortest time for the underground pipeline segments installed across the roads; - Gathering profound materials, manpower and equipment to carry out the construction during low traffic times (from 22:00 to 5:00 AM) and immediately or temporarily recover the road surface before 5:00 AM to ensure normal daytime traffic in the project area; <p>For roads with wide roadbeds and low daily traffic volume, it is possible to temporarily block ½ part of the roadway for construction. After such construction being completed, recovering the road surface, cleaning up the site and blocking the remaining part of the roadway for construction.</p>				
Focus of workers, accident risks and impacts on dust in construction site	Risk of Occupational and Community Health and Safety	<ul style="list-style-type: none"> ▪ Equipping fully labor protection tools for workers ▪ Training workers in labor safety. ▪ Preparing first aid facilities on the construction site ▪ Ensuring living conditions for workers, preparing camps for workers in the construction site. ▪ Periodically inspecting safety equipment, operation mode of devices. ▪ Direct workers at construction site or operating officials must be trained and practiced proper operation rules when having problems. ▪ Rules and safety warning signs at construction site ▪ Full lighting system if constructing at night ▪ Periodically checking workers' health 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Partial (Many contractors' workers are not conscious of using labor protection tools/equipment during working hours, as: not wearing helmets while working, safety belts when working at height, of when CSC or PMU staff are not present)
	Electrocution	<ul style="list-style-type: none"> ▪ Power lines in offices and construction sites must be safely installed. Power connectors must not be left on the ground and 	The whole project area	Contractors	TWACO, supervision consultant,	Partial (The power lines still run on the

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<p>must have plugs and sockets. Outdoor electrical panels must be securely placed in protective boxes/cabinets;</p> <ul style="list-style-type: none"> ▪ Safety rules must be posted at construction sites; ▪ Warning signs on areas prone to fire and explosion must be installed; ▪ Construction sites must be equipped with fire extinguishers; ▪ Install appropriate lighting system; ▪ Install automatic fire equipment for the whole area; ▪ Install fire extinguishing system inside the wall; ▪ Arrange fire and explosive rescue system; ▪ Inspect the fire and explosive prevention on a regular basis; ▪ Regularly communicate, train officials, workers on fire protection methods; ▪ Design and construct water supply systems with a sufficient storage capacity to ensure the fire prevention and protection in the entire Project area; ▪ 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; ▪ Regularly check the equipment on the probability of fire and explosives such as electrical appliances for daily activities; 			local government and community	ground at some construction sites)
Mobilization of vehicles and machinery	Risk of Occupational and Community Health and Safety	<ul style="list-style-type: none"> ▪ When automobiles are mobilized, brake and safe navigation system must be inspected, transportation vehicles must have wide lights and signboard; ▪ When it is foggy or smoky affecting visibility less than 30m, turn yellow 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; 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> Transportation vehicles to/from the construction sites must not generate dust and mud on the routes. 				
	Public infrastructure encroachment	<ul style="list-style-type: none"> The vehicles for transportation need to be operated with registration load and covered carefully. The contractor does not excavate outside the construction area. Filling soil and ground restore need to be conducted immediately after pipe laying. 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 A plan for possible contingencies will be set up in which there is any broken facilities will be compensated by Contractor if any In case of road is broken, Contactor has responsibility to repair existing condition of the road. 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Yes
Construction activities Concentration of workers and equipment	Social disturbance	<ul style="list-style-type: none"> Avoid prolonging construction: focus on construction, ensure the schedule for the pipeline constructed in section. Coordinating with the local authority to strictly manage with labors from other areas such as staying temporary absent registration procedures. Set up rules on work hours, workers must have the cards to enter the area of the project to facilitate the management Announcing the progress and schedule of construction, aggregating material in the construction area There must be electric lighting on the site Construction materials shall be stored tidily at the required locations. Installation of barriers (temporary fence) at construction areas to prevent people access to the construction site of WTP and raw water pumping station (Phuc Triu commune) 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Partial (The TN-CW01 Contractor lacked arranged guard stations and barriers on the main road to control people entering and leaving the water treatment plant site)

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation). Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority. Educate workers on appropriate behaviour for interactions with local community and risks of communicable diseases 				
Reduce Diseases	Prevention and control of Covid-19	<ul style="list-style-type: none"> - Disseminate workers on the situation of the Covid-19 disease since the first case was discovered in Vietnam. - Provide masks, hand sanitizer for workers and engineers on site. - Strictly implement anti-epidemic measures adopted by the Government of Vietnam during the period of worldwide social distancing. - Remind workers about Covid-19 prevention. - Implement "5K: Masks - Disinfection - Distance - Distractions - Medical declaration". 	The whole project area	Contractors	TWACO, supervision consultant, local government and community	Yes
Operational phase						
Impacts of treatment machinery, pressure affected to wall pipe, broken pipe by external forces	Degradation of input/output water quality	<ul style="list-style-type: none"> 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. Assigning staffs for regularly checking water pipelines and facilities of project; 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; Testing influent raw water and treated water periodically 	Raw water pumping station and water treatment plant area	Project owner (TWACO)	The local authorities	Yes
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>	The whole project area	Project owner (TWACO)	The local authorities	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> - Assigning staffs for regularly checking water pipelines and facilities of project; - 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; <p>Signing and recommendation symbol for people to know what the water pipes go through residential areas to avoid damaging pipes</p>				
Chlorine leakage, electrical short-circuit, lightning	Operational risks (chemical leak etc.)	<ul style="list-style-type: none"> • Need quantitative check of proper concentration of chemicals (chlorine) coming into a tank. • Checking the chemicals storage regularly to avoid chemical leakage into environment • Arranging backup generator • Training operation procedures to entire workers • Labor protection has to be equipped fully • The equipment for fire prevention and fighting such as fire extinguishers and fire hydrant has to be equipped fully • Proposal of fire prevention and fighting measures, gaseous chlorine leakage measures • Chlorine detecting equipment, spays at the chlorine room 	Water treatment plant area	Project owner (TWACO)	The local authorities	Yes
Water treatment activities	Sludge	<ul style="list-style-type: none"> • Dredging periodically, • Shipping disposal in accordance with provincial regulations • Transport vehicles should be carefully covered, not overloaded to avoid spillage of mud on the road through the village causing to unsanitary environment. 	Water treatment plant area	Project owner (TWACO)	The local authorities	Yes
Activities of Operators	Domestic wastewater, solid waste	<ul style="list-style-type: none"> • Arrange barrels at the WTP, pumping station area • Wastewater is treated in septic tank before discharging to environment 	Water treatment plant area	Project owner (TWACO)	The local authorities	Yes
General operation	Fire, Electrocutation	<ul style="list-style-type: none"> ▪ Inspect the fire and explosive prevention on a regular basis; ▪ Regularly communicate, train officials, workers on fire protection methods; ▪ Regularly check the equipment on the probability of fire and explosives such as electrical appliances for daily activities; 	Water treatment plant area	Project owner (TWACO)	The local authorities	Yes

Project Activity	Environmental impacts	Mitigation Measures	Location	Responsibility		Compliance (Yes, Partial, No)
				Implementation	Supervision	
		<ul style="list-style-type: none"> Manage the use of electrical equipment in the offices and operating rooms of WTP properly. Avoid using overloaded electrical equipment that may affect the electrical system of whole works. 				

C. Environment monitoring

17. Monitoring requirements are set out in the uEMPs and summarized in Table 3 below. The Environmental Monitoring Program for the Components would include: (i) monitoring the uEMP compliance, and (ii) monitoring of environmental effects caused by the activities attendant to the execution of works for the project activities with major concentration on construction.

18. Environmental effects monitoring was implemented with major concentration during the construction phase where most of the adverse impacts are projected to occur. It is conducted to evaluate the impacts by the project activities on ambient environmental quality and determine the extent of variations and changes in the levels of pollutants in the environment and other parameters and indicators considering the implementation and operation of the Project. Environmental performance monitoring is conducted to evaluate compliance with the 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 are established and complied with by Contractors during construction phase.

19. Sampling schedules corresponding with construction progress of the two packages are presented in the table below in line with Initial Environmental Examination (IEE)/Environment Management Plan (EMP) and uEMPs approved by ADB in 2019 and 2021.

Table 3: Summary of Environmental Effects Monitoring Plan

Mitigation Measures	Environmental Indicators	Location	Method	Frequency	Reporting	Responsibility		Compliance (Yes, Partial, No)
						Implementation	Supervision	
Construction phase								
Monitoring of dust and noxious fumes	TSP, and meteorological indicators	<ul style="list-style-type: none">- 1 point in Nui Coc WTP- 1 point in No. 270 road (pipeline network).- 1 point in network pipelines (No. 267 road) (pipeline network).	Take air sample for analysis and compare result with related Vietnam Standards QCVN 05:2013/BTN MT	Every quarter in 24 months	Quarterly	Construction Supervision Consultant and Sub-contractor for environmental sampling	Project owner (TWACO)	Yes
Monitoring of noise	L _{eq} , L ₅₀ and L _{max}	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	Quarterly	Construction Supervision Consultant and Sub-contractor for environmental sampling	Project owner (TWACO)	Yes
Surface water quality	pH, TSS, DO, COD, BOD 5, ammonium (NH ₄) by N, nitrite, nitrate (NO ₃ ⁻), Phosphate, Floating oil, Coliform	<ul style="list-style-type: none">- 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/BT NMT)	Every quarter in 24 months	Quarterly	Construction Supervision Consultant and Sub-contractor for environmental sampling	Project owner (TWACO)	Yes

D. Summary of implemented mitigation measure during construction

20. Construction/Contractor EMPs (CEMP) of two packages (TN-CW01 and TN-CW02) were submitted by the Contractors and approved by the Construction Supervision Consultants (CSC). The construction supervision consultant (CSC) had supervised the implementation of environmental and safety mitigation measures of Contractors (TN-CW01, TN-CW02 packages) according to the requirements in the uEMP and their CEMPs. The implementation of the CEMPs is under the responsibility of the Contractors which includes appropriate and timely mitigation measures stipulated in the EMPs. These mitigation measures are to provide the safeguards that will control and reduce unexpected effects during the Project implementation.

21. The Contractor of TN-CW01 package prepared CEMP and submitted to PMU and CSC for approval on 23th July 2020. The Contractor of TN-CW02 prepared CEMP and submitted to PMU and CSC for approval in Sep 2020. The TN-CW01/TN-CW02 Contractors assigned one staff on environmental safeguard and one labor safety staff to ensure implementation environmental mitigation measures of each package. The Contractors has also submitted relevant legal permits/ licenses to CSC. Every month, the Contractors also submits a monthly report on the implementation of measures to reduce environmental impacts of each package.

22. The CSC supported the PMU to prepare the semi-annual monitoring report for the period of January to June 2020 (submitted to ADB for approval in August 2020) and for the period of July to December 2020 (submitted to ADB for approval in March 2021), the period from January to June 2021 (submitted to ADB for approval in September 2021), the period from July to December 2021 (submitted to ADB for approval in March 2022), the last period from January to June 2022 (submitted to ADB in August 2022).

23. During the reporting periods, all violations discovered at the worksites were minor but recorded by the CSC. Contractors were reminded and warned of their violations by the CSC's document and direct reminder. The TN-CW01/TN-CW02 contractors environmental and safety performance are considered generally satisfactory. However, some non-compliances of contractors have been observed by CSC such as there are still some workers who are not fully PPE wearing during working time, the power lines still run on the ground at some construction sites, etc. The contractors had been requested to carry corrective actions to address these non-compliances under supervising by CSC.

24. The following table highlight the contractors' performance and compliance with the EMP requirements for all packages. The construction items under the Project have been completed and these are operating.

Table 4: Summary of Compliance with EMP Requirements (Environmental Performance)

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
TN-CW01	Reducing loss of forest due to construction activity in and around the forest area: - Establishment of barriers, fences to separate the areas for construction sites and the remaining forest area; - Education and awareness of workers that the remaining forest area is not to be accessed for any purposes; - No materials to be used from the remaining forest area;	No			
TN-CW01	Reducing Noise, Dust and exhaust gases and vibration generation from construction Nui Coc WTP; raw water pumping station: - Regularly maintenance of construction machines, quality registration and washing machinery complying with manufacturer's requirements - Local communities must be informed about construction schedules - Using of machinery with periodically quality registration - 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. - On hot and dry days, regularly watering on the transportation routes and on the construction site 2 times per day to reduce dust. - 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 Machineries, construction vehicles must be ensured in term of registration certificate of environment and technique	No			
TN-CW01	Avoid local flooding on construction site by heavy rain: - Redundancy drainage pump at construction site of WTP and raw water pumping station (Phuc Triu commune). - Dredging canals/trench on construction site of WTP and raw water pumping station (Phuc Triu commune)	No			
TN-CW01	Prevention land subsidence due to excavation activities in construction sites of raw water pump station and WTP: - Reinforcements must be performed with piles and steel piles at the construction sites In case of land subsidence, the Contractor has to take reinforcement measures immediately	No			

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
TN-CW01	<i>Prevention water pollution due to excavation activities and worker camp:</i> - 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, - 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. - 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.	No			
TN-CW01	<i>Reduce generation of solid waste from daily life of workers, transporting waste and materials and building the plant:</i> - Arrange two trash bins with a capacity of 200 liters for construction site. - Collect 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 - There has been disposal area at construction site; waste will be transported every day to the disposal areas - Construction waste materials such as broken bricks, concretes, waste steel, soil should be gathered and sorted into groups to process and transport to landfill site;	No			
TN-CW01	<i>Reduce generation of hazardous waste from building the plant:</i> - Arranging trash bins covered and labelled with a capacity of 200 liters to store Hazardous waste. - Equipment/vehicle maintenance and refuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. - Fuel and other hazardous substances shall be stored in areas provided with roof. - Conduct daily records on use of hazardous substance and waste generation.	No	-	-	-
TN-CW01	<i>Management traffic disturbance due to transportation waste, material:</i> - 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. - Barriers around WTP, raw water pumping station construction area	No			
TN-CW01	<i>Reduce risk of Occupational and Community Health and Safety due to construction activities and mobilization of vehicles and machinery:</i> - Equipping fully labor protection tools for workers	No			

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
	<ul style="list-style-type: none"> - Training workers in labor safety. - Preparing first aid facilities on the construction site - Ensuring living conditions for workers, preparing camps for workers in the construction site. - Periodically inspecting safety equipment, operation mode of devices. - Direct workers at construction site or operating officials must be trained and practiced proper operation rules when having problems. - Rules and safety warning signs at construction site - 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; - Safety rules must be posted at construction sites; - Warning signs on areas prone to fire and explosion must be installed; - Construction sites must be equipped with fire extinguishers <p>The vehicles for transportation need to be operated with registration load and covered carefully</p>				
TN-CW01	<p>Reduce Social disturbance from workers:</p> <ul style="list-style-type: none"> - Coordinating with the local authority to strictly manage with labors from other areas such as staying temporary absent registration procedures. - Set up rules on work hours, workers must have the cards to enter the area of the project to facilitate the management - Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority. - Educate workers on appropriate behaviour for interactions with local community and risks of communicable diseases - Installation of barriers (temporary fence) at construction areas to prevent people access to the construction site of WTP and raw water pumping station (Phuc Triu commune) 	No			
TN-CW01	<p>Prevention Covid-19:</p> <p>The Contractor has to prepare Covid-19 H&S risk management plan, integrate it into CEMP, submit to CSC for reviewing and PMU for approval.</p>	No			
TN-CW02	<p>Management of construction site:</p> <ul style="list-style-type: none"> - Informing the local community about the construction plan; - Arranging information boards, rules boards, reflective barriers, signs, warnings... - Limit the scope of disturbances by construction activities. 	No			

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
	<ul style="list-style-type: none"> - Restoring affected infrastructure works. - Ensuring lighting on the construction site. 				
TN-CW02	<p><i>Reducing Noise, Dust and exhaust gases and vibration generation on construction site</i></p> <ul style="list-style-type: none"> - Regularly maintenance of construction machines, quality registration and washing machinery complying with manufacturer's requirements - Local communities must be informed about construction schedules - Using of machinery with periodically quality registration - Transporting vehicles must be covered carefully and before leaving the construction site - On hot and dry days, regularly watering on the transportation routes and on the construction site, especially residential areas of Tan Cuong, Phuc Triu, Phuc Xuan, Quyet Thang, Tan Thinh, and Thinh Dan communes/wards 2 times per day to reduce dust. - Machineries, construction vehicles must be ensured in term of registration certificate of environment and technique 	No			
TN-CW02	Avoiding partial flooding at site due to heavy rains	No			
TN-CW02	<p><i>Prevention land subsidence due to excavation activities in construction sites:</i></p> <ul style="list-style-type: none"> - Reinforcements must be performed with piles and steel piles at the construction sites <p>In case of land subsidence, the Contractor has to take reinforcement measures immediately</p>	No			
TN-CW02	<p><i>Prevention water pollution due to excavation activities and worker camp:</i></p> <ul style="list-style-type: none"> - 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, - 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. 	No			
TN-CW02	<p><i>Reduce generation of solid waste from daily life of workers, and from construction activities:</i></p> <ul style="list-style-type: none"> - Arranged two trash bins with a capacity of 200 liters for construction site. - 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 - There has been disposal area at construction site; waste will be transported every day to the disposal areas 	No			

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
	- Construction waste materials such as broken bricks, concretes, waste steel, soil should be gathered and sorted into groups to process and transport to landfill site;				
TN-CW02	<i>Reduce generation of hazardous waste from building the plant:</i> <ul style="list-style-type: none"> - Arranging trash bins covered and labelled with a capacity of 200 liters to store Hazardous waste. - Equipment/vehicle maintenance and refuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. - Fuel and other hazardous substances shall be stored in areas provided with roof. - Conduct daily records on use of hazardous substance and waste generation. 	No			
TN-CW02	<i>Management traffic disturbance due to transportation waste, material:</i> <ul style="list-style-type: none"> - Placing construction signs, speed limit sign and temporary fence and mobilizing transportation instructors for traffic management at the routes with pipeline construction - At the populated areas such as the area a long 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. - Construction materials shall be stored tidily at the required locations. - Temporary access shall be provided in along the pipelines which high household density streets at identified above for the affected households; - Reinstate access to affected households upon completion of the works items and road surface at the sections need to be excavated by construction activities - 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. 	No			
TN-CW02	<i>Reduce impact on traffic activities and social safety:</i> <ul style="list-style-type: none"> - Apply appropriate engineering and construction measures to minimize impacts arising from the construction and installation of underground pipelines across roads. 	No			
TN-CW02	<i>Reduce risk of Occupational and Community Health and Safety due to construction activities and mobilization of vehicles and machinery:</i> <ul style="list-style-type: none"> - Equipping fully labor protection tools for workers - Training workers in labor safety. - Preparing first aid facilities on the construction site - Ensuring living conditions for workers, preparing camps for workers in the construction site. - Periodically inspecting safety equipment, operation mode of devices. 	No			

Package	Implemented mitigation measures	Pending issues	Requested for follow up actions		
			Requested action	Responsibility	Time
	<ul style="list-style-type: none"> - Rules and safety warning signs at construction site - Safety rules must be posted at worker camp - Warning signs on areas prone to fire and explosion must be installed; - Worker camp must be equipped with fire extinguishers <p>The vehicles for transportation need to be operated with registration load and covered carefully</p>				
TN-CW02	<p>Public infrastructure encroachment:</p> <ul style="list-style-type: none"> - The vehicles for transportation need to be operated with registration load and covered carefully. - The Contractor does not excavate outside the construction area. Filling soil and ground restore need to be conducted immediately after pipe laying. - 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 - A plan for possible contingencies will be set up in which there is any broken facilities will be compensated by Contractor if any - In case of road is broken, Contactor has responsibility to repair existing condition of the road. 	No			
TN-CW02	<p>Reduce Social disturbance from workers:</p> <ul style="list-style-type: none"> - Coordinating with the local authority to strictly manage with labors from other areas such as staying temporary absent registration procedures. - Set up rules on work hours, workers must have the cards to enter the area of the project to facilitate the management - Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority. - Educate workers on appropriate behaviour for interactions with local community and risks of communicable diseases 	No			
TN-CW02	<p>Prevention COVID 19:</p> <p>The Contractor has to prepare COVID19 H&S risk management plan, integrate it into CEMP, submit to CSC for reviewing and PMU for approval.</p>	No			

E. Summary of results of environment affect monitoring

25. Sampling schedules corresponding with Package TN-CW01/TN-CW02 are presented in the Table 5 below.

26. Two packages were monitored for air quality with parameters TPS, NO₂, SO₂, CO, Noise while TN-CW01 package was monitored for both air quality and surface water quality with parameters temperature, pH, DO, EC, BOD₅, COD, TSS, NH₄⁺, NO₃⁻, Cl⁻, Cu, Pb, Zn, Mn, Fe, As, Oil & grease, Coliform.

Table 5: Sampling schedules for environmental monitoring

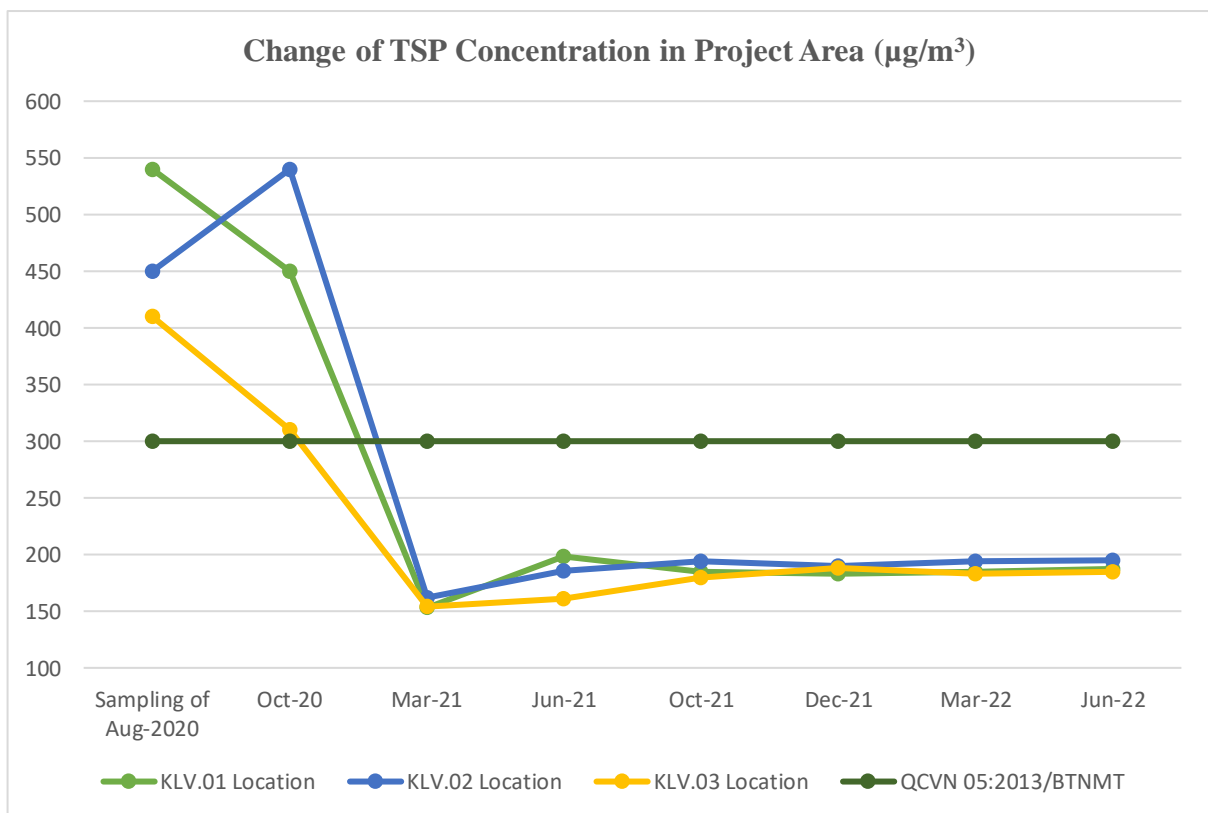
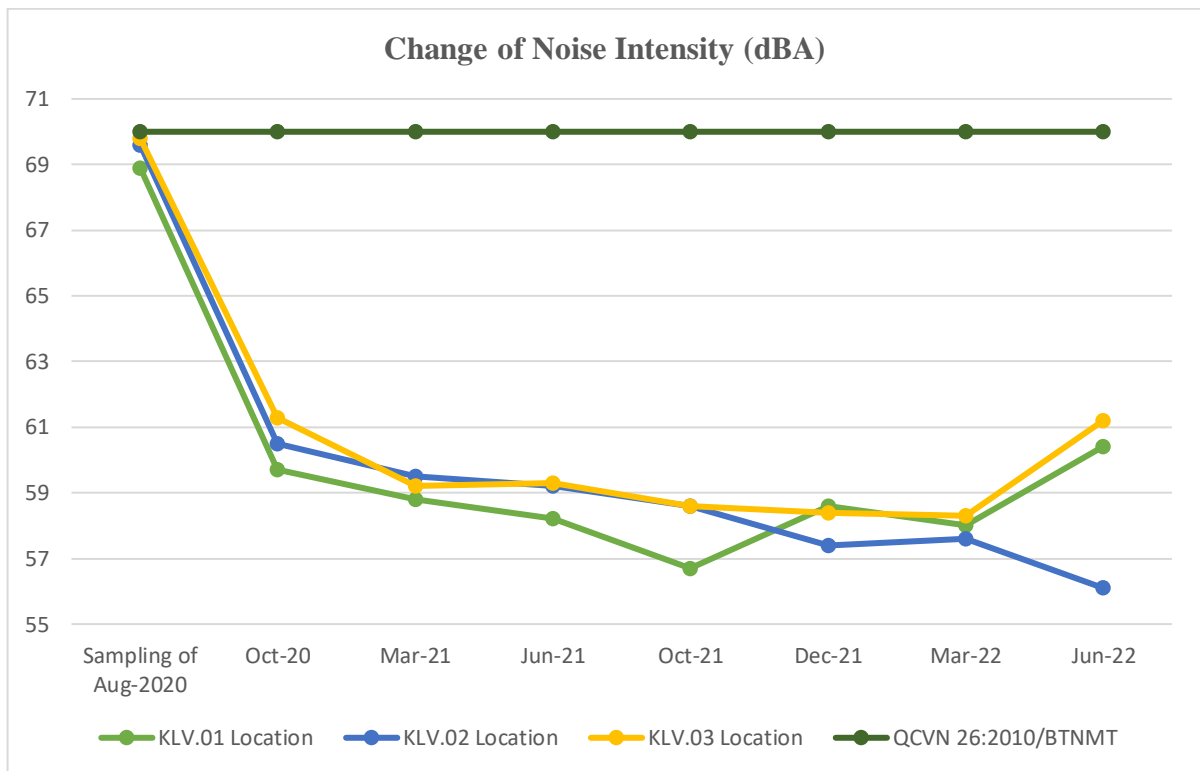
No.	Monitoring day	Package TN-CW01		Package TN-CW02
		Ambient Air, Noise	Surface water	Ambient Air, Noise
1	August 7 th , 2020	1	1	2
2	October 22 nd , 2020	1	1	2
3	March 31 st , 2021	1	1	2
4	June 29 th , 2021	1	1	2
5	September 30 th , 2021	1	1	2
6	December 17 th , 2021	1	1	2
7	March 25 th , 2022	1	1	2
8	June 17 th , 2022	1	1	2

Remark:

27. Air quality, noise: The results show that concentrations of pollutants in ambient air samples (Except for Total Suspended Particles concentration in first two monitoring periods) are all lower than the maximum allowable levels under QCVN 05:2013/ BTNMT - National Technical Standard on Ambient Air Quality. Noise are all lower than the maximum allowable levels under QCVN 26:2010/BTNMT - National Technical Standard on noise (normal areas: from 6 am-9 pm), respectively.

28. Surface water quality: The monitoring results of surface water quality of package TN-CW01 on the project area illustrates that surface water quality was good. Most analysed samples attained QCVN 08-MT:2015/BTNMT - National technical regulation on surface water quality.

29. Graph illustrating the evolution of air quality in the project area through 8 monitoring periods of the project (August 2020, October 2020, March 2021, June 2021) , October 2021, December 2021, March 2022 and June 2022) are shown in figure below.



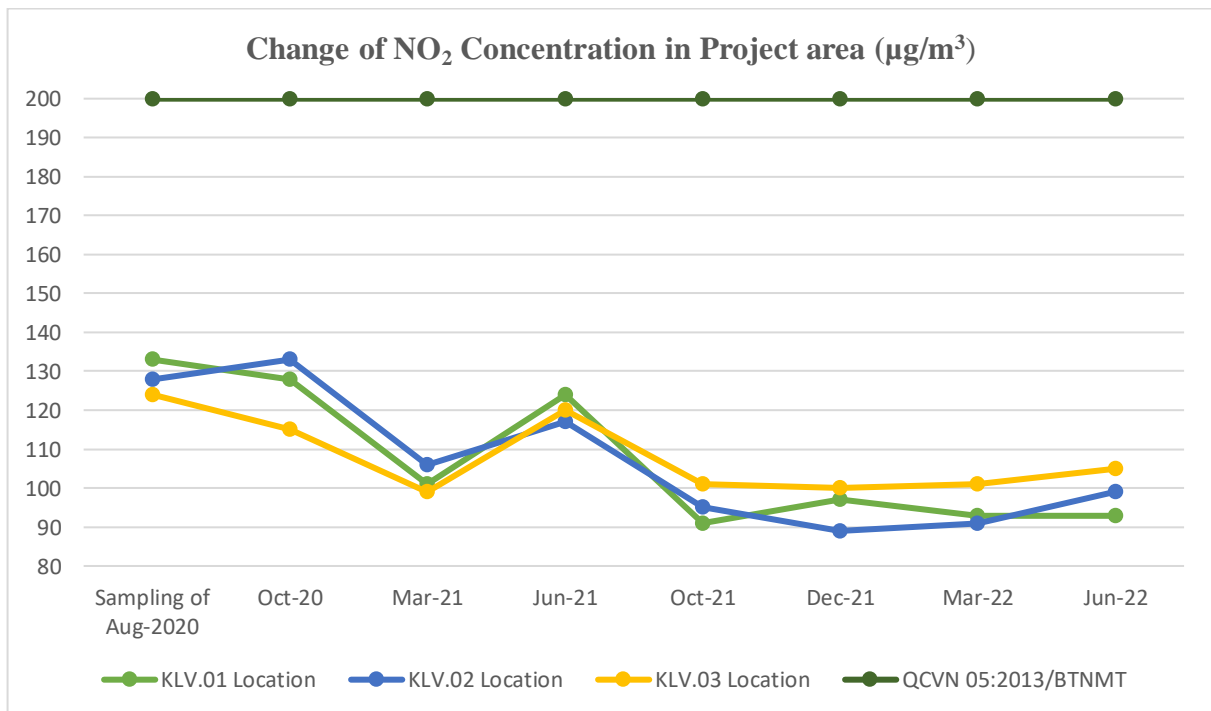
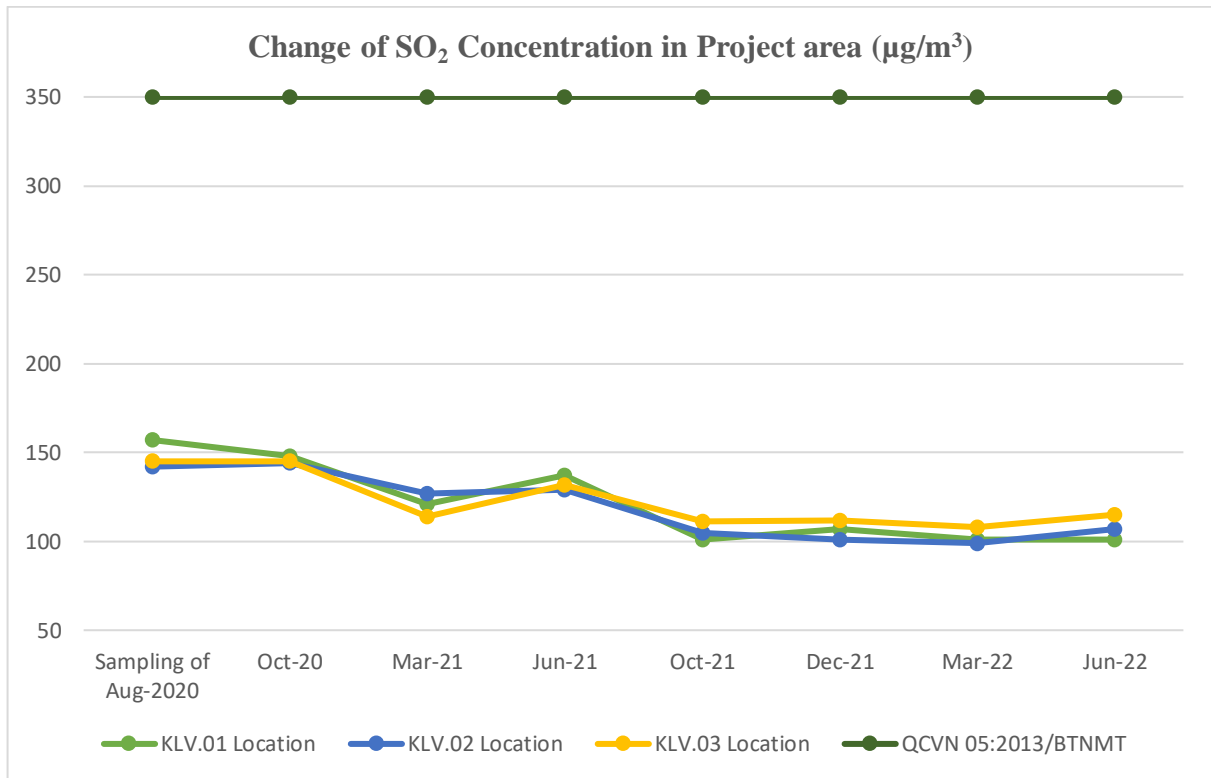
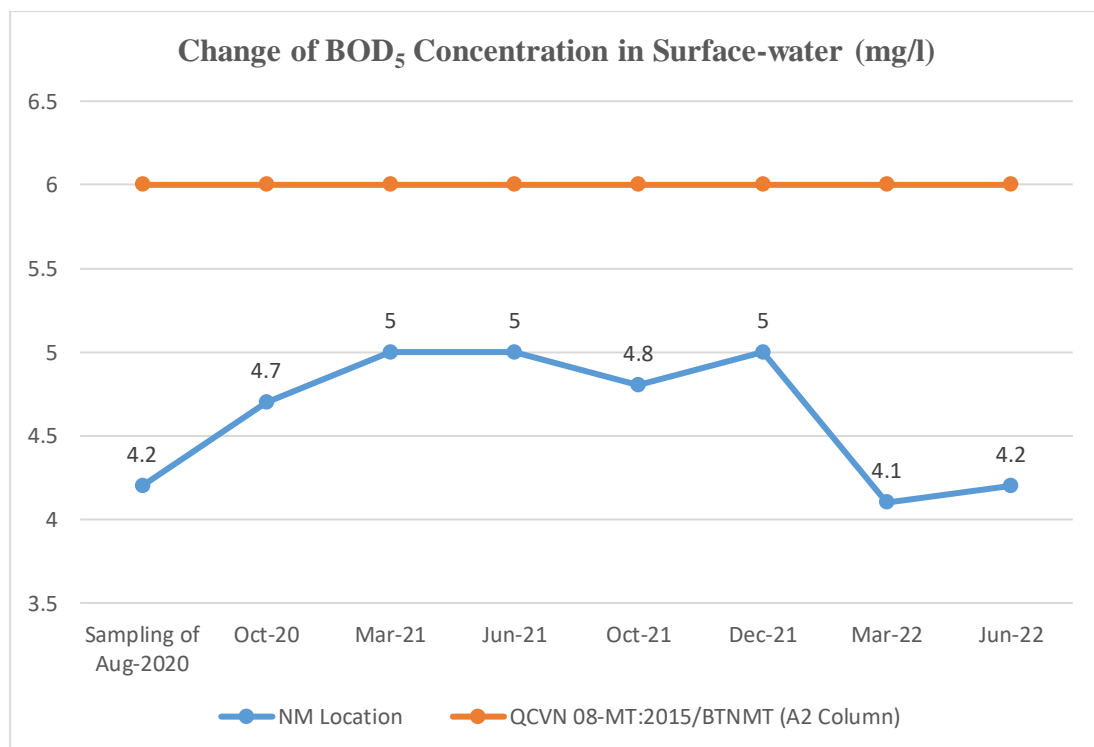
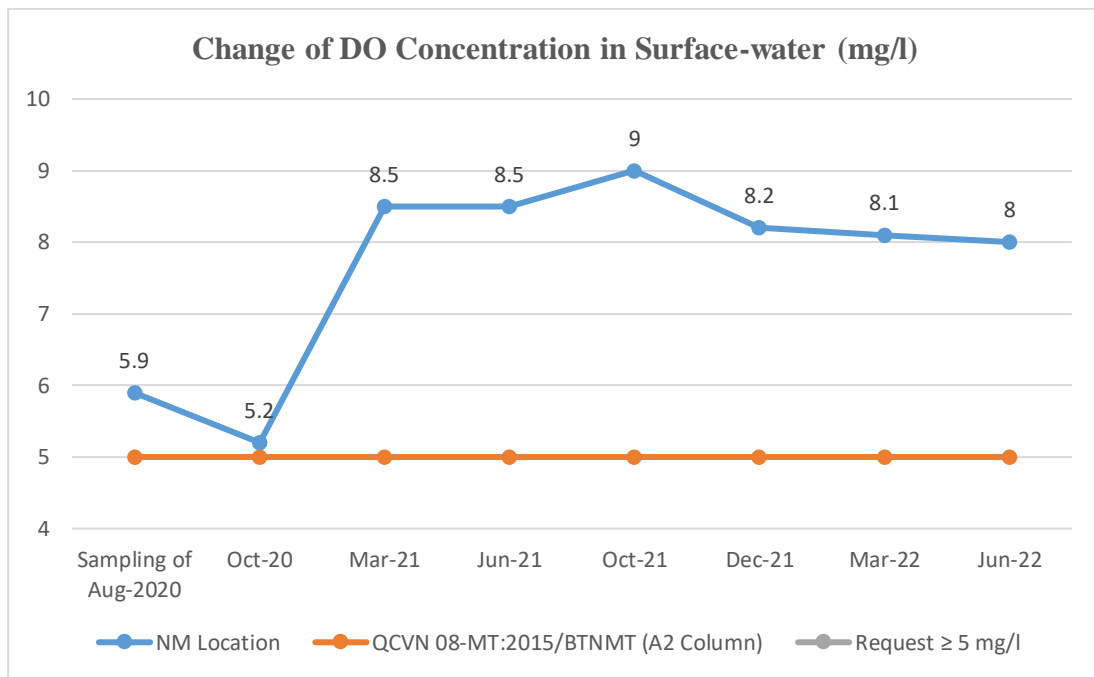
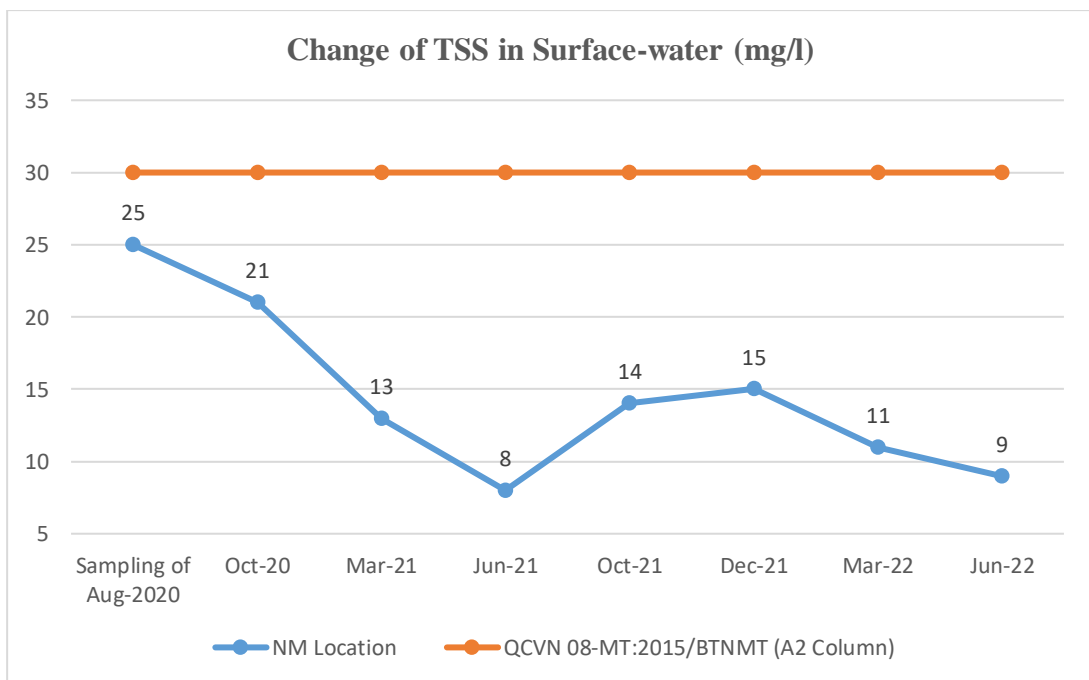
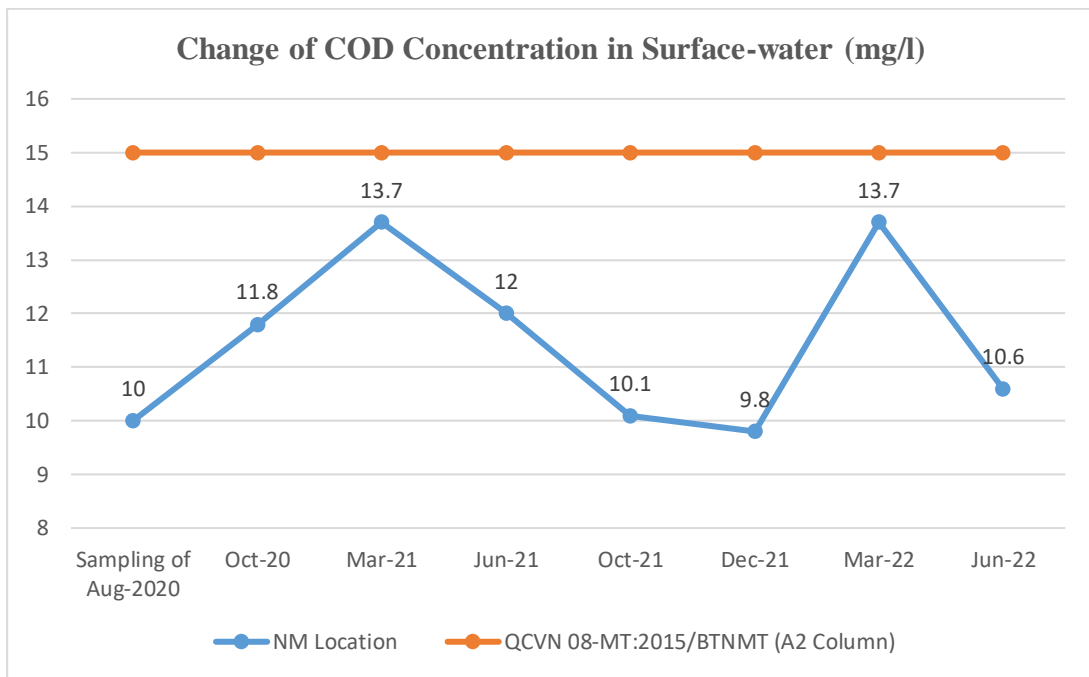
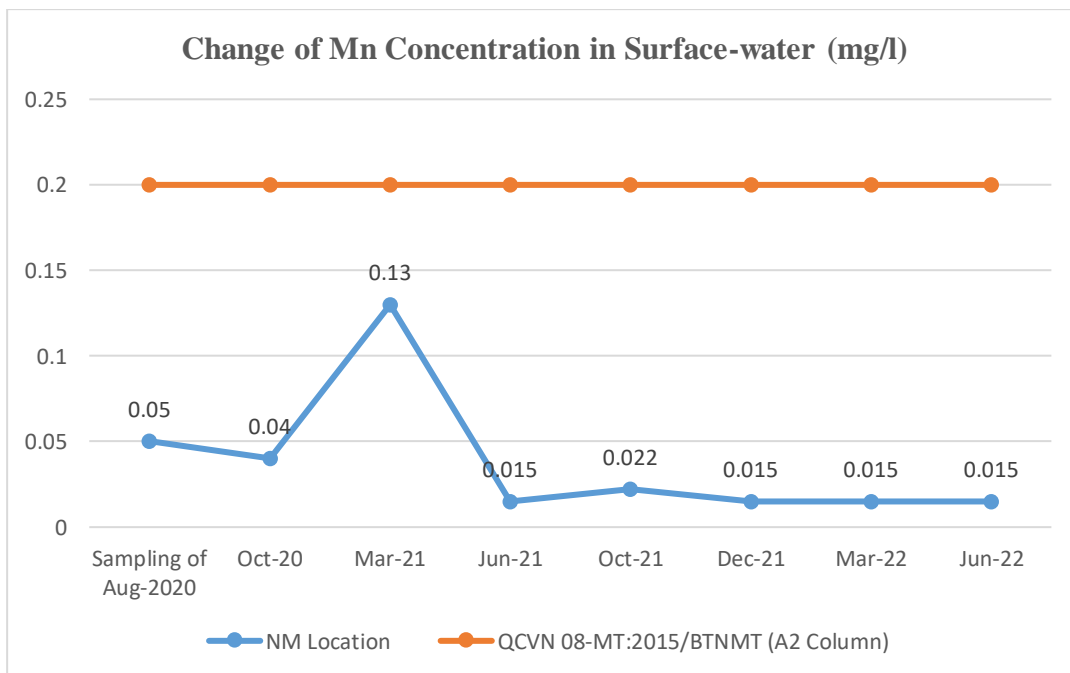
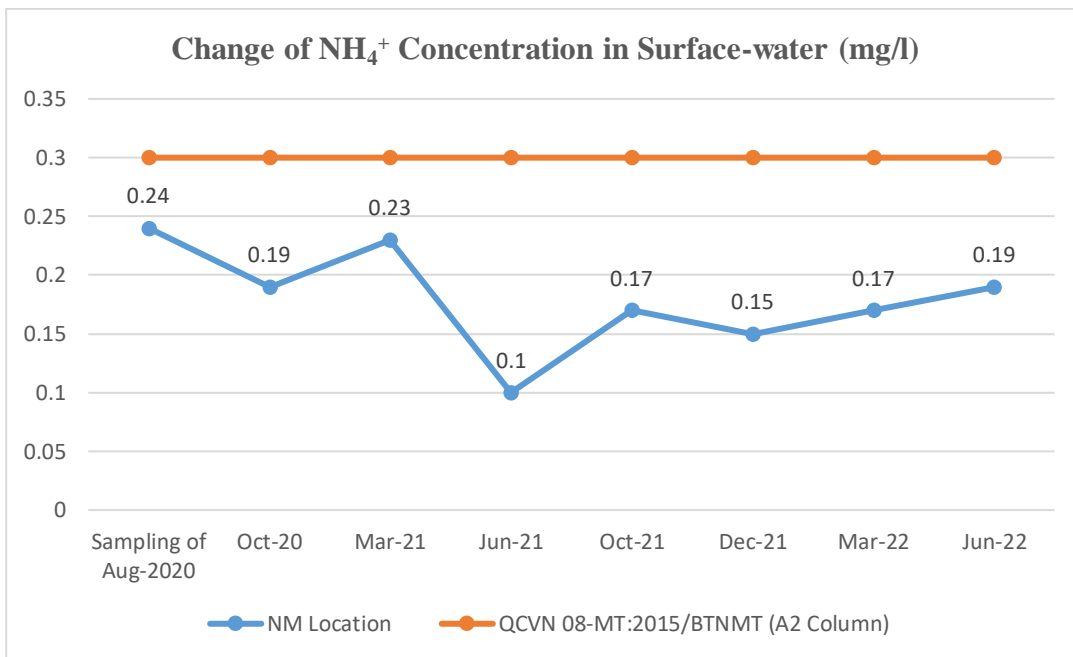


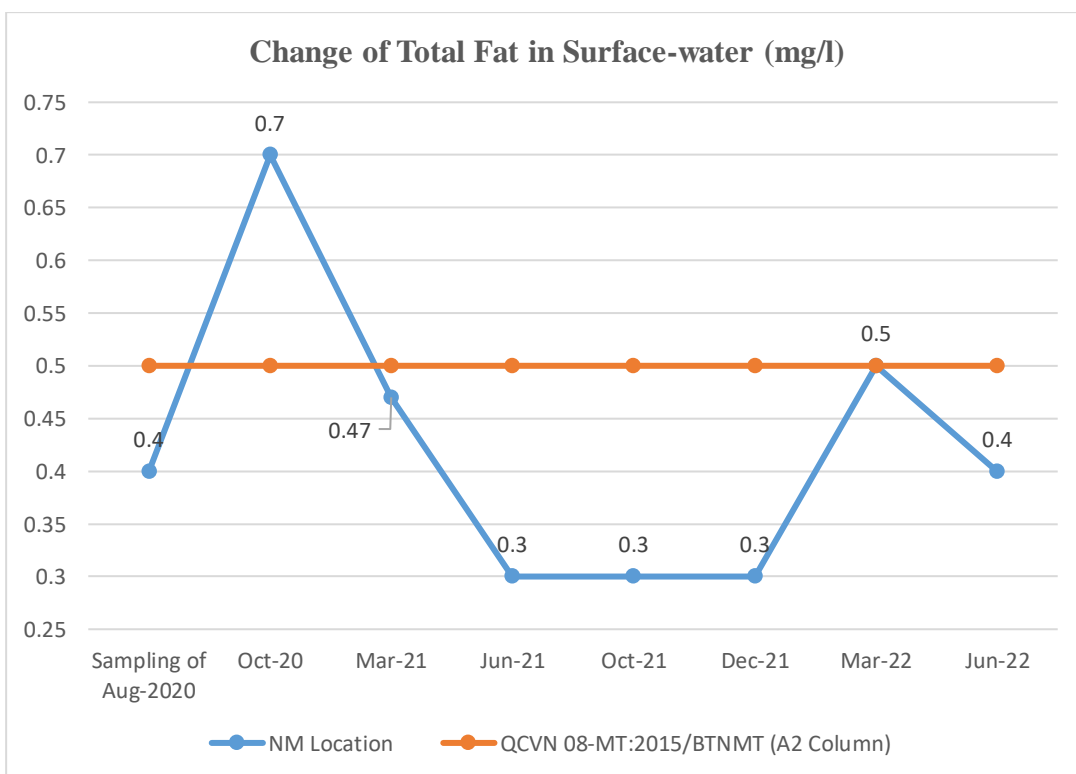
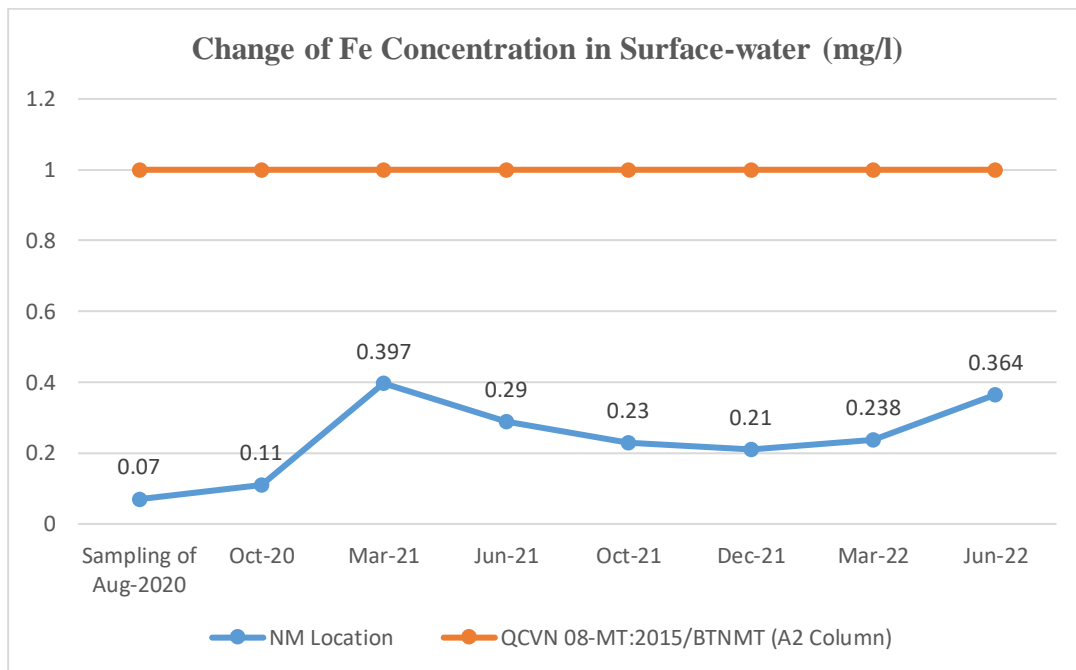
Figure 1. Changes of Air Quality in Monitoring Periods

30. The chart illustrates the evolution of some environmental parameters of Nui Coc lake surface water quality in the implementation area of Package TN-CW01 through 8 monitoring periods of the project (August 2020, October 2020, March 2021, June 2021, October 2021, December 2021, March 2022 and June 2022) are shown in Figure below.









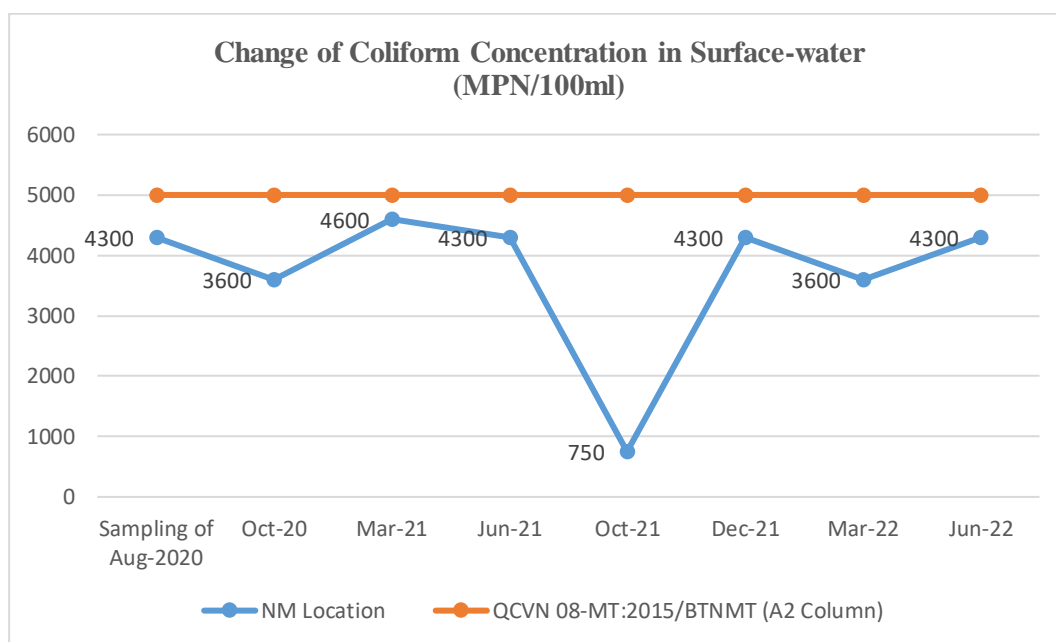


Figure 2. Changes of Surface Water Quality at Different Sampling Points in Monitoring Periods

F. Loan compliance review

31. Results of Compliance with environment and safety requirement setting forth in the Loan Agreement.

Table 6: Review of Compliance with environment and safety as requirement in Loan Agreement

Plan	Index	Agreement	Compliance			Remark
			Y	N	P	
4	7	The Borrower shall cause the EA not to award any works contract for which involves environmental impacts until the Project Executing Agency has: (a) Obtained the final approval of the IEE from the Borrower's Ministry of Natural Resources and Environment; and (b) Incorporated the relevant provisions from the EMP into the works Contract.	√			(a) IEE reports were submitted to ADB for approval in October 2014. The EMP, which was updated the first time based on the detailed design in March 2019 and the second time for the forest acquisition and compensation in August 2019, have been submitted to ADB for approval and disclosure in March and August 2019 respectively; EIA report was approved by Thai Nguyen DONRE in June 2019. (b) The uEMP approved by ADB was included in the bidding documents for TN-CW01 package and is a part of the Contract of TN-CW01 package.
5	7	The Borrower shall cause the Project Executing Agency to ensure that all bidding documents and Contracts for works contain provisions that require Contractors to: (a) comply with the measures and	√			(a) Provision (a) was included in: - Sub-clause 4.18 Environmental Protection under Part B – Specific Provision of bidding document of package TN-CW01 and item 1.9 – Environment Management under General Specification of TN-CW02 package;

Plan	Index	Agreement	Compliance			Remark
			Y	N	P	
		requirements relevant to the Contractor set forth in the updated IEE and the EMP, and any corrective or preventative actions set out in a Safeguards Monitoring Report; (b) make available a budget for all such environmental measures; (c) provide the Borrower with a written notice of any unanticipated environmental or impacts that arise during construction, implementation or operation of the Project that were not considered in the updated IEE and the EMP.				<ul style="list-style-type: none"> - Item 1.9 – Environment Management under General Specification part of Contract construction contract of package TN-CW01. (b) Provision (b) was included in: <ul style="list-style-type: none"> - Item (c) of Sub-clause 4.18 Environmental Protection, part 6.2 Environmental Management Plan under Part B – Specific Provision; item 1. Preamble to Bill of Quantities part Bill of Quantities of bidding document of package TN-CW01; - Item 1.9 – Environment Management under General Specification of bidding document of TN-CW02 package; - Item 1.9 – Environment Management under General Specification part of Construction Contract of TN-CW01. (c) Provision (c) was included in Sub-clause 4.18 Environmental Protection under Part B – Specific Provision of bidding document of package TN-CW01 and item 1.9 – Environment Management under General Specification of TN-CW02 package.
5	8	The Borrower shall cause the Project Executing Agency to make available necessary budgetary and human resources to fully implement the EMP.	√			The budget and human resources for implementing environmental safeguards has been allocated adequately. For example: the cost for reforestation plan was paid as in the approved uEMP in 458.733.051 VND ; the cost for environmental monitoring and sampling is provided in CSC Contract, the CSC has assigned an environmental staff and signed a Contract with FEC Joint Stock Company for conducting sampling program as indicated in the approved EMP; the cost for implementing environmental mitigation measures is provided in Contracts of Contractor of package TN-CW01 and TN-CW02, the Contractor has assigned 02 staffs in charge on environment and labor safety. Besides, PMU assigned a staff in charge of environmental and safety management of the project.
5	9	The Borrower shall cause the Project Executing Agency to do the following: (a) submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant	√			(a) The first Safeguards Monitoring Reports of last 2019 from was submitted to ADB in May 2020 and was disclose in the ADB's website. This report was combined information on environment and resettlement; therefore, all relevant information from the first report was informed to affected people of 3

Plan	Index	Agreement	Compliance			Remark
			Y	N	P	
		<p>information from such reports to affected persons promptly upon submission;</p> <p>(b) if any unanticipated environmental and impacts arise during construction, implementation or operation of the Project that were not considered in the updated IEE and the EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan;</p> <p>(c) report any actual or potential breach of compliance with the measures and requirements set forth in the updated EMP.</p>				<p>communes in the project area. After that, semestral reports for 2020, 2021 and the first 6 months of 2022 were also prepared and submitted to ADB.</p> <p>(b) Since the beginning of the pandemic COVID-19, PMU carried out prevention measures as requirement from the government and guidance from ADB, such as (i) providing hand-washing liquid, masks, check temperature of staff at PMU office, work at home to keep social distance...(ii) requesting CSC and TN-CW01 Contractor and TN-CW02 Contractor to implement prevention measures in construction site as ADB's requirement; (iii) requesting Contractors of TN-CW01 and TN-CW02 to prepare COVID-19 H&S plan as a part of CEMP to submit to CSC/PMU for approval. Result of prevention COVID-19 is mentioned in the first SEMR of 2020, submit to ADB for clearance. At the request of ADB in December 2020, PMU with the support of CSC has updated the uEMP of the project. The newly updated uEMP has added "<i>Information on construction methods, possible impacts, mitigation measures and construction supervision plan for underground pipelines at the road cutting sites of the Contract TN-CW02</i>". This is a matter related to the Contractor's construction techniques, which ADB considers as important bottlenecks in the implementation of the Contract TN-CW02, which can have a great impact on the environment and social safety, but has not yet been resolved. Thoroughly reviewed and mentioned in the updated EMP and uEMP documents in March 2019 and August 2019. The updated uEMP report in December 2020 has been submitted to ADB and is now publicly available on ADB's website.</p> <p>(c) Any actual or potential breach of compliance with the measures and requirements set forth in the updated EMP have been reported in the safeguard monitoring reports prepared by the PMU with the assistance of the CSC that are periodically (semi-annual) submitted to ADB from May 2020.</p>

G. Grievance Redress mechanism implementation

32. The grievance mechanism established since the pre-construction phase of the project is maintained to help ensure that the complaints of affected people are resolved in a timely and satisfactory manner (see in Section 9 of uEMP).

33. This grievance redress mechanism is developed by the Project Management Unit (PMU). Accordingly, the Construction Supervision Consultant (CSC) receives information of violations from the people verbally or in writing and the CSC/PMU will determine whether the violation is minor or serious. For minor violations, CSC will require the contractor(s) to take remedial measures within a certain period of time, monitor and evaluate the contractor's remedial effectiveness, as well as notify the people and get the satisfaction level of the people. Complaints and remedies will be recorded in the contractor's construction site diary.

34. For complaints that are considered as serious violations of contractors, people can submit complaints in 3 stages, starting at the commune level, district level, and provincial level before going to the court as a last measure if the complaint is not satisfactorily resolved by all levels. CSC and PMU are responsible for coordinating with local authorities to request and monitor the implementation of remedial measures.

35. Grievance redress mechanism is communicated to the people through the commune/ward People's Committee and the public broadcasting system of the communes/wards. The PMU has also provided the local People's Committees of communes/wards with information about personnel, means of communication with the personnel directly performing the construction supervision and receiving information from the community by the PMU (Mr. Ma Dinh Ly, contact number: 0945.333.569, email: madinhly@gmail.com) and Supervision Consultant (Mr. Tran Quang Binh, contact number: 0904215956, email: thainguyenwsp.cs2@gmail.com).

36. Construction contractors have also publicly announced in relevant documents sent to the People's Committees of communes/wards and on the signboards of the packages the address to receive complaints, the name of the person receiving and handling complaints and the contractor's community complaint hotline number. For Package TN-CW01, the address to receive complaints is the Contractor's Office located at Voi Phun Hill, Phuc Triu Commune, Thai Nguyen City, the person receiving and settling complaints is Mr. Nguyen Dinh Thang, hotline: 0888.244.286, email: nguyenthang.25292@gmail.com. For Package TN-CW02, the address to receive complaints is the Contractor's Office in Go Moc Hamlet, Quyet Thang Commune, Thai Nguyen City, the person receiving and settling complaints is Ms. Than Thi Thanh Yen, hotline: 0336.615.754, email: thanhyenthanthi@gmail.com.

37. From June 2020, the Community Project Supervision Board of the 3 communes and 1 ward in the project area, Phuc Triu, Phuc Xuan, Quyet Thang, and Thinh Dan was established with the task of monitoring investment efficiency and safety policies. Up to now, all communes/wards in the project implementation area have community project monitoring boards. These community supervisory boards monitor the contractor's activities by visually observing the construction activities on the construction site, the environmental mitigation measures taken by the contractors, site recovery after construction, etc. Besides, the

community monitoring boards also monitor the contractor's activities through receiving complaints from local people.

38. During the implementation of project, no complaints in writing, by email, by phone were recorded in the responsible sections/persons for receiving and handling of complaints from the PMU, the Supervision Consultant and the Contractor's Office for both packages.

H. Lesson learnt from EMP implementation and monitoring

39. The lessons learned are likely to come from the differences between ADB's projects and government's projects such as mainstreaming of EMP into construction and monitoring contracture arrangements; to define focal staffs in charge of environmental issues in the PMU, CSC and Contractors, such as:

- ❖ Clear assignment of the roles and responsibilities of stakeholders in the EMP implementation and monitoring is an important factor in compliance with EMP implementation.
- ❖ For the contractor: the arrangement of full-time personnel in charge of safety, environment and funding for EMP implementation will help in implementing the EMP well.
- ❖ PMU's experience and capacity is also a prerequisite for effective implementation of this project EMP implementation.

I. Conclusion and recommendation.

40. Overall, PMU has complied with the requirements for social and environmental safeguard according to ADB's policy and Vietnamese Government's requirements, including: (i) All quarterly reports including implementation of the Environmental Management Plan were submitted to ADB; (ii) PMU assigned environmental staff; integrated environmental requirement in bidding document and contract with contractor; (iii) approved CEMP of contractors; (iv) monitored EMP implementation; (v) GRM of the project was disseminated in communes, wards in project area; (vi) PMU periodically or irregularly supervises the contractor's activities on the construction, etc.

41. The CSC has completed the environmental management and monitoring roles with no serious complaints related to environmental issues. The CSCs had been (i) regularly monitoring the EMP implementation of contractors according to HSE checklists; (ii) usually visited construction sites, in case an environmental or safety issues were detected; (iii) recorded and required corrective action; and (iv) submitted monthly report on environmental monitoring for each package to PMU.

42. The contractors have implemented the environmental protection measures complied with EMP requirement. The construction activities have not affected traffic in the project area. The noise and dust levels have been lower than those levels in the Viet Nam standards. The construction equipment and vehicles are full of operating licenses and have emission level that

is within the allowable limit. There is no grievance from local people about social and environmental issues and resettlement.

43. Public consultation was also carried out throughout the construction period with main subjects as local people. Majority of the contractors have shown that implementation of the contractors' mitigation measures has been quite good. The PMU, CSCs had requested the Contractors to solve these issues timely and reasonable during the construction phase. There is no pending issue.

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