

# Initial Environmental Examination

September 2014

## VIE: Viet Nam Water Sector Investment Program – Cua Lo Water Supply Subproject

Prepared by Cua Lo Water Supply Company for the Asian Development Bank.



Nghe An PPC  
Cua Lo Water Supply One-member Ltd. Company

**Asian Development Bank**

**MFF0054-VIE: PFR3**

**CUA LO WATER SUPPLY SUBPROJECT**

**CUA LO TOWN, NGHE AN PROVINCE**

**FINAL REPORT**

**APPENDIX 11**

**INITIAL ENVIRONMENTAL EXAMINATION REPORT**

**September 2014**



## **ABBREVIATIONS**

ADB	Asian Development Bank
BOD	Biological Oxygen Demand
BPS	Booster Pumping Station
COD	Chemical Oxygen Demand
CPC	Commune People's Committee
DARD	Department of Agriculture and Rural Development
CLWACO	Cua Lo Water Supply One Member Ltd,. Company
NAPC	Nghe An People's Committee
DoNRE	Department of Natural Resources and Environment
DPC	District People's Committee
DPI	Department of Planning and Investment
EIA	Environmental Impact Assessment
HH	Household
IEE	Initial Environmental Examination
lcpd	Litters per Capita per Day
LEP	Law on Environment Protection
MARD	Ministry of Agriculture Rural Development
MASL	Meter Above Mean Sea Level
MOD	Meter Over Datum
MoLISA	Ministry of Labour, Invalids and Social Assistance
MoNRE	Ministry of Natural Resources and Environment
MPN	Maximum Probable Number
ND	Not detected
NEA	National Environmental Agency
NPV	Net Present Value
NRW	Non-Revenue Water
PAC	Poly-Aluminium Chloride
PMU	Project Management Unit
PPC	Provincial People's Committee
PPTA	Project Preparation Technical Assistance
RBO	River Basin Organization
RC	Reinforced Concrete
SEA	Strategic Environmental Assessment
TDS	Total Dissolved Solids
TOR	Term of Reference
TREC	Technical Resources and Environment Co., Ltd
TSS	Total Suspended Solids
USP	Utility Support Project
UXO	Unexploded Ordnance
WHO	World Health Organization
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

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## **EXECUTIVE SUMMARY**

### **Background and Scope**

1. The project, classified as *Environment Category B*, is judged to have some potential adverse environmental impacts, particularly in relation to pipeline construction activities and, to a lesser degree, the disposal of sludge from the water treatment process. The unavoidable construction impacts are temporary and can be mitigated, whereas adverse impacts related to sludge disposal have been avoided by incorporating sludge dewatering in the design of the water treatment facility.
2. The raw water source, specified by the Nghe An People's Committee, is based on an approved plan to build a pumping station to pump water from the Phuong Tich River and a water treatment plant in Nghi Hoa Commune, Nghi Loc District, Nghe An Province. As such, the environmental assessment covered only the construction of the water treatment plant in Nghi Hoa Commune, the booster pumping station (BPS) and the administration building in Nghi Huong Ward, Cua Lo Town, and the transmission pipeline from the water treatment plan to the BPS and the rehabilitation, and the distribution network for treated water.

### **Project Description**

3. In 1995, the Cua Lo water treatment plant and water supply system with a capacity of 5,000m<sup>3</sup>/day was invested for construction. In 1999, the Cua Lo water treatment plan and water supply system was completed and put into operation with an actual capacity of 3,000m<sup>3</sup>/day, only serving 25% of the overall water demand for the town (According the statistic data in 2011 at FS stage). The existing main raw water source is from the Phuong Tich River.
4. With the existing capacity, the system cannot meet the water demand at the present time as in the future of Cua Lo Town and its vicinity. In 2011, the coverage of water supply network was 73%, but the rate water supply of the town is only about 59%. The water supply service is intermittent. The old pipes have been severely degraded, leakage occurs in most pipelines. Under these circumstance, the implementation of the construction investment project: Rehabilitation and Expansion of Cua Lo Water Treatment from the capacity of 3,000m<sup>3</sup>/day up to 13,000m<sup>3</sup>/day is needed, in order to meet the growing water use demand; this project is highly feasible.
5. The proposed project consists of: raw water intake, reservoir, raw water pumping station, treatment units, treated water storage tanks, secondary pumping station, chemical house, sedimentation pond and ancillary facilities such as administration building, warehouse, guard house, garage, yard and roads, gates and fences, trees... Construction of BPS in combination with the company office in Nghi Huong Ward, Cua Lo Town including main items: treated water storage tank, BPS, company office building, warehouse, workshop, guard house, yard and roads, gates and fence... installation of water supply network, transmission pipeline, distribution, services and connection to the HHs.
6. The transmission pipeline starts from the Nghi Hoa water treatment plant to direct water to the BPS in Nghi Huong Ward, then water from the BPS will be distributed to the wards and communes under the Project area.
7. The project area has a relatively developed river and canal system including South Irrigation System; that is the Phuong Tich river (the Cam river) and its downstream section is known as the Cua Lo river; in the south of the river is a tributary of the Cam river such as Kiet river, Nghi Xa river and the system of canals and ditches in Eastern communes of Nghi Loc

district. In general, the hydrological regime of rivers and canals in the region is relatively stable due to flowing through the low-lying plain area, which is downstream of the rivers before flowing into the sea.

8. Water is drawn from the Phuong Tich River to the reservoir through the reinforced concrete (RC) pipeline. At the sedimentation pond, water is neutralized, and suspended solids and impurities in raw water are primarily settled. The sedimentation pond is constructed near the water collection inlet which is approximately 30m far from the Phuong Tich river bank. The Company will be proactive to reserve sufficient water source in the raw water sedimentation pond to ensure that water is still produced during prolonged drought condition (the raw water sedimentation pond has a storage capacity of approximately 150,000m<sup>3</sup>).

9. When the prolonged drought occurs, depending on the actual condition, the Company will coordinate with the local authorities and other agencies to provide the proper options for operation and regulation, absolutely not impacting the irrigation water for agricultural production of the localities along the Phuong Tich River.

10. Water treatment process will basically consists of two stages: (1) clarification, and (2) filtration and disinfection. Aside from the conventional water treatment units (receiving tank, reaction tank, settlement tank, filter tank, and clean water tank), other structures to be constructed at the WTP site are a chemical house, chlorine house, generator house, warehouse, pumping station, and administration office. Chemicals to be used on a regular basis during operation are poly-aluminium chloride (PAC) for flocculation, soda for pH control, and chlorine for disinfection.

### **Impacts and Mitigation Measures**

11. The main benefit of the proposed project is a decreased supply costs to consumers as a result of shifting from non-piped sources (i.e., shallow wells in the case of Cua Lo town) to a piped water system under CLWACO. According to PPTA economic analysis, the project would generate direct user benefits valued at \$54 M (NPV at 2010 prices). Indirect user benefits include: (a) cost savings of \$11.8 M due to shifting from well water to CLWACO water for existing customers (non-incremental water); (b) value of the incremental water supplied, \$6.4 M; and (c) value of health benefits, \$40 M. The EIRR is 15.6%.

12. Expected climate change impacts in the Center of Vietnam include increased in frequency and/or intensity of tropical cyclones; increased rainfall and run-off; an expansion in flooded areas and a rise in annual flood levels. Climate change impacts will be considered during detailed design.

13. The Table below summarizes the potentially adverse environmental impacts of the project, mainly associated with construction works, and corresponding safeguards and mitigation measures.



Potentially Significant Impacts of the Project	Summary of Mitigation Measures and Safeguards	Verification and Monitoring Means
<ul style="list-style-type: none"> <li>- <b>Construction:</b> Excavation work for the pipeline trenches will produce spoil; heaps of excavated soil beside the trench could obstruct community access, and erosion from spoil storage areas could silt up nearby streams and drains. Dry heaps could cause dust nuisance.</li> </ul>	<ul style="list-style-type: none"> <li>- Temporary heaps of excavated soil to be used to backfill the pipeline trench should not be left on the roadside for long periods, and should be watered regularly to prevent excessive dust.</li> <li>- At excavation sites close to drains and streams, silt traps should be used to prevent excessive water turbidity.</li> <li>- Storage or disposal areas for excess spoil should be sited so as not to be susceptible to flooding, and not located on steep slopes. Adequate drains/ditches should be installed around the area.</li> <li>- Tender documents for construction should require provisions for proper handling and disposal of spoil. Soundness of measures should be part of selection criteria for contract awards.</li> </ul>	<ul style="list-style-type: none"> <li>- Water quality along the Phuong Tich River (at four locations) to be monitored every 3 months throughout the duration of pipeline construction. Include 21 criteria parameters under National technical Code QCVN 08:2008/BTNMT for surface waters.</li> <li>- Groundwater quality to be monitored in three locations 2 times per year during project construction: 14 parameters based on Vietnamese Code QCVN 09:2008 for underground water.</li> <li>- Bidding documents, contractor plans and compliance reports on the temporary storage and disposal of spoils. Also, criteria used by the PMB procurement committee in contractor selection.</li> <li>- Follow-up consultations and interviews with local residents, every 3 months during construction. (To be done after results of water and air sampling are completed.)</li> </ul>
<ul style="list-style-type: none"> <li>- <b>Construction:</b> Obstruction to traffic flow during raw water pipeline construction, exacerbated by the narrow road and work spaces: <ul style="list-style-type: none"> <li>- Local residents could be cut off from the road due to the trench-building</li> <li>- Increased traffic of dump trucks carrying spoils to and from storage areas</li> <li>- Air pollution from excavation and transport equipment</li> <li>- Traffic hazard to pedestrians, especially school children and</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Excavation and transport equipment should be appropriately sized to fit the narrow road and limited work spaces. Impose speed limits.</li> <li>- Durable wooden or steel plates/planks should be placed across open trenches and drainage ditches to provide temporary crossings.</li> <li>- Check emissions from construction and transport equipment for compliance with standards, particularly for particulates.</li> <li>- During dry weather, the construction transport route near residential areas should be sprayed with water to prevent excessive</li> </ul>	<ul style="list-style-type: none"> <li>- Air quality to be monitored in 3 locations and every 3 months along the pipeline construction route during construction; include 9 parameters based on QCVN 05:2009/BTNMT National technical regulation on ambient air quality</li> </ul>

elderly	dust. Dump trucks loaded with dry earth should be covered.	
<ul style="list-style-type: none"> <li>- <b>Construction:</b> Nuisance and public safety hazards caused by pipeline excavation and pipe-laying activities in urban areas</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Work schedules should be well-planned and activities during rush hours near schools and markets should be minimized; construction and materials storage sites should be adequately lighted at night; open trenches must be fenced and clearly marked; and adequate sanitation facilities for workers should be provided at the major work sites.</li> <li>- Contractors must avoid activities producing loud noise and vibration if night time construction work is necessary.</li> <li>- Ensure compliance with existing Vietnamese regulations and standards for managing pollution, nuisance effects, and public safety hazards related to construction works.</li> <li>- Tender documents to require contractor to specify safeguards and compliance measures, which will be considered in awarding contracts.</li> </ul>	<ul style="list-style-type: none"> <li>- Bidding documents, contractor plans, and regulatory compliance reports.</li> <li>- Criteria used by the PMB procurement committee in contractor selection.</li> <li>- Follow-up consultations and interviews with local residents, every 3 months during construction.</li> <li>-</li> </ul>
<ul style="list-style-type: none"> <li>- Operation: Hazard posed by water treatment process chemicals during operation, of which Chlorine is the most hazardous</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Clearly mark the chlorine storage house, storage containers, and associated process equipment, and keep Chlorine containers moisture-free and stored separately from other chemicals.</li> <li>- Provide adequate personal protective equipment for workers handling chlorine. They should be trained on safe work practices and emergency steps in case of exposure. Adopt regular inspection and maintenance schedule for all chlorine storage and handling equipment.</li> </ul>	<ul style="list-style-type: none"> <li>- Detailed design of the water treatment plant facilities, and operating rules for the handling of chemicals during commissioning and WTP operation.</li> <li>-</li> </ul>
<ul style="list-style-type: none"> <li>- Operation: Disposal of water treatment sludge and wastes from WTP operation</li> </ul>	<ul style="list-style-type: none"> <li>- The recommended design feature of the WTP is dewatering of sludge by plate pressing (producing caked sludge) so that it can be easily transported and disposed in</li> </ul>	<ul style="list-style-type: none"> <li>- Detailed design of the water treatment facilities, construction plan, commissioning plan and report.</li> </ul>

	<p>controlled landfill.</p> <ul style="list-style-type: none"> <li>- Proper procedures (during plant commissioning) for the disposal of test water, water used for disinfecting tanks, and other chemical wastes from the plant start-up and adjustment process will be incorporated into the contract specifications during the testing and commissioning stage of the WTP.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>-</li> <li>-</li> </ul>
<ul style="list-style-type: none"> <li>- Operation: Increase in the volume of municipal wastewater generated.</li> </ul>	<ul style="list-style-type: none"> <li>- The town government has planned for the simultaneous refurbishment and expansion of its solid waste and wastewater treatment facilities – Feasibility study for solid waste treatment and landfill by these facilities have not been constructed yet; it therefore meet a lot of difficulties.</li> </ul>	<ul style="list-style-type: none"> <li>- Regular monitoring reports on wastewater treatment effluent with reference to standards set under TCVN 7222:2002 for the operation of municipal WWTPs, and TCVN 188:1996 on discharge standards for urban WWTPs.</li> </ul>

### **Information Disclosure, Public Consultation, and Grievance Redress**

14. With support from the Technical Resources and Environment Co., Ltd One Member, public information and consultation activities were carried out as part of a baseline survey of local environmental conditions along the pipeline corridor and in the WTP plant site. The construction of Nghi Hoa Water Treatment Plant should permanently acquire 80,950m<sup>2</sup>. In which, part of the land area previously Nghi Hoa Commune People's Committee let rent out to the local persons for brick production and freshwater fish farming, and now this land leases have expired. The remained is the public land area managed by Nghi Hoa Commune People's Committee. In this land area, there are five temporary houses and other structures constructed by the local persons for brick production; in addition, there are some trees, and the construction of the project will not require acquisition of land and no HHs are required to relocate.

15. Residents responding to the survey questionnaire were informed of its purpose and expected benefits, and about the nature of construction activities to be undertaken in the area. Overall, there was no opposition raised against the proposed project. However, respondents and focus group discussants raised concerns that were mostly about: traffic congestion during construction, land occupied temporarily (for construction of distribution pipeline network, service) is relatively large, spread along the pipelines, so the negative impacts are significant if the resettlement work is not done effectively at the same time during installation of pipes. Currently, bombs, mines, UXOs remaining after war may still be buried in the soil. So, if the bomb-mine clearance is not carried out, they may explode before construction.

16. The three-stage grievance redress mechanism will be established for raising and resolving grievances related to environmental impacts and community dislocation and resettlement. As a guiding principle, grievances related to any aspect of the Project will be handled through negotiation aimed at achieving consensus. Complaints and grievances will pass through the three stages-first through the Commune People's Committee, second

through the Town People's Committee, and third through the Provincial People's Committee-before such grievances can be elevated to a court of law as a last resort. The CLWACO will shoulder all administrative and legal fees that might be incurred in the resolution of such grievances and complaints.

### **Environmental Management Set-up**

17. **Institutional Arrangement:** The project will be implemented under the Nghe An People's Committee as the Executing Agency and the CLWACO as the project implementing agency. A Project Management Unit (PMU) has been created to supervise the implementation, on behalf of CLWACO.

18. The PMU will be responsible for fulfilling the environmental requirements of the project, in particular for incorporating the mitigation measures and safeguards identified in this report in the detailed engineering design of the pipeline, WTP and distribution network, as well as in the bid documents and construction contract documents. The PMU will also be responsible for commissioning water and air quality sampling activities, undertaking environment-related investigations that may arise during implementation (in coordination with the Nghe An Environment Protection Agency), and responding to environment or nuisance-related complaints from residents or businesses affected by the project works.

19. Technical Resources and Environment Co., Ltd One Member will be requisitioned to provide environmental monitoring support during project construction (using as baseline the environment survey that was conducted as part of this IEE), and to conduct follow-up consultations and interviews with local residents to identify concerns or grievances arising during construction.

20. A sub-group under the PMU would be designated to handle environment and public safety concerns. Its main duties are to:

- a. Oversee the implementation of the safeguards related to handling of spoils, water quality protection, public nuisance impacts, unexploded ordnance (UXO) survey, and public safety;
- b. Coordinate with the Nghe An Environmental Protection Agency on regulatory compliance issues (for water quality in streams affected by construction drainage or erosion from storage areas for excavated soil, noise and vibration from construction sites, sanitation in workers campsite, etc.);
- c. Check that the safeguards are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts;
- d. Prepare terms of reference (TOR) for the survey of the pipeline route to detect UXOs(if present in the pipeline work areas);
- e. Prepare TOR for the conduct of water and air quality sampling, including follow-up interviews with local residents on issues and concerns arising during project construction;
- f. Advise the PMU director on environment-related concerns arising during project construction, and recommend corrective measures;
- g. Disseminate to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among HHs or small businesses near the construction sites;

h. Prepare a quarterly status reports on environment and public safety protection to be submitted (through the PMU director) to the Nghe An PC.

21. Safeguards compliance monitoring during the construction phase-particularly compliance with safeguard measures specified in construction contracts, as recommended in this report--will be incorporated in the duties of the construction supervision company to be engaged by CLWACO (and supervised by the PMU). The compliance inspections and audits will be documented, and findings and recommendations for corrective measures submitted to CLWACO. During the operation phase, CLWACO will be responsible for safeguards and effluent monitoring, and the findings will be reported to the DoNRE

22. The Nghe An Environmental Protection Agency will conduct random environmental monitoring and inspection before, during, and after construction, as well as in the event of emergencies. It will also review the monitoring reports of the TREC. If abnormalities are found, the DoNRE may impose fines and issue a notice of rectification with a specific deadline to the responsible entities. If complaints are formally received from the public through the People's Committee, the Nghe An Environmental Protection Agency will carry out verification inspections.

23. Within three months after the construction completion or no later than one year, an environmental acceptance monitoring and audit report on the completion of the project components will be prepared by a qualified environmental institute, e.g., the Technical Resources and Environment Co., Ltd One Member. The report will be reviewed and approved by the DoNRE and submitted to the ADB.

24. The environmental monitoring, including the environmental benefit monitoring, will be incorporated into the project performance management system (PPMS) indicators for the project. Assisted by a local environment specialist, the PMU will be responsible for analyzing and consolidating the data via their management information system. The PPMS will be designed to allow adequate flexibility to adopt remedial actions regarding the project design, schedules, activities, and development impact. At the start of the project, the PMU and consultants will develop comprehensive PPMS procedures for systematically generating the data on inputs and outputs of the project components, and agree on the environmental and related socioeconomic indicators to be used to measure the project impacts. The PMU will refine the PPMS framework, confirm the achievable goals, firm up the monitoring and recording arrangements, and establish the systems and procedures no later than 6 months after the loan takes effect.

25. Budget. The monitoring budget covers: (a) follow-up perception surveys and consultations with local residents to be commissioned by the PMB, preferably with the Technical Resources and Environment Co., Ltd One Member which conducted the baseline environment/site survey and facilitated the public consultations for the IEE; (b) surface water, groundwater and air quality monitoring during construction; (c) survey of the pipeline trench route to check that there are no UXO that might endanger construction workers; (d) a local environment specialist to provide intermittent support to the PMM (in preparing survey TORs, assessment of water and air quality sampling results, drafting of safeguard provisions to be incorporated in construction tender documents and contracts, preparing reports to the Nghe An PC and DoNRE); and (e) cost of orientation-training for PMU staff and community leaders on managing environmental impacts of pipeline construction and related safeguards (to be facilitated by the environment specialist). The total budget is \$230,000, to be funded from the loan proceeds.

26. During the operation of the new water treatment plant, water quality monitoring of drinking water taps at various locations in the new or expanded CLWACO service areas will be done routinely by the Environmental Protection Agency of the DoNRE in compliance with Vietnam regulations and using the agency's own budget.

### **Project Implementation Schedule**

27. The main project tasks are presented in the table below

<b>Tasks</b>	<b>Tentative schedule</b>
Loan agreement negotiation and signing	11/2014
Establishment of PMU	Early 2015
Preparation of detailed design, cost estimate and bidding document, procurement and selection of bidder.	2nd Quarter 2015
Update EMP and conduct consultation with downstream communities;	3 <sup>rd</sup> Quarter 2015
Coordinate with the Environment Protection Center on regulatory compliance issues	All duration of the project
Construction duration (24 months)	Start Early 2016

### **Conclusion and Recommendation**

28. The proposed project will produce significant benefits for the population of Cua Lo Town, specifically by enabling HHs that are currently not served or only partially served by CLWACO to shift from reliance on wells as a source of water (which has to be boiled or filtered) to more secure and safe piped water source.

29. The potential adverse environmental impacts of the project are the consequence mainly of construction activities, in particular the potential impairment of water and air quality in areas near the pipeline construction corridor, and nuisance and safety hazards posed to nearby HHs and small businesses. However, these impacts are temporary and can be mitigated.

30. HHs that will be affected by construction activities, either because of dislocation or damage to property, will be relocated and/or compensated in accordance with ADB guidelines. These measures are presented in a separate report focused on the project's resettlement and compensation aspects.

31. For purposes of compliance with ADB environmental assessment guidelines, no additional study or full environmental impact assessment is needed to further assess the potential environmental impacts of the project.

## **I. BACKGROUND**

1. Cua Lo town water supply project is part of the seven water supply subprojects<sup>1</sup> that formed the third Periodic Funding Request (PFR-3) of the Multi-tranche Financing Facility (MFF0054-VIE) for Support of the Water Sector in Viet Nam. The tranche finances 7 water companies for urban water supply, including one economic zone (see Figure 1).

**Figure 1: Location of Sub-Projects**



2. This project, classified as Environment Category B, is judged to have some potential adverse environmental impacts, particularly in relation to pipeline construction activities and, to a lesser significance, the disposal of sludge from the water treatment process. The unavoidable construction impacts are temporary and can be mitigated, whereas adverse impacts related to sludge disposal have been avoided by incorporating sludge dewatering in the design of the water treatment facility.

3. This report was prepared, from August to April 2011, by the Cua Lo PMU with support from the Technical Resources and Environment Co., Ltd. It was prepared in compliance ADB Safeguard Policy Statement (ADB SPS 2009). It follows the standard outline for environmental assessments: legal and administrative framework; description of the environment; description of the project and its significance; assessment of environmental

<sup>1</sup> Subprojects in Nghe An Province (Thai Hoa, Vinh & Cua Lo), Thai Nguyen Province (Thai Nguyen City), Bac Giang Province (Bac Giang City), Quang Nam Province (Dien Nam - Dien Ngoc and Tam Hiep) and Thanh Hoa Province (Nghi Son Economic Zone)

impacts and mitigation measures, including alternatives considered; public consultation and information disclosure; and environment management plan.

4. The scope of this assessment covers: (a) transmission by pipeline of raw water to be abstracted from a reservoir, (b) water treatment facilities, and (c) treated water distribution.

## **II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

5. Vietnam's Law of Water Resources was passed in June 2012. It establishes water as a resource to be managed as an economic good. Water resources boundaries are to be delineated according to hydrological rather than administrative boundaries. The law also gave strong institutional focus on creating a national apex body for water resources management, the setting up of river basin organizations, decentralization of management for water resources assets including infrastructure, and greater accountability for water services delivery.

6. The water law also provided for establishment of more effective regulatory institutions, including the use of abstraction licenses, discharge permits and more strengthened safety procedures for infrastructure development and operation. The Law was not only intended to facilitate shift to more sustainable and economically efficient development of the country's water resources; it was also intended to support achievement of the country's broader imperatives of poverty alleviation, socio-economic development and environmental protection.

7. The Ministry of Agriculture and Rural Development (MARD) was originally responsible for implementing the water law; this responsibility was later transferred to the Ministry of Natural Resources and Environment (MoNRE). Subsequently, MoNRE was mandated to direct river basin management activities throughout the country.

8. Under the Law on Water Resources, the GoV issued Decree No. 201/2013/ND-CP: on stricter regulations for effective water resource management. Under this Decree, projects requesting water abstraction from underground or surface water or for discharging wastewater into water bodies have in particular to get permits and to collect opinions of representatives of local communities. The aforesaid projects include reservoirs and dams with a total capacity of at least 500 cubic meters and works using surface water with a total flow of 10 cubic meters per second, reservoirs and dams interrupting rivers' and streams' current for at least one kilometer, and works discharging wastewater into local water sources with a flow of 10,000 cubic meters per day.

9. The Law of Environmental Protection (LEP) was originally passed in 2003 and took effect in January 2004. Decree 175/CP issued in October 2004 provided implementing guidelines for (a) assignment of environmental management responsibilities among ministries, provinces and people's organizations; (b) an environmental impact assessment system; and (c) a regulatory permitting system based on standards. Chapter III of Decree 175/CP contains requirements for the submission of environmental impact assessments by investors and enterprises; the appendices to the Decree also contained detailed provisions prescribing the format and content of EIA reports. In 1998, Circular 490 was issued providing additional guidelines for the preparation and review of EIA reports.

10. In November 2005, the LEP was revised. Decree 80/2006, issued in August 2006, provided detailed implementation guidelines for the amended law, replacing Decree 175/CP. Decree 80/2006 was added in December 2008 by Decree No. 21/2008 of the Government. By June 2011, all provision relating to the EIA of the investment project were replaced by Decree 29/2011 dated 5/6/2011 of the Government. Then, the MoNRE issued Circular No. 26/2011 guiding the implementation of Decree 26/2011. The project-based EIA system was



strengthened, and a new environmental management tool was introduced in the form of strategic environmental assessments (SEA) for national, provincial and inter-provincial development plans, policies and programs. Responsibility for conducting SEAs is assigned to the state agency responsible for formulating the strategy or plan. Environmental Impact Assessment is applied to the investment projects as specified in Decree 26/2011, whereby the agencies who appraise and approve the EIA report are MoNRE, Ministries made decision on investment and People's Committee of provinces and cities. The commitment to environmental protection made for small-scale projects is to be implemented in two forms: environmental protection commitment and NVMT commitment, simply with the approval of authorized DPC or commune/ward.

11. The National Assembly of Viet Nam approved a new Law on Environment Protection (LEP) on 23 June 2014. The Law will however be effective from 1 January 2015. Implementing guidelines and associated regulations are under preparation.

12. Environmental management in Viet Nam is administered on the national level by the MoNRE. The environmental arm of MoNRE, the National Environmental Agency (NEA), is the body specifically tasked with environmental protection. Aside from MoNRE, environment divisions in the various line Ministries are tasked with environmental management functions related to the specific sectors.

13. At the provincial level, the relevant management authorities are the Departments of Natural Resources and Environment (DoNRE) which carry out their environmental protection activities through their respective environment divisions. In the case of Nghe An DoNRE, an Environment Protection Centre is responsible for monitoring environment quality and providing technical solutions. The DoNREs come under the purview of the central MoNRE only in relation to administrative matters and technical guidance. For all other purposes, the DoNREs operate under the direct control of their respective provincial governments, through the People's Committees.

14. The Project required GoV approval through the Nghe An DoNRE. Contractors have to comply with all statutory requirements set out by DoNRE for use of construction equipment, hazardous waste & chemicals management, and operation of construction plants, e.g., concrete batching. Permits and certificates need to be obtained from Nghe An DoNRE for the Project. The delay for such approvals can take between 2 months to 3 months once the file is complete.

15. At district level, the relevant management agency is Division of Environment and Natural resources under District's PC. This division has qualified team responsible for environmental protection and consulting for District's PC leaders to make responding environmental decisions.

16. This project being funded in part by the ADB the Safeguard Policy Statement (SPS) applies and requires all the borrowers to identify project impacts and assess their significance; examine alternatives; and prepare, implement, and monitor environmental management plans. The SPS requires borrowers to consult people likely to be affected by the project and disclose relevant information in a timely manner and in a form and in languages understandable to those being consulted. Regarding IEE, SPS required the description of the environmental condition of a project, including potential impacts, the formulation of mitigation measures, and the preparation of institutional requirements and environmental monitoring for the project.

17. The ADB determined that the Project is Category B and subject to IEE. The ADB defines a Category B project as follows (ADB SPS 2009):

***Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.*

### **III. PROJECT DESCRIPTION**

18. In recent years Cua Lo town and vicinity have evolved many economic, tourism and industrial developments. With the new economic development, the water demand of the local people, shops, restaurants, hotels and factories is increasing rapidly.

19. The existing clean water plant managed by the CLWACO has a capacity of 3.000 m<sup>3</sup> which only serve 30% of the overall water demand for the town (According the statistic data in 2011 at FS stage). Under these circumstances, the implementation of the construction investment project: Rehabilitation and Expansion of Cua Lo Water Treatment from the capacity of 3,000m<sup>3</sup>/day up to 13,000m<sup>3</sup>/day is needed, in order to meet the growing water use demand; this project is highly feasible.

20. The proposed project consists in :

- The construction of a raw water intake from Phuong Tich river and the rehabilitation and expansion of the actual Water Treatment Plant with an additional production capacity of 10,000 m<sup>3</sup>/day;
- The construction of a BPS;
- The construction of a transmission and distribution network 65 km pipes HDPE diameter D100 – D400 and 216 km service pipes HDPE D40 – D90;
- The connection of 7,352 houses with meters;
- The construction of office building and auxiliary facilities;
- And support for the implementation and operation of the project;

Figure 3 presents the location of the main components.

21. The project will increase the connection ratio to above 50% for the residents to benefit 10,000 HHs and 72% of tourists. The existing main water supply system of Cua Lo town takes water from the Phuong Tich river, with a water treatment plant located in Nghi Huong ward, Cua Lo town (see Photos below).

**Figure 2: Photos of existing facilities**

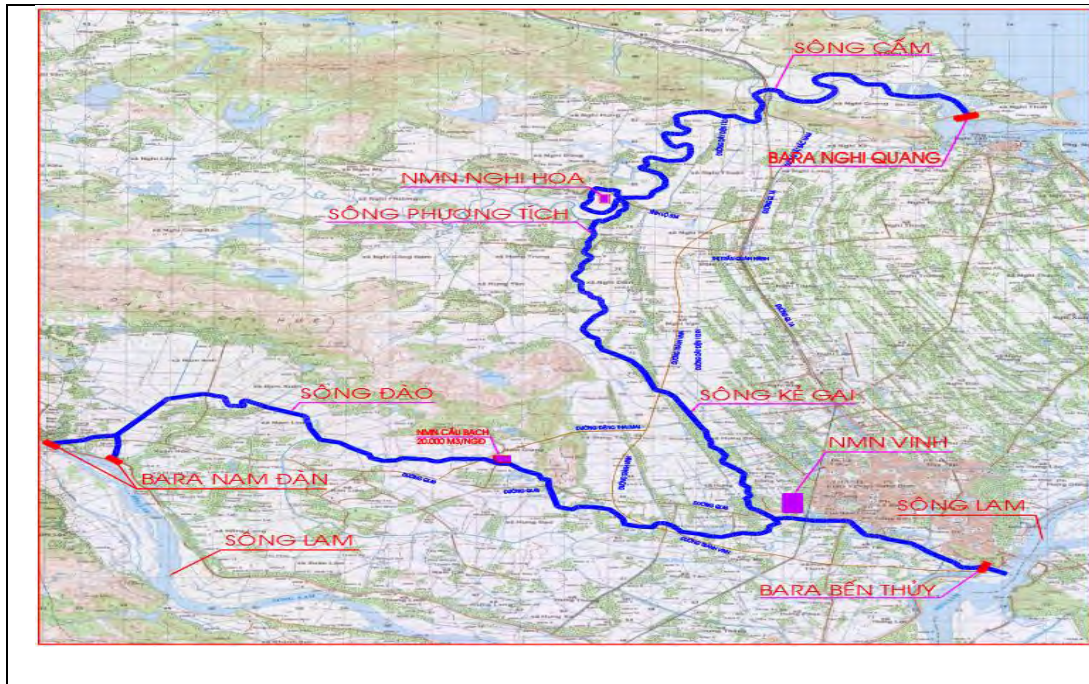


Figure 3: Location of the Main Components





**Figure 4: Hydrological network chart of Nghi Hoa water treatment plant area**



23. Most of river water currently supplied to the Cua Lo Water Treatment Plant water comes from the Phuong Tich River. The Phuong Tich River has a large catchment of 170 km<sup>2</sup> with the main physical characteristics being that it is short and winding, and that the meander factor is large (see Figure 4). The flow regime of the river depends on the flow regime of Nghe An Southern Irrigation System. The hydrological regime of the Phuong Tich River entirely depends on the opening/closing modes of Nam Dan-Nghi Quang sluice gates and Ben Thuy sluice gate.

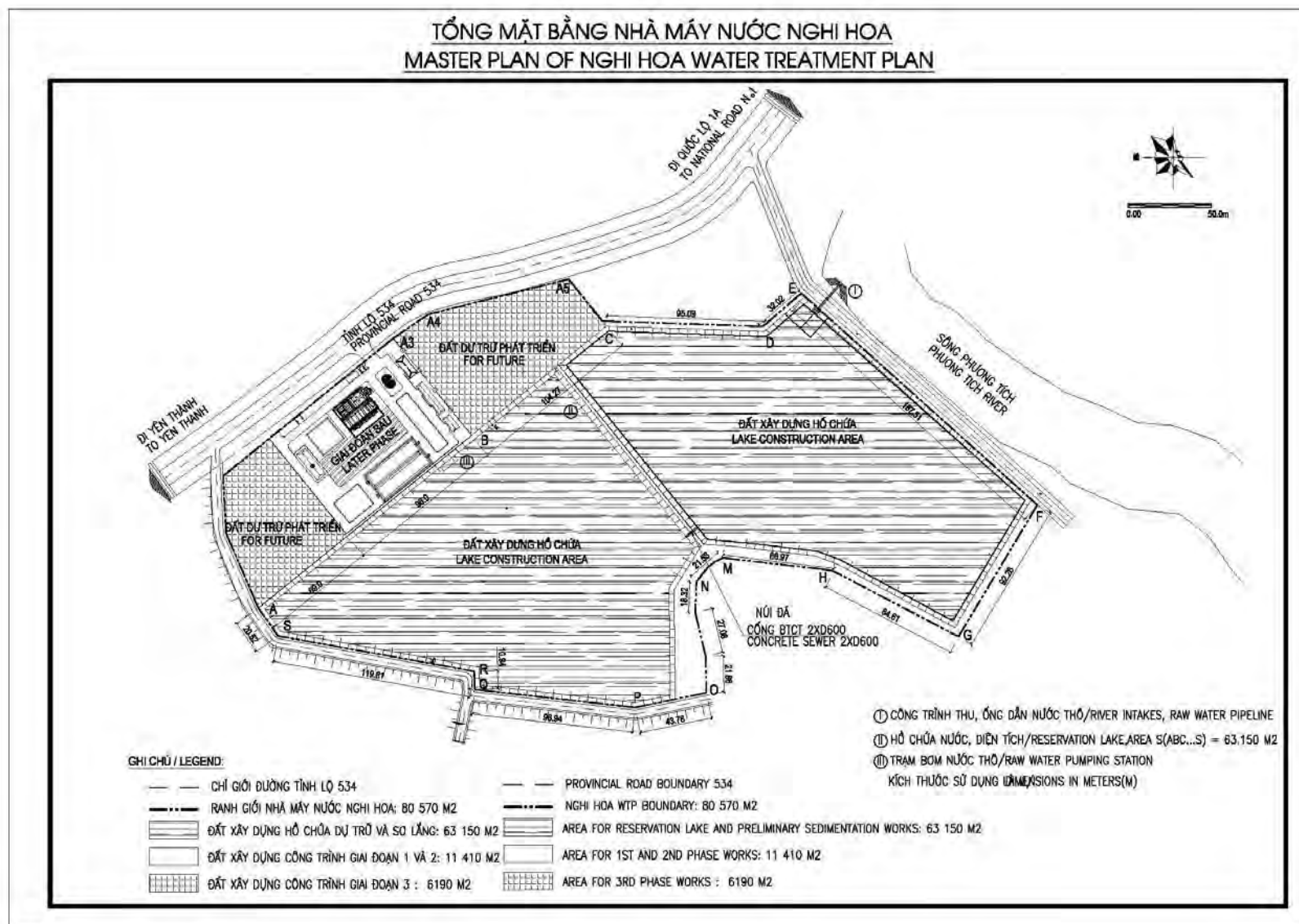
24. The Nghe An People's Committee has decided to develop the Phuong Tich River as a strategic new water supply source for Cua Lo Town -- in large part because the water catchment lies within the province's jurisdiction, so there is no more difficulty to control in terms of water allocation and quality protection. The water catchment also does not lie in a nature reserve, or impact historical relics.

25. The proposed project consists of (a) raw water abstraction from the Phuong Tich River and planned reservoir located 30m from the Phuong Tich River; (b) conveyance by gravity of the raw water to the inlet of the water intake located adjacent to the river's edge; (c) construction of a booster pumping station in Nghi Huong ward; and (d) expansion of the water distribution network.

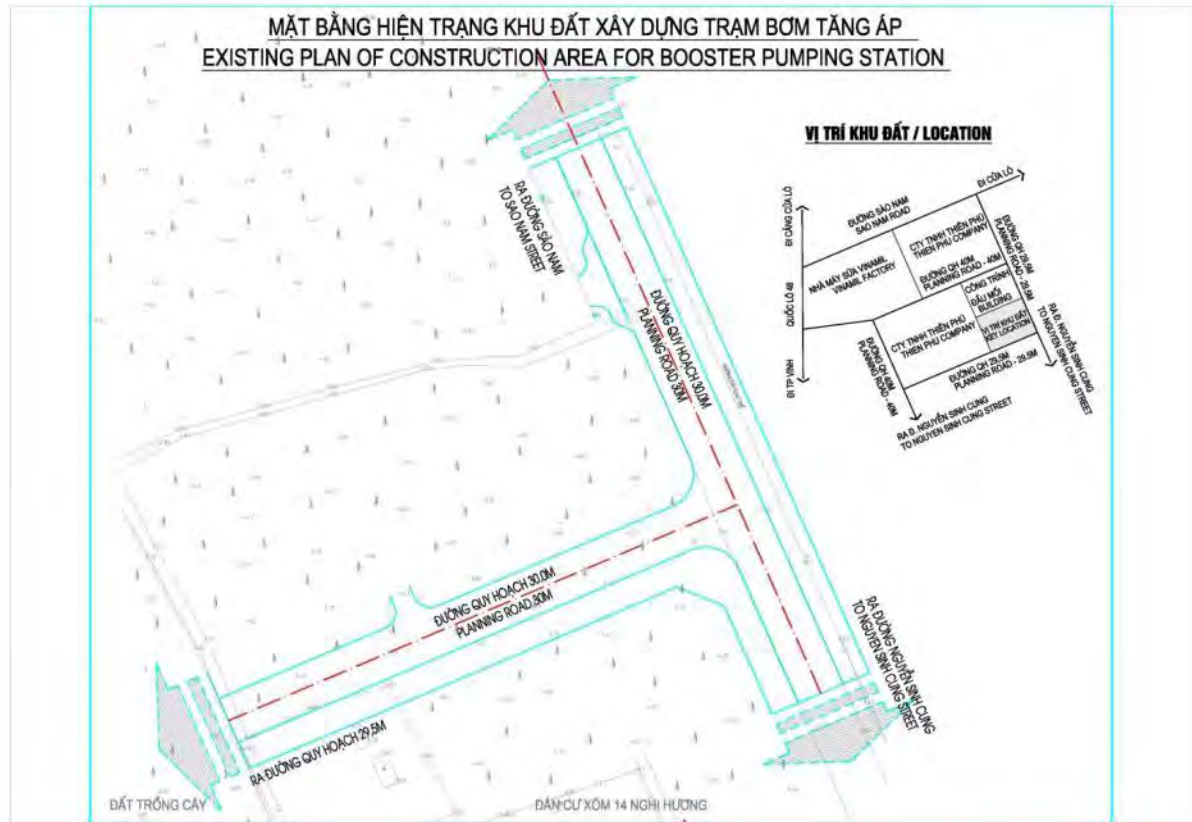
26. The water treatment plant to be refitted and expanded in Nghi Hoa Commune, Nghi Loc District (the detailed planning has been approved by the PPC at the Decision No. 3300/QĐ.UBND-CN dated 13/7/2009) and the Office area and Cua Lo Town Waterworks have been approved in Nghi Huong ward, Cua Lo Town (the detailed planning has been approved by the PPC at the Decision No. /QĐ.UBND-CN dated 17/9/2012, with a total land of the project is 9, 32 ha. The general plan for the WTP is presented in the figure 5.

27. The Project will only rehabilitate existing facilities (water treatment plant, pipeline network). The initial assessment did not identify any outstanding environmental issues related to the operation of these facilities. All mitigation measures defined in Table 8 pertaining to handling of chemicals, waste storage/stockpile, and / other storage in existing facilities will be followed.

Figure 5: WTP planned site



### Figure 6. Construction area and location of BPS



30. Service pipeline is installed from the BPS located in Nghi Huong and goes to the wards in Cua Lo Town and 4 communes of Nghi Loc District (namely Nghi Hop, Nghi Khanh, Nghi Xuan and Nghi Thach) to supply (together with the existing pipeline) clean water for Cua Lo Town and its vicinity. The total length of various types of transmission, distribution and service pipelines is 274,608m and there are 7,352 connection points to the HHs.

31. As a result, the scope of the impacts and in which the majority later is inherited benefit from the project include Nghi Hoa Commune (construction site of water treatment plant), Nghi Huong Ward (construction site of company office and waterworks) and the communes where the transmission, distribution and service pipelines are to be installed(including: the communes belonging to Nghi Loc District such as Nghi Trung, Nghi Thinh, Nghi Hop, Nghi Khanh, Nghi Xuan, Nghi Thach, and the wards belonging to Cua Lo Town: Nghi Thu, Nghi Tan, Thu Thuy, Nghi Hoa, Nghi Hai, Nghi Huong and Nghi Thu).

32. The pipeline networks of Cua Lo Town is a dead-end network with diameters from  $\phi 100$  to  $\phi 250$  and a length of 6,000m. Currently, the plant has been operated at 100% capacity in the winter, and when severe water shortage occurs in the summer due to the strong increase of the number of tourists. The existing pipeline network meets only 30% of water HHs consumptions. Once this project will be implemented, the existing system will not be removed and/or relocated. Only maintenance will be needed where the pipes are degraded. The existing clean water production capacity (together with the expanded plant and network) will increase the capacity of the whole system up to 13,000m<sup>3</sup>/day.

33. Construction of the BPS combined with the Company office in Nghi Huong Commune, Cua Lo Town includes the following main work items: treated water storage tank, BPS, company office building, storehouse, workshop, guard house, yard and roads, gates and fence... installation of water supply network, transmission, distribution and services pipelines and connection to the HHs.

34. Treated water storage tank: Construction of 01 tank. Tank foundation is constructed of monolithic concrete; foundation is strengthened by press pile system, beam and foundation mat is RC, grade 250. The levels and elevations are followed the production line.

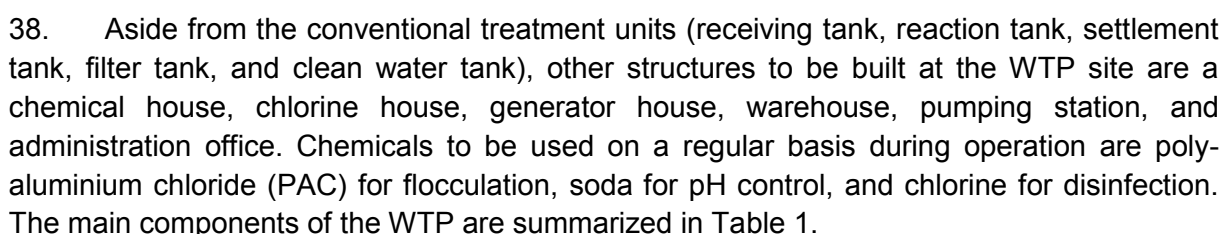
35. BPS: Architecture: one-storey building; designed in a rectangular shape, dimension of 16.5 × 7.0m, bay = 3.3m, span = 6.0m; vertical clearance = 4.7m; The building consists of 5 rooms, including 2 rooms for operation + control panels, the remained 3 rooms are for pumps with the RC platform; overhead travelling crane is installed for lifting and installation where necessary. The levels and elevations follow the production line.

- Civil: 3 raw water pumps are installed, 2 duties and 1 standby, each pump has following parameters:  $Q = 315\text{m}^3/\text{h}$ ,  $H = 45\text{m}$ .
- Structure: Building with load-bearing RC frame; brick masonry walls; floor base is consolidated with black sand, each layer is watered and compacted with a thickness of 0,4m; RC foundation, stone masonry foundation wall; frame, beam and floor are made out of poured concrete in place.

36. The transmission and distribution pipeline use HDPE-PN10 pipes with a total length of the following categories: (i) D400-L = 15.500m; (ii) D300-L = 3.600m; (iii) D200-L = 4.500m; (iv) D150-L = 5.500m; (v) D100-L = 7.500m. The average depth of pipe installation to the top of the pipe is 1.2m. The trench of pipe installation is 0.9m wide on average. On the distribution/main transmission pipelines with the diameter greater than D110, the washout valve is provided at the lowest points, and the air-relief valve is provided at the highest points. Pipe cradles and support pillars are installed at the locations of tees, enlargers/reducers and bends, etc. For the pipes crossing the bituminous roads, National highways and Provincial roads, they should be protected by means of protection sleeves or slabs. The disposition of the transmission and distribution pipeline can be observed partly in Figures 3 & 7.



### Figure 7. General Layout of the Water Supply System



**Table 1: Nghi Hoa Water Treatment Plant Components**

Main Components	Design Features
<b><i>Nghi Hoa Water Treatment Plant</i></b>	
Water intake:	Water is abstracted from the Phuong Tich River to the reservoir through a RC pipeline with a concrete grade of 200, Diameter of 1000 and 27 m long; Inside the water intake, a collection well is installed with a volume $V=18,0\text{m}^3$ , dimension of 2,0 x 3,0m, height of 3.2m, RC structures for bottom, walls and floor; electric penstock D1000..



Main Components	Design Features
Reservoir:	Wet area of 6.0 ha; reservoir banks is made of compacted soil, and bank slope is protected by brick masonry for anti-erosion
Raw Pumping Station:	<p>+ Architecture: one-storey building; designed in a rectangular shape, dimension of <math>W \times L \times H = 4.5 \times 8 \times 4.8\text{m}</math>, The levels and elevations are followed the production line.</p> <p>+ Civil: 3 raw water pumps are installed, 2 duty and 1 standby, each pump has following parameters: <math>Q = 253\text{m}^3/\text{h}</math>, <math>H = 13\text{m}</math>.</p> <p>+ Structure: Frame columns and walls are made of reinforced concrete; floor base is consolidated with black sand, each layer is watered and compacted with a thickness of 0.3m; wall, beam, floor and column is made of monolithic concrete.</p> <p>+ Finish: concrete components are rendered with grade 75 cement mortar; floor of the pump room is finished with grade 100 cement mortar, 300mm thick; foundation of pump is designed separately for each pump category.</p>
Reaction tank	Consisting of two steel mechanical flocculators. The retention time in the tanks is 10 minutes. Tanks are equipped with agitator to provide flocculation. The dimension of reaction tank: $L \times W \times H = 1.5 \times 1.5 \times 3.3\text{ (m)}$
Clarifier	Lamella Clarifier: Consisting of a steel clarifier. This tank contains flat lamella plates with Polycarbonate material, located to form into multiple small gaps. Water is collected at the clarifier through the V-notch trough, and distributed to the filter tank through the distribution channel. Lamella clarifier dimension: $L \times W \times H = 3.0 \times 5.8 \times 7.0\text{ (m)}$ .
Filter tank	Filter tank: consisting 01 steel tank. The tank contains filter media, support, water distribution pipes, water collection pipes and other accessories. Tank dimension: $D \times H = 3.6 \times 4.8\text{ (m)}$ .
Treated water tank	Tank volume $V = 500\text{m}^3$ , steel fabricated, Tank diameter $D = 12.8\text{m}$ , $H = 4.3\text{m}$ . Foundation is constructed of monolithic reinforced concrete; foundation is strengthened by press pile system; beam and foundation mat are constructed of grade 250 RC. The levels and elevations are followed the production line.
Treated water pumping station	<p>- Treated water pumping station:</p> <p>+ Architecture: one-storey building; dimension of <math>16.5\text{m} \times 7.0\text{m}</math>; bay = <math>3.3\text{m}</math>, span = <math>6.0\text{m}</math>; vertical clearance = <math>4.7\text{m}</math>; The building consists of 5 rooms, including 2 rooms for operation + control panels, the remained 3 rooms are for pumps with the RC platform; overhead travelling crane is installed for lifting and installation where necessary. The levels and elevations are followed the production line.</p> <p>+ Civil: 3 raw water pumps are installed, 2 duty and 1 standby, each pump has following parameters: <math>Q = 237\text{m}^3/\text{h}</math>, <math>H = 43\text{m}</math>.</p> <p>+ Structure: Building with load-bearing RC frame; brick masonry walls; floor base is consolidated with black sand, each layer is watered and compacted with a thickness of 0.4m; RC foundation, stone masonry foundation wall; frame, beam and floor are placed</p>

Main Components	Design Features
	<p>monolithic concrete.</p> <p>+ Electricity for lighting: cables are embedded inside the walls and ceiling, neon lights, and accessories; Dynamic electricity: installation of control capacitor, cable, and accessories</p>
Chemical house	<p>+ Civil: Combined chemical house for alum, lime and chlorine including space for chlorine storage, chlorine dosing, alum and lime storage, alum and lime preparation, alum dosing, water quality analysis and chemical room.</p> <p>+ Architecture: One-storey building; building area of 86m<sup>2</sup>. Rectangular layout, Length = 8.22m, Width = 7.72m; the building consists of 5 rooms, column spacing of 3.5m, 2.8m and 4.2m. Height from floor of 0.2m; vertical height of 3,7m; On the layout is arranged: 02 chlorine storage rooms; 01 chlorine dosing room; 01 alum and lime storage room; 02 alum &amp; lime mixing, and alum &amp; lime dosing rooms.</p> <p>+ Structure: load-bearing RC frame, brick masonry walls, floor base is consolidated with black sand, each layer is watered and compacted with a thickness of 0,3m. Strip foundation 1,2m wide, cast-in-place RC; frame, beam and floor is made of monolithic concrete.</p> <p>+ Finish: Wall and concrete components are rendered with grade 75 cement mortar, all outside and inside wall and ceiling are applied mastic paint, and colour is specified by the designer. Floor is laid with tile 400 x 400. Hip roof is covered with corrugated iron, 047mm thick; form-steel purlin. Panel doors and windows are made of magnolia timber</p>
Sedimentation ponds	Quantity: 02 ponds; dimension of W x L x H = (9 x 36 x 1,3)m.
<b>Booster pumping station(BPS) and Company Office in Nghi Huong Ward</b>	
Treated water storage tank	Construction of 01 tank with a volume of V= 1000m <sup>3</sup> , cylinder steel, Dimension of L x H = 20m x 4,5m. Tank foundation is constructed of monolithic concrete; foundation is strengthened by press pile system, beam and foundation mat is RC, grade 250. The levels and elevations are followed the production line.
BPS	<p>+Architecture: one-storey building; designed in a rectangular shape, dimension of 16.5 ×7.0m, bay =3.3m, span = 6.0m; vertical clearance = 4.7m; The building consists of 5 rooms, including 2 rooms for operation + control panels, the remained 3 rooms are for pumps with the RC platform; overhead travelling crane is installed for lifting and installation where necessary. The levels and elevations are followed the production line.</p> <p>+ Civil: 3 raw water pumps are installed, 2 duty and 1 standby, each pump has following parameters: Q = 315m<sup>3</sup>/h, H = 45m.</p> <p>+Structure: Building with load-bearing RC frame; brick masonry walls; floor base is consolidated with black sand, each layer is watered and compacted with a thickness of 0,4m; RC foundation, stone masonry foundation wall; frame, beam and floor are placed monolithic concrete.</p>

Main Components	Design Features
	+Electricity for lighting: cables are embedded inside the walls and ceiling, neon lights, and accessories; Dynamic electricity: installation of control capacitor, cable, and accessories  + Equipment: Arrangement of 5 treated water pumps with capacity of $Q = 324\text{m}^3/\text{h}$ . $H = 45\text{m}$ . Cubicles/Panels, frequency converters and signal transducers.

39. Treated water distribution works will entail construction of a water transmission pipeline and branch pipelines from the Cua Lo treatment plant to the new and expansion service areas, including construction of distribution pipes in the served areas. The lay-out of the supply network conforms to the general plan for the development of Cua Lo projected up to 2025. The network has been designed in accordance with the projected land use in the city's master plan, and the projected water demand of each sub-area or zone. The lay-out of the water supply pipelines is arranged along the main road network in accordance with the town's spatial master plan. As much as possible, the existing pipelines will be retained and incorporated in the new network.

40. The service pipelines are calculated according to the flow distribution diagram, depending on the number of household to be supplied with water. Routing for the service pipeline network depends on the population distribution and the concentration of population. The service pipeline will be mainly located under the sidewalks or edge roads, 0.5 – 1.5m from the local people's house. The average depth of pipe installation to the top of the pipe is from 0.3 – 0.5m.

41. The average depth of pipe installation to the top of the pipe is 1.2m. The trench of pipe installation is 0.9m wide on average. On the distribution/main transmission pipelines with the diameter greater than D110, the washout valve is provided at the lowest points, and the air-relief valve is provided at the highest points. Pipe cradles and support pillars are installed at the locations of tees, enlargers/reducers and bends, etc. For the pipes crossing the bituminous roads, National highways and Provincial roads, they should be protected by means of protection sleeves or slabs.

42. Connection to HHs: construction of 7,352 connection points to the HHs.

43. The overall project implementation timetable is shown in Annex 1.

#### **IV. DESCRIPTION OF THE ENVIRONMENT**

##### **A. Location, Climate and Geology**

44. Cua Lo town is located from 18°45' to 18°50' N latitude and 105°42' to 105°45' E longitude, 16 km from Vinh city to the North East, 300 km from Hanoi to the North, and 1,400 km from Ho Chi Minh City to the South. Cua Lo town is also connected to the North of Thailand by NA 8A, 468 km from Vien Chan, Cua Lo town is in the middle of 2 rivers, Phuong Tich River to the north and Lam River to the south and limited by:

- To the South: Lam River;
- To the North: Nghi Loc district (South East economic area of Nghe An province)
- To the East: Pacific Ocean
- To the West: Vinh city.

45. Cua Lo town consists of 7 wards: Nghi Thuy, Nghi Tan, Thu Thuy, Nghi Hoa, Nghi Hai, Nghi Huong and Nghi Thu.

46. Cua Lo Town, Nghe An province has a tropical monsoon climate divided into two main seasons: the rainy season from April to October and the dry season from November to March. Usually, July and August account for over 50% of total annual rainfall. Small rainy season usually occurs around April and May. The average annual rainfall is about 3,400mm in the last 5 years. The annual rainfall has increased in recent years.

47. The annual average temperature is 29.9°C, maximum temperature is 39.4°C, and the lowest temperature is 6.2°C. Air humidity ranging from 80-90%. Fog is quite common because it is a coastal area.

48. Because of the location, the province and especially the project area, Cua Lo is often affected by tropical storms, which usually occurs between April and October each year.

49. The topography is relatively flat. The town has many small mountains and islands to make up beautiful scenery. Cua Lo town is limited by 2 rivers, Phuong Tich River to the north and Lam River to the south.

50. Cua Lo town near the seaside, summer afternoon is usually blown sea wind to bring water vapour and created fresh and cool air.

51. The environment in the project area is relatively protected. However, water and air pollution exist in areas with high density of services, traffics and markets.

52. Located close to the sea and at both ends of Cua Lo town's two major rivers Lam River and Phuong Tich River has the effect of drainage rapidly. So land and residential in the entire town is not flooded only local flooding.

53. As of 2008 the town has 23,714 employees working in different industries, the labor structure in the following sectors: agriculture, forestry workers, seafood: 6,376 people, accounting for 26.9%; Industry – construction: 2913 people, accounting for 12.3%; commercial, services: 14,425 people, accounting for 60.8%.

**Figure 8: Location of Cua Lo Town**



54. Expected climate change impacts in the Center of Vietnam include increased in frequency and/or intensity of tropical cyclones; increased rainfall and run-off; an expansion in flooded areas and a rise in annual flood levels. Although the intergovernmental panel for climate change (IPCC) does not forecast any great changes in the timespan of the project 2025 but more in the years 2060 to 2090, punctual events due to climate change, notably recurrent flash floods could affect the infrastructures. As such, climate change impacts will be considered during detailed design. Also, a salinity increase could occur due to sea level rise but the salinity question is already known for and the construction design is already taken into account. Also, drought events aggravated by climate change could also occur during the same period. This could cause 2 potential risks: decrease of water quantity and quality and misuse of treated water. The question of the quantity and quality will be resolved by the location of the intake pipe in the river channel and an adjustment of the treatment at the WTP. The second issue, if it happens, will probably auto regulate itself with the water being charge to the user.

55. Measures to protect infrastructures (in particular water intake) from disaster risk (flash flood, drought etc.) will be identified during the detailed design.

56. The above measures will contribute to the safety of water supplies during such events (flood, drought etc.). This will also help to implement the Water Safety Plan to be implemented in parallel with the support of the World Health Organization (WHO).

57. Preliminary Climate Risk Screening Checklist has been filled and is presented in a separate document. Results from this screening shows medium risk for the Sub-Project.

58. Vietnam has been classified as a low seismicity region. However, some moderate earthquakes occurred in Vietnam. 90% of Earthquakes have taken place in the north-western Vietnam. In the other regions, there was not any earthquake of magnitude larger than 5.5. Earthquake. A Seismological Station is located in nearby in Vinh.

## **B. Population and Land Use**

59. According to the preliminary census of population, as of December 2011, Cua Lo town's population is 51,889 people equivalent to 11,740 HHs, and the population density of the entire town is 1,866 people per km<sup>2</sup>. The physical increase rate in the town tends to decline; the physical increase rate in 2008 is 7.72% lower than 2.95 times compared with the

first year when the town was founded by 22.8% (1994). This rate shows the general trend of urban development at present.

60. The land area for construction of Nghi Hoa WTP in Nghi Hoa commune is the land area previously Nghi Hoa Commune People's Committee let rent out to the local persons for brick production and freshwater fish farming, and now this land leases have expired and now is under management of Nghi Hoa Commune People's Committee. Therefore, the acquisition will take place very smoothly; the Owner only need to compensate for land, trees and temporary works for previous brick production and freshwater fish farming of the local people, as well as public land managed by the Commune People's Committee.

61. In recent years, there has been a significant increase in shifting land use from agricultural to urban land use, particularly for the development of residential areas, commerce and tourism. The areas classified as urban land increase by 17% during this period, with 390 hectares of residential land increased.

62. The town's urban expansion is expected to accelerate in the northwest and south corridor. However, the town's master plan has given priority for development in the northwest area traversed by Highway 1 A, because the trunk road network is already in place. This urban expansion area is targeted to be served by the proposed water supply expansion project using the Phuong Tich River.

63. No specific cultural site or significant location is located in the project area. The project area is mainly under agriculture or unused land.

64. More than 35 years after the war ended, Vietnam is still contaminated with hundreds of thousands of tons of UXOs scattered all over the country. During earth work and especially for the pipeline excavation corridor, survey for UXOs prior to construction work has to be conducted by a specialized agency.

### **C. Surface Water Resources**

65. The town's main river is Phuong Tich River. The water level in this river is significantly affected by floods during the rainy season (September to December), and by sea tides during the dry season (March to August). The sea tides also increase the salinity level in the river.

66. The flow in the project area is mainly coastal and tidal follow caused by waves. The flow of the Cam River (Phuong Tich River), downstream section, previously had a role in formation and existence of a creek in Cua Lo port, this factor now is considered negligible since the Nghi Quang Dam has been constructed to block the flow of the Cam River, approximately 4 km downstream.

67. The hydrological conditions of the project area in general and the location for construction of Nghi Hoa WTP (under the project) have been directly influenced by the hydrological regime of the Nghe An Southern Irrigation System managed by the Nghe An Southern Irrigational Work Operation Company. The Nghe An Southern Irrigation System is located in the south-east of Nghe An Province, including Nam Dan, Hung Nguyen and Nghi Loc district, Vinh city and Cua Lo town.

68. There are 5 main channels within a total length of over 70km; they are Thap channel, Lam Tra channel, Hoang Can channel, Gai channel, and two natural channels, namely Vinh and Cam (the Phuong Tich river).

69. The rivers start from the spine mountains and tend to flow either east-to-west or north-to-south. They are formed from mainly intrusive and extrusive volcanic rocks that have medium to hard crushing properties and provide ideal dam foundations and building materials. Drainage has created steep-sided V-shaped valleys especially where rivers have cut north to south along the fault lines.

70. The hydrological regime of the Phuong Tich River entirely depends on the Nghe An Southern Irrigation System managed by the Nghe An Southern Irrigation One Member Ltd., Company. Specifically, the flow regime depends on the opening/closing modes of the Nam Dan Sluice Gate, the Nghi Quang Sluice Gate and the Ben Thuy Sluice Gate. The opening/closing procedure of these sluice gates is as follows: (1) for the Nam Dan sluice gate: In the producing season: the sluice gate is fully opened in as per its design aperture to meet the water demand of the users. In the flooding season, when the water level of the Lam River exceeds 3.5m, the gate is closed to limit the flood. (ii) For the Nghi Quang Sluice Gate: In the producing season, the upstream water level is maintained from 0.6m – 0.7m (if the upstream water level is below these levels, the gate is fully closed to maintain the water level for production). In the flooding season, the automatic opening mode is applied and is opened to a proper aperture to prevent flood. (iii) For the Ben Thuy Sluice Gate: In the producing season, the upstream water level is maintained from 0.6m – 0.7m (if the upstream water level is below these levels, the gate is fully closed to maintain the water level for production). If the upstream water level is greater than 1m – 1.2m with the favourable conditions, it is allowed to discharge for flushing salinity. In the flooding season, the automatic opening mode is applied and is opened to a proper aperture to prevent flood for both Vinh City and Hung Nguyen District.

71. The opening/closing modes of the abovementioned sluice gates will affect the flow of the Phuong Tich River in particular and all the Southern Irrigation System in general. In the producing season, when the Ben Thuy and Nghi Quang Sluice Gates are fully closed and the Nam Dan Sluice Gate is opened to its design capacity, the flow regime of the system and the Phuong Tich River have no significant changes except for the case of prolonged drought and high water demand. In the flooding season, when the water level of the Lam River exceeds 3.5m, the Nam Dan Sluice Gate is fully closed to limit the flood, and the Nghi Quang and Ben Thuy Sluice Gate, depending on the actual situation, are opened to discharge flood, the flow regime depends on these sluice gates; in addition, at this time, the flow regime of the Phuong Tich depends on the rainfall of the region. Total flow, flow module and flow factor are larger than that in the dry season. However, because the sluice gates are opened automatically in the seasons and the times in the year, the flow regime of the overall Southern Irrigation System in general and the Phuong Tich in particular are always regulated.

72. During the four-month rainy season from September to December, the mean river flows are some five times larger than in the dry season. The region experiences typhoon rainfall on average 3 to 4 times a year when daily rainfalls of up to 650 mm have been recorded. Intense rainfall from extreme weather events cause widespread flooding in the low-lying coastal floodplain. Also during the wet season, the rivers carry high sediment loads. In the dry season, flows are much diminished and have higher concentrations of human, agricultural and industrial pollutants.

73. A groundwater study in the coastal area showed that the groundwater system had low transmissivity and yield. Many HHs use shallow wells to supplement piped water supply from CLWACO. In areas unserved by piped water, wells are the main source; well water is usually boiled first if used for drinking. Many industries rely on deep wells. Because of the coastal

location, excessive groundwater abstraction has induced saline intrusion into the aquifer. Future sustainable groundwater use is expected to be earmarked for rural communities, with industries targeted to shift to surface water sources through the city's expanded water supply system which draws water from the rivers.

#### **D. Existing Water Supply Source**

74. The raw water demand for the Nghi Hoa WTP: 10,000m<sup>3</sup>/day. The water supply source is taken from the downstream side of the Phuong Tich river.

75. Demand for domestic water supply: According to TCXDVN 33:2006/BXD Regulation on water supply – pipe networks and design standard Of the Ministry of Construction, the water supply per capita is taken as 120 l/person/day; with the number of employees of 100 people, the demand for domestic water supply is 12m<sup>3</sup>/day, provided by the clean water produced in the Nghi Hoa WTP.

#### **E. Water Demand**

76. Currently, the Clean Water Plan managed by the CLWACO has a capacity of 3,000m<sup>3</sup>/day, only serving 30% of the overall water demand for the town (according to the statistical data in 2011 at FS stage). Under these circumstances, the implementation of the construction investment project: Rehabilitation and Expansion of the Cua Lo Water Treatment from the capacity of 3,000m<sup>3</sup>/day up to 13,000m<sup>3</sup>/day is needed, in order to meet the growing water use demand.

77. In 1995, the Cua Lo water treatment plant and water supply system with a capacity of 5,000m<sup>3</sup>/day was invested for construction. In 1999, the Cua Lo water treatment plant and water supply system was completed and put into operation with an actual capacity of 3,000m<sup>3</sup>/day, and underground water was used.

78. With the existing capacity, the system cannot meet the water demand at the present time as in the future of Cua Lo Town and its vicinity. In 2011, the coverage of water supply network is 40%, but the rate water supply of the town is only about 30%. The water supply service is intermittent. The old pipes have been severely degraded, leakage occurs in most pipelines

79. Water quality: meets the water supply standard in accordance with National Technical Code QCVN 08:2008/BTNMT. The lack of investment in water supply infrastructure leads to the lower water supply rate and service level. As a result, about 70% of HHs in Cua Lo town have to force to take water from the less safe and less reliable sources as shallow wells.

#### **F. Water Quality**

80. Samples of surface water in the project areas were taken (including the Phuong Tich river, section where the Nghi Hoa WTP to be constructed, and the catchment); the specific locations are as follows: (i) M1: surface water in the lake where the raw sedimentation pond of the Nghi Hoa WTP is proposed to construct in Nghi Hoa commune, Nghi Loc district; (ii) M2: surface water of the Phuong Tich river outside the sedimentation pond, at the Phuong Tich Bridge pier in Nghi Hoa commune; (iii) M3: surface water of the Phuong Tich river, 500m far from the proposed upstream location for raw water abstraction; (iv) M4: surface water of the Phuong Tich river, in the Cam Bridge, 10,000m far from the proposed downstream location for raw water abstraction.

81. By comparing to the maximum permissible limits as per QCVN 08:2008/BTNMT National Technical Regulation on Surface Water Quality, Column A2, and the results show



that most the parameters are within the permissible limits specified in Column A2, water for domestic purpose but needing to be treated to meet the National Regulation on drinking water quality.

**Table 2: Surface Water Quality of Project Area**

	Parameters	Analysis method	Unit	Analysis results				QCVN 08:2008/BTNMT Column A2
				M1	M2	M3	M4	
1	Temperature	Equipment HANNA HI 9828	oC	27,6	27,5	28,9	28,8	-
2	pH	TCVN 6492:1999	-	6,9	7,05	7,0	7,06	6-8,5
2	Salinity	Salinity Meter HANNA HI 931100	%o	0,1	0,15	0,12	0,14	-
3	TSS	TCVN 6625: 2000	mg/l	28,5	24,5	26,0	24,6	30
4	Turbidity	Turbidity meter TurbiDirect	NTU	31,2	21,6	22,5	22,6	-
5	COD	TCVN 6491-1999	mg/l	12,6	11,4	11,6	12,4	15
6	BOD5	OxiTop Control	mg/l	5	6	5	6	6
7	Mn	TCVN 6002:1995	mg/l	0,16	0,12	0,11	0,12	-
8	Total Fe	TCVN 7325:2004	mg/l	0,29	0,21	0,22	0,22	1
9	DO	TCVN 5499: 1995	mg/l	6,0	6,5	6,5	6,4	≥5
10	NH4+	TCVN 5988:1995	mg/l	0,16	0,11	0,11	0,12	0,2
11	NO3-	TCVN 6180:1996	mg/l	2,9	1,1	1,2	1,1	5
12	NO2-	TCVN 6176:1996	mg/l	0,01	0,01	0,01	0,01	0,02
13	F-	TCVN 6195:1996	mg/l	ND	ND	ND	ND	1,5
14	CN-	TCVN 6181:1996	mg/l	ND	ND	ND	ND	0,02
15	As	TCVN 6626-2000	mg/l	ND	ND	ND	ND	0,02
16	Pb	SMEWW 3500-Pb D	mg/l	0,001	0,002	0,001	0,002	0,02
17	Cd	TCVN 6197:1996	mg/l	0,001	0,001	0,001	0,001	0,005
18	Hg	SMEWW 3500-Hg C	mg/l	ND	0,0001	ND	0,0001	0,001
19	Cu	SMEWW 3500-Cu E	mg/l	0,04	0,05	0,04	0,05	0,2
20	Cr (VI)	TCVN 6658:2000	mg/l	0,001	0,002	0,001	0,002	0,02
21	Coliform	TCVN 6187-1:1996	MPN/ 100ml	3600	2900	2900	3000	5.000

ND: Not detected.

82. As part of the baseline environment survey conducted under the PPTA, underground water samples were also collected from the vicinity of the pipeline construction and the site for the water treatment plant at Nghi Hoa Commune. The samples were analysed by the Technical Resources and Environment Co., Ltd One Member Laboratory; the results are shown below, along with the water quality criteria set under QCVN09:2009/BTNMT.

**Table 3: Groundwater Samples in Vicinity of Pipeline Corridor and WTP Site**

No.	Parameters	Unit	Results				QCVN 09:2008/ BTNMT
			N1	N2	N3	N4	
1	pH	-	7,01	7,02	6,96	7,08	5,5 - 8,5
2	Hardness	mg/l	131,5	153,0	153,6	146,3	500
3	TSS	mg/l	12,5	12,8	14,1	14,4	1500
4	NO <sub>3</sub> <sup>-</sup>	mg/l	2,21	2,16	2,06	2,16	15
5	NO <sub>2</sub> <sup>-</sup>	mg/l	0,06	0,08	0,08	0,07	1,0
6	NH <sub>4</sub> <sup>+</sup>	mg/l	0,02	0,02	0,03	0,02	0,1
7	Fe	mg/l	0,92	0,75	0,47	1,66	5
8	Cu	mg/l	0,002	0,001	0,002	0,002	1,0
9	Zn	mg/l	0,001	0,001	0,001	ND	3,0
10	Pb	mg/l	ND	ND	ND	ND	0,01
11	As	mg/l	ND	ND	ND	ND	0,05
12	SO <sub>4</sub> <sup>2-</sup>	mg/l	69,0	76,0	71,5	68,5	400
13	Cl <sup>-</sup>	mg/l	6,5	7,8	7,8	9,5	250
14	Coliforms	mg/l	0	1	0	0	3

83. After analyzing Samples N1, N2, and N4, it is found that all the analyzed parameters are within the permissible limits of QCVN 09:2008/BTNMT. This demonstrates that the quality of groundwater in the project area has no signs of pollution and still ensures the quality for the domestic and living of the people in the present time.

### **G. Nghi Hoa water treatment plant Component**

84. The new WTP will utilise the land of an old brick factory (see photos in Figure 9). The total area of land for construction of the new WTP of the project is 80,750 m<sup>2</sup>; in which, the sedimentation reservoir will be 60,100 m<sup>2</sup> in area and will extract water from Phuong Tich River to be treated by the Nghi Hoa WTP. For the projected construction site for the WTP, the slot was defined as an old brick factory.

85. The factory is located in Van Tai village, Nghi Hoa commune. The location of the WTP was approved by Nghe An PC by Decision 3300/QD UBND-CN. Currently the land has been recovered and clearance compensation by decision 2393/QD-UBND dated 28/12/2012 Nghi Loc District People's Committee. A Resettlement Plan has been prepared in conformity with ADB SPS 2009. The area of Nghi Hoa WTP will be 80,750m<sup>2</sup> and delimited by:

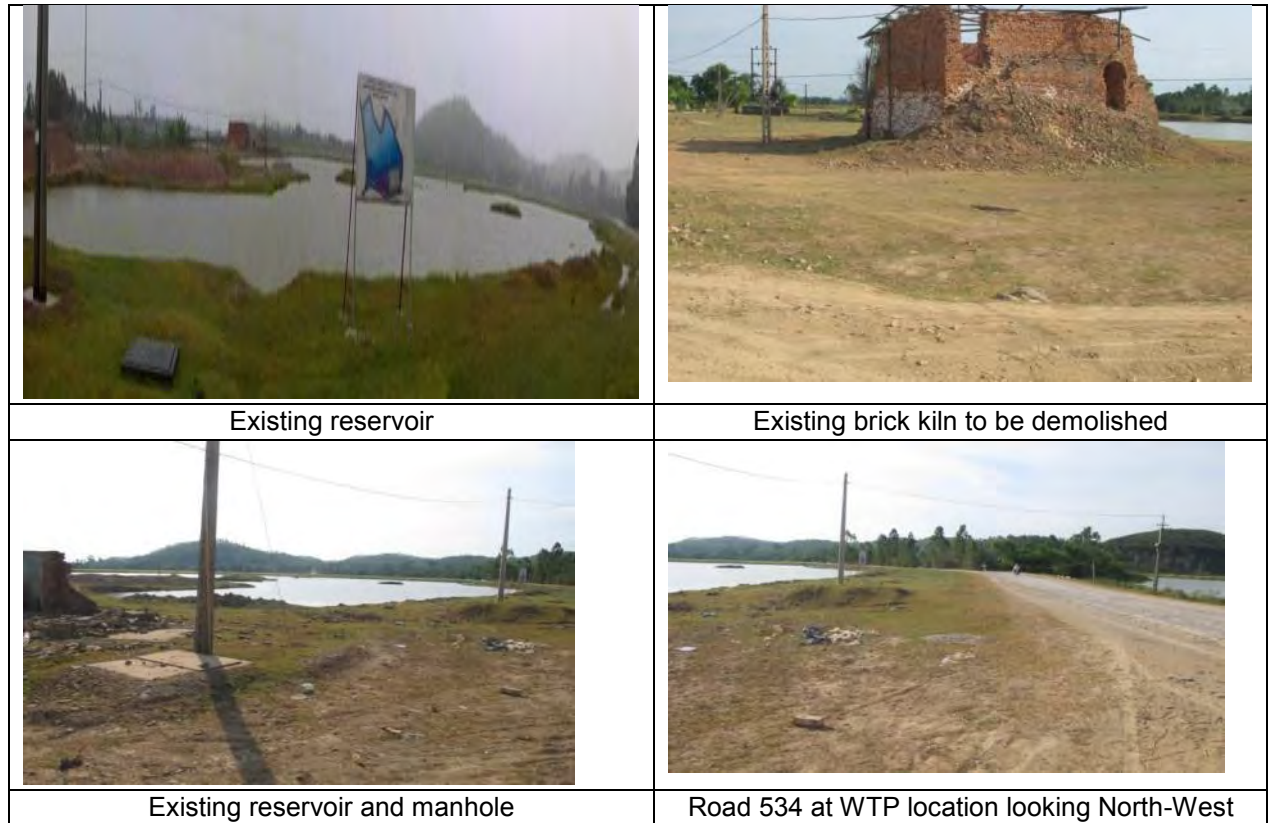
- To the North: provincial highway 534;
- To the South: mountain;
- To the East: Cam River;
- To the West: Nghi Hoa agriculture land.

86. Figures 9 & 10 present the location of the future WTP.

**Figure 9: Location of Nghi Hoa WTP and clarification reservoir**



**Figure 10: Photos of Location of the WTP**



**H. Booster pump station/ Cua Lo water supply company office building Component**

87. The location selected to build the booster pumping station / office buildings meets all the technical factors and access convenience factors for it is place easy transaction, in addition to favorable for clearance working. After the site survey, combination consultation of investors as well as commitments about land of local government. Location was selected in Nghi Huong ward, Cua Lo Town.

88. This location was approved by Nghe An People's committee by decision of 3549/QD UBND-CN: Acquired land constructed booster pump stations under the management of the Nghi Huong ward PPC. Currently the land has been recovered and clearance compensation was approved by decision 4000/QD-UB dated 27/12/2012 of Cua Lo town PPC. The area of the BPS will be 12.250 m<sup>2</sup> and delimited by:

- To the North: Land of construction headworks;
- To the South: Planning road 29.5 m;
- To the East: Planning road 29.5 m;
- To the West: Project planning land for Thien Phu company.

89. Figures 10 & 11 present the location of the BPS and Water Company's office.





**Figure 11: Location of BPS and Company office building**



**Figure 12 Location of the Booster pumping station and Company office building**

## **V. IMPACTS, ALTERNATIVES AND MITIGATION MEASURES**

### **A. Area of influence of the Project**

90. The area of influence of the project includes the water intake area including, the downstream user, the area along the raw water pipe and around the WTP and the area served by the new pipe network. It includes the following wards and communes: 7 Wards Cua Lo Town (Nghì Thuy, Nghì Tan, Nghì Hoa, Nghì Hai, Thu Thuy, Nghì Thu and Nghì Huong) and 4 communes of Nghì Loc district (Nghì Khanh, Nghì Hop Nghì Xuan and Nghì Thach).

### **B. Expected Benefits**

91. Overall, the benefits of the project are significant in terms of meeting projected growth in water demand and shifting household water supply from non-piped to piped sources. Based on the PPTA economic analysis, the full cost to residents of non-piped water is greater than the cost of piped supply. The PPTA household survey results revealed that the average household in Cua Lo consumes about 104 litres per capita per day (lpcd) from the CLWACO piped water system, and an additional 43 lpcd from non-piped sources. The total compares reasonably with the survey data on water consumption of HHs not connected to CLWACO, i.e., 148 lpcd.

92. In Cua Lo Town, almost all non-piped water consumption comes from drilled well which needs to be pumped, and filtered or boiled first for drinking use. Because of rapid urbanization and expansion of industries, the risk of contamination to shallow water wells could rise.

93. The main benefit of the proposed project is decreased supply costs to consumers as a result of shifting from non-piped sources (i.e., shallow wells in the case of Cua Lo) to a piped water system under CLWACO.

94. The discussion that follows focuses on a number of potential adverse environmental impacts of the project -- mainly associated with construction works and operation -- and corresponding options, safeguards and mitigation measures. The assessment is presented in three sections: (a) raw water pipeline from the Phuong Tich river intake to the BPS; (b) BPS, and (c) Water supply distribution system. For each section, the discussion of impacts and mitigation measures is presented with regard to project construction and operation phases.

### **C. Design and Location Consideration**

95. Location of the WTP has been chosen due to its low impacts on human activities (abandoned brick factory). The area is also not subject to flooding and the risk of seismicity is low.

96. Climate change impacts will be considered during detailed design. If necessary, proposed adaptation measures will be identified and included in the detailed design (i.e., increase of road elevation, increase of drainage pipe diameter to accommodate more extreme flooding; etc. ).

### **D. Pre-Construction Activities**

97. The pre-construction activities under the Project (for the raw water pipeline, WTP and distribution network) are related to the construction of the water treatment plant.

98. Since excavation related to infrastructure development is one of the main causes of accidental detonation of UXO in Vietnam, and given the proximity of the excavation work sites to populated areas, care must be taken to ensure that the pipeline route is surveyed for presence of UXO prior to construction. If such ordnance are detected and verified, clearing work will need to be commissioned, following established procedures under the National Mines Regulatory Authority, prior to undertaking any civil works. (A budget for this pre-construction survey work is provided in the environmental management plan.) It should be noted that areas required for the project have seen some development and modifications over the years. Road buildings, ditch excavation, construction have covered a lot of the project area. Nonetheless, UXO have been moved before without a deflagration and so being, although the risk is low, the whole excavation and building areas should be revisited by specialists.

## **E. Construction Activities**

99. The environmental impacts associated with construction activities, notably for the raw water pipeline and the WTP, are largely influenced by the location and nature of the construction works -- in particular, the excavation of the pipeline trench. The available corridor for laying the raw water pipeline is geographically limited by the space along Highway 601 which traverses a narrow area bounded by the erodible banks of the Cu De River on the north side and by steep hills on the south side. To avoid being scoured by the river during floods, the pipeline will generally be positioned between the road and the hillside, unless the hillsides are too close to the road, in which case the pipeline will be buried under the road bed.

100. The roadsides where the pipeline trench will be excavated are inhabited, and the settlements become dense as the pipeline approaches the WTP site. As such, excavation activities will happen close to the where people live, causing disruption or dislocation as well as various kinds of nuisance effects, including the potential for improperly stored excavation spoils to impair water quality in the nearby river.

101. In addition to the permanent land acquisition, during construction, there may be the impact of temporary land acquisition. The land area which is acquired temporarily (to construct the distribution pipe network, services, etc.) is relatively large, spreading along the pipelines; so the negative impact is significant if the resettlement work is not done effectively prior and/ or at the same time of the laying pipe process. According to the preliminary investigation results, the temporarily affected area is about 129,080m<sup>2</sup> along the transmission, distribution and service pipelines of the water supply system. The number of affected HHs along the sides of the roads in the project area is about 2,560 HHs; in which, 462 business and service HHs are affected. However, the impacts on the natural environment by resettlement activities for installation of pipelines are evaluated in the later section. Upon completion of each pipeline section, the surface will be immediately reinstated to its original condition by the Contractor. These impacts do not last for a long time but only take place during construction. Therefore, the temporary impacts are not considered significant.

102. In terms of both least-cost considerations and environmental impact, the option of building one large-diameter pipeline to match the capacity requirements for the two phases is the most advantageous

103. The area disturbance could be mitigated by placing the pipeline under the existing roadbed. However, this is not feasible because the road width is narrow (only 3-4 m wide);

excavating the road would completely cut off the traffic in the area. In any case, the road needs to remain unobstructed to provide space for access to the trench excavation works and for the movement of equipment and construction materials.

104. Laying pipelines of the size specified for the project would typically require an easement of up to 15 meters wide in order to provide enough space for movement, pipe trench excavation, and temporary storage of excavated materials. However, such a width is not available for considerable lengths of the pipeline route where the distance between the road and the bordering hillside, or between the road and the adjacent houses and establishments, is less than 5 meters. As such, the excavation and handling of excavated material, in particular, need to be properly managed to prevent obstruction to paths or alleys used by the community, or silting up of drains from eroding piles of excavated soil, or creating nuisance caused by dust from dry mounds and movement of dump trucks.

105. Use of temporary spoil storage sites for extended periods should be avoided, and the mounds should be watered regularly to prevent excessive dust production. At construction areas close to streams, silt traps should be used to prevent sediment build-up and excessive water turbidity.

106. Use of temporary spoil storage sites for extended periods should be avoided, and the mounds should be watered regularly to prevent excessive dust production. At construction areas close to streams, silt traps should be used to prevent sediment build-up and excessive water turbidity.

107. A large fraction of the excavated material will be used to backfill the trench after the pipes are laid. As such it is not expected that an excessive amount of spoils from the pipeline construction will need to be disposed. In any case, the final disposal areas for the excess spoils should be carefully sited so that these are not vulnerable to flooding, and are located on stable slopes to prevent slumping. If possible, the disposal areas should be covered by topsoil and re-vegetated. Around the disposal areas, adequate drains should be installed. The excavation spoils should be treated as a resource and their possible beneficial uses maximized -- for instance, as base material if suitable for raising road-top levels in flood-prone sections, for filling in of areas being developed for settlement use, or for constructing or improving protective riverside embankments.

108. Tender documents for the pipeline construction should include provisions to prevent improper handling of spoils. Contractors should explain the excavation methods to be used and the measures for handling spoils. Before areas are designated for spoils temporary storage or final disposal, the contractor should examine the physical suitability of the sites and also assess alternative beneficial uses of the material. The soundness of the measures should be part of the selection criteria for awarding construction contracts.

109. Because of the narrow road width, and the crowded conditions in some sections of the pipe route, the impact on local traffic could be significant. As it may not be possible in the narrow sections to store the excavated earth on the road itself without blocking traffic, the material would have to be transported to a designated storage site first and, when needed to back fill the trench, would be transported back to the work site. As such, there could be frequent movement of trucks transporting earth material along the road.

110. In view of nearby residential areas, nuisance impacts from earth hauling activities such as noise, exhaust fumes and dust need to be mitigated. Dump trucks carrying spoils need to be cleaned regularly, and their emissions checked for compliance with standards,

particularly for particulates. During the dry season the transport route near residential areas should be sprayed with water to prevent excessive dust.

111. To minimize construction impacts overall, work schedules should be well-planned and activities during rush hours near schools and markets should be minimized. Construction and transport equipment used should be of appropriate sizes to fit the limited work spaces; durable wooden or steel plates should be used across trenches and drainage ditches to provide temporary crossings for pedestrians and motorcycles; construction and materials storage sites should be adequately lighted at night; open trenches must be fenced and clearly marked; and adequate sanitation facilities for workers should be provided at the work sites. Contractors must avoid activities producing loud noise and vibration if there is night time construction work necessary.

112. To a large extent, these safeguards are not unique to the project and are provided for in existing government decrees and codes of practice regulating construction work. Tender documents for construction should, therefore, require adherence to safeguards as specified in existing laws and regulations, with provisions for calling on the contractor's performance bond as sanction for violations.

113. Overall, the most significant effect of the pipeline construction is the disruption or damage to property caused to the resident population. The construction of the pipeline along the inhabited sections will inevitably affect existing houses, farms, and some public buildings. However, it is important to emphasize that only a few HHs will need to be relocated, since the roadside residential areas traversed by the pipeline are mostly the front yards of the houses. Where houses are too close to the road and will be damaged by the pipeline construction, the owners will be compensated so that their houses can be moved farther back from the roadside.

114. Even though, under a Nghe An People's Committee decree issued in October 2005, provincial roads are to be provided with a 15 m easement or safety corridor to both sides, the existing HHs along the road and pipeline alignment have long lived there and, consequently, have legal land use rights. They will have to be compensated if parts of their lots are recovered by the government or if portions of their houses are damaged due to the construction works.

115. Based on the survey of HHs and farms along the pipeline route, 195 HHs will be affected by the "recovery" of roadside areas to be traversed by the 4-m wide pipeline corridor (covering a total of 6.4 ha). The term recovery is used here to mean that the government will pay affected parties (residents and farmers) to gain complete and permanent control of the pipeline corridor. In terms of size, 2.88 ha of the pipeline corridor will require compensation for the recovery of the area; the remaining 3.58 ha to be recovered will not require compensation as these are currently public lands.

116. The estimated cost of the compensation package for affected HHs, commercial establishments, and farmers along the raw water pipeline corridor is 5,360 million Dong (\$290,000).

117. A detailed discussion of the impacts due to construction of both the pipeline and the water treatment plant, including the corresponding compensation and relocation measures to be implemented, is presented in a separate report on resettlement and compensation issues, following ADB guidelines (Appendix 16 of the Draft Final Report, i.e., Resettlement Framework).



118. No historical relics will be demolished or relocated by the pipeline construction. The areas required for the project are located in sites that have been worked before for most of them for agricultural purposes or road building. Trace finds are not impossible but the sites show a very low potential.

119. The water resource at the intake location is constant and regulate via a floodgate. Risk of affecting nearby structures or water demand for other users and for the natural habitat will be close to nil for 2 reasons. The first, already said is that the flow is controlled from a bigger water source located in the same province and control by similar and related authorities. The second reason is the two reservoirs. Although they are used for settlement / sedimentation, in time of drought the intake will be close to maintain sufficient flow for agricultural purposes. The 150 000 m<sup>3</sup> will provide water for at least 10 days and a planned intake during low consumption periods of the day will assure stability of availability to the aqueduct and the other users.

120. Traffic safety is a major concern for the project due to narrow roads was some works will take place. To ensure traffic safety, the schedule of construction and vehicle activity during light traffic periods. Traffic detours, and sufficient signage & warning lights at all construction locations and additional pedestrian crossings will be installed. Discussion with the community will be conducted to find on how to best co-exist with construction vehicles on their roads.

121. Measures to ensure workers and public safety will also be taken. The workers and public safety guidelines published by MoLISA will be disclosed to contractors and will be followed. In particular, worker education and awareness seminars for construction hazards should be given. A construction site safety program should be developed and distributed to workers. Detailed measures are included in Table 8 Environmental Management Plan.

122. A minor impact could be lowering of water levels in the shallow wells used by some HHs located on the side of the road across the pipeline. This is because the pipeline trench could intercept the groundwater table from the mountain (recharge) areas toward the river. However, such water table lowering effect near the open trenches during construction is not expected to cause the shallow wells to become permanently unusable.

123. It should be noted that the environmental impacts described above are temporary in nature, i.e., during the two-year construction period for the pipeline. The pipeline operation itself is not expected to produce adverse effects, and indeed, a benefit of the pipeline corridor created is that it will provide space for future widening of the provincial road.

124. The raw water pipeline construction (and that of the WTP) will not have a significant impact on the flora and fauna, as the construction activities will take place in existing agricultural and settlement/urban areas.

125. The lay-out of the water distribution network consists of the transmission pipeline from the water treatment plant, the main pipelines to the district service areas newly served or expanded, branch pipelines within the districts, then distribution and service pipes to end-users. The lay-out of the supply network conforms to the general plan for the development of Cua Lo. The main and distribution pipelines from the WTP will be built along the roads (existing and planned) such that:

126. As for the construction or rehabilitation of the water distribution network, the locations are determined by the lay-out of the water supply network conforming the general plan of development for the town. The main and distribution pipelines will be built along the existing

and planned roads, with the branch distribution pipes laid under the sidewalk to minimize impact on traffic flow

127. As in the case of the raw water pipeline, the adverse impacts are related to the disruption and nuisance caused by construction activities on the nearby residential and commercial establishments.

128. The same mitigation measures and safeguards as those earlier discussed for the raw water pipeline construction should be applied for the development of the distribution network, summed up below:

- Manage excavation and pipe-laying activities so as to avoid unnecessarily blocking streets or alleys used for mobile and pedestrian traffic;
- Use of temporary spoil storage sites for long periods should be avoided, and (in the dry season) the mounds of spoil should be watered regularly to prevent excessive dust production.
- A large fraction of the excavated material will be used again to backfill the pipeline trenches, and so the excavated soil will be placed on the side of the road until needed for backfilling. Temporary earth piles placed along the roads and pavements should be managed in order to avoid silting up drains/ditches or creating nuisance caused by dust. At construction areas close to streams or canals, silt traps should be used to prevent clogging the drainage system.
- Disposal areas for the excess excavated soil should be properly sited so that these are not vulnerable to flooding or slumping. If possible, the disposal areas should be re-vegetated. Around the disposal areas, adequate drains should be installed.
- Excavation spoils could be treated as a resource and their possible beneficial uses maximized. As such excavated material is usable for various purposes, it is expected that the deposits in the disposal area will be removed/recovered over time.
- Tender documents for the pipe construction should include provisions to prevent improper methods for excavation and handling of spoils. Contractors should explain such methods which should be part of the criteria for awarding contracts.
- In very narrow streets, it may not be possible to store excavated earth on the road or pavement without completely blocking traffic. In this case, excavated material would have to be transported to a temporary storage site, then transported back to the construction site for backfilling. In this case, nuisance impacts from earth hauling activities such as noise, exhaust fumes and dust need to be mitigated. Dump trucks carrying spoils should be cleaned regularly, and exhaust emissions checked for compliance with standards, particularly for particulates.
- Noise from jackhammer operation or grinding of concrete or asphalt roads/pavements will be unavoidable, although the nuisance created will be temporary.
- To minimize construction impacts overall, work schedules should be well-planned and activities during rush hours near schools, hospitals, and markets should be minimized. Construction and transport equipment used should be of appropriate sizes in limited work spaces; steel plates should be used across excavated trenches to provide temporary crossings for pedestrians and motorcycles;

construction sites should be adequately lighted at night; open trenches must be fenced and clearly marked; and portable toilets for workers should be provided at the major work sites.

129. In addition, project contractors should be required to comply with existing Vietnamese guidelines and regulations for the control of temporary nuisance impacts related to construction works, as listed in Table 8.

**Table 4: Vietnam Laws and Standards for Regulating Construction Impacts**

Relevant Aspect/Impact	Vietnam Guidelines and Standards
Dust emission	TCVN 5937:2005
Air emission from construction equipment and transport vehicles	TCVN 5947-1; TCVN 6438; TCVN 5939; TCVN 5940
Noise	QCVN26:2011/BTNMT
Vibration	QCVN27:2011/BTNMT
Traffic obstruction	TCVN 4054:1998
Excavation heaps and spoil storage areas	TCVN 5299:1995
Effluent/discharge standards	QCVN40:2010/BTNMT
Hazardous substances	QCVN06:2009/BTNMT

130. To minimize disruption of water supply during the rehabilitation of existing connections, a detailed plan for phasing-in of the new water supply system will be prepared during the detailed engineering design of the project.

## **F. Project Operation**

131. 3 pumps are installed in the raw water pumping station, 2 duty, 1 standby (alternate), each pump has parameters of  $Q = 253\text{m}^3/\text{h}$ ,  $H = 13\text{m}$ , in which 1 VFD pump is used for variation of frequency and rotational speed; therefore, the flow can be adjusted. All these pumps are located below the lowest water level in the preliminary sedimentation pond for pumping water through the discharge pipe D700 (72m long) to the reaction tank.

132. Chemicals for clean water production at the Nghi Hoa WTP are chlorine and lime with sufficient quantities to meet the demand for water treatment. The amounts of chlorine and lime in one day are calculated based on the design capacity of the plant as follows: The amount of chlorine required in one day is 24kg/day. The amount of lime required to alkalize in one day is 682kg/day.

133. Because chlorine is a very reactive and corrosive material, it can cause severe irritation if workers become exposed. In contact with water, chlorine can create a highly corrosive and dangerous acid mist. Therefore, storage and handling procedures are very important. During WTP operation, the chlorine storage house, storage containers, and associated process equipment need to be clearly marked. Chlorine containers must be kept moisture-free and stored separately from other chemicals.

134. Workers need to wear personal protective equipment such as splash goggles, face shields, gloves, coveralls, and leather boots when handling chlorine. They should be trained on safe work practices and emergency steps when handling the chemical. The plant's operating procedures should include an inspection and maintenance schedule for all chlorine storage and handling equipment, which should also be regularly checked for possible leaks.

135. As previously stated, chlorine is a highly reactive substance in its solid form. Calcium hypochlorate, a solid chlorine as opposed to sodium hypochlorate, needs to be kept apart from all other chemicals and needs to be handled with care. Since it reacts on contact of organic matter it should be handled with all the protective measures such as long sleeve synthetic gloves, face shield and a synthetic apron worn on top of a fully clothed individual.

136. The storage room should be built with a ventilation system inducing 3 changes of air per hour.

137. Risk of solid chlorine run off and creating a potential risk to the surrounding populations is very unlikely. On the other hand risks to the worker are highly possible. Chlorine storage room door should be closed and locked at all times to prevent or minimize adverse effects on persons, property and the environment.

138. Intervention in case of spills would be to decrease maximum spreading of dust by shutting down the ventilation, if and only if, a proper breathing apparatus is available (tanks, proper filter mask not with carbon cartridges cause it will react with the product). In all cases put a breathing apparatus, protective clothing and gloves. Avoid dry sweeping and to clean the surfaces with compressed air. The whole area should be thoroughly vacuumed. Return the maximum amount of product in a proper container, like an empty used chlorine container, and discard the product. Any product recovered, because it is used for water sanitation, should be discarded. If the package (drum or bag) of the product is damaged, repair it or put it immediately into a recovery synthetic or metal drum to avoid or minimize product loss and contamination of the surrounding environment. Immediately replace damaged containers to prevent product loss and contamination of surrounding atmosphere.

139. An emergency plan will be prepared and must be in place during the construction and subsequent operation phases of the new raw water pipeline, WTP, and treated distribution network to protect the public and workers. Potential emergencies could arise from accidents resulting from the operation of heavy equipment, excavation activities including work at borrow pits, chemical spills, electrical shock, work in/or near rivers, and from worker & public vehicle traffic. Environmental incidents could occur from pipeline failures, spills at WTP sites, improper disposal of WTP sludge, and failures along distribution network. In addition to the proposed training, simulated drills of safety measures will also be conducted.

140. The emergency plan will address the following issues and will clearly state the role and responsibilities of each agency involved in the project.

- Alert & communication & initial response
- Procedure for evacuation
- Medical issues (first aid, nearest medical services)
- Procedure in case of fire and explosion;
- Procedure in case of hazardous material spill
- Procedure in case of drinking water contamination

141. Apart from the potential hazard associated with handling of treatment chemicals, disposal of sludge and wash water from the treatment process is the most important aspect of the WTP operation that can cause adverse impacts, specifically on the surrounding land and waterways. Sludge is a product of the sedimentation and filtration processes, and it consists of chemical floc, fine particles and reservoir-derived algae removed from the raw water through flocculation. The sludge contains the aluminium-based flocculating agent but is not toxic. The quantity of sludge produced from the WTP is not estimated to be large since

the raw water comes from a reservoir in which sedimentation processes would have already removed most of the turbidity.

142. The clarifier sludge (produced as batch discharges from the plant operation) will have few potential beneficial uses, and provision needs to be made for disposal. There are two options for dealing with the sludge: (a) dewatering so that it can be handled easily and disposed as solid waste in a controlled landfill, or (b) discharge in liquid form into the river or spreading on open land. Due to potential environmental impacts related to discharge of sludge in water course, the dewatering option will be implemented.

143. The dewatering option has two variants: (a) mechanical pressing to thicken the sludge into cake, or (b) natural settlement and drying. For (a), sludge coming from the settling tank is first conveyed to a separate thickening tank, from where it then goes through a mechanical (plate) press to remove the water. The dewatering process converts the sludge into block/cake form which can then be easily transported to a landfill. Alternatively, for (b), the sludge and wash water would be piped to a lagoon or basin to settle, alternating the operation with a second basin to allow for settlement and removal. The thickened sludge is moved from the settling basin to a drying area, and then taken away to a landfill. This second variant requires more space.

144. The sludge in the regular batch discharges from the clarification process would normally contain up to 3% solids (by weight). After dewatering, the solids content would increase to about 25 to 30%, and the sludge would have the consistency of cake, which is easier to handle and transport to the landfill. It is estimated that around 10-15 m<sup>3</sup>/day of dewatered sludge would be generated by the WTP.

145. At the existing Cua Lo WTP, the sludge is not discharged into the river directly---since the plant draws raw water from the same river. Rather, the sludge is allowed to settle in two alternating settling basins; then the thickened sludge is removed for disposal (as regulated by the Environmental Protection Centre of the DoNRE).

146. The remaining choice is dewatering of the sludge, either through plate pressing, or through natural settlement in a lagoon or tank (which will take up more space). This would be decided mainly on the basis of economy and efficiency considerations. As the technology for dewatering of sludge by means of plate pressing becomes more conventional, this option is to be preferred as a long term design feature of all new WTPs in Nghe An province.

147. Table 5 shows the handling and disposal of other kinds of waste expected during the commissioning/testing and normal operation of the WTP.

**Table 5: Mitigation of WTP Wastes**

Stage	Source of Waste	Nature of Waste	Treatment/Disposal
<b>During commissioning</b>	Hydraulic testing water	Usually free of contaminants	Discharge to the nearby water course (an existing channel leading to the Cua Lo River)
	Treated test water during the plant start-up and process adjustment	Process water containing chlorine which may exceed the drinking water quality standard	Discharge to water course after dechlorination if necessary

	Water used for disinfecting tanks	High chlorine residual	Discharge into the nearby water course after dechlorination if necessary
	Filter backwash water	Media fines	Settlement and discharge to nearby water course
<b>During normal operation</b>	Clarification sludge	Regular batch discharges	Sludge to be dewatered through plate pressing (described above), and disposal to landfill
	Filter backwash water	Regular batch discharges; typically 300 mg/l solids content	Recycle
	Wash water from the sand filter	Biological matter, such as algae	To settlement tank, drying and disposal
	Treatment process overflows	Could contain low residual chlorine and suspended solids	Discharge to nearby water course after dechlorination (as needed)
	Chemical wastes	Dross, flushings, drainage washings, spillages	Neutralize and hold for tanker removal

148. Compensation and resettlement in Nghi Hoa Commune: The construction of Nghi Hoa Water Treatment Plant should permanently acquire 80,950m<sup>2</sup>. In which, part of the land area previously Nghi Hoa Commune People's Committee let rent out to the local persons for brick production and freshwater fish farming, and now this land leases have expired. The remained is the public land area managed by Nghi Hoa Commune People's Committee. In this land area, there are five temporary houses and other structures constructed by the local persons for brick production; in addition, there are some trees (*statistical data taken from Chapter 1*). Therefore, the construction of the project will not require acquisition of land and no HHs are required to relocate. Currently, the Owner has been working with relevant agencies to survey in detail, and Nghi Loc District People's Committee issued Decision No. 2393/2010/QD.UBND dated 12/28/2012 regarding the approval of the compensation and resettlement plan. The Owner will make compensation for organizations and individuals according to the above plan; it is expected that the impact of compensation and resettlement is negligible and the land acquisition will take place very smoothly.

**149.** Compensation and resettlement in Nghi Huong Ward: Construction location of the BPS and the company offices will occupy 12.250 m<sup>2</sup>; in which: plantation of horsetail trees of the local people (9,889.8 m<sup>2</sup>), transportation (8,179 m<sup>2</sup>) and a small part residential land (1,542.7 m<sup>2</sup>), two (2) HHs must be relocated because their land is acquired for the project. These relocated HHs have the permanent houses with flat roofs and the secondary structures.

150. The acquisition of land for this project item will affect the daily life, living and studying of the children of these two HHs due to relocation. However, according to the survey results

of the Consultant, these two HHs wish to receive compensation in cash and move to the resettlement area adjacent to the Vinh – Cua Lo Avenue.

151. Generally, the loss is not significant. To minimize the impacts, the Owner should compensate in cash for the losses in accordance with the compensation and resettlement plan which was approved in the Decision No. 4000/QĐ-UBND dated 27/12/2012 of the Cua Lo Town People's Committee and other relevant decisions.

152. The detailed assessment of the resettlement aspect the water treatment plant site is presented in a separate report.

153. Operation of the new water treatment plant will provide 13,000 m<sup>3</sup>/day and they will be developed over two phases in early 2013. The additional supply will increase the volume of urban wastewater generated. Currently, the collection and treatment of urban wastewater has not been done.

154. Clean water in the transmission, distribution and service pipelines of the water supply system basically has no impact on the natural environment, except leakage from joints, welds; if so, clean water will carry the pollutants and infiltrate to ground and affect groundwater. So, the Owner will regularly check the pipeline with the modern test equipment. This budget is part of the ADB's investment program.

155. It is necessary to control the flow of raw water to the water treatment plant. If the plant has a failure that force the plant to stop operation, raw water might be pumped into the supply system and direct to the treated water distribution networks. Therefore, during design, it is necessary to take into account of redundant capacity for the important items such as pumping stations, reservoir with automatic cut-off valves.

156. It is necessary to have a specific schedule for quality monitoring of supplied water in the raw water intake, water after disinfection tank, so that the timely and satisfactory remedies will be made.

## **6. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION**

157. The Cua Lo Water Supply One Member Limited Liability Company has issued the official letter regarding “The Construction Investment Project for Rehabilitation and Expansion of the Water Supply Factory for the Cua Lo Town from 3000m<sup>3</sup>/day to 13.000m<sup>3</sup>/day” as well as the environmental impacts, the mitigation methods and prevention of the environmental pollution incidents of the project. Besides, they also ask for the consultations while the Environmental Impact Assessment (EIA) Report is being prepared to deliver to the agencies in local area where the project is going to be implemented such as the People’s Committee, the Fatherland Front who represent the community in the communes/wards in the project area.

158. The methods and measures for mitigation of the negative impacts of the project to the natural and socio-economic environment are shown the brief EIA report which is realistic and feasible. The People’s Committees of the Communes/Wards in the project highly supported these proposed methods and measures.

159. The negative impacts to the natural and socio-economic environment caused by the project implementation at the construction stages of the infrastructure and at operation stages are specifically presented for each stage and each affected person. The People’s Committees of the Communes/Wards in the project area have highly agreed with what has been mentioned in the EIA brief report.

160. During construction, it should make sure that the project includes the measures to minimize the pollution caused by dust and noise which affect the community around the project area.

161. During project operation, the Project Owner shall comply with the provisions of the law on environmental protection, construct treatment facilities, limit the negative impacts on environment and protect community health. The company should be proactive to reserve sufficient water source in the raw water sedimentation pond to ensure that water is still produced during prolonged drought condition. The company must be absolutely committed to not allowing the water source disputes. Coordination with local authorities and other agencies in the water resources management in the Phuong Tich River regarding reserves and quality is also required.

### **A. Public consultation**

162. Public information was conducted in two ways: i) interviews of HH through questionnaire; ii) joint public consultation for environment and resettlement issues.

#### **a. Households’ Survey**

163. A survey on local environment was carried out along pipelines and the for the WTP. The interviews were carried out using a questionnaire survey that helped assess community awareness and concerns about the proposed project.

164. A 6-person survey team conduct surveys and interviews with local residents of 7 Wards Cua Lo Town (Nghị Thủy ward, Nghị Tân ward, Nghị Hòa ward, Nghị Hải ward, Thu Thủy ward, Nghị Thu ward, Nghị Hương ward) and 4 communes of Nghi Loc district (Nghị Khanh commune, Nghi Hop commune. Nghi Xuan commune, Nghi Thach commune) of the project area from 8th to 22th September, 2011. Results show that the project gains enthusiastic support among people interviewed. Eleven (11) community leaders were interviewed in more details on their concerns over potential impacts of the project.



**Figure 13: Interviews of local authority officers and residents**



165. People who answered the questionnaire survey were informed of the purpose and expected benefits of it and the nature of the construction activities that will be carried out in the region. In general, there is no opposition against the proposed project. However, the respondents and the focus group discussion concerned mainly: (a) traffic congestion during construction, due to the width of the streets and narrow alleys in the area, especially in the center of town with schools and markets; (b) the potential hazards caused by fast moving trucks and pits without fences, danger to children and the elderly (c) dust, smoke, noise, and soil on the streets in the transportation of pipeline excavating materials; (d) waste from the construction and sewer blockages, and (e) the movement of migrant workers and illegal behavior such as gambling and disorder conduct. Answers to the issues raised are summarized in the Table below.

**b. Public meetings**

166. Consultation meetings were conducted at the Water Treatment Plant and Administration office among HH affected by the Project (along pipelines and at the WTP location). The meeting was conducted on both environmental and resettlement issues.

167. People expressed opinion directly about impact from construction of WTP and administrative office. Generally, almost all people in the meeting agree with the Project.

168. Minutes of the meetings on 9th, October 2013 and list of people who join the meeting on 20th October 2013 on compensation, water demand and ability to pay water charge, are presented in Annex 2. Answers to the issues raised are summarized in the Table below.

**Figure 14: Photo of consultation meeting**



**Table 6: Summary Matrix on Public Consultation**

<b>Issues Raised</b>	<b>Project's Answers</b>
a) Traffic congestion during construction;	The following measures will be undertaken: <ul style="list-style-type: none"> <li>– Schedule of construction adapted to traffic periods.</li> <li>– Traffic detours, and sufficient signage &amp; warning lights at all construction locations.</li> </ul>
b) Public safety due to fast moving trucks and pits without fences, danger to children and the elderly	<ul style="list-style-type: none"> <li>– Additional pedestrian crossings will be installed in dangerous locations.</li> <li>– Discussion with the community will be conducted to find on how to best co-exist with construction vehicles on their roads</li> </ul>
c) Dust, smoke, noise, and soil on the streets in the transportation of pipeline excavating materials;	<ul style="list-style-type: none"> <li>– Regular watering;</li> <li>– All aggregate loads on trucks must be covered;</li> </ul>
d) Waste from the construction and sewer blockages;	<ul style="list-style-type: none"> <li>– Waste will be disposed in adapted and authorized location;</li> <li>– Contractor will be responsible for any blockage of sewer;</li> </ul>
e) Presence of outside workers and illegal behavior such as gambling and disorder conduct.	<ul style="list-style-type: none"> <li>– Worker education and awareness seminars for behavior with host communities;</li> <li>– Regular communication with local authorities</li> </ul>
f) Currently we are using water from drilled well were water quality is not controlled. We expect the water quality will be ocnrolled with th enew water system	<ul style="list-style-type: none"> <li>– Yes, water quality will be controlled of in the taped water system form the Cua Lo Water Supply One Member Co., Ltd.</li> </ul>
g) Fair compensation is needed for affected land and assets	<ul style="list-style-type: none"> <li>– Compensation rates will be based on market rates;</li> </ul>
h) Do HH will have to pay fees for water connection?	<ul style="list-style-type: none"> <li>– Water connection will be funded by the project and HH will not have to pay such fees;</li> </ul>
i) Willingness to pay; HH are ready to pay reasonable increase of fees;	<ul style="list-style-type: none"> <li>– Water fee will raise from 5.500VND/m3 to 6.500VND/m3 in the next two years,</li> </ul>

**B. Consultation with Downstream Communities**

169. As per provision of Decree 201/2013/ND-CP projects requesting water abstraction from surface or underground water are required to collect opinions of representatives of local communities including downstream communities. Results of the surveys will be documented and sent to ADB during detailed design.

**C. Disclosure of Information**

**170.** IEE and Environmental Management Plan will be translated in Vietnamese and will be made available at the office of the People's Committees (PC) of the 7 Wards Cua Lo Town (Nghi Thuy ward, Nghi Tan ward, Nghi Hoa ward, Nghi Hai ward, Thu Thuy ward, Nghi Thu ward, Nghi Huong ward) and at the PC4 communes of Nghi Loc district (Nghi Khanh commune, Nghi Hop commune.

## **7. GRIEVANCE REDRESS MECHANISM**

171. During project operation, the Project Owner shall comply with the provisions of the law on environmental protection, construct treatment facilities, limit the negative impacts on environment and protect community health. The company should be proactive to reserve sufficient water source in the raw water sedimentation pond to ensure that water is still produced during prolonged drought condition. The company must be absolutely committed to not allowing the water source disputes. Coordination with local authorities and other agencies in the water resources management in the Phuong Tich River regarding reserves and quality is also required.

172. The mechanism described below follows the procedure adopted also for raising and resolving grievance in the resettlement and the social development report. As a guiding principle, grievances related to any aspect of the Project will be handled through negotiation aimed at achieving consensus. Complaints and grievances will pass through three levels of entities, which have the potential to resolve the situation, before they can be elevated to a court of law as a last resort. CLWACO will shoulder all administrative and legal fees that might be incurred in the resolution of such grievances and complaints.

173. The first stage venue for raising and resolving complaints and grievances is the Commune People's Committee (CPC). An aggrieved party may bring its complaint or petition before any member of the Commune People's Committee, either through the village chief or directly to the CPC, in writing or verbally. Grievances may also be raised during follow-up consultations and interviews with local residents during construction. It is incumbent upon said member of CPC or the village chief to notify the CPC about the complaint. The CPC will then meet personally with the complainant and will have 15 days after the lodging of the complaint to resolve the complaint. The committee may obtain the assistance of the Nghe An Environmental Protection Agency in evaluating the technical basis of complaints related to environmental impacts. The CPC secretariat will be responsible for documenting and keeping a record of all complaints that are lodged with the committee.

174. If not resolved in the first stage above, the second venue for grievances is the District People's Committee (DPC). That is, if after 15 days the aggrieved party or complainant does not hear from the CPC, or if the complainant is not satisfied with the decision taken on the complaint, the affected party may bring the case, either in writing or verbally, to any member of the DPC or the District CRC. The DPC in turn will have 15 days following the lodging of the complaint to resolve the case. The DPC secretariat is responsible for documenting and keeping a record of all complaints that are lodged with the district committee.

175. The third stage is the Provincial People's Committee (PPC). If after 15 days the aggrieved and affected party does not hear from the District People's Committee, or if the complainant is not satisfied with the decision taken with regard to the complaint, the case may then be brought, either in writing or verbally, to any member of the PPC or the Provincial CRC. The PPC has 15 days within which to resolve the complaint to the satisfaction of the concerned parties. The PPC secretariat is responsible for documenting and keeping a record of all complaints lodged with the committee.

176. In the event that the grievance remains unresolved even after being raised at the level of the Provincial People's Committee, the final resort is the Court of Law Arbitrates. Specifically, if after 15 days following the lodging of the complaint with the PPC, the aggrieved party does not hear from the Provincial CRC, or if the complainant is not satisfied with the decision taken on the complaint, the case may then be brought to a court of law for adjudication.

## **8. ENVIRONMENTAL MANAGEMENT PLAN**

177. The environmental impacts and mitigation measures for the proposed project were described in Section V above. This section summarizes the significant impacts and mitigation measures with attention to key items to be monitored, the implementation set-up and assignment of responsibility, and the required budget.

### **A. Subproject components**

178. The Cua Lo subproject consisted of the following components:

- The construction of a raw water intake from Phuong Tich River and a new Water Treatment Plant with a production capacity of 10,000 m<sup>3</sup>/day;
- The construction of a BPS;
- The construction of a transmission and distribution network 65 km pipes HDPE diameter D100 – D400 and 216 km service pipes HDPE D40 – D90;
- The connection of 7,352 houses with meters;
- The construction of office building and auxiliary facilities;
- And support for the implementation and operation of the project;

### **B. Institutional Arrangement and Responsibilities**

179. The project will be implemented under the Nghe An People's Committee as the Executing Agency and the CLWACO as the project Implementing Agency (IA). A Project Management Unit (PMU) has been created to supervise the implementation, on behalf of CLWACO, of the capital investments related to the water supply project.

180. The CLWACO PMU has two operating groups: one for technical and administration matters and another for planning and finance. The technical and administration group will be responsible for the detailed engineering and preparation of construction plans, and for construction monitoring. The planning and finance group will be responsible for overseeing the overall procurement process (starting from preparation of bid documents for specific works, to bid evaluations and recommendation of award, and up to payment for completed works) as well as for the overall financial monitoring of the project. Currently, there are 11 persons assigned to the PMU

181. The IA (CLWACO) has the ultimate responsibility for implementation of the entire subproject, including finance and administration, technical and procurement matters, monitoring and evaluation, and environmental safeguards compliance. The CLWACO will operate the completed water supply system (WS)

182. A Detailed Design and Supervision Consultant<sup>2</sup> (DDSC) who will assist with detailed designs of subproject, and update EMP to ensure EMP meets the final subproject designs. The ADB is responsible for monitoring to ensure subproject meets the environmental safeguards of the SPS (2009).

183. The PMU will be responsible for fulfilling the environmental requirements of the project, in particular for incorporating the mitigation measures and safeguards identified in this report in the detailed engineering design of the pipeline, WTP and distribution network, as well as in the bid documents and construction contract documents. The PMU will also be responsible for commissioning water and air quality sampling activities, undertaking

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<sup>2</sup> DDSC contract expected to include construction supervision.

environment-related investigations that may arise during implementation, and responding to environment or nuisance-related complaints from residents or businesses affected by the project works.

184. Key duties of the PMU are summarized as follows:

- With DDSC, review and update the EMP during detailed design and engineering phase to ensure EMP meets detailed subproject designs;
- As part of the EMP update, ensure that public consultations that continue through subproject implementation document concerns of stakeholders situated downstream of intake points or in-stream construction sites;
- Ensure safeguard requirements of the final EMP are adequately described in the bidding documents (instruction to bidders) so that contractors can prepare their respective site-specific CEMP<sup>3</sup> based on the final EMP, and ensure criteria for evaluating contractor bids and awarding construction packages include relevant safeguard requirements of the final EMP;
- Ensure construction contractors successfully implement impact mitigation measures of EMP as part of their CEMPs ;
- Coordinate with the DoNRE Environment Protection Center on regulatory compliance issues (e.g., for water quality in rivers affected by construction drainage or erosion from storage areas for excavated soil, noise and vibration from construction sites, sanitation in workers campsite, etc.);
- Prepare terms of reference for the military to conduct surveys to detect unexploded ordnance, and ordnance disposal if necessary;
- Advise the PMU director on environment-related concerns arising during project construction, and recommend corrective measures;
- Disseminate to stakeholders the results of environmental monitoring and implementation of safeguards, especially among HHs or small businesses near the construction sites;
- Include monthly contractor reports in quarterly status reports to CLWACO on status of EMP & environment safeguards, and public stakeholder issues during construction phase of subproject; and
- Prepare ToRs for TREC (see below) for implementation of monitoring plan of EMP, and for assistance with follow-up interviews and consultations with public stakeholders on issues and concerns arising during project construction.

185. The Technical Resources and Environment Co., Ltd (TREC) One Member will be requisitioned to provide environmental monitoring support during project construction, using as baseline the environment survey that was conducted as part of this IEE. The Center will undertake sampling and testing of surface water, groundwater and ambient air quality along the pipeline construction corridor three times per year during the two-year construction period. The TREC will also conduct follow-up consultations and interviews with local residents to identify concerns or grievances arising during construction. The TREC will report its findings to CLWACO, and the latter will relay the findings to the Nghe An PC and DoNRE.

186. Safeguards compliance monitoring during the construction phase - particularly compliance with safeguard measures specified in construction contracts, as recommended in

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<sup>3</sup> Contractors Environmental Management Plan

this report--will be incorporated in the duties of the construction supervision company to be engaged by CLWACO (and supervised by the PMU). The compliance inspections and audits will be documented, and findings and recommendations for corrective measures submitted to CLWACO. During the operation phase, CLWACO will be responsible for safeguards and effluent monitoring, and the findings will be reported to the DoNRE.

187. The Nghe An Environmental Protection Agency will conduct random environmental monitoring and inspection before, during, and after construction, as well as in the event of emergencies. It will also review the monitoring reports of the TREC. If abnormalities are found, the DoNRE may impose fines and issue a notice of rectification with a specific deadline to the responsible entities. If complaints are formally received from the public through the People's Committee, The Nghe An Environmental Protection Agency will carry out verification inspections, as described in the grievance redress mechanism.

188. Within three months after the construction completion or no later than one year, an environmental acceptance monitoring and audit report on the completion of the project components will be prepared by a qualified environmental institute, e.g., Technical Resources and Environment Co., Ltd One Member. The report will be reviewed and approved by the DoNRE and submitted to ADB.

189. The environmental monitoring, including the environmental benefit monitoring, will be incorporated into the project performance management system (PPMS) indicators for the project. Assisted by a local environment specialist, the PMU will be responsible for analysing and consolidating the data via their management information system. The PPMS will be designed to allow adequate flexibility to adopt remedial actions regarding the project design, schedules, activities, and development impact. At the start of the project, the PMB and consultants will develop comprehensive PPMS procedures for systematically generating the data on inputs and outputs of the project components, and agree on the environmental and related socioeconomic indicators to be used to measure the project impacts. The PMB will refine the PPMS framework, confirm the achievable goals, firm up the monitoring and recording arrangements, and establish the systems and procedures no later than 6 months after the loan takes effect.

### **C. Summary of Potential Impacts**

190. The monitoring specifications described in Table 7 focuses on the potentially adverse environment-related impacts, based on the assessment presented in Chapter V. Benefits associated with providing adequate and safe water supply will be monitored within the project's overall design framework (i.e., the project logical framework).

**Table 7 Summary of key Potential Impacts from IEE**

<b>Construction Phase</b>	
1)	Excavation work for the pipeline trenches will produce spoil; heaps of excavated soil beside the trench could obstruct community access, and erosion from spoil storage areas could silt up nearby streams and drains. Dry heaps could cause dust nuisance.
2)	Obstruction to traffic flow during raw water pipeline construction, exacerbated by the narrow road and work spaces: <ul style="list-style-type: none"><li>• Local residents could be cut off from the road due to the trench-building</li><li>• Increased traffic of dump trucks carrying spoils to and from storage areas</li><li>• Air pollution from excavation and transport equipment</li><li>• Traffic hazard to pedestrians, especially school children and elderly</li></ul>
3)	Nuisance and public safety hazards caused by pipeline excavation and pipe-laying activities in urban areas
4)	Accidental Detonation of unexploded ordnance (UXO) during pipeline excavations
<b>Operation Phase</b>	
1)	Hazard posed by water treatment process chemicals during operation, of which Chlorine is the most hazardous
2)	Disposal of water treatment sludge and wastes from WTP operation
3)	Increase in the volume of municipal wastewater generated.

#### **D. Mitigation Plan**

191. The monitoring specifications described in Table 8 focuses on the potentially adverse environment-related impacts, based on the assessment presented in Chapter V. Benefits associated with providing adequate and safe water supply will be monitored within the project's overall design framework (i.e., the project logical framework).

**Table 8 Environmental Mitigation Plan**

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Pre-construction Detailed Design Phase								
Confirmation of required resettlement and temporary relocations	No community impacts	1. Affected persons well informed well ahead of project implementation.	At intake at Phuong Tich river, at WTP, at treated water pipeline, at BPS & along distribution network	Before subproject implemented	See resettlement plan	See resettlement plan	CLWACO / PMU <sup>4</sup>	Resettlement committees
Disclosure, & engagement of community	No community impacts	2. Implement information disclosure and activate grievance redress mechanism (see IEE)	At all construction sites.	Beginning of subproject	Quarterly	No marginal cost <sup>5</sup>	CLWACO	PMU
GoV approvals	No negative impact	3. Notify DoNRE of project initiation to ensure GoV EIA requirements approved, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PPC & DDSC <sup>6</sup>	PMU
Detailed designs	Minimize negative environmental impacts	4. Complete detailed designs of: <b>1)</b> raw water intake and reservoir from Phuong Tich river to Nghi Hoa WTP; <b>2)</b> new Nghi Hoa WTP; and <b>3)</b> treated distribution network that incorporate the following:  a) updated review of raw water sources at Phuong Tich river to ensure that <u>sufficient</u> and <u>sustainable</u> supplies of <u>treatable</u> raw water will be available to water supply systems long after commissioning stage;  b) re- confirm assertion of IEE that no critical habitat, rare or endangered flora or fauna, or cultural property or values will be affected by any component of the water supply systems;  c) minimal acquisition of agricultural land  d) no or minimal disruption to water supply, utilities, and electricity with contingency plans for unavoidable disruptions; and  e) Conduct survey with downstream users once approval of the raw water intake.	(a-e), Entire subproject area: 1) raw water intake and reservoir; 2) Nghi Hoa WTP; 3) pipeline corridor 4) BPS and office and Treated water distribution network	Before construction initiated	Once with detailed designs documents	No marginal cost	CLWACO / DDSC	PMU

<sup>4</sup> Project Management Unit under CLWACO; identified as Project Management Board (PMB) in IEE

<sup>5</sup> No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

<sup>6</sup> Detailed Design & Supervision Consultant



Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
EMP	Minimize negative environmental impacts	5. Include all mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs. 6. Identify all potential impacts of project and include in EMP. 7. Submit EMP with all potential impacts to ADB to review. 8. For the 3 components of subproject develop individual environmental management sub-plans for: <b>a)</b> Securing GoV approvals; <b>b)</b> UXO survey & removal; <b>c)</b> Forest clearing, tree/ vegetation removal, & site restoration; <b>d)</b> Civil works; <b>e)</b> Cultural chance finds; <b>f)</b> Contaminated spoil identification & disposal; <b>g)</b> Construction materials acquisition, transport, & storage including borrow pit management; <b>h)</b> Erosion & river sedimentation control; <b>i)</b> Construction site drainage; <b>j)</b> Noise, dust & NOx, SOx, CO, CO <sub>2</sub> emissions; <b>k)</b> Worker camp operation; <b>l)</b> Solid and liquid waste disposal; <b>m)</b> Hazardous chemical & waste management; <b>n)</b> Construction & urban traffic (especially along raw water pipeline); <b>o)</b> Utility and Power Disruption; <b>p)</b> Worker and public Safety (especially along raw water pipeline); <b>q)</b> Raw water quantity & quality sustainability; <b>r)</b> Training & capacity development plan; <b>s)</b> WTP chemicals & sludge management; and <b>t)</b> Treated water quality management.	Entire subproject	In parallel with completion of detailed designs	Once, as part of detailed design phase	No marginal cost	CLWACO / DDSC	PMU
Develop bid documents	No negative environmental impact	9. Ensure the EMP is included in contractor tender documents to enable contractors to develop their CEMP <sup>7</sup> , and that tender documents specify that implementation of CEMP must be included in cost estimates. 10. The environmental management sub-plans identified in 11) above should be identified in the appropriate contractor tender documents, for the contractor to detail into CEMPs for their bidding documents. 11. Specify in bid documents that contractor must have experience with implementing EMPs, and/or provide staff with EMP experience.	All project areas	Before construction begins	Once for all tenders	No marginal cost	CLWACO / DDSC	PMU / DDSC

<sup>7</sup> Contractors Environmental Management Plan

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
UXO survey	Injured worker or public	12. Ensure military is consulted and clears areas where necessary.	All construction sites.	Before any clearing or excavation	Once	See Monitoring Plan below	PPC & military	military
Training & capacity development	No negative environmental impact	13. Develop and schedule training plan for CLWACO / PMU staff to be able to fully implement EMP, and manage implementation of mitigation measures by contractors. 14. Create awareness and training plan for later delivery to contractors whom will implement mitigation measures.	For all project areas	Before construction begins	After each training session	No marginal cost	DDSC	DDSC / CLWACO
Procurement of Contractor(s)	No negative environmental impact	15. Ensure winning contractor bid(s) include a CEMP that addresses items 8 – 11 of the EMP" section above.	All project areas	Before contracts signed	Once	No marginal cost	CLWACO / DDSC	CLWACO / DDSC
Recruitment of workers	Community mischief, & sexually transmitted disease	16. Use local workers as much as possible, reducing #s of migrant worker	For all work locations	Throughout construction phase	After worker hiring stages	No marginal cost	CLWACO / DDSC	Contractor's bid documents
<b>Construction Phase – General Mitigations for all Components of Subproject</b>								
Initiate EMP & sub-plans,	Prevent or minimize impacts	17. Initiate the EMP including individual management sub-plans for the different types of potential impacts identified in pre-construction phase. See sub-plan implementation guidance below.	For all construction sites	Beginning of construction	Once	No marginal cost	CLWACO / DDSC	PMU & contractors
Obtain & activate construction permits and licenses	Prevent or minimize impacts	18. Contractors to comply with all statutory requirements set out by DoNRE for use of construction equipment, hazardous waste & chemicals management, and operation of construction plants, e.g., concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	CLWACO / DDSC	PMU & contractors
Worker camp operation	Pollution and social problems	19. Locate worker camps away from human settlements. 20. Ensure adequate housing and waste disposal facilities including pit latrines, garbage cans and recycling bins if services are available. 21. Exceeding prepared food should be offered to local charity (shelters/orphanage/food bank, temple). 22. A solid waste collection program must be established and implemented that maintains a clean worker camps 23. Locate separate pit latrines for male and female workers	All worker camps	Throughout construction phase	Monthly	No marginal cost	DDSC & PMU	contractor

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		<p>away from worker living and eating areas.</p> <p>24. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times.</p> <p>25. Worker camps must have adequate drainage.</p> <p>26. Local food should be provided to worker camps. Guns and weapons not allowed in camps.</p> <p>27. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers.</p> <p>28. Preservatives should be provided if such practice does not interfere with local belief or customs.</p> <p>29. Camp areas must be restored to original condition after construction completed.</p>						
Training & capacity	Prevention of impacts through education	30. Implement training and awareness plan for CLWACO / PMU (Environmental staff) and contractors.	PMU offices, construction sites	Beginning of construction	After each event	No marginal cost	DDSC	DDSC & PMU
Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and erosion of landscape	<p>31. Restrict tree and vegetation removal to within designated RoWs.</p> <p>32. Within RoWs minimize removals, and install protective physical barriers around trees that do not need to be removed.</p> <p>33. All RoWs to be re-vegetated and landscaped after construction completed. Consult forestry department to determine the most successful restoration strategy and techniques.</p> <p>34. Recuparate tree logs and make them available for local use.</p>	All construction sites.	Beginning and end of project	Monthly	No marginal cost	DDSC / PMU	contractor
Civil works	Degradation of terrestrial resources	<p>35. All construction sites should be located away forested, plantation, &amp; agricultural areas as much as possible.</p> <p>36. No unnecessary cutting of trees.</p> <p>37. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas.</p> <p>38. No waste of any kind is to be discarded on land or in forests/plantations.</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSC & PMU	contractor

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Civil works	Degradation of water quality & aquatic resources	39. Minimize earthworks & final area of foundation for intake in Phuong Tich River. 40. Phuong Tich river pipeline placement works should be done during dry season. 41. Excavation spoils and reprofiling activities of the actual reservoir should be done so the excess water does not disperse back into the river. 42. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 43. Plastic tarps should be used to cover piles to avoid drying and erosion of the piles. 44. Earthworks should be conducted during dry periods. 45. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters. 46. No waste of any kind is to be thrown in surface waters. 47. No washing or repair of machinery near surface waters. 48. Pit latrines to be located well away from all surface waters. 49. No unnecessary earthworks in or adjacent to all water courses. 50. No aggregate mining from Phuong Tich river, or from nearby lakes. 51. All existing irrigation ditches, canals and channels to be protected the same way as rivers and lakes.	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSC & PMU	contractor
Cultural chance finds	Damage to cultural property or values & chance finds	52. As per detailed designs all civil works should be located away from all cultural property and values including cemeteries and pagodas. 53. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 54. Upon a chance find all work stops immediately, find left untouched, and PMU and CPC notified. If find deemed valuable, provincial cultural authorities must be notified. 55. Work at find site will remain stopped until authorities allow work to continue.	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	DDSC & PMU	contractor

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Construction materials acquisition, transport, and storage sub-plan	Pollution, injury, increased traffic, disrupted access	56. All borrow pits and quarries should be approved by DoNRE. 57. Select pits and quarries in areas with low gradient and as close as possible to construction sites. 58. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 59. Pits and quarries should not be located near surface waters, forested areas, critical habitat for wildlife, or cultural property or values. 60. Although it should be avoided at all costs, if aggregate mining from fluvial environments is required small streams and rivers should be used, and dry alluvial plains preferred. 61. All topsoil and overburden removed should be stockpiled for later restoration. 62. All borrow pits and quarries should have a fence perimeter with signage to keep public away. 63. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original non-organic overburden excavation spoils. <sup>8</sup> 64. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting. 65. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites. 66. Define and schedule how fabricated materials such as steel, wood structures and scaffolding will be transported and handled. 67. All aggregate loads on trucks must be covered. 68. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non-traffic areas.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	DDSC / PMU	Contractor(s)
Excavation		69. Uncontaminated spoil to be disposed of in DoNRE-	All excavation areas	Throughout	Monthly			

<sup>8</sup> Note : Organic matter buried at a certain depth preventing oxygen to infiltrate the soil will degrade while emitting methane which is 21 times stronger than carbon dioxide as a greenhouse gas

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
spoil management sub-plan	Contamination of land and surface waters from excavated spoil	<p>designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified.</p> <p>70. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive features including wetlands such as swamps.</p> <p>71. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits.</p> <p>72. A record of type, estimated volume, and source of disposed spoil must be recorded.</p> <p>73. Contaminated spoil disposal must follow GoV regulations including handling, transport, treatment (if necessary), and disposal.</p> <p>74. Suspected contaminated soil must be tested, and disposed of in designated sites identified by DoNRE as per GoV regulations.</p> <p>75. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.</p>		construction phase		<p>No marginal cost</p> <p>Testing of contaminated soil (See Monitoring Plan below)</p>	DDSC, PMU & DoNRE	<p>Contractor</p> <p>DoNRE</p>
Construction Drainage sub-plan	Flooding from loss of drainage & flood storage	<p>76. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding.</p> <p>77. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses.</p> <p>78. Install temporary storm drains or ditches for construction sites.</p> <p>79. Ensure existing road &amp; street drains do not become plugged with construction waste<sup>9</sup>.</p> <p>80. Protect surface waters from silt and eroded soil.</p>	All areas with surface waters	Design & construction phases	Monthly	No marginal cost	DDSC & PMU	contractor
		81. Management of general solid and liquid residual matter of						

<sup>9</sup> Waste: A WASTE is the end product which can't be recycled, reused or transformed and needs to be sent to a landfill or a furnace. The term RESIDUAL MATTER fits best where recycling material are either collected separately from the wastes or when they are gathered with the actual wastes.

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	DDSC, PMU, & DoNRE	contractor
		82. Areas of disposal of solid and liquid residual matter to be determined by DoNRE.						
		83. Disposed of residual matter should be catalogued for type, estimated weigh, and source.						
		84. Construction sites should have large garbage bins.						
		85. A schedule of solid and liquid residual matter pickup and disposal must be established and followed that ensures construction sites are as clean as possible.						
		86. Solid residual matters should be separated and recyclables sold to buyers in community.						
		<u>Hazardous Waste</u>						
		87. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations.						
		88. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents)						
		89. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors.						
Noise and dust sub-plan	Dust Noise	90. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC & PMU	contractor
		91. During construction, a prevention kit consisting of heavy weight oil only absorbent and / or cat litter should be available to prevent infiltrations much as possible.						
		92. Regularly apply wetting agents to exposed soil and construction roads especially in high density areas.						
		93. Cover or keep moist all stockpiles of construction aggregates, and all truckloads of aggregates.						
		94. Minimize time that excavations and exposed soil are left open/exposed. Backfill ASAP.						
		95. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving.						



Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
		96. Maintain equipment in proper working order 97. Replace unnecessarily noisy vehicles and machinery. 98. Vehicles and machinery to be turned off when not in use. 99. Construct temporary noise barriers around excessively noisy activity areas where possible and if the impacts of constructing such a barrier is lesser then the noise impact itself.						
Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	100. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 101. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 102. Contact affected community to inform them of planned outages. 103. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC, PMU & Utility company	contractor
Erosion sub-plan	Land erosion	104. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 105. Earthworks should be conducted during dry periods. 106. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 107. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 108. Re-vegetate all soil exposure areas ASAP.	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSC & PMU	contractor
Worker and	Public and	109. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 110. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 111. Worker and public safety guidelines published by MoLISA should be followed. 112. Population near blast areas should be notified 24 hrs ahead, and evacuated well before operation. Accepted GoV blast procedures and safety measures implemented. 113. Speed limits should be imposed on all roads used by construction vehicles. 114. Standing water suitable for disease vector breeding should be filled in.						

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
public safety sub-plan	worker injury, and health	115. Worker education and awareness seminars for construction hazards should be given. A construction site safety program should be developed and distributed to workers. 116. Appropriate safety clothing and footwear should be mandatory for all construction workers. 117. Adequate medical services must be on site or nearby all construction sites. 118. Drinking water must be provided at all construction sites. 119. Sufficient lighting be used during necessary night work. 120. All construction sites should be examined daily to ensure unsafe conditions are removed.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC & PMU	contractor
Construction and local vehicle traffic sub-plan	Traffic disruption, traffic block, accidents, public injury	121. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights at all construction locations. 122. Post speed limits, and create dedicated construction vehicle roads or lanes. 123. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 124. Increase the number of pedestrian crossings away from construction areas. 125. Increase road and walkway lighting. 126. Organize the dump trucks travelling to avoid as much as possible the circulation of empty loads on the roads. 127. Provide alternate routes and / or work planned locations to help emergency response units to plan their alternate routes	All construction sites	Fulltime	Monthly  Weekly	No marginal cost	DDSC & PMU	contractor
<b>Specific Mitigations for Refitting and Expansion of Nghi Hoa WTP and the Reservoirs</b>								
Construction of WTP	Minimal negative environmental impacts	128. Mitigation measures to address potential impacts of WTP all addressed by the general subproject mitigations listed above.	Land around WTP site	During construction	Monthly	No marginal cost	DDSC / PMU	contractor
Excavation and refitting of the reservoirs	Minimal negative environmental impacts	Specific attention to be given to the protection of the following values: 129. a) erosion and spillage of spoils through Phuong Tich river intake installation & water quality of Phuong Tich rivers; b) public & worker safety.	Reservoir at WTP	During construction	Monthly	No marginal cost	DDSC / PMU	contractor

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Specific Mitigations for Construction of Treated Water Supply Pipeline								
Construction of pipeline	Minimal negative environmental impacts	130. Special attention to be given to sub-plans identified item #8 and 107 to 109. Specific attention to be given to the protection of the following values: a) Public & worker safety; and b) traffic and community/ commercial disruption along to Booster Pumping Station.	Pipeline corridor	During construction	Monthly	No marginal cost	DDSC / PMU	contractor
Specific Mitigations for Construction of Booster Pumping Station, Office and Treated Water Supply Pipeline								
Construction of Booster Pumping station	Minimal negative environmental impacts	131. Mitigation measures to address potential impacts of BPS are the same as the WTP construction and found in the general subproject listed above.	BPS and Offices site	During construction	Monthly	No marginal cost	DDSC / PMU	contractor
Construction of treated water supply distribution system	Minimal negative environmental impacts	132. Mitigation measures to address potential impacts of distribution network are addressed by the mitigations identified for the treated water pipeline above.	End user property, roads, and public area	During construction	Monthly	No marginal cost	DDSC / PMU	contractor
Post-construction Operation of Water Supply System								
Treated water supply	Unsustainable quantity or quality of treated water	133. Develop and implement O&M manual for all equipment and operations of WS system which includes regular maintenance of treatment system components, and materials supply to ensure treated water production (m³/day) always meets WTP design specifications. Incorporate contingency and back-up plans for planned and unplanned system shutdowns. 134. Establish a regular treated water quality monitoring program to ensure the quality of treated water meets original WTP design specifications. Incorporate contingency and response plans to address episodes of decreased treated water quality, including public notification. (See Environmental Monitoring Plan below). 135. As part of #131 coordinate with Dept of Health for them to periodically monitor treated water quality to ensure it meets potable quality standards	Entire WS system  At WTP outlet and at select locations along distribution network	Quarterly, and as needed	As needed	No marginal cost	CLWACO / DDSC	CLWACO  TREC / DoH
Operation of raw & treated water pipelines	Local flooding from ruptures	136. As part of implementation of O&M manual for entire WS system instate a regular inspection program of all pipeline networks starting at intake at Phuong Tich River to SP, than to WTP and then entire distribution network with focus on junctions and end-user connections.	At all pipeline locations	Quarterly, and as needed	As needed	No marginal cost	CLWACO / DDSC	CLWACO

Project Activity	Potential Impact	Proposed Mitigation Measure	Location	Timing	Reporting	Estimated Cost (USD)	Responsibility	
							Supervision	Implementation
Operation of WTP	Chemical spills, and pollution from solid and domestic waste	137. As part of O&M manual provide clear methods and procedures for safe handling and storage of planned treatment chemicals defined by poly-aluminum chloride (PAC), soda, and chlorine in designated chemical house and chlorine house on WTP property, including spills action plan. 138. With O&M manual define and implement a formal solid and domestic waste collection and disposal protocol for all WTP activities.	At WTP	Continuously	As needed	No marginal cost	CLWACO	CLWACO
Production of WTP sludge	Contamination of environment	139. Review and clarify with DN DoNRE the appropriate landfill location to dispose of the planned dried sludge produced at the WTP. 140. Ensure planned plate pressing technology for dewatering sludge to be located in sludge press house at WTP is maintained in good working order, and can more than accommodate production capacity of WTP. 141. Ensure sludge is covered when transported to designated landfill. 142. Never dump or temporarily store sludge on lands outside landfill site, WTP property, or near water courses. 143. Develop and implement regular sludge quality monitoring to document sludge quality	At WTP	Continuously	As needed	No marginal cost	CLWACO / DoNRE	CLWACO
Production of treated water	Wastewater production too much for city wastewater management	144. Review and clarify wastewater loads generated from treated water from Cua Lo and Nghi Hoa WTP can be handled by current and planned future capacity wastewater collection and treatment systems for Cua Lo.	At WTP	Periodically	As needed	No marginal cost	CLWACO / DoNRE	CLWACO
Operation of entire WS system,	Worker and public injury	145. Educate workers in workplace safety of WS system operation according to MoLISA regulations. Prevent public access to SP and WTP property, Phuong Tich river intake area, and all pipeline areas with fencing and appropriate signage. 146. Enforce WTP truck drivers to follow speed limits on roads and highways. Provide adequate signage informing public of WTP truck traffic routes, and pipelines service routes. 147. Ensure all WS system vehicles in good working order.	WTP and all pipeline property  WTP area & road to landfill site  All facilities	Continuously	As needed	No marginal cost	CLWACO	CLWACO

## **E. Environmental Monitoring Plan**

192. The environmental monitoring requirements identified in the IEE were carried forward and expanded with more detail into a comprehensive monitoring plan (Table 9). The monitoring plan focuses on all three phases (pre-construction, construction, post-construction operation) of the project and provides environmental indicators, the sampling locations & frequency, method of data collection, responsible parties, and the estimated costs.

193. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject. The PMU will be required to oversee the implementation of environmental monitoring plan by the TREC. Similar to the mitigation plan, the monitoring plan will need to be updated at the detailed design stage to ensure it meets the monitoring needs of the detailed designs of the subproject

194. The monitoring budget covers: (a) follow-up perception surveys and consultations with local residents to be commissioned by the PMU, preferably with the Technical Resources and Environment Co., Ltd One Member which conducted the baseline environment/site survey and facilitated the public consultations for the IEE; (b) surface water, groundwater and air quality monitoring during construction; (c) survey of the pipeline trench route to check that there are no UXO that might endanger construction workers;

195. During the operation of the new water treatment plant, water quality monitoring of drinking water taps at various locations in the new or expanded CLWACO service areas will be done routinely by the Environmental Protection Agency of the DoNRE in compliance with Vietnam regulations (with reference to quality standards for drinking water under TCXDVN 33:2008/BXD) and using the agency's own budget.

## **Compliance Monitoring & Reporting**

196. Regular reporting on the implementation of mitigation measures, and on monitoring activities during construction phase of the project is required as indicated in Table 9.

197. Construction contractors are required to submit brief monthly reports on environmental issues and mitigation activities to the PMU. The PMU must prepare quarterly reports on the EMP to the EA which include input from regular meetings with public stakeholders. The EA must prepare biannual reports on activity and effectiveness of EMP to ADB.

198. Environmental monitoring reports will be prepared in parallel quarterly for the PMU/EA by the monitoring agency. The reports will table all indicators measured from the monitoring plan of EMP, and will include relevant GoV environmental quality standards (i.e., QCVN & TCVN).

199. A template for monitoring process is presented in Annex 3.

**Table 9: Environmental Monitoring Plan**

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated <sup>10</sup> Cost (USD)
					Supervision	Responsibility	
Pre-construction Phase – Update Baseline Conditions							
Update baseline on presence of rare & endangered fauna & flora, and critical habitat that may be affected by WTP, reservoir and pipeline construction and operation. Include aquatic resources of affected reaches of Phuong Tich river	Phuong Tich river intake/reservoir and pipeline corridor in non-developed areas.	Review of existing data and information supplemented by original surveys as required.	Once	Once	DDSC & CLWACO & MB of BN-NR	TREC	tbd
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 at Phuong Tich river station during PPTA & reported in IEE. Water quality data collected in Phuong Tich river during PPTA & reported in IEE are sufficient.	Representative sites of heavy civil & earthwork including along truck routes  At raw water intake and reservoir	Using field and analytical methods described in QCVN and TCVN standards for ambient air and surface water quality sampling & analysis.	One day and one night measurement	One baseline supplement report before construction phase starts	DDSC & PMU	TREC	tbd.  tbd
Presence of UXO	Potentially located throughout project area	Military to survey and sweep affected areas of UXO	Once	Once	CLWACO	military	\$100,000
Construction of Nghi Hoa WTP and Reservoir, Pipeline, BSP and Treated Water Distribution Network							
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 & faecal coliform, pH, DO, COD, BOD <sub>5</sub> , temperature, NH <sub>3</sub> , and other nutrient forms of N & P.	A – B): At water quality sites #1 - #4 sampled during PPTA and reported in IEE (Phuong Tich river)   C): Using hotline number placed at construction areas  D): At all construction areas	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/PMU	(A – B): Quarterly during construction periods  C) Continuous public input D) Continuous	Quarterly	DDSC / PMU	TREC	A) & B) \$20,000 under ADB loan
C) Public comments and complaints D) Incidence of worker or public accident or injury					PPC / CLWACO	PMU / contractor	C) & D) With (no marginal cost)

<sup>10</sup> Estimated costs to be updated at detailed design stage

**Document : Initial Environmental Examination Report**

**MFF0054-VIE: PFR3 – Cua Lo Water Supply Subproject – Cua Lo Town, Nghe An province**

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated <sup>10</sup> Cost (USD)
					Supervision	Responsibility	
Perception survey and follow-up consultations with local residents	Residents near and along the main components; downstream users;	HH survey	3 times per year during construction	Quarterly	CWALCO	TREC	\$ 15,000 under loan
<b>Operation of WTP &amp; Pipeline Network</b>							
Air quality: dust, noise and vibration levels	At WTP	Using field and analytical methods described in QCVN & TCVN standards for ambient air quality monitoring.	Quarterly for 5 years	Biannual	TREC		Tbd under ADB loan
Worker & public injury associated with WTP & pipeline network	On property of WTP, pipelines, and pump stations	Regular record keeping	Continuously	For each event	CLWACO		No marginal cost
Treated water quality: total & faecal coliform, pH, DO, NH <sub>3</sub> , NO <sub>3</sub> , NO, chlorine, PAC, NaCl, and heavy metals (As, Cd, Pb <sub>2</sub> ).	At WTP & random user locations along distribution network	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	Biannually, or when public complaint arises	For each event	DoNRE Nghe An (EPA)		Under EPA regular budget
WTP sludge quality: ToC, heavy metals (As, Cd, Pb <sub>2</sub> ), coliforms, pH, BOD, nutrients (N&P), PAC, chlorine,	After removal from sludge drying building and before disposal at designated landfill.	Using field and analytical methods described in QCVN & TCVN standards for water quality monitoring	Quarterly for 5 years	Biannually	CLWACO		No marginal cost
Public complaints of operation of WTP, drinking water availability & quality, and malfunctions with pipelines (e.g., leaks).	At all sites	Regular record keeping	Continuously	Biannually	CLWACO		No marginal cost



**F. Budget**

200. In addition to the monitoring costs identified in the table above, the following costs will be added:

- Costs for a local environment specialist to provide intermittent support to the PMU (in preparing survey TORs, assessment of water and air quality sampling results, drafting of safeguard provisions to be incorporated in construction tender documents and contracts, preparing reports to the Nghe An PC and DoNRE);
- Cost of orientation-training for PMB staff and community leaders on managing environmental impacts of pipeline construction and related safeguards (to be facilitated by the environment specialist).
- Cost for environmental audit after project completion;

201. Total budget for the IEE and EMP implementation is presented in the Table below.

**Table 10: Budget for EMP and Monitoring**

Item or Activity	Frequency	Budget (US\$)	Source of Budget
Sampling and testing of surface water, groundwater and ambient air quality along the pipeline construction corridor	3 times per year during the 2-year construction period	20.000	Loan
Perception survey and follow-up consultations with local residents	3 times per year during construction	15.000	Loan
Survey of pipeline corridor for unexploded ordnance	Once, prior to start of construction	100.000	Loan
Local environment specialist	Intermittent input: 8 person-months over 2 years	32.000	Loan
Training and orientation for PMU and community leaders	Once, prior to start of construction	4.000	Loan
Environmental audit	Once, after project completion	30.000	Loan
Contingency (in case of construction delay)		29.000	Loan
<i>Total</i>		230.000	

## **9. COMMITMENT OF PROJECT OWNER**

202. Commitment to undertake the measures for waste treatment and minimizing other impacts is outlined in the agreement: During project implementation, the Project Owner is committed to fully implementing the measures for handling waste, mitigating the negative impact on the natural and eco-social environment in the town, specifically as follows: (i) commitment to building wastewater treatment facilities such as BASTAF tanks and portable toilets, ensuring that water quality after going through the treatment system meets the discharge limits for domestic wastewater, preventing surface water and groundwater from being polluted by wastewater; (ii) Commitment not causing air pollution due to transport activities and excavation, not allowing rock and soil spillage into the street, not allowing dust carried by movement of dump trucks on the street causing dust contamination for the HHs residing along the transport routes; (iii) commitment to collecting and handling solid waste in accordance with the provisions of the Decree No. 59/2007/ND-CP dated 09/04 2007 04 on solid waste management; collecting, storing, transporting and handling hazardous wastes in accordance with the Circular No. 9/2012/TT-BTNMT dated 14/4/2011 of the MoNRE on hazardous waste management; (iv) commitment to good management of plant's staff, not allowing conflicts with the local people; (v) commitment to working closely with the local authorities in using water, ensuring security and order, and environmental sanitation.

203. Commitment to achieve the current treatment standard requirements and technical regulation on environment: during construction, the Project Owner is committed to ensuring compliance with the Vietnamese and International standards and regulations on environment, ensuring air quality, surface water, groundwater, sediment and soil, including: (i) QCVN 08:2008/BTNMT National Technical Regulation on Surface Water Quality; (ii) QCVN 09:2008/BTNMT National Technical Regulation on Groundwater Quality; (iii) QCVN 14:2008/BTNMT National Technical Regulation on domestic wastewater; (iv) QCVN 05:2009/BTNMT National Technical Regulation on Ambient Air Quality; (v) QCVN 40:2011/BTNMT National Technical Regulation on Industrial Wastewater; (vi) QCVN 26:2010/BTNMT National Technical Regulation on Noise ; (vii) QCVN 27:2010/BTNMT National Technical Regulation on Vibration.

204. Commitment to undertake the other measures for environmental protection under the provisions of the current law of Vietnam: The Project Owner strictly committed to the Environmental Protection Law adopted by the National Assembly on 29/11/2005 and Decree No. 80/ND-CP dated 09/08/2006 of the Prime Minister guiding the implementation of environmental protection law; Decree No. 21/ND-CP dated 28/02/2008 of the Prime Minister on revision and supplement of some articles of Decree 80/ND-CP dated 09/08/2006 and Decree No. 29/2011/ND-CP dated 18/04/2011 of the Government on strategic environmental impact assessment, environmental impact assessment and commitment to environmental protection; Circular No. 26/2010/TT-BTNMT dated 18/7/2010 of the MoNRE guiding the implementation of articles of Decree No. 29/2011/ND-CP dated 18/4/2011 of the Government on environmental impact assessment, environmental impact assessment and commitment to environmental protection and Decree 201/2013/ND-CP on stricter regulations for effective water resource management including associated consultation of communities.

## **10. CONCLUSION**

205. The proposed project will produce significant benefits for the population of Cua Lo, specifically by enabling HHs that are currently not served or only partially served by CLWACO to shift from reliance on wells as a source of water (which has to be boiled or filtered) to more secure and safe piped water source.

206. The potential adverse environmental impacts of the project are the consequence mainly of construction activities, in particular the potential impairment of water and air quality in areas near the pipeline construction corridor, and nuisance and safety hazards posed to nearby HHs and small businesses. However, these impacts are temporary and can be mitigated.

207. Project construction will not have a significant impact on the flora and fauna, as the pipeline and WTP construction works will take place in existing agricultural and settlement/urban areas. No historical relics will be demolished or relocated by the pipeline and WTP construction

208. Potential adverse effects of sludge production during project operation have been avoided by incorporating sludge dewatering in the design of the water treatment plant.

209. HHs that will be affected by construction activities, either because of dislocation or damage to property, will be relocated and/or compensated in accordance with ADB guidelines. These measures are presented in a separate report focused on the project's resettlement and compensation aspects, i.e., Appendix 16 of the Draft Final Report.

210. For purposes of compliance with ADB environmental assessment guidelines, no additional study or full environmental impact assessment is needed to further assess the potential environmental impacts of the project.

## **Annex 1: Overall Project Implementation Schedule**

1. Project schedule includes: project preparation and project implementation phases.
  - Project preparation phase:
    - Preparation of FS report, basic design and support reporting for ADB's appraisal, PPC approval. Loan negotiation and signing is planned by the end of 2014.
  - Project implementation phase:
    - Geological Survey, topographic surveys, connection status;
    - Detailed designs, cost estimate, prepare construction and equipment supply bidding documents.
    - Update of UMP by the PMU and compliance with GoV regulations;
    - Organization of contractor selection and sign contract;
- : Overall Project Implementation Schedule is presented in the table below:

	Works contents	Project implementation time schedule															
		2013				2014				2015				2016			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>A</b>	<b>Project preparation phase</b>																
1	Preparation of FS, basic design and supporting reports																
2	Appraisal FS and supporting reports by ADB																
3	FS, basic design and supporting reports are approved by Nghe An PPC																
4	Appraisal of VDB Bank																
5	Negotiation Loan Agreement ADB and GoV																
6	Establishment of PMU and preparation of project implementation plan																
<b>B</b>	<b>Project implementation phase</b>																
1	Topographical surveys, geological survey for designing construction drawing																
2	Detailed design, cost estimate, bidding documents and bids evaluation																
3	Update EMP and conduct consultation with downstream communities;																
4	Coordinate with the Environment Protection Center on regulatory compliance issues																
5	Civil construction and installation equipment, supervision and handed over using																
6	Technical Assistance for project implementation																
7	Technical Assistance for enhancement of O&M																

## **Annex 2: Minutes of Joint Public Meeting for Environment & Resettlement**

**THE SOCIALIST REPUBLIC OF VIET NAM**

***Independence - Freedom – Happiness***

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### **WORKING MINUTES**

#### ***Project to Upgrade & Extend the Water Supply System in Cua Lo Town District***

Location: People's Committee of Nghi Huong Ward.

Today, on 9<sup>th</sup>, October, 2013

#### **I. Meeting participants:**

##### **1. Representatives of the People's Committee of Cua Lo Town District.**

Mr: Nguyen Thanh Tung - Director of

##### **2. Representatives of the People's Committee of Nghi Huong Ward.**

Mr: Hoang Van Viet - Vice chairman of Nghi Huong Ward

##### **3. Representatives of Asian Development Bank ADB.**

Mrs: Sushma Kotagiri - ADB Bank Specialist

Mr: Dang Huu Luu - ADB Bank Specialist

##### **4. Representatives of Cua Lo Water Supply One Member Co.,Ltd.**

Mr: Nguyen Huu Luan - Director of Company

Mr: Tran Phuc Thanh - Deputy Head of Project Management

##### **5. Representatives of the household in a compensatory support**

Mr: Nguyen Hong Hai - Block 14, Nghi Huong Ward

Mrs: Vu Thi Thien - Block 14, Nghi Huong Ward

Mr: Nguyen Dinh Duong - Block 14, Nghi Huong Ward

Mr: Vu Minh Long - Block 14, Nghi Huong Ward

Mrs: Ngo Thi Trang - Block 14, Nghi Huong Ward

#### **II. Content of the Meeting:**

- Mrs Sushma Kotagiri asks: "All households are willing to be paid the price compensated?"
- The answer: All households participating agree the price that they enjoy."
- Mrs Sushma Kotagiri asks: "Which types of water resources do all households use at the present? Are they guaranteed? And do they want to use pure water system?"
- The answer: "Now, they are using well drilling water system in this region and do not make sure whether they are guaranteed because of not being assessed. Most of people have a desire to use the clean water resources from tap water system of Cua Lo Water Supply One Member Co., Ltd."

- Mrs Sushma Kotagiri asks: “Currently, the cost of clean water is 5.500VND/mm<sup>3</sup>. If it will be increased 6.500VND/m<sup>3</sup> in next two years, could you pay that price?”
- The answer: “All of people make sure that they could pay it.”
- Mrs Sushma Kotagiri asked Mr Hai: How much was his family compensated? Has the recovered area of crops affected to the lives of his family?”
- He answered: They did not have an effect on their lives since they were planted for fuel.
- Mrs Sushma Kotagiri asked Mrs Trang: Besides of farm work, has her family done any outside job?
- She answered: Yes, they had a small trade business.
- Mrs Sushma Kotagiri asked Mr Tung: Have the compensation’s policies have any changes from 2011 up to present? Were the rates of compensation applied according to the state regulation or market price? Unit price 2011 and 2012, have they been compensated that was reasonable?
- Mr Tung: The compensation’s rate was applied to the price that we referred to the market price and submitted to the decision-making Council and the unit price from 2011 to now have not had any changes. The plants compensated depends on the tree diameter and the people compensated was the right time that we proceed to tally and hence it did not have any effect on the people’s interest.
- Mrs Sushma Kotagiri asked Mr Tung: In their region, was there any project applied to this compensation’s policy?
- He answered: Now there is a drainage projects funded by Belgium and some other DA in its budget.
- Mrs Sushma Kotagiri asked Mr Viet: Which roles has the local authority played in supporting compensation to project?
- He answered: The local authority always supports investors in implementing project in collaboration with the Center for development of land fund and the investor public tally of metrics, compensatory unit price to announce broadly to all households compensated.
- Mrs Sushma Kotagiri asks Mr Luan: “Are all households used the pure water supply? And do they have to pay any fees when connecting up water?”
- He answers: “Not only the household in Block 14 but also all people in Cua Lo town district will be free of charge when DA comes into carrying out connecting up water”.

**REPRESENTATIVES OF THE CENTRE  
FOR DEVELOPMENT OF CUA LO  
TOWN DISTRICT LAND FUND**

**Nguyen Thanh Tung**

**REPRESENTATIVES OF THE PEOPLE’S  
COMMITTEE OF NGHI HUONG  
WARD**

**Hoang Van Viet**

**REPRESENTATIVE OF CUA LO WATER  
SUPPLY ONE MEMBER CO., LTD**

**REPRESENTATIVES OF ASIAN  
DEVELOPMENT BANK ADB**

**Nguyen Huu Luan**

**Tran Phuc Thanh**

**Sushma Kotagiri**

**Đang Huu Luu**

**REPRESENTATIVES OF HOUSEHOLDS**

**Nguyen Hong Hai**

**Vu Thi Thien**

**Nguyen Dinh Duong**

**Vũ Minh Long**

**Ngô Thị Trang**



**THE SOCIALIST REPUBLIC OF VIET NAM**

***Independence - Freedom - Happiness***

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**WORKING MINUTES**

***Project to Upgrade & Extend the Water Supply System in Cua Lo Town District.***

Location: The People's Committee of Nghi Hoa ward

Today, 9<sup>th</sup>, October, 2013

**I. Meeting participants:**

**1. Representatives of People's Committee of Nghi Hoa ward.**

Mr: Nguyen Van Huong - Chairman of Nghi Hoa Ward People's Committee

**2. Representatives of Asian Development Bank ADB.**

Mrs: Sushma Kotagiri - ADB Bank Specialist

Mr: Dang Huu Luu - ADB Bank Specialist

**3. Representatives of Cua Lo Water Supply One Member Co.,Ltd.**

Mr: Nguyen Huu Luan - Director of Company

Mr: Tran Phuc Thanh - Deputy Head of Project Management

**4. Representatives of households in a compensatory support**

Mr: Nguyen Van Hoa                      Lane 2 Nghi Hoa

Mr: Nguyen Dinh Phu                      Lane 2 Nghi Hoa

Mr: Nguyen Khac Thang                      Lane 2 Nghi Hoa

**II. Content of the Meeting:**

- Mrs Sushma Kotagiri asks Mr Huong: "The roles of local authority in support of compensation to project?"
- The Answer: "People's Committee of Nghe An Province has investigated and selected Lane 2 Nghi Hoa Ward to be the placement of water factory since 2009. The land cannot be cultivated in this location. Therefore, People's Committee of ward has consulted superiors for permission to convert and renovate brickworks and aquaculture since 200. And People's Committee of Province has come to the decision on shutting the doors of all brick oven up to 2010. From 2008 up to now, People's Committee of Ward have permitted some households to employ their digging ponds to fish tiles to form a temporary contract (which expires in 2011).The views of local authorities is always approving of advocates and advocating support in compensating the shrine's clearance to carry out the project soon."
- Mrs Sushma Kotagiri asks: "Do two households dispose in different location to continue their breeding?"
- The answer: "Household Mr Nguyen Van Hoa has been arranged other locations nearby to make farms for continuing cattle breeding. The household Mr Nguyen Dinh Phu is choosing the other locations to reproduce (2 places that Mr Phu is selecting)"

- Mrs Sushma Kotagiri asks: “As for the household of brickworks? Are they arranged new location for continuing their work?”
- The answer:” Certainly not, because People’s Committee of province prohibited producing handcrafted tiles.”
- Mrs Sushma Kotagiri asks: “So now what they do?”
- The answer: “Two households concentrate in breeding. Mr Thang’s house hold is trading business (marketing, sale of tiles)”
- Most households are satisfied with the price compensatory aid and support of project being soon performed in order that the people in the area are used the clean water resources because now there is not pure water resources in this area and the people are using the well drilling water resources and rain water reserves.

**REPRESENTATIVES OF ADB BANK**

**REPRESENTATIVES OF PEOPLE’S  
COMMITTEE OF NGHI HOA WARD**

***Sushma Kotagiri***

***Đặng Hữu Lưu***

***Nguyễn Văn Hương***

**REPRESENTATIVE OF CUA LO WATER SUPPLY ONE MEMBER CO., LTD**

***Nguyen Huu Luan***

***Tran Phuc Thanh***

**REPRESENTATIVES OF HOUSEHOLDS**

**Nguyen Van Haa**

**Nguyen Đình Phú**

**Nguyen Khắc Thang**

### Annex 3: Template for Safeguards Monitoring Report

#### I. Summary:

(to be included as part of the *main Report*)

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

#### II. Safeguards Monitoring Report

(to be included in the annex/appendix of the *main Report*)

##### 1. Introduction and Project Overview

<b>Project Number and Title:</b>		
<b>Safeguards Category</b>	Environment	
	Indigenous Peoples	
	Involuntary Resettlement	
<b>Reporting period:</b>		
<b>Last report date:</b>		
<b>Key sub-project activities since last report:</b>	<p>This section can include, among others, the following:</p> <ul style="list-style-type: none"> <li>• Activities of Proponent</li> <li>• Progress of Work (% physical completion)</li> <li>• Changes of Surrounding Environment</li> <li>• Status of Permits / Consents</li> </ul>	
<b>Report prepared by:</b>		

##### 2. Environmental Performance Monitoring

###### a. Summary of Compliance with EMAP Requirements (Environmental Performance)

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

**b. Issues for Further Action**

Issue	Required Action	Responsibility and Timing	Resolution
<b>Old Issues from Previous Reports</b>			
List of EMoP measures or activities not completed (last column of previous table)			
<b>New Issues from This Report</b>			

**c. Other activities**

- Other issues not covered by EMAP/EMoP
- Environmental monitoring as required by GOI (e.g., air quality, water sampling)

**3. Involuntary Resettlement Performance Monitoring**

**a. Summary of Compliance with RP Requirements**

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action <sup>11</sup>
Establishment of personnel in PMU/PIU			
Public consultation and socialization process		Provide information on: <ul style="list-style-type: none"> <li>• Public consultation, participation activities carried out</li> <li>• Inclusive dates of these activities</li> </ul> To be elaborated on in Item 5	
Land area to be acquired is identified and finalised			
Land acquisition completed			
Establishment of Resettlement Site(s)		Please state: <ul style="list-style-type: none"> <li>• Number of AHs to be relocated as per agreed RP</li> <li>• Number of AHs already relocated</li> <li>• Number of houses built</li> <li>• Status of installation of community facilities to be provided as per agreed RP</li> </ul>	
Compensation payments for affected assets is completed		Please state: <ul style="list-style-type: none"> <li>• Total Number of Eligible AHs and APs (as per agreed RP)</li> <li>• Number of AHs and APs compensated as of this monitoring period</li> <li>• Total Budget allocation as per agreed RP</li> <li>• Total budget disbursed to AHs as of this monitoring period</li> </ul>	
Transport assistance for relocating affected HH		As above	
Additional assistance to vulnerable affected household		Please state: <ul style="list-style-type: none"> <li>• Total Number of vulnerable AHs and APs (as per agreed RP)</li> <li>• Agreed forms of assistance as per RP</li> </ul>	

<sup>11</sup> To be elaborated further in table 3.b (Issues for Further Action)

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

**b. Issues for Further Action**

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

**4. Occupational, Health and Safety (OHS) Performance Monitoring**

**a. OHS for worker**

Issue	Required Action	Responsibility and Timing	Resolution
<b>Old Issues from Previous Reports</b>			
<b>New Issues from This Report</b>			

**b. Public Safety**

Issue	Required Action	Responsibility and Timing	Resolution
<b>Old Issues from Previous Reports</b>			
<b>New Issues from This Report</b>			

**5. Information Disclosure and Socialization including Capability Building**

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

**6. Grievance Redress Mechanism****Summary:**

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

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

**7. Conclusion**

- Important results from the implementation of EMAP/EMoP and RP monitoring
- Recommendations to improve EMAP/EMoP and RP management, implementation, and monitoring

**8. Attachments**

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Photographs
- Maps