Initial Environmental Examination

Stage of the document: Final
Project number: 49026-002
April 2017

VIE: Basic Infrastructure for Inclusive Growth in the Northeastern Provinces Sector Project-Construction of Water Supply System in Phu Ngoc Commune, Xuan Hoa Town, Ha Quang District, Cao Bang Province

Prepared by Planning and Investment Department of Cao Bang province for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 27 April 2017)

Currency unit	–	Viet Nam Dong (D)
D1.00	=	$0.000044
$1.00	=	Đ 22,730

ABBREVIATIONS

ADB	–	Asian Development Bank
CPC	–	Commune People's Committee
CSC	–	Construction Supervision Consultant
DARD	–	Department of Agriculture and Rural Development
DONRE	–	Department of Natural Resources and Environment
DOT	–	Department of Transportation
DPC	–	District People's Committee
DPI	–	Department of Planning and Investment
ECT		Emergency Control Team
EIAR	–	Environmental Impact Assessment Report
EMP	–	Environmental Management Plan
EPP	–	Environmental Protection Plan
ESO	–	Environmental Safeguards Staff
ESS	–	Environmental Safeguard Specialist
ESWSC		Environment Sanitary and Water Supply Cooperative
IEE	–	Initial Environmental Examination
LEP	–	Law on Environmental Protection
lpd	–	Liters / person / day
MASL	–	Meters above sea level
MPI	–	Ministry of Planning and Investment
MPN	–	Most Probable Number of viable cells of a pathogen - a measure of water quality
PPC	–	Provincial People's Committee
PPE	–	Personal Protective Equipment
PPMU	–	Provincial Project Management Unit
PPTA	–	Project Preparatory Technical Assistant
ROW	–	Right of Way
SPS	–	Safeguard Policy Statement

The PPTA	–	The Project Preparatory Technical Assistant Consultants
The Project	–	Basic Infrastructure for Inclusive Growth in Northeast Provinces
The Subproject	–	Water Supply System for Domestic Use of Xuan Hoa Town, Phu Ngoc Commune - Ha Quang District, Cao Bang Province
UXO	–	Unexploded ordnance
WTP	–	Water Treatment Plant

WEIGHTS AND MEASURES

Km^2 (square kilometer)	–	unit of length
m^3 (cubic meter)	–	A measure of volume

Note:

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

CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. EXECUTIVE SUMMARY

1. The proposed Basic Infrastructure for Inclusive Growth in the Northeastern Provinces Sector Project (BIIG 1) will invest in the recently completed Four Northeast Provinces (FNEP) Overall Development Plan (2015). The development plan responds to the Government of Vietnam's strategy of targeting the investment into poorer provinces and regions. The use of a sub-regional approach seeks to build the interrelationship between provinces as one of the foundations for accelerating growth in the more remote regions. As such the plan targets investment into outputs that build areas of comparative advantage in a manner that increases the competitiveness of economic activity in the sub-region. The expected impact is to improve socio-economic wellbeing of local communities through the improved financial returns and through lower costs of accessing public health services, education, water supply and markets.

2. The project has four outputs being (i) FNEP road network connectivity improved, (ii) rural water supply improved, (iii) ARVCs in Lang Son improved, and (iv) decentralized public asset management processes implemented.

A. Subproject Summary

3. The subproject "Construction of a Water Supply System for Xuan Hoa Town, Phu Ngoc commune - Ha Quang district, Cao Bang Province" and is an output 2 representative subproject: Improved Rural Water Supply. The Subproject aims to expand water services in the district of Ha Quang, Cao Bang. It’s objectives are to improve public hygiene, improve the landscape and appearance of the urban area, and to improve the health status and living conditions of people living in the town.

4. The project is expected to contribute to sustainable economic growth and to improve the quality of urban life through the provision of accessible, stable and sustainable water supply services. Plateau communes of Thong Nong district and Tra Linh district, Cao Bang province are home to about 30,000 people of ethnic groups, who have had little or no access to clean water supplies for many generations. Currently, Ha Quang district has been able to ensure water supply to the people, but only at an average level of 30 lpd (liters/person/day) and local water shortages still occur. With the goal of increasing the average level of access to clean water for people in the project to 45 liters/person/day sustainably, facilitating hygiene and water safety, reducing the incidence of water related disease, contributing to poverty reduction, and improving people's living conditions, investment in construction is essential and urgent.

5. The scope of the subproject is

- A reinforced concrete intake structure on the right hand side of the stream immediately upstream of the bridge on the road to Na Dam village
- A screened wet well set into the stream bed and equipped with a pair of pumps (pump station)
- Water treatment plant (WTP) - 250m from the pump station
- A pair of gravity mains to Xuan Hoa town and Phu Ngoc commune (transmission pipelines), run alongside the existing road for 4.4km long and 5.5km respectively.
- 100m access road to the WTP starting from the road connecting Xuan Hoa to Phu Ngoc.

6. The project, is classified as Environment Category B, is judged to have limited potential adverse environmental impacts, particularly in relation to pipeline construction activities, access road construction activities and, to a lesser degree, the disposal of sludge from the water treatment plant (WTP). The unavoidable construction impacts are temporary and can be mitigated, whereas adverse impacts related to incorporating grey water in the design of the WTP has minimized the discharge.

7. This Initial Environmental Assessment complies with the laws, decrees and circulars, the national technical standards and national technical standards of Vietnam and the Asian Development Bank (ADB) policy.

B. Environment impacts and mitigations

8. The project has very limited impacts on the natural environment, ecological resources and cultural assets. Most of the likely impacts are common for construction activities such as dust, noise, traffic disruptions, and waste can be prevented or minimized by standard mitigation measures.

9. During operation of the Water Treatment Plant (WTP) upgrading system, it is necessary to ensure that the management of chemical treatment process and new sludge tanks under the design meet the GOV discharge standards and water source protection management, hygiene condition of the WTP in accordance to Circular No.50/2015/TT-BYT[1].

10. In some proposed areas, the project may increase the volume of grey water produced by households receiving new connections. It is recommended that before installing the new water connection in each project area, construction supervision consultants, PMU, and representatives of Environment Sanitary and Water Supply Cooperative (ESWSC) make a general inspection to confirm that there is a combination of drainage system and WTP in the central area of Xuan Hoa town and Phu Ngoc commune to be able to handle the increased grey water load. On the other hand, they will identify additional works to be carried out by the drainage system and / or the local community before the new connection is made.

11. The EMP for the subproject includes mitigation measures and monitoring processes to manage and assess the expected and unexpected impacts of this project. The EMP also specifies responsibilities for implementation, and capacity development and training requirements of ESWSC and the appointed PMU to monitor the implementation of the EMP. The implementation of the EMP will require assistance from an environmental specialist (ESS), and a construction supervision consultant (CSC) to take part in the audit work of the EMP.

C. Information Disclosure, Public Consultation, and Grievance Redress

12. According to Vietnamese law, for a water supply facility with a capacity less than 50,000 m^3/day, it is not necessary to prepare an Environmental Impact Assessment Report (EIA) including public consultation but in accordance with the ADB Safeguard Policy Statement, for category B subprojects, it is necessary to conduct public consultation. As such, consultation on option of construction of WTP, technology processes, water supply alternatives, etc. is essential as a part of actual survey in project preparation. Public information and consultation activities were carried out as part of a baseline survey of local environmental conditions along the projects sites. Meeting with

[1] Circular No.50/2015/TT-BYT dated 11 December 2015 of the Ministry of Health, providing for the inspection of drinking water and domestic water's sanitation and quality

local authorities took place on 16 September 2013. A public meeting was held in Xuan Hoa town center on 19 September 2016.

13. During the consultation on environmental matters, local leaders and members of some households were given an introduction to the project, anticipated environmental impacts and mitigation measurements, the project implementation schedule and relevant environmental issues. Overall, there was no opposition raised with respect to the proposed subproject.

14. A three-step grievance redress mechanism will be established for the subproject common to social as well as environmental safeguards to handle environmental impacts and land occupation. As a guideline, any complaints about any subproject's activity will be solved through negotiation to get agreement. Complaints will be submitted toward 3 levels of entities: First through commune/ward's PC, then the Town's PC and finally through PPC. If an agreement was not reach, then they will be law court as the final method. Environment Sanitary and Water Supply Cooperative (ESWSC) will bear all administrative and legal cost arising in such complaint solving processes in the operation phase.

D. Institutional arrangement

15. Cao Bang DPI has established an Official Development Assistance (ODA) Project Management Unit (PMU) and assigned relevant staff to support the preparation of the subproject in the PPTA period. One member of the PMU has been assigned as the Environmental Safeguards Officer (ESO). Two staff, including the ESO, have been participating in a training course on "Fundamental Safeguard and Gender Safeguard Policy Statement (SPS) of ADB" under TA8902-VIE Capacity Building for Project Management Unit Professionalization - organized by ADB in August 2016. The ESS will organize a formal training course and on-the-job training for relevant PMU staff, the CSC, communities, and contractors; and will provide support for establishment and operation of the subproject environment management system in the construction phase. The ESS will also support PMU's capacity building by reviewing and evaluating the capacity for environmental protection of the PMU and ESWSC – subproject management organization in the operation phase.

16. To ensure that environmental protection and mitigation measures are included in the civil works contracts, the EMP will be included in the bidding documents and civil works contracts. Any omission of environmental management costs will create high risks for implementing mitigation measures during the construction phase due to lack of resources and capacity, thus the environmental protection cost and responsibilities need to be involved from the beginning. Bid documents will also specify that contractors shall engage capable and trained staff to take responsibility for the environmental management and safety issues at the working level and to monitor the effectiveness and review mitigation measures as the subproject proceeds.

E. Conclusion

17. The IEE concludes that the feasibility study of the subproject combined with available information is sufficient to identify the scope of potential environmental impacts and formulate mitigation measures for the subproject. Providing that significant changes to the subproject description do not occur at the detailed design phase, and that new sensitive environmental, or cultural resources are not encountered, further detailed environmental impact assessment (EIA) is not required. In case of any change in the subproject design, the ESS will update EMP in accordance with changes in design, if any.

Figure 1 – General Map of Cao Bang and Subproject Area

II. BACKGROUND

A. Objectives of the Subproject

18. The objectives of the subproject will be achieved through upgrading the water supply system, providing greater access to clean water, especially for people in the remote areas, including poor households. Specifically, including Water supply system for domestic use for Xuan Hoa town, Phu Ngoc commune, Ha Quang district.

19. The subproject is initially categorized as 'B' for environmental safeguards, and this IEE is required according to the ADB Safeguards Policy Statement (SPS) of 2009. The objectives and scope of this IEE are to (i) assess the existing environmental conditions in the vicinity of the subproject road; (ii) identify potential environmental impacts from the proposed water supply system subproject; (iii) evaluate and determine the significance of the impacts; (iv) develop an environmental management plan (EMP) detailing mitigation measures, monitoring activities, reporting requirements, institutional responsibilities and cost estimates to address adverse environmental impacts; and (v) carry out public consultations to document any issues/ concerns that stakeholders may have on the subproject and to ensure that such concerns are addressed in the subproject design and mitigation measures.

III. POLICY AND LEGAL FRAMEWORK

20. The subproject shall comply with requirements of ADB SPS 2009 and the GOV's Guidelines on Implementation of the Law on Environmental Protection 2014. Decree No. 18/2015/ND-CP has detailed information on environmental protection assessment, environmental impact assessment and environmental protection plans. However certain activities commonly associated with infrastructure subprojects such as quarry operations, extraction of gravel, etc., will also require permission from the relevant provincial level authorities.

A. ADB SPS requirements

21. The ADB safeguard policy statement (SPS) 2009 imposes safeguard requirements for all projects. The SPS 2009 clarifies the rationale, scope and contents of the environmental assessment. It emphasizes environmental and social sustainability in progress of economic growth and poverty reduction in Asia and the Pacific, with the following aims:

- Avoid adverse impacts of projects on the environment and affected people, where possible;
- Minimize/mitigate and/or compensate for adverse impacts on environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks

22. For environmental safeguards, the subproject is initially categorized as 'B'. A subproject that would be classified as category A on environmental safeguards would be ineligible as a BIIG 1 subproject.

B. Legal and Administrative Framework for Environmental Protection in Vietnam

23. The subproject has to comply with the environmental legal framework of Vietnam, which is outlined in this section. The main components of the framework, if not, the more applicable ones are shown here.

1. Laws

- Law No. 55/2014/QH13 of 23 June 2014 by the National Assembly on environment protection
- Law No. 17/2012/QH13 of 21 June 2012 by the National Assembly on water resources
- Law No. 20/2008/QH12 of 13 November 2008 by the National Assembly on Biodiversity Conservation
- Law No. 68/2006/QH11 of 29 June 2006 by the National Assembly on standards and technical regulations

2. Decrees and regulations

- Decree No. 18/2015/ND-CP dated February 14, 2015 on environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plans.

- Circular No. 27/2015/TT-BTNMT dated May 29, 2015 on strategic environmental assessment, environmental impact assessment and environmental protection plans.
- Circular No. 50/2015/TT-BYT dated 11 December 2015 of the Ministry of Health providing for the inspection of drinking water and domestic water's sanitation and quality.
- National Technical Regulations on air and noise quality
    - QCVN 05: 2013/BTNMT on ambient air quality
    - QCVN 26: 2010/BTNMT on noise
    - QCVN 27: 2010/BTNMT on vibration
- National Technical Regulations on water quality
    - QCVN 01: 2009/BYT on drinking water quality
    - QCVN 02: 2009/BYT on domestic water quality
    - QCVN 08: 2008/BTNMT on surface water quality
    - QCVN 09: 2008/BTNMT on underground water quality
    - QCVN 14: 2008/BTNMT on domestic wastewater

3. Other legislation applicable to the subproject are the following

- Decision No. 3733/2002/QD-BYT of 10 October 2002 by the Ministry of Health promulgating 21 labor hygiene standards, 5 principles and 7 labor hygiene measurements
- Law No. 50/2014/QH13 of 18 June 2014 by the National Assembly on construction
- Circular No. 22/2010/TT-BXD of 03 December 2010 by the Ministry of Construction on labor safety in work construction
- Law No. 10/2012/QH13 of 18 June 2012 by the National Assembly on labor code.

IV. PROJECT DESCRIPTION

A. The need for subproject

24. The proposed water supply scheme is the water supply system for Phu Ngoc commune and Xuan Hoa town to deliver 2,000m^3/day to supply 2,173 households (Cao Bang PDO). Household demand is high with population growth leading to Xuan Hoa commune being upgraded to a town in 2007. Consumers have no confidence in the quality of water and have been sourcing water from mountain streams and also from a private water supplier (Pac Bo) through bottled water. Some have switched to shallow wells however these have been drying up after 1-2 years. The general location of the proposed Water Treatment Plant (WTP) and the pipe system is shown in Figure 2.

25. Currently the subproject area only has partial water supply coverage. The scheme supplies only the centre of Xuan Hoa town, water quality is poor, and the supply is intermittent. Water is abstracted from the Bang Giang river adjacent to the district hospital and pumped to treatment works close by in Mai Nua hamlet were it undergoes some rudimentary treatment before distribution. The water treatment works were built in 2001 and since 2007 has been managed for the DPC by the ESWSC. The ESWSC is responsible for the operation of the assets and it is unclear if the assets are vested in the cooperative or not.

26. The treatment plant supplies partially treated water to about 130 households in Xuan Hoa town, which is way less than the original design number of 300 households. Water is pumped through a pressure main up to an adjacent service reservoir from where gravity feeds the distribution network. Delivery to each household is through a metered household connection to a point located typically inside the property boundary. There are a number of small-scale privately operated water supplies installed by the beneficiaries using springs and tanks. These prove sufficient during the rainy season but most dry up or become polluted when the rain season ends.

27. The existing water treatment plant is located in Mai Nưa hamet and the intake and raw water pumping station are located in Na Dam hamlet, Phu Ngoc commune, approximately 1,300 m away from Xuan Hoa town. The treatment plant occupies an area of about 5,000 m² and water charges are only collected from about 130 households. The works are in a very poor condition and there are serious weaknesses in O&M. Lack of pressure in the gravity delivery main means that households located at higher elevations cannot be served. In-migration to Xuan Hoa town from the surrounding communes is increasing demand, however demand is stated in terms of 24-hour supply of potable water.

28. The current pumping station is dilapidated however the pumps are in moderate to good condition due to the fact that they are idle for long periods of time, the water storage and treatment facility (settling tanks, filtering basin, fresh water storage) is located on a flow hill above the General Hospital of Ha Quang district and has insufficient space for the required expansion and works.

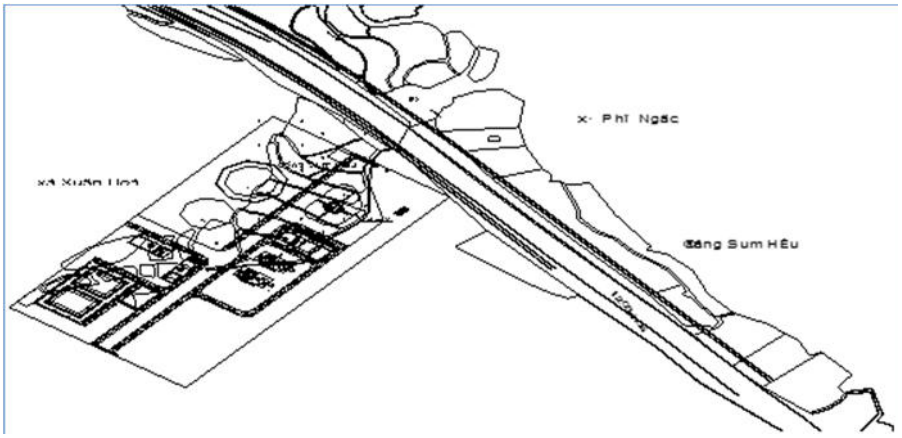


Figure 2 - Sketch map of the subproject works

29. Alternate water sources area available and offer significant operational advantages including water reliability, water quality and elevation enabling a gravity-based distribution that reduces the pumping costs currently incurred.

B. Location and scope

30. The location of the alternate supply is the Na Dam stream, Phu Ngoc commune about 6km southeast from Xuan Hoa town and about 20km from Cao Bang city in the Northeast direction. Water source shall be taken from Na Dam stream, according to the rapid inspection of the PPTA with Na Dam village the Na Dam stream originates from 3 underground water source. Water source is strong with high cleanness, continuous flow with an average flow depth of around 1.2m.

31. Construction of the Water Supply System for Domestic Use of Xuan Hoa Town, Phu Ngoc Commune subproject

- Construction of intake; 4.4 km and 5.5 km transmission pipe to Xuan Hoa town and Phu Ngoc commune respectively;
- Construction new WTP supply for the demand of 2,000 m^3/day;
- Gravity water supply delivery main 48 k
- Construction period 12 months

32. A reinforced concrete intake structure will be constructed on the right hand side of the river immediately upstream of the bridge on the road leading to Na Dam village. The riverbank is stable and rock is close to the surface allowing the structure to be located on a sound foundation. A screened wet well set into the river bed and equipped with a pair of pumps (one standby and one duty) will abstract and pump water about 250m up to a new treatment works to a ridge between Xuan Hoa town and Phu Ngoc commune. This will involve the construction of an access road, which will follow an existing forestry track on a steep 100m alignment. After treatment, water from the clean water tank will deliver water to the beneficiaries through a pair of gravity mains to Xuan Hoa town and Phu Ngoc commune. Both mains will run alongside the existing road for 4.4km long and 5.5 km respectively.

33. The need to site the new treatment plant with sufficient elevation to use a gravity system the recommended location will need an access road of about 100m starting from the road connecting Xuan Hoa to Phu Ngoc. The feasibility study fieldwork has proven the suitability of

the selected alignment (vertical and horizontal). A preliminary assessment of the geological and geotechnical characteristics has been made which indicates that the soils are stable and present no unforeseen challenges. At the detailed design stage further site investigations (trial pits and soils testing) will needed to confirm this initial assumption.

34. The water distribution pipelines will run alongside existing roads to minimize disruption and avoid compensation costs. They will transition down from large to small diameters and ultimately provide a metered house connection to each household. Valves and controls along the pipeline will control flows, quantify losses, and allow sections of the network to be isolated when a breakage or essential maintenance work is required. Where the pipeline crosses bridges or similar structures the pipeline will be in galvanized steel. Other than in situations where pipeline safety is threatened the pipe material will be HDPE or HDPE depending on the design application. The existing pipeline network serving Xuan Hoa town should remain in usable condition until 2030.

In details

- Location of the WTP: The WTP will be constructed in Na Dam village, Phu Ngoc commune, Ha Quang district - about 6km Southeast from Xuan Hoa town. The layout of the WTP is showed in the Figure 3 below:

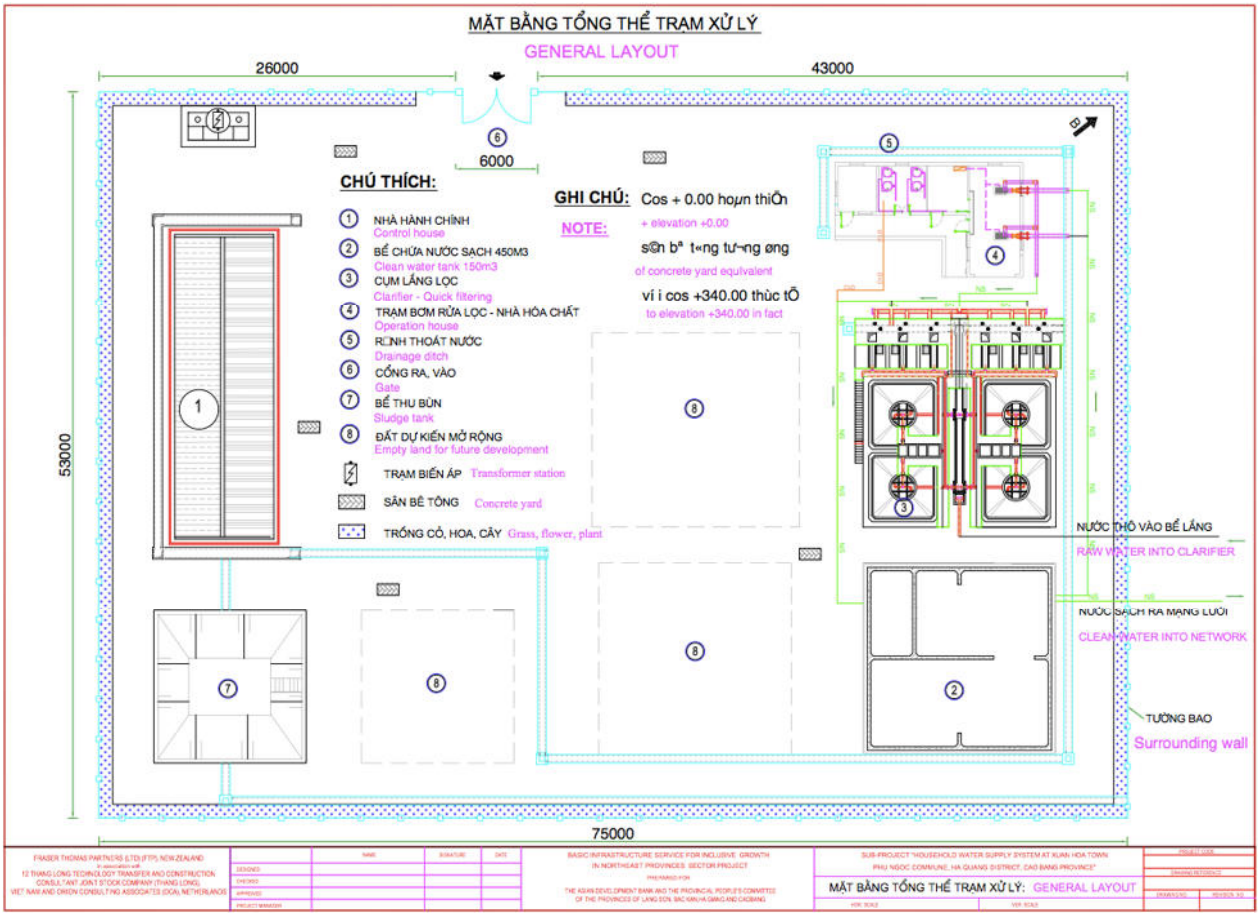


Figure 3 – Layout of the Water Treatment Plant

- Total investment capital: $ 2.310 mil USD; of which:
- Duration of the project: 2017 - 2018 (12 months)
- The estimated cost of the subproject is showed in the below table:

Table 1 - Subproject cost estimates

Summary of Xuan Hoa & Phu Ngoc Subproject Costs ex Tax			
No	**Cost items**	**Đ mil**	**$'000**
1	**Construction costs**		
	Materials	23359	1045
	Labor	8556	383
	Equipment	3167	142
	Subtotal	**35082**	**1570**
2	Equipment costs	591	26
3	Management costs	609	27
4	Consultancy	3300	148
5a	General costs and training	1115	50
5b	Contract Management	337	15
6	Peripheral electricity costs	909	41
7	Land compensation	708	31
8	Contingency cost	4285	192
	Tax (10%)	4707	211
	Total	**51644**	**2310**

Source: PPTA Consultant Estimates

35. The distribution system is planned as a single network delivering water from the new WTP. The new system will only utilize the services pipeline and meters from the existing system. A bulk transmission pipeline will be installed to link the new WTP with the distribution network.

36. The bulk transmission pipeline will be the networks backbone and will be installed to create a completed network to transfer water effectively to the service area of Xuan Hoa town and Phu Ngoc commune (except some remote villages including Nooc Mo and Lung Giang villages in Phu Ngoc commune).

V. DESCRIPTION OF THE ENVIRONMENT

A. Natural Conditions

1. Topography, Geology, and Soils

37. Cao Bang has a complex topography with an average elevation of 300m above MASL, gradually going down from North to South and from West to East. The highest point is the summit of Phia Oac Mountain in Nguyen Binh district with a height of 1,931m MASL. The topography of Cao Bang is divided in three main types: (i) a geosyncle depression in the central area of the province; (ii) hills formed from sedimentary deposits; and (iii) limestone karst. The karst area runs from the North, along the Vietnam - China border line to the South East part of the province. It is concentrated in Ha Quang, Tra Linh, Trung Khanh, Thong Nong, Ha Lang, Quang Uyen and Phuc Hoa districts. The subproject area is largely located inside this karst area in Ha Quang districts. Terrain in this karst area of the province is characteristically steep, with 75% of slopes steeper than 25^0.[2]

38. The soil of Cao Bang is divided in 3 main groups, with 24 types in total. These are high mountain soils, found over 900m MASL; hill soils on steep terrain below 900 MASL flat-valley soils hill soils with a typical yellow-red color. The predominant type in the subproject area is the hill soils.

39. The hill soil group is developed on low hill, or corrugated terrain. It features accumulated iron and aluminum compounds which result in the typical yellow red color. The soil is derived from basic and ultrabasic igneous parent rock and makes up around 47% of the total soil area of Cao Bang, while that derived from metamorphic rock such as gneiss makes up around 30%. [3]

40. The subproject area includes Xuan Hoa town and Phu Ngoc commune, Ha Quang district, shown in Figure 1Figure 4 below. The location is described as follows:

- Bordering with Truong Ha, Keo Yen, Van Dinh, Thuong Thon, Van Dinh communes, Ha Quang district to the North
- Ma Ba, Ha Thon communes, Ha Quang district to the East
- Nam Tuan, Dan Chu communes, Nuoc Hai district and Dao Ngan commune, Ha Quang district to the South
- Quy Nhan, Na Sac communes, Ha Quang district to the West

[2] Status of Environment report (SOE) of Cao Bang province 2015 - Prepared by Cao Bang DONRE 2015 http://tnmtcaobang.gov.vn/index.php?language=vi&nv=dltnmt&op=Du-lieu-ve-moi-truong/Bao-cao-hien-trang-moi-truong-theo-dinh-ky

[3] Cao Bang Electronic Portal - http://dukhach.caobang.gov.vn

Figure 4 - Subproject Location

2. Weather, natural disaster and climate change

41. Cao Bang has a tropical monsoon climate with two separated seasons in the year: a hot season with plentiful rainfall lasting from April to October and a cold season with less rain from November to March. The annual average temperature varies from 19.8^{0}C to 21.6^{0}C. In the summer months, the average temperature varies from 25^{0}C to 28^{0}C while in the winter months it varies between 14^{0}C to 18^{0}C. The average number of hours of sunshine in a year is 1,300 - 1,400, which is not distributed evenly over the year.

42. The annual average rainfall for the province as a whole is from 1,450 to 1,600mm. The rainy season (also the hot season) makes up 70-80% of the year. The driest period is between December to March of the each year. Rainfall patterns vary over the province, with the highest rainfall in the subproject district - Ha Quang, reaching 1,637mm per year while Thach An and Bao Lac districts have the lowest rainfall at 1,000 - 1,300mm averaged over the year. The average humidity is 84-85%, reaching 88-89% in July and down to 80-82% in December.

43. There are two main wind directions: Northeast winds appear from December to April each year and a Southeast prevailing wind blows from May to November. Whirlwinds or tornados sometimes occur on a local scale.[4]

44. The average temperature of Cao Bang has a rising trend of 0.42^{0}C every 10 years. Summers are starting to last longer and more extreme hot days, with temperatures greater than 40^{0}C, are becoming more frequent. Winters are becoming shorter and later, while the extreme cold period is longer. Rain is irregular and the frequency of heavy rain is higher, concentrated in

[4] Status of Environment (SOE) of Cao Bang province 2015

the rainy season, leading to flash flooding and landslides in mountainous area. The water level in the river, stream, pond and lake has a decreasing trend[5].

45. The main weather related risks in the subproject area of Ha Quang district are hail, extreme cold and drought. Periods of extreme cold impact on cultivation activities, causing an increase in livestock deaths in the winter. Serious hail events have been reported in Ha Quang district, one in April 20, 2012, broke 235 household roofs while 2 households in Phu Ngoc commune lost their entire roof. Hail has also affected more than 100/160 ha of tobacco cultivation. In March 31, 2014, another serious hailstorm impacted more than 7 communes with more than 600 households sustaining roof damage, loss of 2 ha of tobacco, and 10 ha of corn. Nearly one month later, in April 26, 2014 the most serious hail storm occurred, damaging 313 household roofs broken in Ha Quang district, more than 214 ha tobacco and 100 ha corn fields. [6]

3. Hydrology

46. Cao Bang is situated upstream of several rivers under two main river systems: the Red River and the Ta Giang River (China). There are nearly 1200 rivers or streams that are more than 2 km in length. In Cao Bang province, the total combined length of rivers and streams is 3,175 km and the density is 0.47 km/km^2. The main Rivers are: Gam River; Bang River; Bac Vong River and part of the Nang River. The rivers and streams of Cao Bang flow through steep terrain and waterfall are common, within the Quay Son and Gam River systems. [7]

47. Bang Giang River is started in Xuan Hoa town then flow south to Cao Bang city. Le Nin stream, originated from Pac Bo Vestigial, Truong Ha commune, Ha Quang district is the main water source of Bang Giang River. In accordance to the subproject PO report, the annual highest water level of the Bang Giang River is 18.121 cm while the lowest level is 17.649 cm.

48. The water source of the proposed Water supply system is the Na Dam stream, located in Na Dam village, Phu Ngoc commune, Ha Quang district. In the subproject area, there is also the Ban Nua Reservoir, about 1.5 km Southwest of the proposed pumping station for the Na Dam stream separated by a mountain. The capacity of the reservoir is more than 1 million m^3 and used for irrigation in Dao Ngan commune, Ha Quang district.

4. Seismicity

49. Vietnam has been classified as a low seismicity region although earthquakes of up to degree VI on the Modified Mercali Scale have occurred in much of the northern mountain region, including Cao Bang province[8]. Ninety percent of the earthquakes that have occurred in Vietnam have taken place in the Northwestern Provinces. As Cao Bang lies along the Cao Bang - Tien Yen Fault, small earthquakes have been recorded in recent years. At 11 pm, August 29, 2010, a

[5] Cao Bang Action Plan on Climate Change for 2011-2020 period. Prepared by Cao Bang DONRE in corporation with other Government Organizations of Cao Bang. http://tnmtcaobang.gov.vn/index.php?language=vi&nv=dltnmt&op=Du-lieu-ve-Khi-tuong-thuy-van/Du-lieu-dieu-tra-danh-gia-ve-khi-hau-bien-doi-khi-hau-tac-dong-cua-bien-doi-khi-hau-tinh-hinh-va-ket-qua-thuc-hien-cac-giai-phap-ung-pho-voi-bien-doi-khi-hau

[6] Cao Bang Electronic Newspaper:
http://baocaobang.vn/Thoi-su/Mua-loc-gay-nhieu-thiet-hai-ve-nha-o-va-hoa-mau/7041.bcb
http://cdvccaobang.vn/chi-tiet-tin/680-mua-da-kem-loc-xoay-lam-thiet-hai-tai-san-va-hoa-mau-tai-4-huyen.html
http://www.caobang.gov.vn/news/2379.cb

[7] Cao Bang Action Plan on Climate Change for 2011-2020 period

[8] UN Office of the Coordination of Humanitarian Affairs (OCHA) Viet Nam: Natural Hazard Risks issued March 2011. http://www.preventionweb.net/files/23469_ochavnmhazardv3110606.pdf

magnitude 3-richter scale earthquake occurred in Ha Quang district causing minor damage but no fatalities[9]. Another earthquake was recorded at 18h15 on November 3, 2011 in Thong Nong district, about 15 km from the subproject area. This 3.6 magnitude-Richter scale earthquake with the epicenter about 10km under the ground[10].

B. Ecological Environment

50. Rice fields and banana cultivation areas cover the banks of Na Dam stream, where the water pumping station is located. The raw water pipe will cross mainly agricultural land. The proposed WTP is located on the top of a low hill, which are covered re-growth trees. At the base of hill is an area of rice cultivation.

Figure 5 – Location of proposed pumping station and WTP

Location of proposed pumping station

Proposed WTP location on top of the low hill

C. Socio-economic Context

1. Administration areas and population

51. Xuan Hoa commune was upgraded to Xuan Hoa town (Urban area class V) in 2007. The total population of Xuan Hoa town and Phu Ngoc commune is 4,358 people and 3,265 people in 2010 respectively. Xuan Hoa town and Phu Ngoc commune are located along provincial road No.203 connect to the Pac Bo Vestigial, a site officially recognized by the State on February 21, 1975 as a national vestige of particular significance, - about 10 km to North of Xuan Hoa town center.

52. According to information from ESWSC, currently the households (about 300 households) still use the water supply by the existing scheme. Some households use groundwater but these sources have mostly dried up after 1-2 years and the households return to use water from the scheme. All parties indicate a demand for water and a willingness to pay for water in the town and surrounding villages, however this demand is conditional on a reliable 24-hour supply of potable water.

[9] http://khoahoc.tv/dong-dat-o-cao-bang-29063
[10] http://www.tinmoi.vn/dong-dat-o-cao-bang-01626322.html

2. Historical, cultural and religious presence

53. The Pac Bo Vestigial is the place chosen by Ho Chi Minh as a secret base to build up the revolutionary movement. Right here, he made a number of important decisions, contributing to the success of the 1945 August revolution. The Pac Bo Vestigial is however some 10km distant to the project. There is no specific evidence or knowledge of the presence of any other site of cultural, religious or historical significance site located in or adjacent to the subproject area. The subproject areas are mainly under agriculture and plantation. Chance finds of artifacts of historical or cultural significance are very unlikely.

3. Unexploded Ordnance

54. There has been no armed conflict in the site in recent decades. Nonetheless, nearly 40 years after Vietnamese - Chinese border war ended, unexploded ordinance (UXO) remains from aircraft, booby traps and land mines, all of which are indiscriminate and all of which result in concealment of the ordinance and information on the extent and location of UXO is sparse. In some locations, such as the sites of former combat bases or military supply routes, the scale of the risk is high. For most of the rest of the country, the level of risk for any one site is largely unknown. Prior to earthworks and especially for the pipeline excavation corridors, survey for the presence UXOs has to be conducted by an authorized bomb and mine Clearance Company.

D. Surface Water Resources

55. Both ground and surface water sources have been assessed for their suitability as a water source. Groundwater exists in shallow and deep aquifers. Shallow aquifers face seasonal shortages while having low turbidity in the rainy season water quality quickly degenerates offering few development opportunities. Good quality groundwater is held in the deeper aquifers at depths from 10 to 50 m and is technically exploitable however available reserves are difficult to evaluate without exploratory drilling and testing.

56. There are 24-drilled wells and a number of hand dug mostly shallow wells in the subproject service areas but these dry up. The DPC and some district offices use ground water pumped from caves fed into surface reservoirs but this is often of poor quality and unreliable.

57. The water source serving the existing water treatment plant will have to come from the Lenin stream which surfaces in the Pác Bó cave and flows northwest to southeast and is augmented by numerous smaller streams and groundwater outlets. The Lenin stream is an important water source, and together with many other branches, joins the Bằng Giang river to form one of the three river systems in Cao Bằng province. Water from the Lenin stream supplies the existing treatment plant at Xuan Hoa town but the quality is poor and there is insufficient flow to meet current demand.

58. A site on the Na Dam stream has been selected as the proposed location for the water source and was assessed during field investigations. No stream gauging data[11] is available and a mixture of minimum flow estimates, and local knowledge has been used to access its suitability. The minimum stream width and depth are 15m and 0.7m respectively, and the

[11] The PPTA's advice to the ADB is to require gauging on all streams be established by loan fact finding and that the gauging be used to monitor stream flow against the rainfall record such that by loan effectiveness and the submission of subprojects for approval at least one year data is available with month stream gauge and catchment rainfall records. Where the reported data differs by more than 10% from the data presented to the FS additional hydrological investigation should be required.

average slope is 0.005 %. Using the stream cross section at the intake point, and inflows from its tributaries, the reliable flow in the Na Dam stream has been calculated, and is about 5 m^3/sec. This is approximately 432,000 m^3/day and well in excess of the daily twenty-four hour demand, which is 2,000 m^3.

59. The selected site has been checked to ensure its engineering suitability. A minimum water depth of 0.7 m is sufficient to maintain water level in a wet well to ensure that pump inlets are submerged. Field interviews indicate that the Na Dam stream never dries up and that floods that occur during the wet season spill out into the surrounding fields and dissipate quickly rather than concentrating flows along the immediate stream alignment which might threaten and damage the intake works.

60. The water source of the proposed Water supply system is the Na Dam stream, which starts from a natural spring in Na Dam village, Phu Ngoc commune, Ha Quang district. It flows southwards to the center of Phu Ngoc commune and then combines with other streams to form Nam Thang River. The River continues southwards then joins the Bang Giang River in Na Duoc village, Nuoc Hai town, Hoa An district.

61. The water intake is in Nam Dam village, Phu Ngoc commune, about 6 km southeast from Xuan Hoa town and about 35 km from Cao Bang city to the Northeast. The site was inspected by the PPTA team. The water source is clean, appears to flow steadily and has an average depth of around 1.2 m.[12]

E. Water Quality

62. Based on the survey results, the most suitable raw water for Water supply system for domestic use of Xuan Hoa town and Phu Ngoc commune is Na Dam stream.

63. The quality of the source water at the of Na Dam stream is good enough to use as the water source for water supply under QCVN 08:2015-MT/BTNMT[13], not polluted by cultivation activities as the intake to the pumping station will be located at the stream head.

64. Na Dam stream has been selected as the proposed location for the water source and was assessed during field investigations. No stream gauging data[14] is available and a mixture of minimum flow estimates, and local knowledge has been used to access its suitability. The minimum stream width and depth are 15m and 0.7m respectively, and the average slope is 0.005 %. Using the stream cross section at the intake point, and inflows from its tributaries, the reliable flow in the Na Dam stream has been calculated, and is about 5 m^3/sec. This is approximately 432,000 m^3/day and well in excess of the daily twenty four hour demand which is 2,000 m^3 [15]

[12] The PPTA Consultants strongly recommend that ADB seek assurance from Cao Bang PMU that the subproject establish water gauging stations at the proposed water source prior to Fact Finding and that where the gauge data differs by more than 10% from current reported data a detailed hydrological assessment be undertaken prior to subproject approval. Concurrently monthly water quality tests should be undertaken

[13] QCVN 08-MT:2015/BTNMT National Technical Regulation on Surface Water Quality Column A1: Water quality for domestic water supply and other purposes

[14] The PPTA advice to the ADB is to require gauging on all stream be established by loan fact finding and that the gauging be used to monitor stream flow against the rainfall record such that by loan effectiveness and the submission of subprojects for approval at least one year data is available with month stream gauge and catchment rainfall records. Where the reported data differs by more than 10% from the data presented to the FS additional hydrological investigation should be required.

[15] The subproject Feasibility Study

Table 2 - Test result of Nam Dam Stream's raw water source[16]

No	Properties	Unit	Result	QCVN 08:2015-MT/BTNMT[17]	Testing method
1	pH	-	6.5	6 – 8.5	APHA 4500-pH
2	Turbidity	NTU	2.20	-	APHA 2130- Turbidity
3	Color	Pt – Co	9	-	A PHA 2120
4	Alkalinity	mg $CaCO_3$/l	208		APHA 2320-Alkalinity
5	Hardness	mg $CaCO_3$/l	176	-	APHA 2340-Hardness
6	Oxidization	mg O_2/l	1.89	-	APHA 4500-KMnO4
7	Total Suspended Solid (TSS)	mg/l	1	20	APHA 2540
8	COD	mg O_2/l	4.46	10	APHA 5220-COD
9	Ammonium (NH_4+ - N)	mg/l	0.05	0.3	APHA 4500-NH3 TCVN 5988-1995
10	Nitrite (NO_{2-} - N)	mg/l	< 0,01	0,05	APHA 4500 TCVN 6180-1996
11	Nitrate (NO_{3-} - N)	mg/l	0.62	2	APHA 4500 TCVN 6178-1996
12	Arsenic (As)	mg/l	< 0.01	0.01	APHA 3500 - As
13	Manganese	mg/l	0.016	0.1	APHA 4500-Mn
14	Total Iron (Fe)	mg/l	0.09	0.5	APHA 3500-Fe
15	Iron (II)	mg/l	< 0.01	0.5	APHA 3500-Fe
16	Chloride	mg/l	10	250	HACH 4500-Chloride B

[16] Tests done by Laboratory of Water, Chemistry and Environment - Science Institute of Infrastructure Engineering and Environment (SIIEE), dated 01 September 2016

[17] QCVN 08-MT:2015/BTNMT National Technical Regulation on Surface Water Quality Column A1: Water quality for domestic water supply and other purposes

65. From the current state of the water treatment plant which has been used and degraded, not ensuring water quality, and from the fact of insufficient water amount for daily domestic use and production of people in Xuan Hoa town and Phu Ngoc commune, it leads to many difficulties for people's living and production.

66. Therefore, it is required to invest in renovation and upgrading of water supply system for Xuan Hoa town, Phu Ngoc commune, Ha Quang district, Cao Bang province. The investment in construction is consistent with the overall development of society; belonging to the National strategy of clean water and sanitation in order to enhance quality of life, reduce the gap in economic life between mountainous region and the deltas.

VI. IMPACT, ALTERNATIVE AND MITIGATION MEASURES

A. Area of influence of the subproject

67. The area of influence of the subproject includes the water intake area the WTP area, the area served by the pipe distribution network and the area along the raw water transmission pipe. It includes Xuan Hoa town, Phu Ngoc communes, Ha Quang district and the 2 downstream communes of Nam Thang River - Nam Tuan and Duc Long, Hoa An district.

B. The expected benefits

68. The benefits of the subproject are improved public health by ensuring full time reliable access to clean water for most of the local people in Xuan Hoa town and Phu Ngoc commune. The water will be safe for drinking and cooking, reducing the incidence of water related disease, which in turn improves the quality of life for beneficiaries, reducing the need to purchase safe water, and reduces productive time lost to illness.

69. Many households in the region seek other water sources by themselves for the purposes of catering and drinking. Commonly, groups of about 3-5 households invest together in a tank system and water pipeline directly from flumes, caves to their house for catering. The capacity of these supplies is inadequate and also reportedly declining so households use dual systems of mountain water for consumption and river water for washing.

C. Alternative; Design and Location Consideration

70. To meet the investment objective of sufficient water for domestic use for the 7,623 residents and staff of agencies, schools and clinics, the estimated scope of the subproject is:

- Fresh water treatment station with capacity of 2,000 m^3/day (1 station).
- Installation of a transmission pipeline network made of HDPE pipe, of total length 9.9 km.
- Proposal of position of new WTP: the site requirements will be at least 5,000-7,000 m^2.
- Household connections

71. There are two options for the water source: The water source from Bang Giang River at Xuan Hoa town and the source from the Na Dam stream, Na Dam village, Phu Ngoc commune. The quality of the Bang Giang River section in Xuan Hoa town is inadequate for household use and the Ha Quang General hospital located at head of the river, which is a significant source of pollution immediately downstream. The water source from Na Dam stream has been selected as the water source for the subproject. The selected site has been checked to ensure its engineering suitability. A minimum water depth of 0.7 m is sufficient to maintain water level in a wet well to ensure that pump inlets are submerged. Field interviews indicate that the Na Dam stream never dries up and that floods that occur during the wet season spill out into the surrounding fields and dissipate quickly rather than concentrating flows along the immediate stream alignment which might threaten and damage the intake works.[18]

72. The proposed location of the WTP has been chosen due to its middle position between Xuan Hoa town and Phu Ngoc commune. It is also has low impact on human activities (in habited areas, mainly agriculture plantation areas). As the WTP located on the top of the small

[18] The subproject Feasibility Report

hill to ensure water from WTP will be supplied to Xuan Hoa town and Phu Ngoc commune by gravity flow.

73. Climate change impacts will be considered during detail design. As the area is subjected to hail storms, proposed adaptation measures will be identified and included in the detail design (for example, avoiding glass structures in the pump station house and other buildings).

D. Pre-construction activities

74. The preconstruction activities under the subproject area are site clearance along the raw water pipeline, WTP and distribution networks. The rice field area where the proposed 250m raw water pipelines will be placed will be acquired for the construction activities. A Resettlement and Ethnic Development Plan (REMDP) has been prepared to cover compensation and assistance based on ADB SPS.

75. **Slope stability**. The 100-m access road to the WTP will follow an existing track but will involve widening to form the road bench. This will involve some cutting into the hillside, and will also alter the existing water flows on the hillside. Risks are to be mitigated by design measures to protect the slopes and manage drainage. This will include (i) careful design of the access road, minimizing the amount of cutting necessary to form the road, (ii) providing for retention on the downslope side (iii) a geotechnical assessment of slopes to be cut should be made, and suitable retention or revetment structures included in the design as necessary (iv) a hydrological assessment and design of road drains and culverts, including cascades to direct runoff water as necessary (v) provision for cut slopes to be re-vegetated with grass and shrub species.

76. Protection of the water source. Provision will be made in the detailed design to include a perimeter fence around the water sources to exclude animal traffic and reduce contamination from animal waste.

E. Potential Impacts and Mitigation Measures in the construction phase

1. Loss of trees and impact to fauna

77. **Impacts:** Construction work will involve some removal of trees along 100m access road and WTP proposed position itself. The trees on the edge are mainly young, of diameter less than 15cm and comprise species that have regenerated naturally. These species are well represented in nearby wooded areas and strips of riparian vegetation and forests in the area and as such the vegetation on the edge does not present a unique habitat. The number of trees that will be cut down as part of the works will be very few, so the impact is not large.

78. **Mitigation measures:** Trees owned by local residents that will be removed, will be compensated under the provisions of the REMDP. To reduce the impact on further trees and vegetation, the DARD office of Ha Quang district will be informed about the number of trees to be cut down, construction time and schedule. The contractor will not use or permit the use of fuel wood for construction activities or for cooking and water heating in worker's camps. The contractor will prohibit staff from collecting fuel wood from nearby forests and will not buy or use wood from illegal sources. The PMU assisted by the ESS and CSC will strictly supervise and monitor the protection of trees and other vegetation.

2. Generation of surplus soil

79. **Impacts:** Soil from excavation activities to construct the access road and building platform, which could not be reused as fill soil will release silt and cause possible soil erosion on slopes if discarded in situ.

80. **Mitigation measures:** Most of the excavated soil will be reused as filling soil to cover the pipe system. Thus, large amounts of excavated soil will not need to be discarded. The remaining surplus will be reused to the extent possible as a base material for the WTP site, for access road construction if suited for the purpose, or provided to local people for use on public or private land, as they desire. Any further surplus soil will be transferred to a disposal site, to be agreed with the CSC and local authorities.

3. Generation of construction waste

81. **Impacts:** Solid waste that will be generated from construction mainly includes waste from workers' camps, debris, and packaging of materials and equipment cement cover, oil containers, crates and cardboard. Some may be contaminated with hazardous or semi hazardous substances. Domestic waste from workers camps may include organic waste, as well as plastic and other packaging and semi toxic items such as used batteries. Other waste will be generated at workshops, storage sites, refueling sites and depots. This is a minor impact, as the main construction site is the proposed WTP, small access road.

82. **Mitigation measures:** Contractors will be required to (i) reuse construction waste such as cement bag cover, metal tools where possible and (ii) install rubbish bins at work sites and in worker's camps to allow efficient collection of waste and transport the solid waste to a disposal site approved by the CSC.

4. Impact from noise, dust and vibration generated by the construction activities

83. **Impacts:** Earthworks and rock crushing activities will be the main sources of dust. Construction machines and vehicles will generate gaseous emissions (NOx SOx, CO, CO_2, etc.) when they are in operation. These gaseous emissions and dust could cause health problems for residents who live near the construction site and along the transportation route and along the distribution pipeline network. The impact is considered as minor as the WTP and access road will be constructed at an edge, about 4.5km to the nearest residential area (Phu Ngoc commune center). The installation of distribution network will be done mainly by manual work.

84. **Mitigation measures:** The contractors will not locate any large or noisy machines near residential area of Xuan Hoa town, Phu Ngoc commune and will work with Xuan Hoa, Phu Ngoc CPCs, with the representative of ESS and PMU, to identify suitable materials transportation route. During the dry period, the sites and patches near residential areas, especially the sensitive receivers like Xuan Hoa secondary school, Ethnic minority boarding school, Ha Quang general hospital, Phu Ngoc secondary school, Phu Ngoc high school, Phu Ngoc primary school and kindergarten should be sprayed with water regularly to suppress dust generated PMU and CSC will responsible to monitor these mitigation measures.

5. Impact on local traffic

85. **Impacts:** Distribution pipelines installation is likely to cause hindrance in traffic flow along PR203 and internal roads of Xuan Hoa town and Phu Ngoc commune if not mitigated properly especially in the area of Xuan Hoa secondary school, Ethnic minority boarding school, Ha Quang general hospital, Phu Ngoc secondary school, Phu Ngoc high school, Phu Ngoc primary school and kindergarten, Phu Ngoc market. Pupils will get difficulties on their way to schools and local people will get difficulties on their way to the market. It will also create difficulties for tourists on their way to Pac Bo cave. The impact duration will be short, during the distribution pipelines installation in 12 months construction phase.

86. **Mitigation measures:** To minimize the disturbance to local people, the contractor will inform Boc Bo CPC the construction schedule for distribution pipelines in advance and will also coordinate with local traffic authorities to implement appropriate traffic diversion schemes (if needed) to avoid inconvenience due to pipelines installation, setup clear traffic signal boards and traffic advisory signs at the market and school areas.

6. Safety of construction workers

87. **Impacts:** Workers are at risk of accidents associated with construction, particularly power connect to the nearby transmission line for the electricity substation of the WTP.

88. **Mitigation measures:** The contractors will (i) conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene (ii) institute site and camp rules such as wearing proper safety apparel such as safety boots, helmets, protective clothes, gloves and ear protection, (iii) ensure all excavation sites are fenced with sign boards and perimeter markers; (iv) liaison with the power company to ensure that qualified technicians are on site to ensure that safety procedures are followed and (v) allocate responsibility to supervisor staff to ensure that all safety rules are followed by all staff at all times. The project will take note of opinions and complaints from local people and authorities on safety.

F. Potential Impacts and Mitigation Measures in the Operation Phase

1. Risk of water pollution and pipe breakages

89. **Impacts:** The water source of Na Dam stream could be polluted by the cultivation activities and animal waste along the upstream; increasing the turbidity and contamination level for the raw water pumped to the WTP. Treated water could also be polluted due to the failure of the treatment system or inappropriate operation procedures like the chemical control. The water pipe could be broken, leading to waste of water and contamination.

90. **Mitigation measures:** ESWSC will install fences surround the water intake location to avoid cattle trespassing and install warning boards at the intake location as well as some main points along the distribution pipeline system. ESWSC will also inspect the water intake, pipeline system regularly and fix any system failure in time to ensure adequate water supply and quality. ESWMC, in collaboration with DARD office of Ha Quang district, will conduct propagandas to raise awareness of local people for water quality protection

2. Risk of accident during WTP operation process

91. **Impacts:** Chemicals using in the WTP, like chlorine compounds, especially in powder form could be leaked and impact on the health of operation workers. Electric shock could be happen with worker working at the electricity substation. Other work accident could happen if the worker not to be trained properly and follow the safe working procedures.

92. **Mitigation measures:** The WTP must be equipped with a fire control system and protective gear for workers. Workers should be trained in the principles of safe working, emergency steps and proper handling and storage of chemicals. Among the chemicals, chlorine is the most toxic and therefore requires safe storage and handling. The operating procedures of the plant should include an inspection and maintenance schedule for all chemical storage and treatment equipment. Chlorine containers must be kept in a dry place and stored separately from non-hazardous materials.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. The purpose of information disclosure, consultation and participation

93. Public Consultation and Disclosure. Public consultation included discussions with members of project beneficiary groups, affected persons and commune officials, as a part of IEE preparation, in order to ascertain any concerns that may need to be addressed. In accordance to Circular No. 27/2015/TT-BTNMT, preparation of an EIA, entailing including public consultation is not required as the capacity of the subproject is only 2200 m^3/day in comparison with the threshold for the EIA requirement being 50,000 m^3/day. As per ADB's SPS (2009), for category B subproject however, it is necessary to conduct public consultation, including the following aspects:

(i) A summary of the proposed works under the subproject;

(ii) A summary of subproject objectives and likely positive and negative environmental impacts, covering the impacts in design, construction and operation phases for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders;

(iii) Invitation for feedback in respect of any areas of concern that the public may have, and suggested means of implementation; Summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples;

(iv) Acceptability of the proposed works to the public; and

(v) Request for information on the known occurrence of unexploded ordinance in the area where the scheme components will be built and facilitating participation of affected people during project implementation.

B. Method of consultation and participation

94. The method of information dissemination and consultation and participation includes the rapid assessment methodology and stakeholders participation and consultation using the following techniques:

- An in-depth interview (live-interview): organizing dialogues, meetings and discussions with local authorities, including interview via phone for additional information. At the commune level, the participants are usually deputy chairman and land administrative staff of the CPC.
- Obtaining information on the questionnaire (integrated with the social survey)
- Public consultation meeting at the CPC with the participant of affected households; representatives of commune, district and provincial level.

C. Consultation process

95. The PPTA in collaboration with the local authorities held consultations. These were conducted as part of the baseline survey on local environmental conditions along the pipeline corridor and the location of the WTP.

96. The main content of the consultation meeting was to announce the main information of the Water Supply System for Domestic Use of Xuan Hoa Town, Phu Ngoc Commune- Ha Quang District, Cao Bang Province; the adverse environment impacts, proposed mitigation measures to be applied during the construction phase and operation phase. The participants also expressed their views as well as other opinions related to the Subproject and other issues.

D. The result of information disclosure and public consultation

97. In general, there is no opposition from the public to the proposed subproject. All the local people have showed support for the subproject and are forward to the commencement of construction as soon as possible.

98. The public consultation meeting was held in Xuan Hoa Town PC's meeting room attended by 8 people, of whom 3 were women; and the participant of local authorities of Xuan Hoa Town and Phu Ngoc commune. The meeting was held in September 19, 2016.

99. The IEE, including Environmental Management Plan (EMP) will be translated in Vietnamese and will be made available at the office of the People's Committees (PC) of Xuan Hoa town and Phu Ngoc commune.

VIII. GRIEVANCE REDRESS MECHANISM

A. Purpose of the mechanism

100. During the preparation of the subproject, information is disseminated to local people on the scope of the subproject; environmental, social impacts and the grievance redress mechanism. Negative impacts of an environmental or social nature, or resettlement impacts, may occur during the construction and operational phases. Any comments/ suggestions of local people will be solved quickly, transparently in accordance with protected the law, particularly for people affected by the subproject. This grievance redress mechanism is classified by level and responsibilities of involved parties. The GRM will be disclosed with the IEE and other safeguard documents to ensure that potentially affected persons are aware of it and their entitlement to raise complaints. During construction, the Contractor will appoint a member of his staff to act as the focal point, who will liaise with the Community Supervision Board and, if appropriate, the complainant(s) to address and seek solutions to any grievance that relates to the Contractor's actions.

B. Grievance redress process

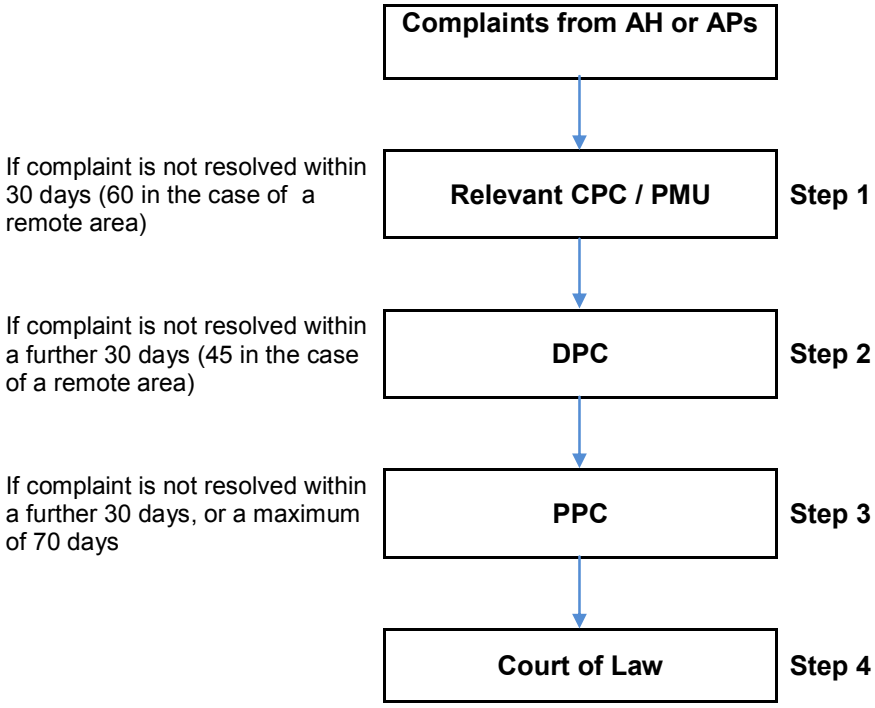
101. There are three steps to address complaints received from stakeholders:

***Stage 1*:** If a household or individual has any complaint he/she can submit a complaint in written or verbal form to the representative of the CPC-community monitoring board (usually the Deputy Chairman of the commune/town). The CPC will work with PMU to solve complaints and a representative PMU will respond in written form to the complainant. The CPC, as a whole body will meet personally with the aggrieved affected household and will have 30 days and a maximum of 60 days after the lodging of the complaint to resolve the complaint, however, depending upon whether it is a complicated case or case comes from a remote area. The CPC secretariat is responsible for documenting and keeping file of all complaints that it handles.

Stage 2: If after 30 days or 45 days (in remote areas) the aggrieved affected household does not hear from the CPC, or if the affected household is not satisfied with the decision taken on his/her complaint, the affected household may bring the case, either in writing, to any member of the DPC. The DPC in turn will have 30 days or a maximum of 70 days after the lodging of the complaint to resolve the case, however, depending on whether the case is complicated or in remote area. The DPC is responsible for documenting and keeping file of all complaints that it handles and will inform the District Resettlement Committee (DRC) of any decision made and the DRC is responsible for supporting DPC to resolve AH's complaint. The DPC must ensure that the complainant is notified of the decision made

Stage 3: If after 30 days or 45 days (in remote area) the aggrieved affected household does not hear from the DPC, or if the affected household is not satisfied with the decision made on his/her complaint, the affected household may bring the case, either in writing, to any member of the PPC. The PPC has 30 days or a maximum of 70 days to resolve the complaint to the satisfaction of all concerned. However, depending if the case is complicated or from a remote area The PPC is responsible for maintaining records of complaints received, action taken and outcomes.

Stage 4: If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, after a period of thirty days, complainants have the right to bring the case to a Court of law for adjudication. The decision of the Court is binding on all parties.


Complaints from AH or APs
If complaint is not resolved within 30 days (60 in the case of a remote area)
Relevant CPC / PMU
Step 1
If complaint is not resolved within a further 30 days (45 in the case of a remote area)
DPC
Step 2
If complaint is not resolved within a further 30 days, or a maximum of 70 days
PPC
Step 3
Court of Law
Step 4

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Implementation Arrangements

102. Cao Bang PMU will recruit one Environment Safeguard Specialist (ESS) under Loan Implementation Consultants (LIC) to support subproject implementation in Cao Bang. ESS will support PMU updated EMP and as well as monitor the compliance of the contractors during construction phase. ESS will also responsible for training and capacity building on the implementation of EMP.

103. PMU will engage Construction Supervision Consultant (CSC) for the monitoring and supervision of the subproject in general and for environmental monitoring as well. CSC will ensure that the contractors implement the provisions of the subproject EMP.

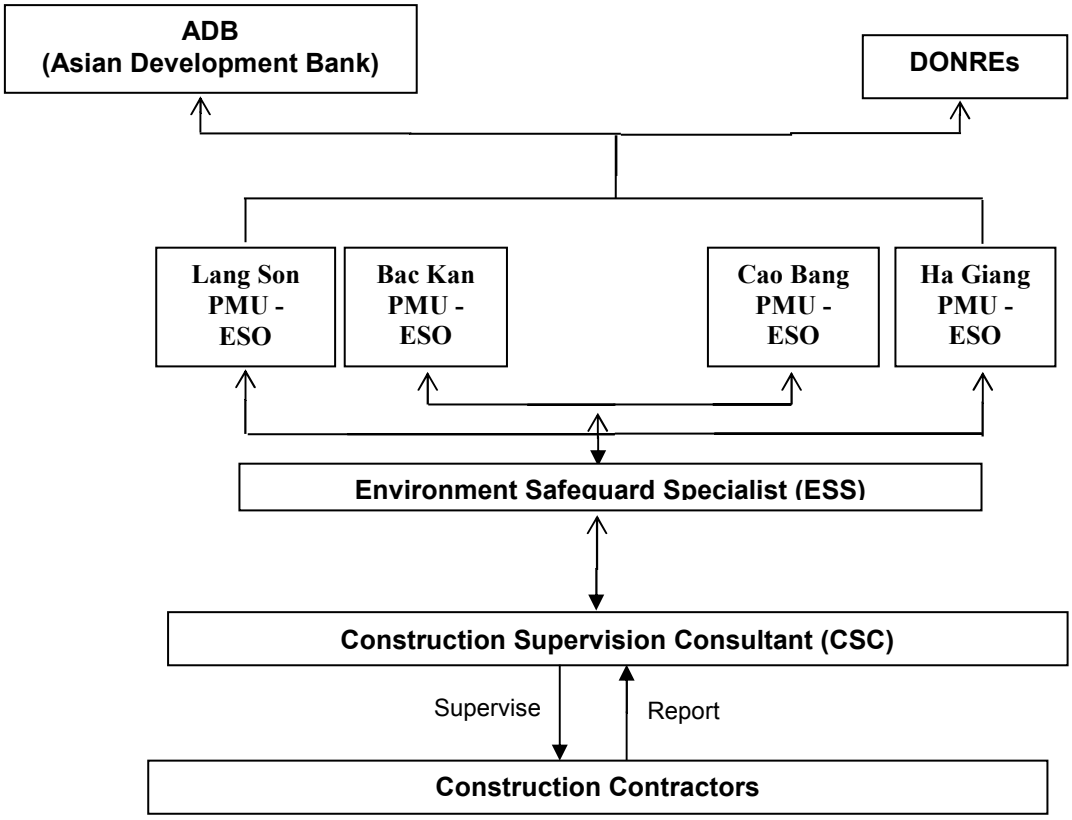
Table 3 – Responsibilities for EMP implementation

Agency	Responsibilities
Cao Bang Project Management Unit under DPI (PMU)	- Ensure that EMP provisions are strictly implemented during various subproject phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels. - Undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) with assistance from CSC and ESS. - Ensure that subproject implementation complies with ADB's environmental policy and safeguards policy statement (SPS 2009) principles and requirements - For subproject duration, commit and retain a dedicated staff within PMU as environment and safeguards staff to oversee EMP implementation - Ensure that environmental protection and mitigation measures in the EMP are incorporated in the detailed design. - With the support from ESS, updated EMP to suitable with any changing in subproject scope or any unanticipated impact rise. - Obtain necessary environmental approval(s) from DONRE prior to award of civil works contracts - Include the subproject updated EMP in the bid and contract documents for civil works - Establish an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Subproject's environmental performance - With assistance from ESS, prepare semi-annual environmental monitoring reports for submission to ADB - Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB.
Environmental Safeguards Staff (ESO)	- PMU staff support for EMP implementation - Work closely with ESS to daily supervise of EMP implementation and preparation of EMP monitoring report
Environment Safeguard Specialist (ESS)	- Update EMP to make it suitable with the current condition or whenever subproject scope change or any unanticipated impact rise. - Ensure that the environmental protection and mitigation measures identified in the EMP for the design stage has been incorporated in the detail design; - Assist PMU to ensure that all environmental requirements and mitigation measures from the IEE and EMP are incorporated in the bidding documents and contracts. - During detailed design phase carry out baseline data collection on air quality, noise and surface water quality (as specified in the EMP) - Implement all mitigation and monitoring measures for various subproject phases

	specified as ESS's tasks in the EMP - Work with PMU to execute any additional environmental assessment prior to subproject construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the IEE prepared during loan processing, etc.) - Undertake environmental management capacity building activities for PMU as described in the IEE and EMP. - Engage national environment specialists to ensure proper implementation of EMP provisions. Through these specialists, the ESS shall: (i) ensure proper and timely implementation of ESS's tasks specified in the EMP, (ii) conduct environmental training as specified in the IEE/EMP for PMU, (iii) conduct workers' orientation on EMP provisions, (iv) undertake regular monitoring of the contractor's environmental performance, as scheduled in the EMP (v) conduct field measurements for surface/ground water quality, dust and noise as required in the EMP, and (v) prepare environmental baseline report and environmental semi-annual environmental monitoring reports , as specified in the EMP, for submission to ADB.
Construction Supervision Consultant (CSC)	- Provide the ESS relevant information as well as full access to the subproject site and all project-related facilities (such as construction yards, workers' camps, borrow and quarry areas, crushing plants, concrete mixing plants, etc.) to monitor contractors' implementation of the subproject EMP, assess environmental impacts resulting from on-going site works and operation related facilities, undertake environmental effects monitoring and orientation of workers on EMP implementation. - Undertake day-to-day subproject supervision to ensure that contractors properly implement the EMP. - Orient workers on EMP implementation, and health and safety procedures - Document and report to PMU on occupational accidents, diseases and incidents - As part of regular progress report submission to PMU, prepare reports on the status of the contractors' implementation of the EMP and health and safety issues - Engage an environmental staff to ensure proper implementation of the above tasks.
Contractors	- Recruit qualified environmental officer to ensure compliance with environmental statutory and contractual obligations and proper implementation of the Subproject EMP. - During detailed design phase, prepare method statement (Waste Management and Spoils Disposal Plan) described in the IEE/EMP. - Ensure full understanding of the EMP and resources require for its implementation when preparing the bid for the work - Implement additional environmental mitigation measures, as necessary
Environment Sanitary and Water Supply Cooperative (ESWSC)	- Responsible for operation and maintenance of Subproject road - Implement EMP monitoring during operation
Cao Bang Department of Natural Resources and Environment (DONRE)	Review and approve environmental assessment reports required by the Government. - Undertake monitoring of the subproject's environmental performance based on their mandate

The organization structure of Environmental Management Plan is showed in the chart below:

Figure 6 – EMP Implementation Organization Chart



B. Environment impact Mitigation

104. The anticipated environmental impacts and mitigation measures discussed in the previous section is presented in Table 4. The table also shows responsibilities and timeframe/schedule for implementation of mitigation measures and monitoring.

105. Table 4 shows that most mitigation activities during pre-construction are to be implemented by the ESS while during construction, measures shall be primarily implemented by the contractors. During operation stage, DOT shall undertake environmental mitigation and monitoring requirements specified in the EMP. To ensure implementation of mitigation measures during construction, the EMP shall be included in the tender and contract documents for civil works. Contractors' conformity with environmental contract procedures and specifications shall be regularly monitored by PMU with assistance from CSC and results shall be reported semi-annually to ADB.

Table 4 - Detail Environmental Mitigation Plan

Environmental Concern	Objective	Proposed Mitigation Measures	Locations	Timing	Responsible to implement	Budget
Preconstruction Detailed Designs Phase						
1. Land acquisition and resettlement	Control the impact of land acquisition and resettlement	1. Affected persons well informed ahead of project implementation 2. Monitor the compensation process to ensure it is suitable with the Land Acquisition and Resettlement Report	N/A	Before subproject starts	PMU	Included in the operation cost of PMU
2. Slope stability	Minimize the impact on the stability of the slope by 100m access road construction activities	1. Minimize the amount of cutting necessary to form the road in the design 2. Design for retention on the downslope side. 3. Conduct geotechnical assessment and include suitable retention or revetment structures in the design. 4. Conduct hydrological assessment and design of road drains and culverts. 5. Design the re-vegetated with grass and shrub species for cut slopes.	In all subproject area	Before subproject starts	Design consultants	Included in the contract with the consultant
3. Protection of water source	Avoid water source pollution	1. Include a perimeter fence around the water sources in the detailed design	At the water intake area	Before construction start	Design consultants	Included in the contract with the consultant
Construction Phase						
1. Loss of trees and impact to fauna	Avoid and minimize impact to flora and fauna in the subproject area	1. Minimize vegetation covers clearances. 2. All replanting works to utilize locally available non-invasive species. 3. The contractors will not use or permit the use of wood,as fuel for the execution of any part of the works and to the extent practicable will ensure that fuels other than wood are used for cooking, and water heating in all camps and living accommodations. 4. Contractors will not buy or use wood from the illegal sources (that come from the illegal logging)	At the WTP construction area, along the proposed access road to the WTP	Through out the construction phase	Xuan Hoa Town PC, Phu Ngoc CPC, Contractors	Included in the contract with the contractors
2. Generation of surplus soil	Control surplus soils	1. Reuse excavated soil as filling soil to cover the pipe system. 2. Surplus soil will be reused to the extent possible as a base material for the WTP site 3. Further surplus soil will be transferred to a disposal site as agreed with the CSC and local authorities	Through out construction site	Through out construction phase	Contractors	Included in the contract with the contractors
3. Generation of construction waste and domestic waste from workers	Control waste disposal	1. Reuse construction waste such as cement bag cover, metal tools where possible. 2. Install rubbish bins at work sites and in worker's camps. 3. Transport the solid waste to a disposal site approved by the CSC.	Through out construction site and worker camps area	Through out construction phase	Contractors	Included in the contract with the contractors

4. Dust, noise and vibration	To minimize negative impacts from dust, noise and vibration during construction period	1. Large or noisy machines will not be located near residential area of Xuan Hoa town and Phu Ngoc commune. 2. Work with Xuan Hoa town PC, Phu Ngoc CPC, ESP and PMU to identify suitable materials transportation route. 3. Spray water regularly to suppress dust generated at the sites and patches near residential area during the dry period	Along the pipe installation line, WTP and access road construction site, material transportation road	Through out construction phase	Contractors	Included in the contract with the contractors
5. Traffic management	Minimize disturbance of traffic	1. Inform Xuan Hoa town PC, Phu Ngoc CPC in advance the construction schedule for distribution pipelines. 2. Coordinate with traffic police of Ha Quang district to implement appropriate traffic diversion schemes (if needed) 3. Setup clear traffic signal boards and traffic advisory signs at the residential and school areas.	Along the distribution pipelines and materials transportation route.	Through out construction phase	Contractors	Included in the contract with the contractors
6. Safety precautions for workers and public safety	Ensure worker and local people safety	1. Conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene 2. Institute site and camp rules like wearing protective tools properly. 3. Ensure all excavation sites are fenced and sign boards, perimeter markers installed 4. Liaison with the power company to ensure that qualified technicians are on site to ensure that safety procedures are followed 5. Assign responsibility to supervisor staff to ensure that all safety rules are followed	Through out the construction site	Through out the construction phase	Contractors	Included in the contract with the contractors
Operation phase						
1. Water pollution and pipe breakages	Ensure the quality of the water supply	1. Install fences surround the water intake location to avoid cattle trespassing 2. Install warning boards at the intake locations and some main points along the pipeline. 3. Inspect the water intake, pipeline system regularly and fix any system failure in time. 4. Collaborate with DARD office of Ha Quang district to conduct propagandas to raise awareness of local people for water quality protection	Water intake area, along the pipeline	Continuously	ESWSC	Included in the operation budget of ESWSC

C. Environmental monitoring

106. An environmental monitoring program will be outlined to monitor the environmental impacts arising during project implementation, including:
107.

- Monitoring the surrounding environment: only typical pollutants arising from the project construction is required to be monitored in accordance with existing standards and regulations of Vietnam with a frequency of at least once in every 6 months, the supervisory positions will be expressed explicitly in a diagram with annotation and coordinate under current regulations.

108. Cao Bang PMU or ESS under LIC will implement environmental monitoring program during the construction phase. In the operation phase, ESWSC and DARD office in Ha Quang district will implement environmental monitoring program.

Compliance Monitoring

109. Table 5 below shows the program for monitoring the compliance on various provisions of the EMP during construction and operation phases. ESS needs to implement a number of measures during detailed design phase (e.g., incorporation of environmental design measures into the detailed design, update EMP, etc.) and this will be confirmed by PMU to ADB. During construction, most of the mitigation the contractors shall implement measures and CSC and ESS shall monitor their environmental performance, in terms of implementation of such measures. The timing or frequency of monitoring is also specified in Table 5. During operation EMP implementation shall be the responsibility ESWSC.

110. Prior to implementation of the subproject the IEE and EMP will be updated and amended, as necessary, by ESS after the detailed designs are complete and contracting arrangements are known. Such updating shall be based on reconfirmation and any additional information on the assumptions made at this feasibility stage on location scale and expected conditions of the subproject.

Environmental Effects Monitoring

111. ESS undertakes baseline environmental monitoring for air quality, noise and surface water quality. Sampling will be conducted prior to start of site works at the specified locations. During construction, ESS shall undertake quarterly monitoring of surface water quality and air quality and noise in the same locations sampled during pre-construction. Additional sampling occasions shall be carried out and additional parameters shall be analyzed (as necessary) to validate complaints and/or investigate pollution events caused by the subproject. MMB will responsible for treated water quality monitoring in the first year of the operation phase.

Table 5 - Environmental Compliance Monitoring

Environmental Concern	Parameter to monitor	Location	Frequency & verification	Responsible to monitor	Estimated Cost
Design and Pre-construction Phase					
1. Land acquisition and resettlement	Compensation documents	N/A	Once, before construction start	Cao Bang DPI, DONRE and PMU	Included in the operation budget of Cao Bang PMU
2. Slope stability	Design documents	N/A	Once, before construction start	Cao Bang PMU	Included in the operation budget of Cao Bang PMU
3. Pollution of water source	Perimeter fence in design documents	N/A	Once, before construction start	Cao Bang PMU	Included in the operation budget of Cao Bang PMU
Construction phase					
4. Loss of tree and impact to fauna	Check of implementation	At the WTP construction site, along the access road to the WTP	Before construction commencement and through out construction phase. Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
5. Waste and surplus soil disposal	Check of implementation	Through out construction site, designated disposal area	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
6. Dust, noise and vibration	Check of implementation	Through out construction site	Bi-weekly and spot checks Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC

7. Traffic management	Check of implementation	Through out construction site, along material transportation route	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
8. Safety precautions for workers and public safety	Check of implementation. Check compliance to Labor Code of Vietnam and other relevant Decision, Decree and Circular under Government requirements	Through out construction site	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
Operation of WTPs & Pipeline Network					
9. Water pollution and pipe breakages	Public complaints of operation of WTPs, drinking water availability & quality, and malfunctions with pipelines (e.g., leaks).	On property of WTP, pipelines, and pump stations, water intake location	Continuously	MMB	Included in the operation budget of ESWSC

Table 6 - Environmental Effects Monitoring

Environmental Concern	Parameter to monitor	Location	Frequency & verification	Responsible to monitor	Estimated Cost
Design and Pre-construction Phase					
1. Air quality (dust, CO, NOx, SOx, noise, wind, and vibration levels) to supplement baseline air quality data collected during PPTA and reported in IEE Water quality parameters sampled in Na Dam stream PPTA & reported in IEE.	Using field and analytical methods described in QCVN and TCVN standards for ambient air and surface water quality sampling & analysis.	Representative sites of heavy civil & earthwork including along truck routes At raw water intake location	One day and one night measurement	ESO	Included in the operation budget of Cao Bang PMU
Construction phase					
A) Air quality: dust, CO, NOx, SOx, noise, wind, and vibration levels B) Surface water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, total & fecal coliform, pH, DO, COD, BOD_5, temperature, NH_3, and other nutrient forms of N & P. C) Public comments and complaints D) Incidence of worker or public accident or injury	A – B: Using field and analytical methods described in QCVN and TCVN standards for ambient air and surface water quality monitoring. Include visual observations of dust and noise from contractor & public reports. C) Information transferred by telephone hotline number D) Regular reporting by contractors/ Cao Bang PMU	A – B): At the intake water area C): Using hotline number placed at construction areas D): At all construction	(A–B): Quarterly during construction periods (1 time for baseline data and 4 times in 1 year construction) C) Continuous public input D) Continuous	Quarterly	A) &B) (60$ & 500$) per sample times under cost norm of Ha Giang[19] C) & D) With (no extra cost)
Operation of WTPs & Pipeline Network					
Treated water quality: total & fecal coliform, pH, DO, NH_3, NO_3, NO, chlorine, PAC, NaCl, and heavy metals (As, Cd, Pb,).	Using field and analytical methods described in QCVN & TCVN standards for water quality monitoring, and parameters of QCVN 14:2008/BTNMT & TCXDVN 33:2008/BXD. Follow the procedures under Circular No.50/2015/TT-BYT providing for the inspection of drinking water and domestic water's sanitation and quality	At WTP & random user locations along distribution network	Biannually for parameter under B column, or when public complaint arises	ESWSC	Included in the operation budget of ESWSC

[19] There is no available cost norm for Cao Bang. Figures have been estimated base on Ha Giang cost norm.

D. REPORTING

112. PMU will submit the following reports to ADB:

- *Monitoring report for baseline environment:* this report shows the result of baseline environment as implemented by ESS on ambient air quality, surface water quality... This report will be submitted to ADB before the construction start.
- *Environmental monitoring reports:* Environmental monitoring reports will cover the status of EMP implementation in terms of required mitigation measures for different phases of the subproject, results of environmental effects monitoring (air quality, noise and surface water quality), necessary remedial actions to effectively address negative environmental impacts due to subproject implementation, status of environmental capacity building activities as well as documentation of complaints received and corresponding action/resolution. The environmental monitoring reports will be submitted to ADB semi-annually during the construction phase and annually for two years after completion of construction.

Table 7 – Reporting procedures

Project Phase	Type Of Report	Frequency	Responsibility	Submitted To Whom
Construction	**Environmental Performance Report** indicating compliance with EMP and monitoring results at the contractor site	Daily	Construction contractor	CSC
	Subproject EMP Compliance Report indicating compliance with subproject EMP and monitoring results	Quarterly	CSC	PMU
	EMP Compliance Report indicating compliance with subproject EMP and monitoring results	Semi-annually during construction phase	ESS/ PMU	ADB
Operation	**EMP Compliance Report: Operation** indicating compliance with subproject EMP commitments during operation	Annually in the first year of operation. On-going frequency to be determined based on review after 1 year.	ESWSC	DONRE Office of Ha Quang DPC

Table 8 – Estimated cost for EMP Implementation (1-year construction/ 2-year in total)

Item	Estimated cost (US$)
1. Environment Safeguard Specialist (ESS)	***10,720***
1 National ESS - 03 man-months (intermittent in 1 year construction) – 2,000 US$/ man-month	6,000
Per diem for ESS: 48 US$ x 30 days x 3 months	4,320
Travelling cost for 2 round trips: 200 US$ x 2 trips	400
2. Environmental effects monitoring (implemented by ESS)	***2,800***
Ambient air quality: 1 monitoring location x 5 times x 60 US$/sample[20]	300
Surface water quality: 1monitoring location x 5 times x 500 US$/sample[21]	2,500
3. Training/orientation, local transportation, supplies (by ESS)	***1,500***
a) Training/orientation: 1 formal training course for PMU, CSC, Contractors, ESWSC and DARD office of Ha Quang district and other "on the job" training	1,000
b) Local transportation and supplies	500
4. Printing Environmental monitoring report by ESS (8 reports)	***300***
Subtotal (1+2+3+4)	**15,320**
5. Contingency	**680**
Total (1+2+3+4+5)	**16,000**

E. Capacity Building

113. In Viet Nam, the environmental assessment process is established but environmental awareness and capability for implementation of EMP in infrastructure projects of both the executing agency and the implementation agency (PMU) are limited and in development. The safeguards staff of the PMU is usually responsible for many different task and do not have good background on safeguards issues. Usually, the engineer will also be in charge of the environmental monitoring and his/ her capacity is not suitable to check the adequacy of the subproject EMP. The IEEs and EMP are referred to the environmental department in DONRE for approval. During the Project PPTA phase, PPU has been established under Cao Bang DPI with one staff has been assigned as ESO.

114. The most significant challenge is the lack of human and financial resources and necessary infrastructure. To address this constraint, Cao Bang DPI/PMU will designate a full time staff as environmental safeguards officer (ESO) to handle the environmental aspects of the subproject during implementation stage. The ESO and other relevant staff of PMU will be trained by the Environment Safeguard Specialist (ESS) during subproject implementation as "on the job" training or by formal training courses.

Table 9 – Detail capacity building program

[20] Due to there is no cost norm for Cao Bang province, figures have been estimated base on environmental monitoring cost norm of Ha Giang province.

[21] Due to there is no cost norm for Cao Bang province, figures have been estimated base on environmental monitoring cost norm of Ha Giang province.

Objective	1. Build capacity and procedures in undertaking systematic environmental assessments in accordance with Government regulations and ADB guidelines 2. Provide training on international best practice on environmental management, monitoring and reporting. 3. Provide guidance on how to effectively incorporate environmental measures into project design and how to incorporate EMP provisions into tender and contract documents.
Tasks/Scope of Work	1. Undertake training needs analyses and review prevailing government regulations and donor guidelines governing the assessment and management of environmental impacts for road development. 2. Review the skills of PMU and ESWSC staff to establish existing capacity on environmental assessments, environmental monitoring and implementation of mitigation measures for road development project. 3. Prepare the training plan and relevant training materials. 4. Deliver the training, which may be through a combination of hands-on assistance, on-the-job training, and training workshops. 5. Evaluate the effectiveness of the training measuring improvements in attitudes and skills achieved. 6. Modify the training documents/materials as necessary. 7. Hand-over the amended training documents/ material to the project manager for use in the delivery of the training. 8. Prepare report on result of training.
Time frame	Possible within 2 months after construction commencement
Target participant	Staff in PMU and ESWSC who responsible for environmental management
Staff resources	National environmental specialist with at least 10 years experience on environmental management of water supply projects and must possess relevant graduate degrees in civil engineering, environmental management and other relevant courses.

X. CONCLUSIONS AND RECOMMENDATIONS

115. This IEE study was carried out in the Technical Assistant for Project Preparation (PPTA) phase. Primary and secondary data were used to assess potential environmental impacts in a comprehensive manner and public consultation and route reconnaissance were carried out in order complete the environmental assessments and recommend suitable mitigation measures. The IEE report provides a picture of potential environmental impacts associated with the upgrading of the subproject road and suitable mitigation measures have been recommended.

116. The implementation of the subproject "Water Supply System for Domestic Use of Xuan Hoa Town, Phu Ngoc Commune - Ha Quang District, Cao Bang Province" will improve conditions and enhance water supply services for people especially people in the rural areas and the poor people so that they can access the qualified and sanitary water resource for their domestic, production and tourism demand. Several actions are required during the detailed design stage to minimize impacts to acceptable levels. The negative environmental impacts from the upgrading works will mostly take place during the construction stage. All of the impacts during construction phase should be very predictable and manageable and with appropriate mitigation and few residual impacts are likely. Additional human and financial resources will be required to improve environmental capability and to progress and achieve necessary statutory compliance and environmental clearance certification for the subproject or associated activities that also require environmental permits under the environmental laws of Viet Nam – LEP 2014.

117. No further or additional impact assessment is considered necessary at this stage. At the implementation stage, PMU through ESS will develop detail EMP to monitor the schedules of mitigation measures and conduct of environmental effects monitoring activities. EMP must be updated to ensure effective environmental monitoring and should be develop follow-monitoring plan as specified in the EMP. With these measures in place, environmental impacts of the subproject should be manageable and will not result in any residual impacts, which are above accepted environmental standards.

XI. APPENDIX

A. Appendix 1: Photos of the subproject area

Proposed area for pump station (view from road to Na Dam village)

Road to Na Dam village, closed to the proposed pump station

PR203 the main road through subproject area

Local people "agreed" with the implementation of the subproject in public consultation meeting

B. Appendix 2: Source of Reference Information

1. *Cao Bang Status of Environmental Report 2015*
2. *Cao Bang Climate Change Adaptation Plan (2011-2020)*
3. *Report on Pollution control under Environmental Protection Plan in 2015 Cao Bang Environmental Agency*
4. *The PO reports of the PPTA for Cao Bang Province*
5. *The Subproject Feasibility Report*

C. Appendix 3: Environmental Mitigation Measures to Include into Bidding Documents

1. Loss of trees and impact to fauna	1. Minimize vegetation covers clearances. 2. All replanting works to utilize locally available non-invasive species. 3. The contractors will not use or permit the use of wood,as fuel for the execution of any part of the works and to the extent practicable will ensure that fuels other than wood are used for cooking, and water heating in all camps and living accommodations. 4. Contractors will not buy or use wood from the illegal sources (that come from the illegal logging)
2. Generation of surplus soil	1. Reuse excavated soil as filling soil to cover the pipe system. 2. Surplus soil will be reused to the extent possible as a base material for the WTP site 3. Further surplus soil will be transferred to a disposal site as agreed with the CSC and local authorities
3. Generation of construction waste and domestic waste from workers	1. Reuse construction waste such as cement bag cover, metal tools where possible. 2. Install rubbish bins at work sites and in worker's camps. 3. Transport the solid waste to a disposal site approved by the CSC.
4. Dust, noise and vibration	1. Large or noisy machines will not be located near residential area of Xuan Hoa town and Phu Ngoc commune. 2. Work with Xuan Hoa town PC, Phu Ngoc CPC, ESP and PMU to identify suitable materials transportation route. 3. Spray water regularly to suppress dust generated at the sites and patches near residential area during the dry period
5. Traffic management	1. Inform Xuan Hoa town PC, Phu Ngoc CPC in advance the construction schedule for distribution pipelines. 2. Coordinate with traffic police of Ha Quang district to implement appropriate traffic diversion schemes (if needed) 3. Setup clear traffic signal boards and traffic advisory signs at the residential and school areas.
6. Safety precautions for workers and public safety	1. Conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene 2. Institute site and camp rules like wearing protective tools properly. 3. Ensure all excavation sites are fenced and sign boards, perimeter markers installed 4. Liaison with the power company to ensure that qualified technicians are on site to ensure that safety procedures are followed 5. Assign responsibility to supervisor staff to ensure that all safety rules are followed

D. Appendix 4: National Technical Regulations of Vietnam

NATIONAL TECHNICAL REGULATION

ON SURFACE WATER QUALITY

1. GENERAL PROVISIONS

1.1. Scope of application

1.1.1. This regulation specifies the limit value of surface water quality parameters.

1.1.2. This regulation applies to assess and control the quality of surface water source, as a basis for the protection and use of water appropriately.

1.2. Explanation of terms

Surface water referred to in this Regulation is water flowing through or stagnate on the ground, streams, canals, ditches, gullies, arroyos, lakes, ponds, swamps, ...

2. TECHNICAL REGULATIONS

Limit values of the surface water quality parameters are specified in Table 1.

Table 1. Limit values of the surface water quality parameters

No.	Parameters	Unit	Limit values			
			A		B	
			A1	A2	B1	B2
1	pH		6-8,5	6-8,5	5,5-9	5,5-9
2	Dissolved oxygen (DO)	mg/l	≥ 6	≥ 5	≥ 4	≥ 2
3	Total suspended solids (TSS)	mg/l	20	30	50	100
4	COD	mg/l	10	15	30	50
5	BOD_5 (20^0C)	mg/l	4	6	15	25
6	Ammonium (NH^+_4) (as N)	mg/l	0,1	0,2	0,5	1
7	Chloride (Cl^-)	mg/l	250	400	600	-
8	Fluoride (F^-)	mg/l	1	1,5	1,5	2
9	Nitrite (NO^-_2) (as N)	mg/l	0,01	0,02	0,04	0,05
10	Nitrate (NO^-_3) (as N)	mg/l	2	5	10	15
11	Phosphate (PO_4^{3-}) (as P)	mg/l	0,1	0,2	0,3	0,5
12	Cyanide (CN-)	mg/l	0,005	0,01	0,02	0,02
13	Arsenic (As)	mg/l	0,01	0,02	0,05	0,1
14	Cadmium (Cd)	mg/l	0,005	0,005	0,01	0,01
15	Lead (Pb)	mg/l	0,02	0,02	0,05	0,05
16	Chrome III (Cr^{3+})	mg/l	0,05	0,1	0,5	1
17	Chrome VI (Cr^{6+})	mg/l	0,01	0,02	0,04	0,05

18	Copper (Cu)	mg/l	0,1	0,2	0,5	1
19	Zinc (Zn)	mg/l	0,5	1,0	1,5	2
20	Nickel (Ni)	mg/l	0,1	0,1	0,1	0,1
21	Iron (Fe)	mg/l	0,5	1	1,5	2
22	Mercury (Hg)	mg/l	0,001	0,001	0,001	0,002
23	Surface-active substances	mg/l	0,1	0,2	0,4	0,5
24	Total oil & grease	mg/l	0,01	0,02	0,1	0,3
25	Phenol (Total)	mg/l	0,005	0,005	0,01	0,02
26	Organic chlorine pesticide					
	Aldrin + Dieldrin	µg/l	0,002	0,004	0,008	0,01
	Endrin	µg/l	0,01	0,012	0,014	0,02
	BHC	µg/l	0,05	0,1	0,13	0,015
	DDT	µg/l	0,001	0,002	0,004	0,005
	Endosunfan(Thiodan)	µg/l	0,005	0,01	0,01	0,02
	Lindan	µg/l	0,3	0,35	0,38	0,4
	Chlordane	µg/l	0,01	0,02	0,02	0,03
	Heptachlor	µg/l	0,01	0,02	0,02	0,05
27	Organic phosphorus pesticide					
	Parathion	µg/l	0,1	0,2	0,4	0,5
	Malathion	µg/l	0,1	0,32	0,32	0,4
28	Herbicide					
	2,4D	µg/l	100	200	450	500
	2,4,5T	µg/l	80	100	160	200
	Paraquat	µg/l	900	1200	1800	2000
29	Total radioactivity α	Bq/l	0,1	0,1	0,1	0,1
30	Total radioactivity β	Bq/l	1,0	1,0	1,0	1,0
31	E.coli	MPN/ 100ml	20	50	100	200
32	Coliform	MPN/ 100ml	2500	5000	7500	10000

Note: The classification of surface water to assess and control the quality of water for various purposes of water use:

A1 - Good use for the purpose of domestic water supply and other purposes, such as type A2, B1 and B2.

A2 – Used for the purpose of domestic water supply but applying the appropriate treatment technology; aquatic plant and animal conservation, or purposes of use as type B1 and B2.

B1 - Use for irrigation and drainage purpose or other purposes with similar water quality requirements or other purposes of use such as type B2.

B2 – Water transportation and other purposes with low water quality requirements.

3. METHOD FOR DETERMINATION

3.1. Sampling for surface water quality monitoring conducted under the guidance of national standards:

- TCVN 5992:1995 (ISO 5667-2: 1991) - Water quality - Sampling. Guidance on sampling techniques.

- TCVN 5993:1995 (ISO 5667-3: 1985) - Water quality - Sampling. Guidance on storage and handling of samples.

- TCVN 5994:1995 (ISO 5667-4: 1987) - Water quality - Sampling. Guidance on sampling in natural and artificial lakes and ponds.

- TCVN 5996:1995 (ISO 5667-6: 1990) - Water quality - Sampling. Guidance on sampling in rivers and streams.

3.2. Analytical methods to determine the parameters of surface water quality shall comply with the guidance of the national standards or corresponding analytical standards of international organizations:

-TCVN 6492-1999 (ISO 10523-1994) - Water quality - Determination of pH.

-TCVN 5499-1995. Water quality - Determination of dissolved oxygen - Winkler method.

- TCVN 6625-2000 (ISO 11923-1997) - Determination of suspended solids by filtration through glass-fibre filters

- TCVN 6001-1995 (ISO 5815-1989) - Water quality - Determination of biochemical oxygen demand after 5 days (BOD 5) - Dilution and seeding method.

- TCVN 6491-1999 (ISO 6060-1989) - Water quality - Determination of the chemical oxygen demand.

- TCVN 6494-1999 - Water quality - Determination of ions of fluoride, chloride, nitrite, Orthophotphat, bromide, nitrate and soluble sulphate in liquid ion chromatography.

- TCVN 6194-1996 (ISO 9297-1989) - Water quality - Determination of chloride. The method of titration of nitrate silver with chromate indicator (MO method).

- TCVN 6195-1996 (ISO 10359-1-1992) - Water quality - Determination of fluoride - Electrochemical probe method for potable and lightly polluted water

- TCVN 6178-1996 (ISO 6777-1984) - Water quality - Determination of nitrite. Molecular absorption spectrometric method.

- TCVN 6180-1996 (ISO 7890-3-1988) - Water quality - Spectrometric method using sulfosalicylic acid

- TCVN 5988-1995 (ISO 5664-1984) - Water quality - Determination of ammonium - Distillation and titration method.

- TCVN 6181-1996 (ISO 6703-1-1984) - Water quality - Determination of total cyanide.

- TCVN 6336-1998 (ASTM D 2330-1988) - Test method for Methylene Blue Active Substances

- TCVN 5991-1995 (ISO 5666-3-1984) - Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Method after digestion with bromine

- TCVN 6002-1995 (ISO 6333-1986) - Water quality - Determination of manganese - Formaldoxime spectrometric method

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of gross alpha activity in non-saline water - Thick source method

- TCVN 6177-1996 (ISO 6332-1988) - Water quality - Determination of iron - Spectrometric method using 1,10 - phenanthroline

- TCVN 6193-1996 (ISO 8288-1986) - Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods

- TCVN 6197-1996 (ISO 5961-1994) - Water quality - Determination of cadmium by atomic absorption spectrometry

- TCVN 6222-1996 (ISO 9174-1990) - Water quality. Methods for the determination of total chromium by atomic absorption spectrometry

- TCVN 6626-2000 (ISO 11969-1996) - Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique)

- TCVN 6216-1996 (ISO 6439-1990) - Water quality - Determination of phenol index - 4-Aminoantipyrine spectrometric methods after distillation

- TCVN 5070-1995 - Water quality - Weight method for determination of oil and oil products

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of gross alpha activity in non-saline water - Thick source method

- TCVN 6219-1995 (ISO 9697-1992) - Water quality - Measurement of gross beta activity.

- TCVN 6187-1-1996 (ISO 9308-1-1990) - Water quality - Detection and enumeration of coliform organisms, thermo tolerant coliform organisms and presumptive Escherichia coli - Part 1: Membrane filtration method

The parameters specified in this Regulation not having national standards guiding the analytical method shall apply the corresponding analytical standards of the international organizations

4. IMPLEMENTATION ORGANIZATION

This Regulation shall apply in substitution for TCVN 5942:1995 - Water quality - surface water quality standards in the List of Vietnamese standards on environment which is mandatorily applied and issued together with Decision No. 35/2002/QD-BKHCNMT dated June 25, 2002 of the Minister of Science, Technology and Environment.

In case the national standards referred in this Regulation amended and supplemented or superseded shall be applied under new documents.

QCVN 09 : 2008/BTNMT

NATIONAL TECHNICAL REGULATION

ON UNDERGROUND WATER QUALITY

Introduction

QCVN 09:2008 / BTNMT was written by the Compilation Board of national technical regulations on water quality, submitted by the General Department of Environment and Legal Department for approval and issued under the Decision No. 16/2008/QD-BTNMT dated December 31, 2008 of the Minister of Natural resources and Environment.

NATIONAL TECHNICAL REGULATION

ON UNDERGROUND WATER QUALITY

1. GENERAL PROVISIONS

1.1. Scope of application

1.1.1. This regulation specifies the limit value of underground water quality parameters.

1.1.2. This regulation applies to assess and control the quality of underground water source, as a basis for the orientation of various purposes of use.

1.2. Explanation of terms

Underground water in this Regulation is the water in the soil and rocks underground.

2. TECHNICAL REGULATIONS

Limit values of the underground water quality parameters are specified in Table 1.

Table 1: Limit values of the underground water quality parameters

No.	Parameters	Unit	Limit values
1	pH	-	5,5 - 8,5
2	Hardness (as CaCO3)	mg/l	500
3	Total solids	mg/l	1500
4	COD ($KMnO_4$)	mg/l	4
5	Ammonium (as N)	mg/l	0,1
6	Chloride (Cl-)	mg/l	250
7	Fluoride (F-)	mg/l	1,0
8	Nitrite (NO^-_2) (as N)	mg/l	1,0
9	Nitrate (NO^-_3) (as N)	mg/l	15
10	Sulgreasee (SO_4^{2-})	mg/l	400
11	Cyanide (CN-)	mg/l	0,01
12	Phenol	mg/l	0,001
13	Arsenic (As)	mg/l	0,05

14	Cadmium (Cd)	mg/l	0,005
15	Lead (Pb)	mg/l	0,01
16	Chromium VI (Cr6 +)	mg/l	0,05
17	Copper (Cu)	mg/l	1,0
18	Zinc (Zn)	mg/l	3,0
19	Manganese (Mn)	mg/l	0,5
20	Mercury (Hg)	mg/l	0,001
21	Iron (Fe)	mg/l	5
22	Selenium (Se)	mg/l	0,01
23	Total radioactivity α	Bq/l	0,1
24	Total radioactivity β	Bq/l	1,0
25	E.Coli	MPN/100ml	Not found
26	Coliform	MPN/100ml	3

3. METHOD FOR DETERMINATION

3.1. Sampling for underground water quality monitoring conducted under the guidance of national standards:

- TCVN 5992:1995 (ISO 5667-2: 1991) - Water quality - Sampling - Guidance on sampling techniques

- TCVN 5993:1995 (ISO 5667-3: 1985) - Water quality -sampling -Guidance on the preservation and handling of samples

- TCVN 6000:1995 (ISO 5667-11: 1992) - Water quality -sampling -Guidance on the sampling of groundwaters

3.2. Analytical methods to determine the parameters of underground water quality shall comply with the guidance of the national standards or corresponding analytical standards of international organizations:

- TCVN 6492-1999 (ISO 10523-1994) - Water quality - Determination of pH

- TCVN 2672-78 – Potable water – Method for determing the general hardness

- TCVN 6178-1996 (ISO 6777-1984) - Water quality -Determination of nitrite - Molecular absorption spectrometric method

- TCVN 6180-1996 (ISO 7890-3-1988) - Water quality - Determination of nitrate - Spectrometric method using sulfosalicylic acid

- TCVN 6200-1996 (ISO 9280-1990) - Water quality - Determination of sulgreasee - Gravimetric method using barium chloride

- TCVN 6181-1996 (ISO 6703-1-1984) Water quality - Determination of total cyanide

- TCVN 5988-1995 (ISO 5664-1984) - Water quality - Determination of ammonium -Distillation and titration method

- TCVN 6194-1996 (ISO 9297-1989) Water quality -Determination of chloride - Silver nitrate titration with chromate indicator (Mohr's method)

- TCVN 6195-1996 (ISO 10359-1-1992) - Water quality - Determination of fluoride - Part 1: Electrochemical probe method for potable and lightly polluted water

- TCVN 6216-1996 (ISO 6439-1990) - Water quality - Determination of phenol index -4-Aminoantipyrine spectrometric methods after distillation

- TCVN 6626-2000 (ISO 11969-1996) - Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique)

- TCVN 6193-1996 (ISO 8288-1986) - Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods

- TCVN 6197-1996 (ISO 5961-1994) - Water quality - Determination of cadmium by atomic absorption spectrometry

- TCVN 6002-1995 (ISO 6333-1986) - Water quality - Determination of manganese - Formaldoxime spectrometric method

- TCVN 6177-1996 (ISO 6332-1988) - Water quality - Determination of iron - Spectrometric method using 1,10 - phenanthroline

- TCVN 6183-1996 (ISO 9965-1993) -Water quality - Determination of selenium - Atomic absorption spectrometric method (hydride technique)

- TCVN 59910-1995 (ISO 5666-3-1984) Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Method after digestion with bromine

- TCVN 6222-1996 (ISO 9174-1990) - Water quality -Determination of chromium - Atomic absorption spectrometric methods

- TCVN 6187-1-1996 (ISO 9308-1-1990) - Water quality - Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive Escherichia coli - Part 1: Membrane filtration method

The parameters specified in this Regulation not having national standards guiding the analytical method shall apply the corresponding analytical standards of the international organizations

4. IMPLEMENTATION ORGANIZATION

This Regulation shall apply in substitution for TCVN 5944:1995- Water quality - underground water quality standards in the List of Vietnamese standards on environment which is mandatorily applied and issued together with Decision No. 35/2002/QD-BKHCNMT dated June 25, 2002 of the Minister of Science, Technology and Environment.

In case the national standards referred in this Regulation amended and supplemented or superseded shall be applied under new document

QCVN 05:2013/BTNMT

NATIONAL TECHNICAL REGULATIONS ON AMBIENT AIR QUALITY

Introduction

QCVN 05:2013/BTNMT was written by the Compilation Board of national technical regulations on ambient air quality, submitted by the General Department of Environment and Legal Department for approval and issued under the Circular No. 32/2013/TT-BTNMT dated October 25, 2013 of the Minister of Natural resources and Environment.

National Technical Regulation on Ambient Air Quality

1. GENERAL PROVISIONS

1.1. Scope of applications

1.1.1. This Regulation deals with limitations on values of basic factors including sulphur dioxide (SO2), carbon monoxide (CO), dioxide nitrogen (NO2), ozone (O3), total suspended particles (TSP), PM10, PM2.5, particles, and lead (Pb) in ambient air.

1.1.2. This Regulation applies to supervision and assessment of ambient air quality.

1.1.3. This Regulation does not apply to air within manufacturing facilities and indoor air.

1.2. Interpretation of terms

In this Regulation, the terms below are construed as follows:

1.2.1. Total suspended particles (TSP) is total particles with aerodynamic diameter less than or equal to 100 μm.

1.2.2. Particle PM_{10} is total suspended particles with aerodynamic diameter less than or equal to 10 μm.

1.2.3. Particle $PM_{2,5}$ is total suspended particles with aerodynamic diameter less than or equal to 2,5 μm.

1.2.4. Average 1 hour: The arithmetic average of the measured values over a period of 1 hour.

1.2.5. Average 8 hours: The arithmetic average of the measured values over a period of 8 consecutive hours.

1.2.6. Average 24 hours: The arithmetic average of the measured values over a period of 24 consecutive hours (a day).

1.2.7. Annual average: The arithmetic average of the 24-hour average values measured over a period of one year.

2. Technical Reputation

Maximum value of basic parameters of ambient air is specified in Table 1.

Table 1: Maximum value of basic parameters of ambient aire

Unit: Micro gram over cubic meter ($\mu g/m^3$)

No.	Parameter	Average 1 hour	Average 8 hours	Average 24 hours	Annual average
1	SO_2	350	-	125	50
2	CO	30.000	10.000	-	-
3	NO_2	200	-	100	40
4	O_3	200	120	-	-
5	Total Suspended Particle (TSP)	300	-	200	100
6	Dust PM_{10}	-	-	150	50
7	Dust $PM_{2,5}$	-	-	50	25
8	Pb	-	-	1,5	0,5
Note: (-) unspecified					

E. Appendix 6: Stakeholder Communication Strategy

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
Disseminate information on project design, key impacts anticipated as well as any mitigation measures, to project Aps and beneficiaries	Language/Culture Literacy Managing expectations, including that of free water delivery and compliance with Viet Nam law (full cost recovery) Reach of information, especially in isolated or remote settlements in peri-urban areas and communes Lack of confidence in local authorities	Subproject Aps Community members (men & women in urban/peri-urban/rural communes) Women headed HH Poor HH	Subproject design, key benefits (including those of treated water supply), implementation arrangements and schedule of civil works Opportunities for temporary employment as construction workers, community mobilizers or IEC campaign facilitators Main impacts of subproject (positive and negative) through disclosure Planned mitigation measures, especially for female APs (including compensation rates, entitlements, grievance redress mechanism) View water as a commercial good and stress the importance of user cost recovery, including for poor HHs Targeted subsidies, including free connections and lifeline tariffs	Public information meetings Resettlement committee meetings in affected areas Printed information in local language(s) posted in accessible public areas Gender-sensitive IEC campaign, including community-level training and public media campaign Meetings, consultations and other interactions between PMUs/ESWSC and CSBs in the subproject area's service zones	Ongoing prior to implementation of activities Early in each phase of subproject preparation Subproject detailed design Ongoing during civil works Post evaluation after project completion	Primary: PMUs ESWSC Contractors/ subcontractors for civil works Local authorities at commune-, ward-, city- and district-level (CPCs, WPCs, CPCs and DPCs) VWU Community Health Centers (CHCs) Secondary: PPCs DPI DOLISA	Costs will be covered in part by the RPs, GAPs as well as basic project implementation budgets under PMU Incremental Cost and Construction Supervision Contract Resettlement Specialist ESWSC/PMU Social Development & Safeguards Specialists Compensation and Resettlement Committees (CRCs) Community Supervision Boards (CSBs) Community health workers (under respective DOHs)

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
			included in tariff by law to poor and women-headed households.				
Deliver information on labor opportunities and good labor practices	Language/Culture Literacy and low levels of awareness	Community members as well as outsiders hired as semi-skilled and skilled construction workers, community mobilizers and IEC campaign facilitators in subproject areas Contractors/ subcontractors for civil works	Opportunities for appropriate skills training/upgrading during period of hire, with quotas reserved for women (GAP) Core labor standards, including no forced labor and child labor Gender parity in work related compensation, i.e., equal pay for equal work, for women and men, and the right to separate living & toilet facilities at work sites Schedule of civil works Labor safety regulations Risks and prevention of HIV/AIDS transmission and Human Trafficking	Public information meetings Printed information in local language(s) and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites IEC campaign for HIV/AIDs and Human Trafficking, including community-level training and public media campaign	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	Primary: PMUs ESWSC Local authorities at commune-, ward-, city- and district-level VWU CHCs Secondary: PPCs DOLISA	Costs will be covered in part by the GAPs as well as basic project implementation budgets under PMU Incremental Cost and Construction Supervision Contract PMU Social Development & Safeguards Specialists CSBs Community health workers Health NGOs
Highlight responsibility of provincial government agencies in enabling access of disadvantaged groups to municipal water supply	Lack of political willingness to implement decrees and decisions Provincial budget constraints	PPCs DOLISA PCs at other administrative levels in provinces, i.e., local authorities	Basic project design, anticipated impacts and any planned mitigation and grievance redress measures as they apply to APs, beneficiary groups and workers in the province State support for	ESWSC meetings with relevant local authorities and government agencies authorities, attended by VWU officials at the appropriate level	From outsets of the project	MPI (as CA) ESWSC VWUs at all levels	Costs will be covered by the GAP and basic project implementation budgets under PMU Incremental Cost and Construction Supervision

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
			water related subsidies to poor and women headed HHs, and other vulnerable groups (including EMs, disabled, etc.), in accordance with Decrees 117 & 124				Contract ESWSC management PMU Director PMU Social Development & Safeguards Specialists
Inform Provincial VWUs about project design and entry points for their participation – community mobilization, IEC, and ensuring women's access to all project benefits	Lack of sectoral capacity Relative lack of resources and decision making authority compared to other departments and agencies, including ESWSC	Vietnam Women's Union (VWU)	Basic project design and anticipated impacts, as they matter to women Disseminate information on improved HH water management, sanitation and hygiene to communities in collaboration with Community Health Centers.	Public information meetings IEC campaign (including materials) to raise awareness on links between gender and WASH issues Training materials integrating gender	From outsets of the project	VWU ESWSC Local authorities at commune-, ward-, city- and district-level CHCs	Costs will be covered by the GAP budget PMU Director PMU Social Development & Safeguards Specialists CSBs Community health Workers
Inform network of Community Health Centers in project areas about project design and the role they are expected to play in disseminating information on improved WASH as well as HIV/AIDS causes & prevention	Relative lack of resources and decision making authority compared to other departments and agencies, including ESWSC	Community Health Centers (and community health workers), Department of Health	Disseminate information on health benefits of improved water supply, sanitation and hygiene to communities in collaboration with VWC Design and propagate training module about HIV/AIDS	Public information meetings, IEC sanitation and hygiene awareness materials, including community based training and public media campaign HIV/AIDS training module	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	VWU PMUs ESWSC Local authorities at commune-, ward-, city- and district-level CHCs	Costs will be covered by the project implementation budget (social development) PMU Social Development & Safeguards Specialists CSBs Community health workers

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
Promote community involvement in resettlement and project monitoring	Identifying valid community representatives Newly formed, slow to build up capacity required Functions vaguely Defined	Community Supervision Boards (CSBs) Compensation and Resettlement Committees (CRCs)	Information on resettlement areas, affected households, resettlement plan and compensation policies Core labor standards integrating gender concerns and labor safety regulations Special consideration of community members from poor and/or women-headed HHs in all aspects of the project Risks and prevention of HIV/AIDS transmission and Human Trafficking	Meetings between ESWSC/PMUs and CSBs and CRCs Public information meetings presided over by CSBs or CRCs Direct interactions between affected HHs and CSBs or CRCs Printed information in local language(s) posted in accessible public areas Gender-sensitive IEC campaign, including community-level training and public media campaign	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	VWU PMUs ESWSC Local authorities at commune-, ward-, city- and district-level	Costs will be covered by the GAPs and basic project implementation (social development component) budgets PMU Social Development & Safeguards Specialists CSBs Community health Workers
Ensure understanding of HIV/AIDS transmission and Human Trafficking risks, and prevention measures for both	Language/Culture Literacy and low levels of awareness	Communities in or near project area construction sites Workers on construction site	Key risks and mitigation measures of HIV/AIDS transmission and Human Trafficking	Public information meetings Printed information in local language(s) and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites IEC campaign for HIV/AIDs and Human Trafficking, including community-level training and public media campaign	Prior to commencement of civil works and throughout civil works	PMUs VWU CHCs Civil works contractors/ subcontractors	Costs will be covered in part by the GAPs as well as basic project implementation budgets PMU Social Development & Safeguards Specialists CSBs Community health workers Local NGOs with a health focus
Strengthen business	Inertia to change; tendency to	All ESWSC and PMU	Reasons why profit generation, user	Resettlement committee meetings and/or meetings	From outset of each subproject	Water Supply Companies	Costs will be covered in part

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
processes and institutions, integrating gender issues	maintain institutional and socioeconomic status quo	staff, especially women in executive and non-executive positions VWU members at all levels within the province	cost recovery and tariff roadmap are core principles of business viability Negotiate sharing of capital costs and underwriting of any subsidies to consumers with state agencies (PCs and DOLISA) Opportunities for training, exposure visits, with quotas reserved for female staff and VWU members to learn more about the sector Gender parity in work related compensation, i.e., equal pay for equal work, for women and men in ESWSC	with affected households, Printed information in local language posted in accessible public areas Training workshops and exposure visits to raise awareness about benefits of community participation in all aspects of project planning, implementation, and M&E Financial and technical training workshops Training materials to promote gender sensitivity Routine consultation with VWUs on gender-related matters relevant to project outputs Routine consultations between ESWSC management and women employees, in executive and non-executive positions, about professional issues that matter to them	Ongoing prior to implementation of activities Early in each phase of subproject preparation At project detailed design Ongoing during civil works	(ESWSC) as independent commercial & legal entities MPI PPCs PMUs VWUs	by the GAPs and project implementation budgets PMU Director PMU Social Development & Safeguards Specialists Staff welfare committees of ESWSC

Key: ADB - Asian Development Bank; PMU –Projects Management Board; APs – Affected Persons; CSB – Community Supervision Board; CPC – Commune Peoples Committee; CWU – Commune Women's Union; DARD – Department of Agriculture & Rural Development; DOC – Department of Construction; DONRE – Department of Natural Resources & Environment; DOT – Department of Transport; DPI – Department of Plan and Investment DRCs – District Resettlement Committees; GAP – Gender Action Plan; IAs – Implementing Agencies; IPP – Indigenous Peoples Plan; PP – Project Proposal; O & M – Operation & Maintenance; PPC – Provincial peoples Committee; of RIs –Rural Infrastructure; RP – Resettlement Plan; VWU – Vietnam Women's Union;

F. Appendix 5: Meeting minutes and Public consultation meeting attendance list

Dự án Hạ tầng Cơ bản Phát triển Toàn diện các tỉnh Đông Bắc

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

PHIẾU ĐIỀU TRA KHẢO SÁT MÔI TRƯỜNG

Ngày 16 tháng 9 năm 2016

Tại Sở Tài nguyên và Môi trường tỉnh Cao Bằng

Đại diện nhóm khảo sát điều tra môi trường - Dự án Hạ tầng Cơ bảnPhát triển Toàn diện các tỉnh Đông Bắc

1/ Ông Nguyễn Thanh Dương - Trưởng nhóm

2/ Bà Doãn Hồng Anh - Cán bộ hỗ trợ

Đã làm việc với:

Đại diện Sở Tài nguyên và Môi trường tỉnh Cao Bằng (có danh sách kèm theo)

Nội dung trao đổi làm việc:

1) Trao đổi các thông tin chung về Dự án Hạ tầng Cơ bản PT toàn diện các tỉnh Đông Bắc

- Tiểu Dự án: Nâng cấp tỉnh lộ 211 từ tt Hùng Quốc đi tt Trùng Khánh.

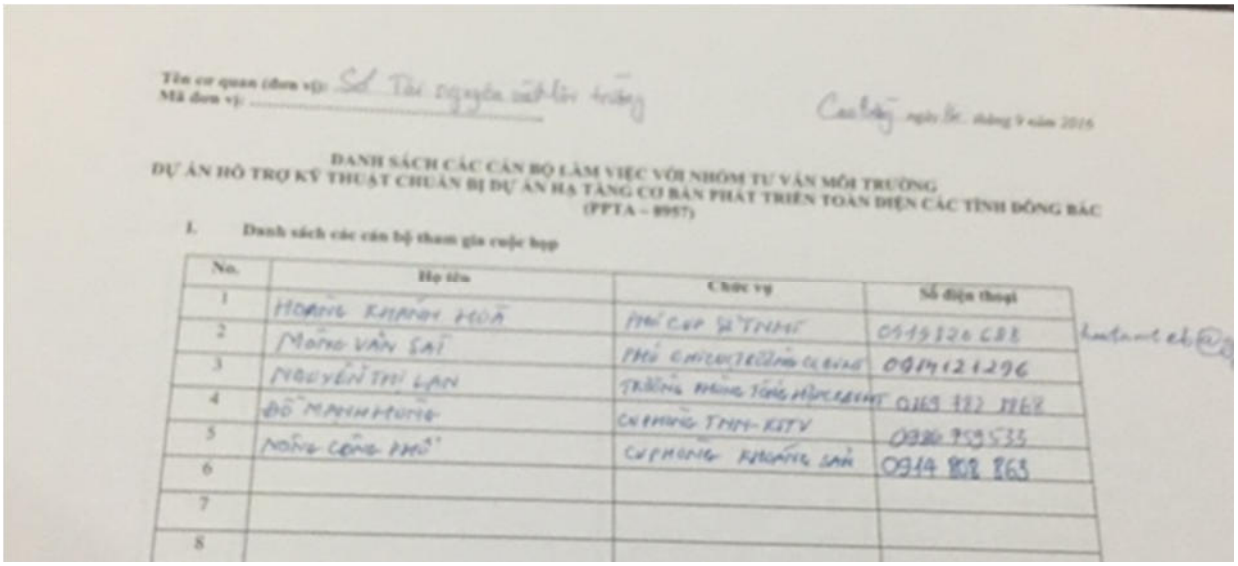
- Tiểu Dự án: Cấp nước xã Phù Ngọc và tt Xuân Hòa huyện Hà Quảng

2) Các thông tin về khu vực TDA

- Rừng phòng hộ nằm ở các khu bảo tồn. Có 8 khu ở tỉnh Cao Bằng như Phia Oắc, Vườn Cao Vít (nằm ở huyện Trùng Khánh nhưng cách xa điểm cuối tuyến đg (hơn 10 km))

Có một số chòm rừng trên các đỉnh núi đá vôi dọc theo tuyến đường. Chủ yếu [illegible] phục hồi [illegible]

- Có danh sách các mỏ vật liệu cấp phép đến 2050.



Tên cơ quan (đơn vị): Sở Tài nguyên và Môi trường
Mã đơn vị: .....

Cao Bằng ngày 8 tháng 9 năm 2016

DANH SÁCH CÁC CÁN BỘ LÀM VIỆC VỚI NHÓM TƯ VẤN MÔI TRƯỜNG
DỰ ÁN HỖ TRỢ KỸ THUẬT CHUẨN BỊ DỰ ÁN HẠ TẦNG CƠ BẢN PHÁT TRIỂN TOÀN DIỆN CÁC TỈNH ĐÔNG BẮC
(PPTA – 8957)

I. Danh sách các cán bộ tham gia cuộc họp

No.	Họ tên	Chức vụ	Số điện thoại
1	HOÀNG KHÁNH HOÀ	PHÓ CHÁNH VĂN PHÒNG	0913926688
2	MÔNG VĂN SÁI	PHÓ CHI CỤC TRƯỞNG CHI CỤC	0914121296
3	NGUYỄN THỊ LAN	TRƯỞNG PHÒNG TỔNG HỢP KẾ HOẠCH	0169 982 1468
4	ĐỖ MẠNH HƯỞNG	CV PHÒNG TNMT-KTTV	0386 959 535
5	NÔNG CÔNG PHỐ	CV PHÒNG KHOÁNG SẢN	0914 862 863
6			
7			
8			

Dự án Hạ tầng Cơ bản Phát triển Toàn diện các tỉnh Đông Bắc

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

PHIẾU ĐIỀU TRA KHẢO SÁT MÔI TRƯỜNG

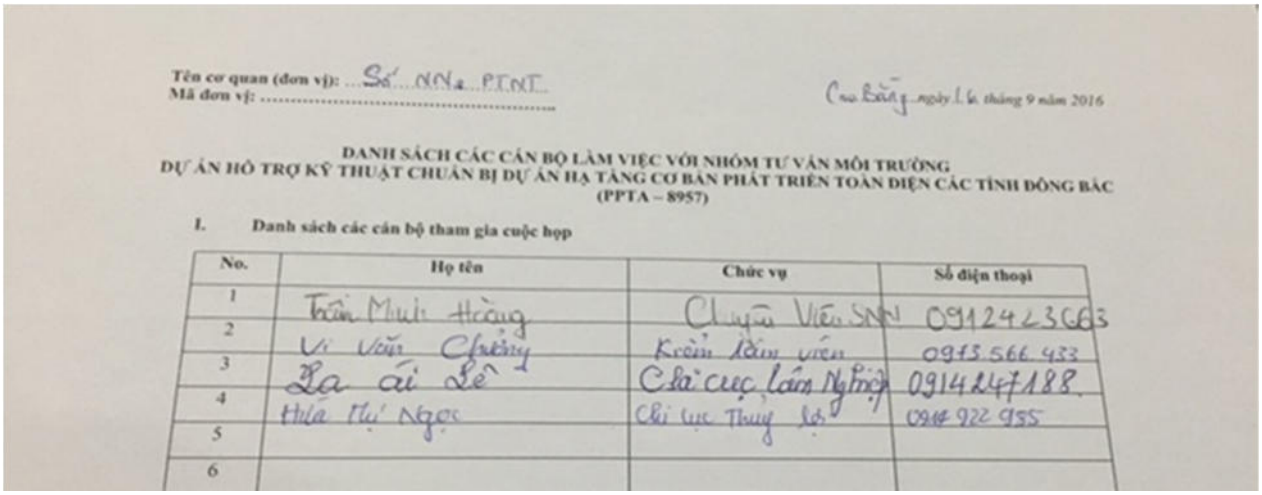
Ngày 16 tháng 9 năm 2016
Tại Nông nghiệp và Phát triển Nông thôn tỉnh Cao Bằng

Đại diện nhóm khảo sát điều tra môi trường - Dự án Hạ tầng Cơ bảnPhát triển Toàn diện các tỉnh Đông Bắc
1/ Ông Nguyễn Thanh Dương - Trưởng nhóm
2/ Bà Doãn Hồng Anh - Cán bộ hỗ trợ

Đã làm việc với:
Đại diện Sở Nông nghiệp và Phát triển Nông thôn tỉnh Cao Bằng (có danh sách kèm theo)

Nội dung trao đổi làm việc:

1) Trao đổi các thông tin chung về DA Hạ tầng Cơ bản PT Toàn diện các tỉnh Đông Bắc
- TDA: Nâng cấp tỉnh lộ 211 Trà Lĩnh - Trùng Khánh
- TDA NSH thị trấn Xuân Hòa + xã Phù Ngọc, Hà Quảng
2) Thông tin chung khu vực TDA.
Rừng Cao Bằng phân 3 loại theo Q.định 445 của UBND tỉnh Cao Bằng.
TT Hùng Quốc: 13378.8 ha; huyện Trùng Khánh 25.546.1 ha; Huyện Hà Quảng: 27.034.5 ha, khu Pác Bó: 1385 ha. K° có diện tích rừng phòng hộ tại khu vực 2 TDA. Rừng chủ yếu phân kết về cho người dân quản lý.
Các huyện có Ban chỉ đạo Dự án BVR và PT rừng bao gồm cả kiểm lâm và cán bộ ở xã.
Có file pdf diện tích rừng phòng hộ của 3 huyện.



Tên cơ quan (đơn vị): Sở NN & PTNT
Mã đơn vị: .....

Cao Bằng ngày 16 tháng 9 năm 2016

DANH SÁCH CÁC CÁN BỘ LÀM VIỆC VỚI NHÓM TƯ VẤN MÔI TRƯỜNG
DỰ ÁN HỖ TRỢ KỸ THUẬT CHUẨN BỊ DỰ ÁN HẠ TẦNG CƠ BẢN PHÁT TRIỂN TOÀN DIỆN CÁC TỈNH ĐÔNG BẮC
(PPTA – 8957)

I. Danh sách các cán bộ tham gia cuộc họp

No.	Họ tên	Chức vụ	Số điện thoại
1	Trần Mười Hồng	Chuyên Viên SNN	0912423663
2	Vi Văn Chường	Kiểm lâm viên	0913.566.433
3	Đa ái Lê	Chi cục Lâm Nghiệp	0914247188.
4	Hứa Thị Ngọc	Chi cục Thuỷ lợi	0918 922 955
5			
6			

Tên cơ quan (đơn vị): TT Xuân Hòa + xã Phú Ngọc ..... ngày ..... tháng 9 năm 2016
Mã đơn vị: .....

DANH SÁCH CÁC CÁN BỘ LÀM VIỆC VỚI NHÓM TƯ VẤN MÔI TRƯỜNG
DỰ ÁN HỖ TRỢ KỸ THUẬT CHUẨN BỊ DỰ ÁN HẠ TẦNG CƠ BẢN PHÁT TRIỂN TOÀN DIỆN CÁC TỈNH ĐÔNG BẮC
(PPTA – 8957)

I. Danh sách các cán bộ tham gia cuộc họp

No.	Họ tên	Chức vụ	Số điện thoại
1	Trương Thị Tâm	cán bộ PC-XD	01635615777
2	Nguyễn Văn Minh	Cán bộ Phòng Tài chính-KH	01235101391
3	Hoàng Minh Dũng	Chuyên viên phụ trách Hội	0976.980.881
4	Đàm Tạo Cường	Cán bộ phòng TN-MT	0913.333.088
5	Nông Thị Hằn	Cán bộ Địa chính-MT	0984457616
6	Lã Hoài Bắc	Chủ tịch UBND xã Phú Ngọc	0263600108
7			
8	Hà Thị Khuyên	Người Dao	
9			
10			
11			
12			