

Initial Environmental Examination

September 2014

VIE: Viet Nam Water Sector Investment Program – Quang Nam Water Supply Subproject

Prepared by Quang Nam Water Supply Company for the Asian Development Bank.

Asian Development Bank

MFF0054-VIE: PFR3

QUANG NAM WATER SUPPLY SUBPROJECT

**DIEN NAM – DIEN NGOX AND TAM HIEP,
QUANG NAM PROVINCE**

FINAL REPORT

APPENDIX 11

INITIAL ENVIRONMENTAL EXAMINATION REPORT

September 2014

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ABBREVIATIONS

| | |
|-------------|--|
| ADB | Asian Development Bank |
| BOD | Biological Oxygen Demand |
| COD | Chemical Oxygen Demand |
| CPC | Commune People's Committee |
| Component 1 | Chu Lai Open Economic zone with intake in Channel 2 of Phu Ninh lake |
| Component 2 | Dien Nam – Dien Ngoc urban development zone with intake in Bau Sau river |
| DARD | Department of Agriculture & Rural Development |
| DoNRE | Department of Natural Resources & Environment |
| DPC | District People's Committee |
| DPI | Department of Planning & Investment |
| EIA | Environmental impact assessment |
| GERUCO | Vietnam Rubber Group |
| IEE | Initial Environmental Examination |
| LCPD | Litters / person / day |
| LEP | Law on Environmental Protection |
| MARD | Ministry of Agriculture & Rural Development |
| MASL | Meters above average sea level |
| MOD | meter over datum |
| MoNRE | Ministry of Natural Resources and Environment |
| MPN | Maximum Possibility Number |
| NEA | National Environment Agency |
| NPV | Net present value |
| NRW | Non-revenue water |
| PAC | Poly-Aluminium Chloride |
| PMB | Project Management Board |
| PPC | City/Provincial People's Committee |
| PPTA | Project Preparation Technical Assistance |
| QNPPC | Quang Nam Provincial People's Committee |
| QNWSD.JSC | Quang Nam water supply and drainage joint stock company |
| RBO | River Basin Organizations |
| SEA | Strategic Environmental Assessment |
| TDS | Total dissolved solids |
| TOR | Terms of reference |
| TSS | Total suspended solids |
| USP | Utility support Project |
| UXO | Unexploded ordnance |
| WTP | WTP |
| WWTP | Waste WTP |

EXECUTIVE SUMMARY

Project Description

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. Urban Water Supply Project of Dien Nam - Dien Ngoc and Tam Hiep - Quang Nam Province aims to expand water services in the province of Quang Nam. Project's objectives are to improve living conditions, health care and economic development for urban and periurban areas by improving clean water production capacity, expanding coverage of water distribution networks and providing favourable conditions for local social - economic development.

3. The project is expected to contribute to sustainable economic growth process and improve the quality of urban life through the provision of accessible, stable and sustainable water supply services. The water demand in the project area is expected to reach approximately 20,000 m³/day by 2018. The expected benefits of the project will be (i) improving and expanding the access to safe and sustainable water supply, (ii) raising public awareness about the importance of clean water usage and reducing the risk to public health, and (iii) maintaining sustainable service delivery through adequate price and full cost recovery, and strengthening industry regulation.

4. The project consist of 2 main components:

Component 1: Construction of Dien Nam - Dien Ngoc water supply system

- Construction of intake and 2.4 km D500 transmission pipe
- Construction new WTP capacity 15.000m³/day;
- Construction of 18 km transmission pipes D300-D400, 54 km distribution pipes D110–D250 and 90 km service pipes (D100 and smaller);
- Installation 10,000 meters.

Component 2: Expansion of Tam Hiep water supply plant

- Construction of intake, pumping station at Phu Ninh Lake with 300 m raw water pipeline;
- Increasing capacity of Tam Hiep WTP from 5,000 to 20,000 m³/day
- Construction of 18 km transmission pipes D300-D500, 39 km distribution pipes D110–D25 and 75 km service pipes (D100 and smaller);
- Installation 10,000 meters.

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

Impacts and Mitigation Measures

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

7. During operation of the WTP upgrading system, it is necessary to ensure that the management of chemical treatment plant and two new sludge tanks under the design meet the GOV discharge standards.

8. In some proposed areas, the project may create a volume of wastewater that need to be treated and released safely to the environment. It is recommended that before installing the new water connection in each project area, construction supervision consultants, PMU, and representatives of local drainage system unit make a general inspection to confirm that there is a combination of drainage system and wastewater treatment in the central area of Dien Ban / Nui Thanh district to be able to treat the increased wastewater load. On the other hand, they will identify additional works to be carried out by the drainage system and / or the local community before the new connection is made.

9. The EMP of the project includes mitigation measures and monitoring process to manage and assess the expected and unexpected impacts of this project. EMP also specifies the organizing responsibility, and capacity development and training requirements of Quang Nam Water Supply and Drainage joint stock Company for companies and appointed PMU to monitor the implementation of the EMP. The implementation of EMP will require assistance from an environmental consultant (EC), and an independent consultant on environment (IEC) to audit the EMP.

Information Disclosure, Public Consultation, and Grievance Redress

10. As regulation of Vietnamese law, to capacity over 50,000 m³/day to work using raw water and per ADB Safeguard Policy Statement, it is necessary to conduct public consultation. As such, consultation on option of construction of WTP, technology processes, water supply alternatives, etc. is essential as a part of actual survey in project preparation. Therefore, public information and consultation activities were carried out as part of a baseline survey of local environmental conditions along the projects sites. Meeting with local authorities took place in July and August 2013. A public meeting was held in Dien Thanh Trung commune on 20 August 2013.

11. Through environmental consultation, local leaders and some HHs were introduced about project, environmental impact and mitigation measurements, project implementation schedule and relevant environmental issues. Overall, there was no opposition raised against the proposed project.

12. Three-step complaints solving procedure will be established to handle environmental impacts and land occupation. As a guideline, any complaints to any project's aspects will be solved through negotiation to get agreement. Complaints will be submitted toward 3 levels of entities: First through commune/ward's PC, then the Town's PC and finally through PPC. If an agreement was not reach, then they will be law court as the final method. QNWDS.JSC will bear all administrative and legal cost arising in such complaint solving processes.

Institutional Arrangement

13. The project will be implemented under the Thai Hoa People's Committee as the Executing Agency and the QNWDS.JSC as the project implementing agency. A Project Management Unit (PMU) has been created to supervise the implementation, on behalf of QNWDS.JSC.

14. The PMU will be responsible for fulfilling the environmental requirements of the project, particularly 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 DoNRE's Environment Protection Center), and responding to environment or nuisance-related complaints from residents or businesses affected by the project works.

15. Environmental monitoring program will be implemented by the project owner or consultants hired by the project owner during the construction phase. On the other hand, during the operation, environmental monitoring program will be implemented by the project owner and the local authorities such as the DoNRE and Department of Health.

16. Monitoring compliance with the safeguards in the construction phase - especially with the implementation of the safeguards provided in the construction contract, as recommended in this report - will be put to task the construction supervisor which can be assigned to QNWDS.JSC (and supervised by the PMU). The compliance monitoring and auditing will be fully documented, and the findings and recommendations will be sent immediately to QNWDS.JSC. During the operation phase, QNWDS.JSC will be responsible for the protection and monitoring of effluent, and the results will be reported to the Division of Environment and Natural Resources.

17. Division of Natural Resources and Environment (under the Province People's Committee) will conduct monitoring and random testing environment before, during and after construction, as well as in urgent cases. The division will also consider the monitoring report of EPRC. If any unusual case found, Town's PC can ask for payment of fines and emit a suspension notice with a specific time limit to the responsible unit. If a complaint is formally received from the public through the PC's, the Division of Natural Resources will conduct verification.

Budget.

18. The monitoring budget covers: (a) survey on awareness and following consultation with local residents conducted by assigned unit of PMU - Environment and Natural Resource Engineering One member Co., Ltd to serve preparation of IEE; (b) monitoring quality of surface water, ground water and air during construction; (c) survey pipe ditches to check materials which can be dangerous to workers; (d) local environmental specialist supporting PMU (in preparing of TORs, air and water sample test evaluation, draft safeguards regulations combined in bidding document and construction contract, preparation of report of PMU) and (e) training for PMU's staff and community authorities on environmental impact management of construction of pipeline and related safeguard measurements (prepared by environmental specialist). The total estimated budget is \$ 410,000 that will be taken from the ADB loan partly under the PMU incremental cost and Construction Supervision Consultant.

Project Implementation Schedule

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

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| Tasks | Tentative schedule |
|--|------------------------------|
| 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 rd Quarter 2015 |
| Coordinate with the Environment Protection Center on regulatory compliance issues | All duration of the project |
| Construction duration (24 months) | Start Early 2016 |

20. 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. Dien Nam - Dien Ngoc and Tam Hiep - Quang Nam Province urban water supply project is part of the seven water supply subprojects 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).

2. 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 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.

Figure 1: Location of Sub-Projects



3. This report was prepared in compliance ADB Safeguard Policy Statement (ADB SPS 2009). It follows the standard outline for the environmental assessments and environmental management Plan.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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 Quang Nam 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.

13. The Project required GoV approval through the Quang Nam, 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 Quang Nam DoNRE for the Project. The delay for such approvals can take between 2 months to 3 months once the file is complete.

14. At district level, the relevant management agency is DoNRE 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.

15. 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.

16. 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.

17. 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 11 pertaining to handling of chemicals, waste storage/stockpile, and / other storage in existing facilities will be followed.

III. PROJECT DESCRIPTION

18. The Quang Nam sub-project includes two components:

- **Component 1: Construction of Dien Nam - Dien Ngoc water supply system**
 - Construction of intake and 2.4 km D500 transmission pipe
 - Construction new WTP capacity 15.000m³/day;
 - Construction of 18 km transmission pipes D300-D400, 54 km distribution pipes D110–D250 and 90 km service pipes (D100 and smaller);
 - Installation 10,000 meters.
- **Component 2: Expansion of Tam Hiep water supply plant**
 - Construction of intake, pumping station at Phu Ninh Lake with 300 m raw water pipeline;
 - Increasing capacity of Tam Hiep WTP from 5,000 to 20,000 m³/day
 - Construction of 18 km transmission pipes D300-D500, 39 km distribution pipes D110–D25 and 75 km service pipes (D100 and smaller);
 - Installation 10,000 meters.



Figure 2: Location of the two Components

A. Component 1: Dien Nam - Dien Ngoc Urban water supply system

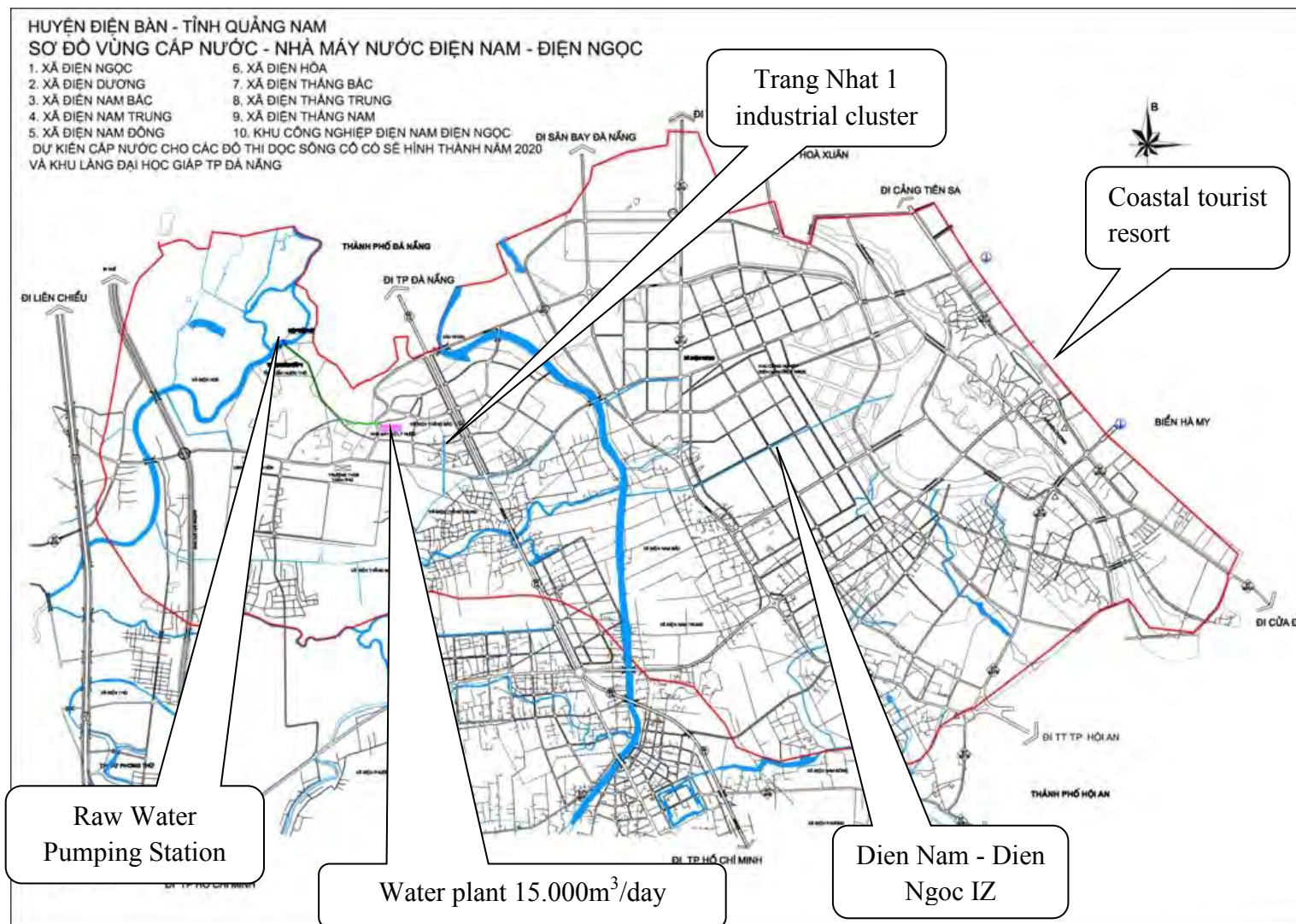
- Location: Trang Nhat 1 industrial cluster, Northern Dien Thang, Dien Ban District, Quang Nam Province.
- Total investment capital: *Component 2: 15,0 million USD; of which:*
 - ADB projected capital: 13,50 million USD (equivalent to 283.986 million VNĐ).
 - Corresponding capital: 1,50 million USD (equivalent to 31.554 million VNĐ).
- Duration of the project: 2015 – 2018.
- The main components of the project:
 - Construction of raw water collection and PS with capacity of 15.000m³/day located at Bau Sau River.
 - Installation of 2.4 km raw water pipeline leading water from raw water PS to Dien Nam - Dien Ngoc Urban WTP using HDPE material, D400 and D300. This pipeline is light, easy to install, low roughness and corrosion resistance.
 - Construction of Dien Nam - Dien Ngoc Urban WTP with the capacity of 15.000m³/day in the first phase from 2012 to 2016 located at Trang Nhat industrial cluster, Dien Ban District.
 - The utility works: The operating house, chemical house; Factory, Warehouse, Gate, Fence, Trees, Road, Drainage, Electricity, new substation 560KVA-22/0,4KV.
 - Construction of transmission pipe system with the length of 18 km using uPVC D400 and D300, 54 km distribution pipelines using HDPE D110, D160, D225, D250 and 90 km services pipeline.
- Installation of 10.000 connections with water meters.

19. The total investment cost of the project (both components) proposed is 28,50 million USD (equivalent to 599.526 Million VNĐ; 01 USD = 21.036 VND), which will be financed from the following sources: (1) Loan back from the multi-trenches financing facility of the ADB's management is 25,0 million USD, (2) Corresponding capital of the GoV is 3,50 million U.S. dollars that is directly from PPC.

20. The distribution system is planned synchronously as single network that combines the outputs from all WTPs in the city and connects existing distribution network as well as expands new distribution network to suit total projected capacity of the system in 2030. The pipeline with high capacity transmission is install to link with the existing plant, to be able to complement each other when one of the two WTP as a problem.

21. The pipelines with high transmission capacity will be the networks backbone and will be installed to create a closed-loop to transfer water effectively to all main water supplied areas of the city, including developed urban areas recently planned.

Figure 3: Component 1: Dien Nam - Dien Ngoc Urban WTP location



B. Component 2: Expansion of Tam Hiep WTP - Quang Nam Province from 5.000 m³/day to 20.000 m³/day

- Location: Tam Xuan 2 Commune, Nui Thanh district, Quang Nam province
- Total investment capital: 13,5 million USD, including:
- ADB projected capital: 11,50 million USD (equivalent to 241.914 million VND)
- Corresponding capital: 2,00 million USD (equivalent to 42.072 million VND)
- Duration of the project: 2015 - 2018
- The main components of the project:
 - Construction of D400 raw water pipeline with the length of 300m from the raw water pumping station at Phu Ninh reservoir to WTP in Tam Xuan 2 Commune.
 - Expansion of Tam Hiep WTP, raising its capacity from 5.000m³/day to 20.000m³/day with the construction of the new production unit 15.000m³/day using rapid filtering and depositing technology.
 - Constructing clean water tank with capacity of 2,000 m³; sedimentation reservoir for wastewater from clarifier and filter-beds, building raw water PS 15,000 m³/day, pumping station level II supplying water to meet the required flow and pressure on the network.
 - Utility works: Operation house, chemical house; Factory, warehouse, Gate, Fence, Trees, internal Road, Drainage, Electricity, new electrical power substation 560KVA-22/0,4KV.
 - Construction and installation of 18.1 km transmission pipeline D500, D400 and D300, 39 km distribution pipeline D110, D165 and D250, and 75 km service pipeline, connections for 10,000 HHs.

22. Figure 4 presents the location of Tam Xuan 2 WTP and Figure 5 presents the general water supply network of Tam Hiep component.

Figure 4: Component 2: Location of Water Treatment Plant

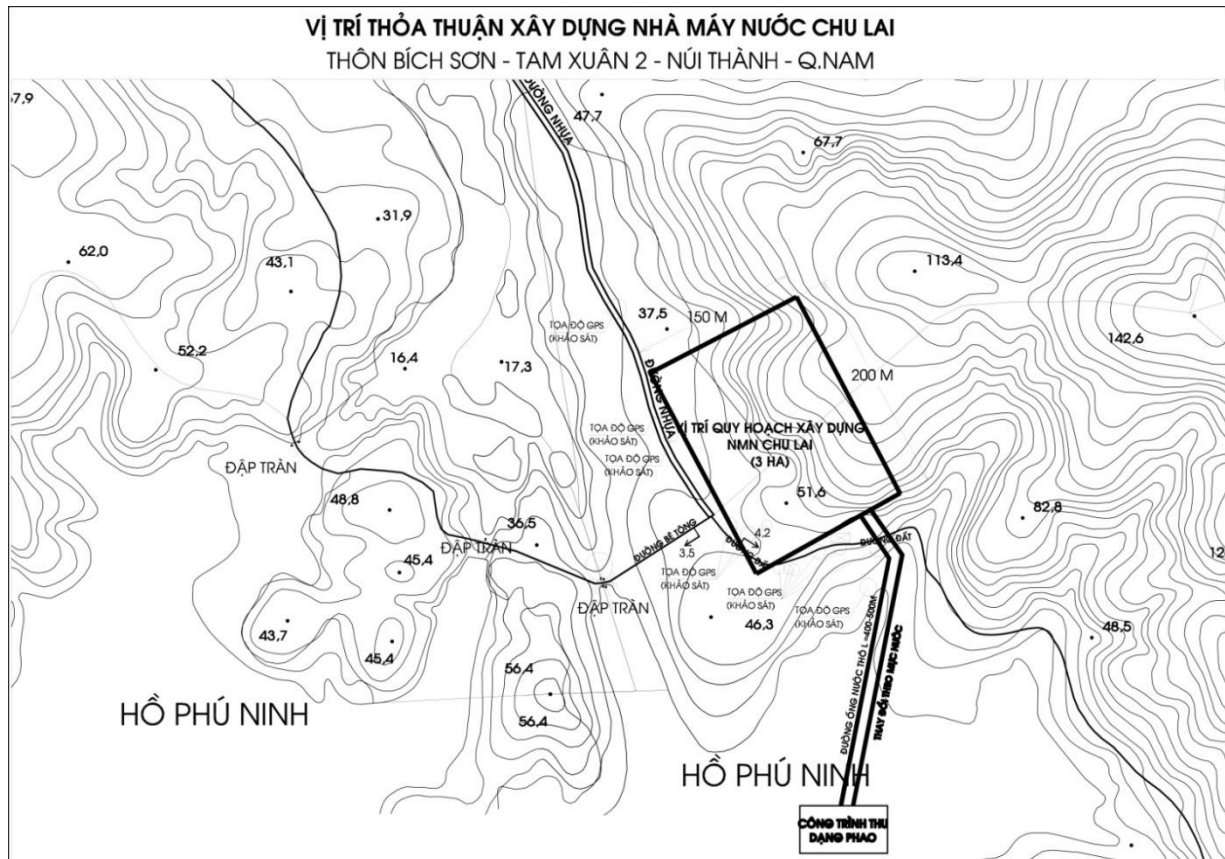
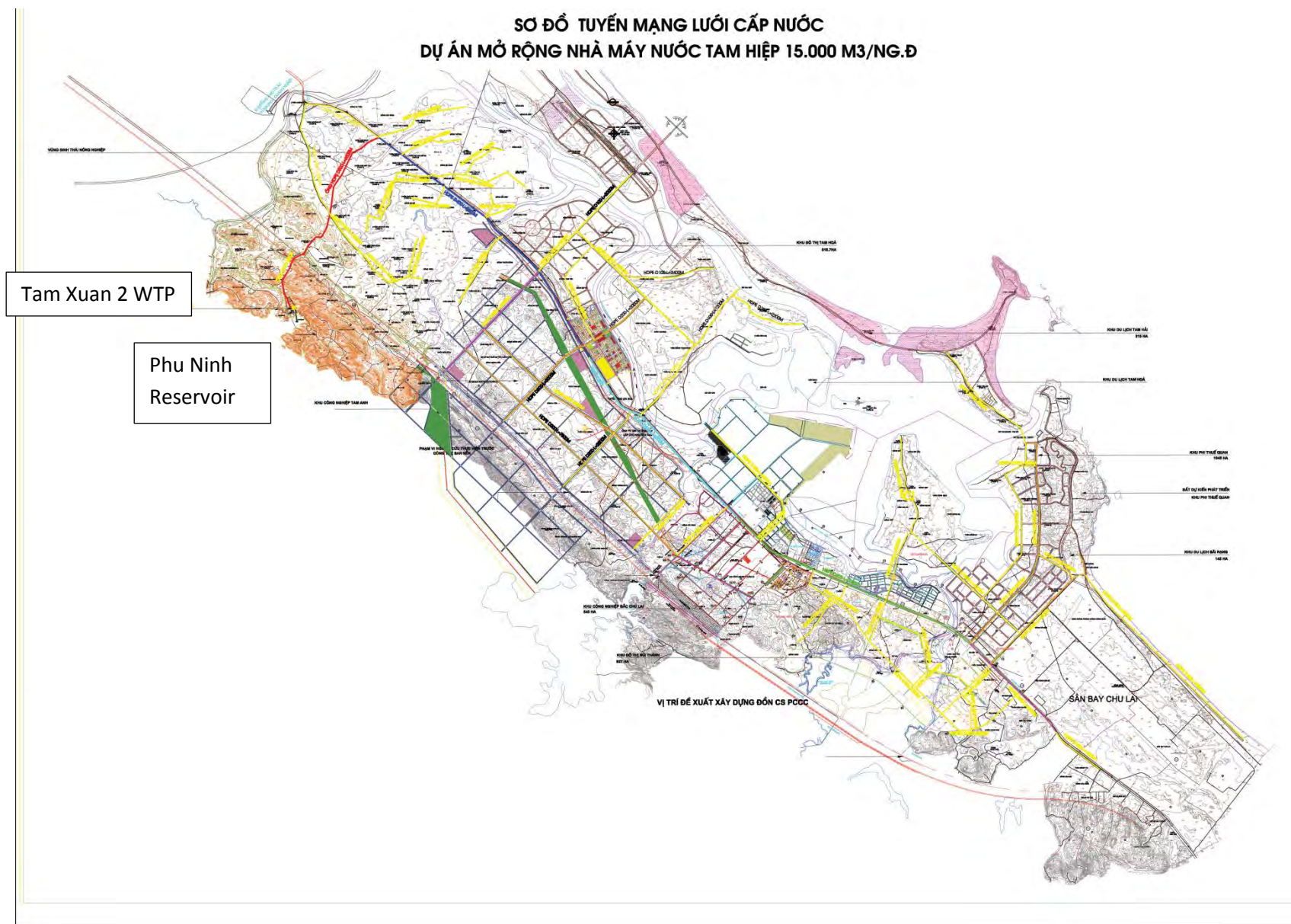


Figure 5: Location of Tam Hiep Water Supply Network



IV. ENVIRONMENTAL DESCRIPTION

A. Natural Conditions

Component 1

a. Geographical Location:

24. The project area includes: Dien Nam - Dien Ngoc New Urban area, Industrial Zone, the industrial clusters on the west of Dien Ban district, located as follows:

- Bordering with Da nang to the North,
- East sea to the East
- Hoi An urban area to the South,
- Bau Sau River to the west.

25. The project is built in eight commune areas, including: Dien Hoa, Northern Dien Thang, Southern Dien Thang, Central Dien Thang, Central Dien Nam, Northern Dien Nam, Southern Dien Nam, Dien Duong, Dien Ban District, Quang Nam Province.

26. After the completion of Dien Nam - Dien Ngoc urban area, an uninterrupted urban area of Da Nang - Dien Ngoc Dien Nam - Hoi An will be formed. There is also Dien Nam - Dien Ngoc IZ with an area of 600 hectares, which is located at the center of the urban area. The site was designated in 1995 and is in operation. To the west of the project includes Trang Nhat 1 and 2, An Luu and Nam Duong industrial clusters.

b. Topography

27. The studied area is located in the Da Nang - Hoi An plain with the topographic features of the Central coast area, generally flat sandy areas and is less prone to floods.

c. Climate features.

28. Dien Ban is located in the tropical monsoon climate area.

- Temperature:
 - + Annual average temperature 25,6°C.
 - + Highest average temperature 29. 8°C; Lowest average temperature 22.7°C.
 - + Hottest day's temperature reached 40.9°C.
- Wind:
 - + Wind Direction in whole year: Southeast.
 - + Average wind direction in summer from April to September: East.
 - + Average wind direction in winter from October to March: North and Northwest
- Rain:
 - + Annual average rainfall is 2066 mm; Average number of rainy days is 147 days.
 - + Rainfall of heaviest raining day is 332 mm.
- Humidity:
 - + Average relative humidity is 82%. Lowest relative humidity is 75%.
- Sunny:
 - + The average sunshine hours are 2158 hours / year.
- Typhoons:
 - + usually occur 9 to 10 times per year between September and November and causes heavy and prolonged rain.

Component 2

a. Geographical Location:

29. Nui Thanh District is located in the coastal region, Southeast of Quang Nam province. It borders with East Sea to the east, Tam Ky city and Phu Ninh district to the northwest, Bac Tra My district on the west and Quang Ngai to the south. It is about 70km South of Tam Ky. It includes Nui Thanh urban area and 16 communes with a total area of 545 km².

30. The project area is located in Chu Lai Open Economic Zone including Nui Thanh Town and neighbouring communes: Tam Hiep, Tam Nghia, Tam Giang, Quang Tam, Northern Tam Anh, Southern Tam Anh, Tam Xuan 1 and 2, Tam Hiep Industrial Zone, Tam Anh, Northern Chu Lai, non-tariff areas and Ky Ha port.

b. Geology, Topography, Hydrology:

31. The results of geological survey show that the area is mainly on stable soil. Stratigraphy is composed of sand, and the soil has good load capacity. Sandy clay layer lie on rocks which include a upper layer weathered shale at depths of 10-20 meters above paltry weathering shale at a depth of 20-50 meters.

32. The groundwater level in the project area is low. The flow and water levels fluctuates seasonally. Groundwater depth range between 2 - 10 meters.

c. Climate:

33. Nui Thanh district has a typical tropical monsoon climate. The average temperature ranges between 21°C in December to 30°C in January and maximum of 39°C between May and July. The annual average temperature is 26°C.

34. Average rainfall is about 2300 - 2500mm with a maximum of 3300 mm and a minimum of 1100 mm. Rain occurs over 120 to 140 days in a year with the rainy season occurring from July to December. Hurricanes season starts in August but usually occurs in October and November and cause damages mainly due to the heavy rainfall, strong winds and flooding. The weather between January and August is relatively dry but small rainfalls also occur in May and June and they are usually too feeble to provide water efficiency.

Climate change

35. 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.

36. Although in an untouched river basin of this altitude sea level rise could be problematic for the Yen river and the Bau Sau river, two dams on the Bau Sau river and one dam on the Yen River prevents such a thing. Therefore, it is of no concern. 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.

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

38. 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).

39. Preliminary Climate Risk Screening Checklist has been filled and is presented in a separate document. Results from this screening shows medium risk for component1 and low risk for component 2..

Seismicity

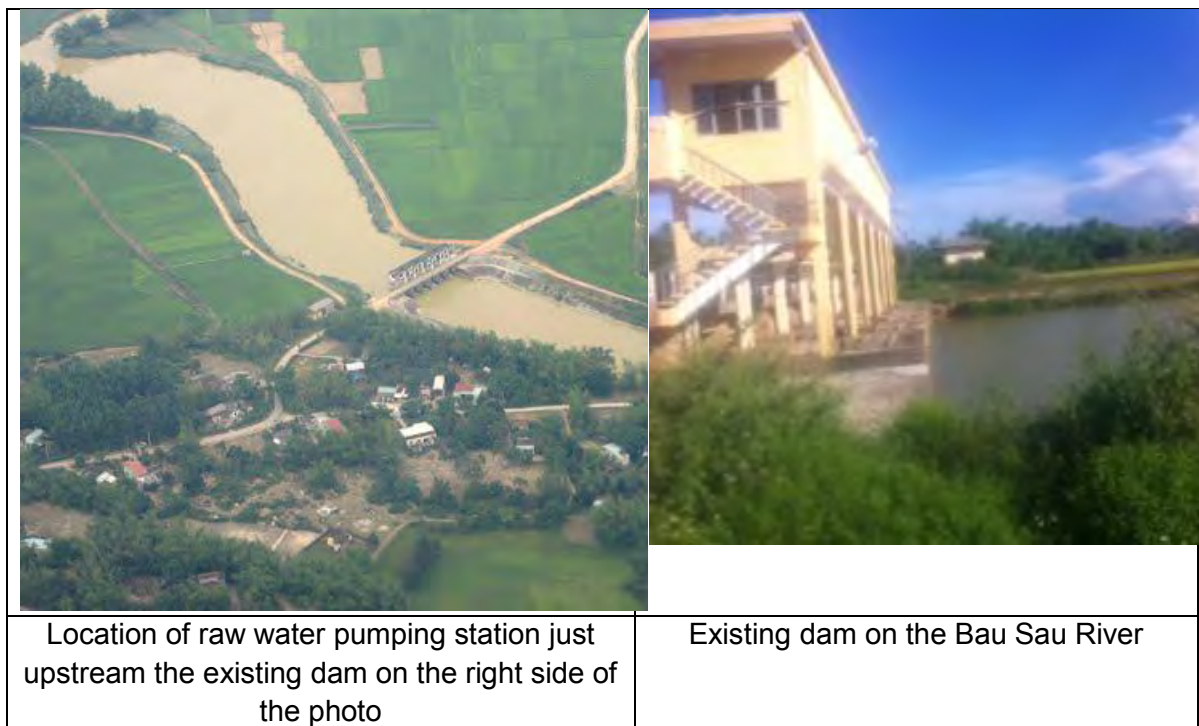
40. Vietnam has been classified as a low seismicity region. However, some moderate earthquakes occurred in Vietnam. 90% of Earthquakes have taken place in the north-western Vietnam. In the other regions, there was not any earthquake of magnitude larger than 5.5.Earthquake.

B. Ecology Environment

Component 1

41. The banks of the Bau Sau River, where the water pumping station is located, are covered by grass and shrubs with some trees (see photos below). The raw water pipeline will cross mainly agriculture land. The WTP is also under agriculture (rice fields and vegetables).

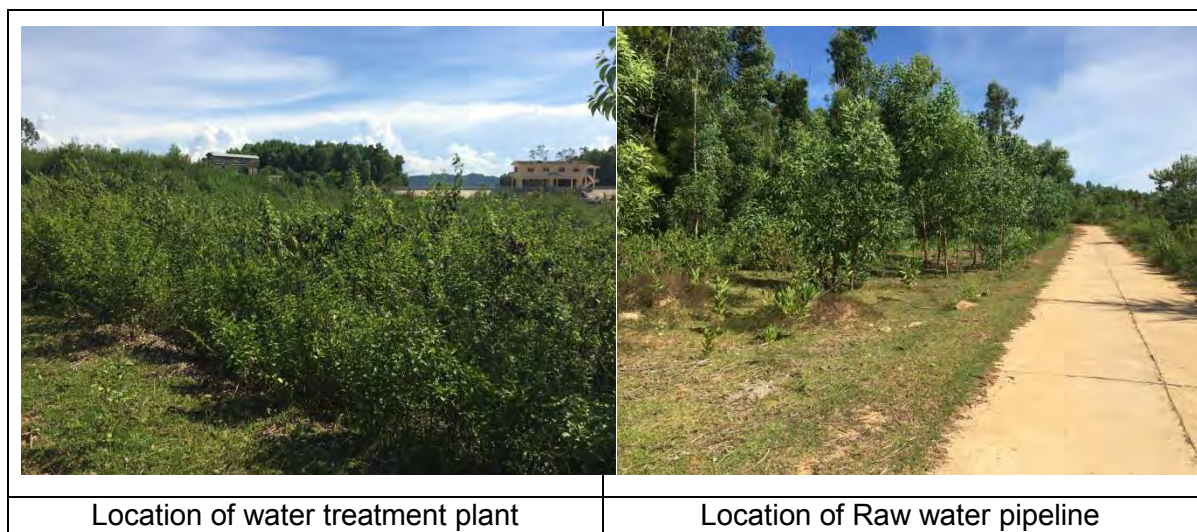
Figure 6: Component 2: Location of Pumping Station and Raw Water Pipeline



Component 2

42. The new pumping station is located close to the Phu Ninh Reservoir (see photo below). Area of the proposed WTP is under forest cover (pine and casuarina trees) on sandy soil. The raw water pipeline is also crossing such forest areas. Trees are planted by local people and are used mainly for domestic fuel wood. No rare or endangered fauna and flora is present in the WTP area.

Figure 7: Component 2: Location of Water Treatment Plant



C. Social-economic context

Component 1

a. Master plan of Dien Nam - Dien Ngoc urban.

43. Under the master plan of Quang Nam social-economic sectorial development and key Central economic Zone, Dien Nam - Dien Ngoc new urban development is the core economic development zone for the North of the province.

44. Cargo traffic and labor force are very convenient. Dien Nam - Dien Ngoc new urban area is near major transportation hubs such as National Highway 1A, railways, Da Nang International Airport and Da Nang port.

45. The area has high potential for development: even and flat land, high terrain, large area, low population density facilitate the process of infrastructure investment; compensation and clearance cost is low.

46. Dien Nam - Dien Ngoc urban area is located in the "Urban Corridor" of the Central key economic region is influenced significantly by Da Nang and Hoi An urban on industrial development and tourism.

- Current population in 2013 about: 54.000 people.
- Expected Population under Urban Planning in 2018: 59 184 people
- Expected Population under Urban Planning by 2025: 66.092 people.
- Construction land: 2.400 ha. Of which: Public land: 1.200 ha, Non-public land: 1.200 ha.

b. The master plan of Dien Duong coastal tourism - Dien Ban district

47. It is necessary to balance the needs for development project growths and the necessity to preserve local culture and harmonious relations between the different land users.

48. The master plan gives priority to tourism development, especially high-end tourism, to ensure ecological balance and conservation to turn the area into a tourist zone of international standards.

49. The master plan attached special importance to development needs of community activities in the region, developing new urban areas to help local population to benefit from tourism development, while conserving the tourism environment quality and create mutual, resonance effects for development.

Spatial organization orientation.

50. The total zone is divided into six areas:

- Area 1: From eastward Da Nang boundary to the central axis of the Dien Nam - Dien Ngoc new urban, this area covers about 1.150 ha urban land and Dien Nam - Dien Ngoc approximately 600 ha, Da Nang University village of about 300 hectares, An Luu, Thuong Tin industrial complexes approximately 100 ha.
- Area 2: Next to region 1 on central axis of unified fork (old), this area is reserve for large international projects; a metropolitan area includes the 5-star hotels, casino, banking telecommunications, with the area of 300 ha.
- Area 3: From centre of unified junction (old), be adjacent to An Bang Hamlet, Hoi An; This area is mainly reserved for tourism development, including projects of local hotels and some local housing retained. On the west, 36-holes Golf Course of 110 ha will be built and 100 ha of forest for relaxing recreation services will be planted. Total area is 335 ha.
- Area 4: From Dien Duong border to Cam An with area of 200 ha. In which, 120 ha is reserved for new urban area and 80 ha for the projects of hotel, service, tree, cultural zone.
- Area 5: Along National Highway 1A eastward and be adjacent to Da Nang city.
- Area 6: Along National Highway 1A westward including communes of Northern Dien Thang, Central Dien Thang, Southern Dien Thang and Dien Hoa. WTP and raw water PS are located here surrounding by 200 ha area of Trang Nhat 1 and 2 industrial cluster.

51. The total study area is 1.288 ha, for the construction of about 800 ha, the remaining area are roads and forests.

c. Historical, cultural and religious presence

52. Although the project and all of its components are located in multiple sites, there is no specific evidence or knowledge of the presence of cultural, religious or historical significant site located in the project area. The project areas are mainly under agriculture, unused land and industrial sites. Chance find are very unlikely.

d. Unexploded Ordnances (UXO)

53. Nonetheless, almost 40 years after the war ended, Vietnam is still contaminated with hundreds of thousands of tons of UXOs scattered all over the country. During earthwork and especially for the pipeline excavation corridors, survey for UXOs prior to construction work has to be conducted by a specialized agency.

Component 2

a. Social-economic development planning in project area by 2010.

54. Chu Lai Open Economic Zone was established based on the Government's document Decision No. 108/2003/QĐ-TTg dated 5th of July, 2003 on establishing and promulgating Chu Lai Open Economic Zone's Regulation.

55. In 2002, the Institute of Urban Planning and Rural Affairs (under the Ministry of Construction) has developed the master plan for the Chu Lai Open Economic Zone in 2020. This master plan was updated in 2005. The Prime Minister has approved orientation for master plan (by Decision No. 43/2004/QĐ-TTg on 23/03/2004).

56. Chu Lai Open Economic Zone in Quang Nam province includes Nui Thanh town, communes of Tam Nghia, Tam Quang, Tam Hai, Tam Hoa, Tam Hiep, Tam Giang, Tam Tien and a part of Tam Xuan 1 and 2 - Nui Thanh district and Tam Thanh, Tam Phu, Tam Thang communes and An Phu ward of Tam Ky Town. The total area allocated to the Chu Lai Open Economic Zone is about 27,040 ha.

57. Chu Lai Open Economic Zone aims to develop industrial zones and urban areas along the National Highway 1A, together with coastal resorts. Besides the construction of Chu Lai Open Economic Zone, the industrialization and modernization will boost development in the region. This area will become the economic, political and cultural center of Nui Thanh district.

b. Orientation of Master Plan is developing urban space.

58. According to the master plan, Chu Lai Open Economic Zone will include the following functional areas:

- Non-tariff area.
- Industrial Zone: Northern Chu Lai, Tam Thanh, Tam Hiep, An Phu and Thang Tam.
- Tourist area: Tam Hai, Rang Bai, Hoa Tam, Tam Tien, Tam Thanh and Nui Thanh.
- Training centers: Research Center, vocational training center (in Tam Phu urban area)
- Urban areas: including Nui Thanh, Tam Hoa and Tam Phu
- Rural residential and ecological areas.

59. After the completion of construction, the Chu Lai Open Economic Zone will cover the entire city of Tam Ky and coastal areas of Nui Thanh district. The development trend of the Chu Lai Open Economic Zone includes the following components:

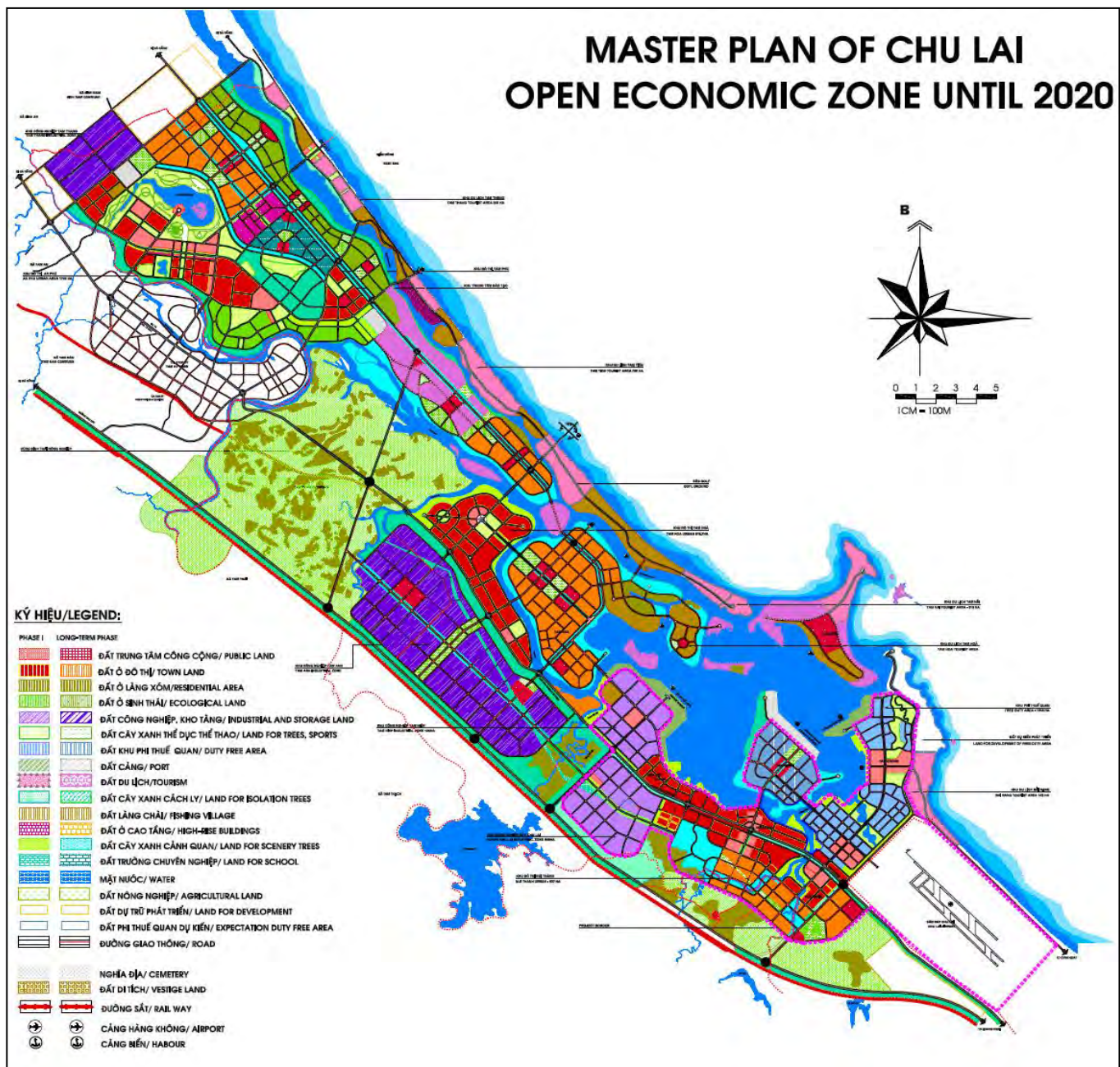
- Nui Thanh urban area (495 ha)
- Tam Hiep IZ (total area of 614 ha, including 125 ha used for the industrial sector, the port and other development zone)
- North Chu Lai Industrial Zone (545 ha)
- Non-tariff area (1.045 ha)
- Bai Rang Tourist zone
- Chu Lai Airport cluster

Other areas:

- Northern and Souther Tam Anh IZ
- Tam Anh and Tam Hoa Tourist area
- Tam Hai Tourist area (145 ha)
- Golf Course
- Tam Hoa urban area
- Tam Tien and Tam Thanh Tourist Area
- An Phu Urban Area

60. All above regions are located in the expanding Tam Hiep water systems project's area.

Figure 8: The drawing shows functional areas in the master plan of Chu Lai Open Economic Zone until 2020.



D. The surface water

Component 1

61. There are two rivers flowing along north-south direction in this area: Vinh Dien and Bau Sau River.

- Vinh Dien River is connected to the Han River to the north and Thu Bon River to the south. It supplies domestic water to Hoi An city and Vinh Dien towns and irrigation water for the agricultural areas. However, Vinh Dien River has a high salinity level and lacks of water its southern portion during the dry reason.
- Bau Sau River flows through Dien Hoa commune and is a secondary channel of the Yen River. It connects with Vinh Dien River to the northeast. This river is the irrigation water source for the agricultural neighbouring communities. A dam is built on the River. Bau Sau River's water resource is abundant and of good quality.
- Average depth of underground water is 1.2m, seasonal fluctuations.

Component 2

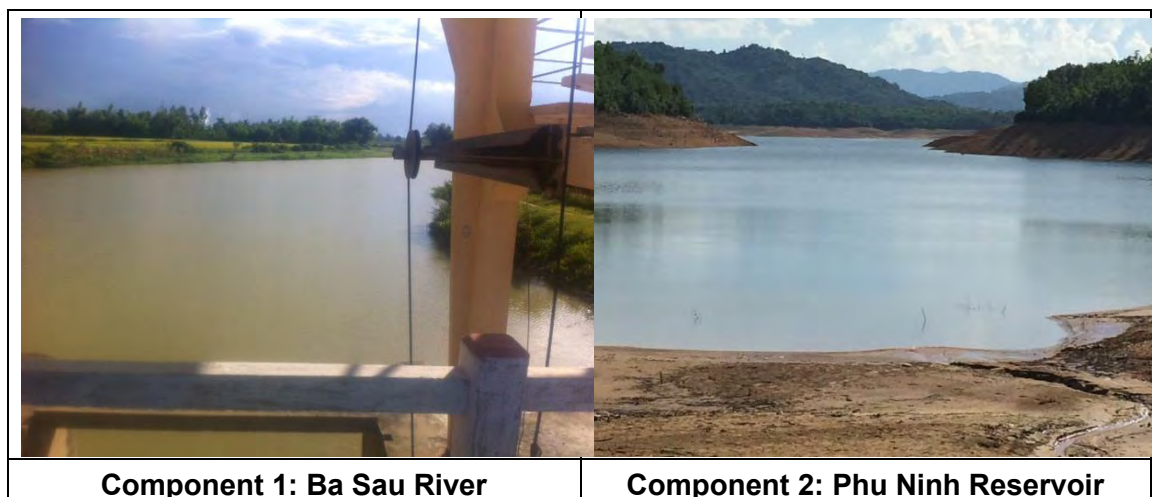
62. The major rivers in project area are the Trau River and Tam Ky River. Trau River has a total catch basin area of about 97 km². It flows into Truong Giang Lake and the flow changes drastically between the dry season and rainy season. The river has high turbidity in flood season and salinity in the dry season.

63. Tam Ky River flows through the north of Chu Lai Open Economic Zone with a total catch basin area of about 800 km². The flow of the river is relatively stable year round.

64. Nui Thanh District includes a great lake: Thai Xuan with total catch basin area of 18 km². Thai Xuan Lake provides water for irrigation activities and raw water source for Tam Hiep WTP at present.

65. Additionally, bordering with Tam Xuan commune of Nui Thanh district, is Phu Ninh Lake in Phu Ninh district. Phu Ninh Lake with a capacity of 344 million m³ of water provides irrigation resource for about 2,300 hectares of agricultural land. There are about 30 large and small islands in the lake. It is also a national tourist spot as well as a raw water source for Phu Ninh and Tam Ky WTPs.

Figure 9: Sources of Water Supply



E. Competition for water resources

Component 1

66. The competition for the water resource has a low potential of creating conflicts in the Bau Sau river. Although it is use for multiple purposes, the river is in fact a connecting channel that takes it source in the Yen river and the majority of its level and course is maintained by two dams before flowing a 4 kilometres after in Vinh Dien river. The flow or the Yen river is constant and the catchment basin is large. Nonetheless, climate change and extreme events could create a certain risk regarding the minimal flow that is needed for the water intake. As such, the depth of the intake will be set so the flow of raw water become unaffected.

Component 2

67. The competition for the water resource has a low potential of creating conflicts in the Phu Ninh reservoir. Although it is use for multiple purposes, the reservoir is managed to assure a constant flow. Nonetheless, climate change and extreme events could create a certain risk regarding the regulation of the reservoir and the minimal flow that must be kept in the N2 channel. If a long drought would occur to the extent that the reservoir managers would need to consider shutting down one of the channels, a communication protocol should be initiated between the 2 companies will need to be drafted.

F. Water Quality

Component 1

68. Water source of Bau Sau River is abundant with good quality and not affected by salinity. The River meets the water needs for the urban area and its vicinity's for clean water demand at present and long term. However, construction of water collection system to meet long - term supply capacity and against salinity is necessary in case of serious droughts and high tides.

69. Based on the survey results combined with criteria of space and location to exploit water easily, the most suitable raw water for Dien Nam - Dien Ngoc WTP is Bau Sau River.

Table 1: Test results of Bau Sau River's raw water source

| Order | Indicators | Unit | Results |
|--------------|---------------------------------------|-----------------------|----------------|
| 1 | pH | | 6.95 |
| 2 | Turbidity | NTU | 159.2 |
| 3 | Total alkalinity | mg/lCaCO ₃ | 25.6 |
| 4 | Insoluble residue | mg/l | 104.2 |
| 5 | Total hardness | mg/lCaCO ₃ | 16.8 |
| 6 | COD Oxidization | mg/l O ₂ | 6 |
| 7 | Conductivity | μS/cm | 38.3 |
| 8 | NO ₃ ⁻ Content | mg/l | 2.25 |
| 9 | Ca ²⁺ Content | mg/l | 4.12 |
| 10 | Mg ²⁺ Content | mg/l | 1.46 |
| 11 | Mn ²⁺ Content | mg/l | 0.3 |
| 12 | NO ₂ ⁻ Content | mg/l | 0.9 |
| 13 | PO ₄ ⁻² Content | mg/l | 1.9 |
| 14 | SO ₄ ²⁻ Content | mg/l | 1 |
| 15 | Cl ⁻ Content | mg/l | 7.3 |
| 16 | NH ₄ ⁻ Content | mg/l | 1.8 |

70. The quality of treated water is required to be safe and be monitored through water quality indicators under water and sanitation standards of the Ministry of Health at the Decision No. NTR 01/2009/BYT.

Table 2: Requirements for drinking water quality

| Order | Indicator | Unit | Maximum limit | Testing method | Checking level (*) |
|--|-------------------------------------|------------------|---------------|---|--------------------|
| I. Perceptible Indicator and inorganic components | | | | | |
| 1 | Color | TCU | 15 | TCVN 6185 -1996 (ISO 7887 -1985) | I |
| 2 | Odour | | No odour | Human smell detection | I |
| 3 | Toxicity | NTU | 5 | TCVN 6184 -1996 | I |
| 4 | pH | | 6.0-8.5 | TCVN 6192 - 1999 | I |
| 5 | Hardness | mg/l | 350 | TCVN 6224 -1996 | I |
| 6 | Amoniac (by NH_4^+) | mg/l | 3 | TCVN 5988 -1995 (ISO 5664 -1984) | I |
| 7 | Nitrate (by NO_3^-) | mg/l | 50 | TCVN 6180 -1996 (ISO 7890 -1988) | I |
| 8 | Nitrite (by NO_2^-) | mg/l | 3 | TCVN 6178 -1996 (ISO 6777 -1984) | I |
| 9 | Chloride | mg/l | 300 | TCVN 6194 -1996 (ISO 9297 -1989) | I |
| 10 | Arsenic | mg/l | 0.05 | TCVN 6626-2000 (ISO 6595-1982) | I |
| 11 | Iron | mg/l | 0.5 | TCVN 6177 -1996 (ISO 6332 -1988) | I |
| 12 | Oxidization by KMnO_4 | mg/l | 4 | Technical normal rules National Institute of Occupational Medicine and Environmental Health (NIOEH) | I |
| 13 | Total Dissolved Solids (TDS) | mg/l | 1200 | TCVN 6053 -1995 (ISO 9696 -1992) | II |
| 14 | Copper | mg/l | 2 | TCVN 6193-1996 (ISO 8288 -1986) | II |
| 15 | Cyanide | mg/l | 0.07 | TCVN 6181 -1996 (ISO 6703 -1984) | II |
| 16 | Fluoride | mg/l | 1.5 | TCVN 6195-1996 (ISO 10359 -1992) | II |
| 17 | Lead | mg/l | 0.01 | TCVN 6193 -1996 (ISO 8286 -1986) | II |
| 18 | Manganese | mg/l | 0.5 | TCVN 6002 -1995 (ISO 6333 -1986) | II |
| 19 | Mercury | mg/l | 0.001 | TCVN 5991 -1995 (ISO 5666/1 -1983 ISO 5666/3 -1989) | II |
| 20 | Zinc | mg/l | 3 | TCVN 6193 -1996 (ISO 8288 -1989) | II |
| II. Micro organism | | | | | |
| 21 | Total Coliform | Bacterium /100ml | 50 | TCVN 6187 - 1996 (ISO 9308 - 1990) | I |
| 22 | E. coli or thermo-tolerant Coliform | Bacterium /100ml | 0 | TCVN 6187 - 1996 (ISO 9308 -1990) | I |

Component 2

71. Phu Ninh Lake is a large fresh water reservoir providing water supply for agricultural production, for potable water demand of people along route canals of the lakes and raw water for WTP as Tam Ky, Phu Ninh WTP. Phu Ninh Lake has the following characteristics:

- Dead water level: H = 20,44m.
- Normal water level: Hbt = 32,00 m.
- Reinforcement water level: Hgc = 35,40 m.
- Death capacity: Vc = 70,3 x 106 m3.
- Useful capacity: Vhd = 273,7 x 106 m3.
- Capacity across normal water level: Vlt = 344,0 x 10 m3.
- Capacity across strengthening levels: Vmax = 460,8 x 106 m3.

72. According to the survey results, water resources from N2 canal of Phu Ninh Reservoir is accessible, of good quality sufficient and stable. In addition it is very close to the Tam Xuan 2 WTP (300 m far from WTP).

73. Test results of Phu Ninh canal's water source at the position expected to be derivate has the following chemical and physical norms found in table 3.

Table 3: Test results of Phu Ninh canal's raw water source

| Order | Indicators | Unit | Results |
|-------|---|-----------------------|--------------------|
| 1 | pH | | 6.8 |
| 2 | Turbidity | NTU | 1.02 |
| 3 | Total alkalinity | mg/lCaCO ₃ | 40 |
| 4 | Total hardness | mg/lCaCO ₃ | 78 |
| 5 | Chromaticity | PtCoAPHA | 5 |
| 6 | Total solids | mg/l | 25.1 |
| 7 | Dissolved solids | mg/l | 20.1 |
| 8 | Suspended solids | mg/l | 5 |
| 9 | Organic substance | mg/l | 3 |
| 10 | E. coli | mg/l | 6 |
| 11 | Fe | mg/l | 0.94 |
| 12 | Content of NO ₂ ⁻ | mg/l | 0.1 |
| 13 | Coliforms | MPN/100ml | 23x10 ¹ |
| 14 | NO ₃ | mg/l | 2.0 |

Figure 10: Canal N2 (Water Supply Source)



G. Water Demand

a. Existing Water Supply System

Component 1

74. Currently, there is no clean water supply system in communes of Dien Nam, Dien Ngoc, Dien Duong, Eastern Dien Nam, Northern Dien Nam, Southern Dien Nam, Central Dien Thang, Southern Dien Thang, Dien Hoa, around Dien Nam - Dien Ngoc IZ. People are using water from drilled wells and shallow wells for their needs (drinking, cooking) and other activities. Dien Ngoc Industrial Zone has a WTP using underground water with capacity of 5.000 m³/day used at 80%. There is no water supply system in the tourist area and for the university.

75. Water source mainly used in project area is from drilled wells with 92.25%. Some HHs in Central Dien Nam have access to clean water by the rural clean water program, but water does not ensure continuous supply.

76. However, according to hydrogeological study in Dien Nam - Dien Ngoc by Groundwater Company II under the Ministry of Agriculture and Rural Development that has been approved by National Reserves Assessment Council,

- Level A: $Q=3.680 \text{ m}^3/\text{day}$.
- Level B: $Q=3.157 \text{ m}^3/\text{day}$.
- Level C: $Q=1.154 \text{ m}^3/\text{day}$.

Exploitation reserves for water supply are 6.837 m^3 per day.

77. In general, the groundwater availability and quality fluctuate widely, are unstable and reserves are low which cannot guarantee a long-term water supply.

Component 2

78. Tam Hiep water supply system in Chu Lai Open Economic Zone uses surface water. Raw water is taken from the Thai Xuan Lake. At present, water system serves approximately 2,600 connections with about 12,500 people equivalent to 18% of the population supplied with clean water.

79. However, Nui Thanh water supply company (NTWSCo) supplies water in the area with limited scope. Water distribution system includes only the main water supply pipeline along Highway 1 and some distribution pipelines in Tam Hiep Industrial Park and North Chu Lai Industrial Zone. There is no water distribution pipeline in Nui Thanh urban area except the main pipeline along the highway.

80. The total length of water distribution pipelines in NTWSCo is about 47 km. Diameters ranges between 300 mm for transmission pipelines and from 40 mm to 50 mm for the distribution pipelines. The overall average diameter are 100 mm and 200 mm which pipes are made out of PVC and polyethylene, as for the 300 mm and some of the 200 mm the material is ductile iron. The water supply system in the region is quite new, built in the 2000s.

Table 4: Status of the Tam Hiep water supply system

| Diameter (mm) | Material | Length (m) |
|----------------------|-----------------|-------------------|
| 300 | Ductile iron | 1.900 |
| 200 | Ductile iron | 58 |
| 200 | uPVC | 8.500 |
| 150 | uPVC | 3.215 |
| 100 | uPVC | 10.000 |
| 80 | uPVC | 5.848 |
| 70 | uPVC | 1.025 |
| 50 | uPVC | 5.413 |
| 100 | HDPE | 1.500 |
| 50 | HDPE | 5.422 |
| 40 | HDPE | 4.004 |

b. Population growth

Component 1

81. Calculations for population growth in the future are based on the current population and the annual population growth rate provided by local authorities.

82. According to survey data, the population in the district has increased rather stably. However, the population growth rate of communes in the project area in the years from 2010 to 2012 is relatively fast. Population growth rates by investment phase in Dien Nam - Dien Ngoc urban area and vicinity are expected as follow in table 6:

Table 5: Population growth rate in Dien Nam - Dien Ngoc urban area and vicinity

| Project area | Population (people) | | | |
|---------------------|----------------------|---------------|---------------|----------------|
| | 2012 | 2015 | 2020 | 2030 |
| Dien Ngoc | 19.372 | 20.310 | 21.977 | 28.735 |
| Nothern Dien Nam | 8.275 | 8.665 | 9.357 | 10.913 |
| Eastern Dien Nam | 7.002 | 7.341 | 7.943 | 9.301 |
| Central Dien Nam | 5.715 | 5.976 | 6.437 | 7.471 |
| Dien Duong | 13.490 | 14.168 | 15.376 | 18.975 |
| Nothern Dien Thang | 6.606 | 6.948 | 7.559 | 8.947 |
| Central Dien Thang | 7.606 | 7.674 | 8.026 | 8.778 |
| Southern Dien Thang | 6.597 | 6.798 | 7.149 | 7.905 |
| Dien Hoa | 12.581 | 12.885 | 13.409 | 14.406 |
| Total | 87.244 | 90.765 | 97.233 | 106.431 |

83. Water demand is expected to reach 15,000 m³/day in 2015 & 30,000 m³/day in 2030. It is estimated that 85%¹ of urban population will use clean water from WS in the early years of operation. The proportion of people willing to connect to the distribution network is 83.8%.

Component 2

84. The project area is located in Chu Lai Open Economic Zone, including Nui Thanh Town and neighbouring communes: Tam Hiep, Tam Nghia, Tam Giang, Tam Quang, Tam Hai, Northern Tam Anh, Southern Tam Anh, Tam Xuan 1 and 2.

85. According to the social - economic survey conducted to prepare this feasibility study report, the current rate of natural population growth in Nui Thanh urban areas is 0.33%, and communes' is 0.55 to 1.13% per year. Total population in the project area is 107.436 people in 2012 according to the Nui Thanh Census Bureau numbers.

Table 6: The rate of population growth in the project area

| Project area | Population (people) | | | | |
|------------------|----------------------|----------------|----------------|----------------|----------------|
| | 2012 | 2015 | 2018 | 2020 | 2030 |
| Tam Xuan 1 | 12.835 | 13.085 | 13.340 | 13.601 | 13.866 |
| Tam Xuan 2 | 11.628 | 11.865 | 12.107 | 12.354 | 12.606 |
| Northern Tam Anh | 6.151 | 6.252 | 6.356 | 6.461 | 6.567 |
| Southern Tam Anh | 8.821 | 8.961 | 9.104 | 9.248 | 9.396 |
| Tam Hoa | 8.629 | 8.862 | 9.101 | 9.347 | 9.599 |
| Tam Hiep | 11.288 | 11.671 | 12.066 | 12.475 | 12.898 |
| Tam Giang | 6.247 | 6.410 | 6.577 | 6.749 | 6.925 |
| Tam Quang | 13.094 | 13.345 | 13.602 | 13.863 | 14.129 |
| Tam Nghia | 10.830 | 11.015 | 11.204 | 11.395 | 11.590 |
| Tam Hai | 7.695 | 7.949 | 8.211 | 8.482 | 8.762 |
| NT Town | 10.218 | 10.319 | 20.535 | 20.738 | 20.944 |
| Total | 107.436 | 109.736 | 122.204 | 124.714 | 127.282 |

¹ Source : Socio-economic survey conducted in 5/2011 by the Consultant.

V. IMPACT, ALTERNATIVE AND MITIGATION MEASURES

A. Area of influence of the Project

Component 1

86. The area of influence of the component 1 of the sub-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 8 communes in Dien Ban District: Quang Nam Province: Dien Hoa, Northern Dien Thang, Southern Dien Thang, Central Dien Thang, Central Dien Nam, Northern Dien Nam, Southern Dien Nam, Dien Duong,

Component 2

87. The area of influence of the component 2 of the sub-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 8 communes in Nui Thanh District: Tam Hiep, Tam Nghia, Tam Giang, Quang Tam, Northern Tam Anh, Southern Tam Anh, Tam Xuan 1 and 2, Tam Hiep Industrial Zone, Tam Anh, Northern Chu Lai, non-tariff areas and Ky Ha port,

B. The expected benefits

88. For both components, benefits of the project are improving public health by ensuring proper access to clean water services; transferring the habit of using water (mostly wells) to using tap water, serving clean water demand for drinking and people's activities and economic development.

89. In the project areas, most people use water from well that need to be pumped and filtered or boiled before use. Due to the process of urbanization and the expansion of industrial parks, quick industrial clusters, the risk of shallow wells contamination is increasing.

90. A raise in public awareness is also expected about personal hygiene, sanitation and water conservation with people's participation in sustainable management of public works through the design and implementation of awareness education program on the subject.

C. Design and Location Consideration

91. In both components, location of the WTP has been chosen due to their low impacts on human activities (unused or/and inhabited areas). The areas chosen are also not subject to flooding and the risk of seismicity is low.

92. 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. The pre-construction activities

93. The pre-construction activities under the two components are site clearance along the raw water pipeline, WTPs and distribution networks. A RP has been prepared to cover compensation and assistance based on ADB SPS.

94. Since excavation related infrastructure is one of the main causes of the sudden explosion of unexploded ordnance (UXO) in Vietnam, and chosen excavation sites are near

to populated areas, it is necessary to ensure that the pipeline route is examined for the presence of UXOs prior to construction. If UXOs are discovered and verified, the work need to be done according to the procedures prescribed by the national authorities on the management of UXO, before receiving any public civil works. The budget for the pre-construction survey 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. The construction activities

95. The environmental impacts associated with construction activities, notably for the raw water pipeline and WTPs, distribution-piping network are influenced largely by the location and nature of the construction, especially by digging ditches to install raw water pipeline and distribution pipes.

For component 1, the WTP is located on agricultural land with some houses scattered around. The main impacts are related to land acquisition that is covered under the RP. For component 2, the WTP is located in an uninhabited area under public forest cover.

96. Raw water pipeline will convey the water over a total distance of 2.4 km from the PS to Dien Nam - Dien Ngoc WTP. Most of pipeline length will be built under the sidewalks along inter-village roads and fields. Initially, raw water pipeline from Vinh Dien River to WTPs was 4.5 km length. However, raw water intake changed from Vinh Dien River to Bau Sau River, which has decreased the pipeline length by 2.1 km while reducing the investment costs significantly. In addition, good quality and stable flow of water from Bau Sau River can meet the water supply needs for future plant expansion when needed.

97. Similarly, raw water pipeline from Phu Ninh channel to WTP located in Tam Xuan 2 is about 300 m in length in comparison with 1.7 km if raw water collection would be abstracted from Thai Xuan Lake. By changing the location of raw water intake the project cost decreased. In addition, water quality and quantity from Phu Ninh channel is ensured for long-term.

98. In considering both the least cost and impact on the environment, building a large-diameter pipe to fit the capacity requirements for the two components is most favourable. It results in the least amount of disordered soil with assumption of construction corridor to install tube is 4 m wide. However, a disadvantage of the large pipeline is the economic aspect of excess capacity in the period before future expansion.

99. For both components, the distribution pipes are mainly in residential areas. Thus, excavation activities for the distribution activities will be done near residential areas with the associated nuisances (interruption of access, difficulties for traffic, dust, noise and risks of improperly stored spoils that could lead to water quality decrease in nearby rivers). Because the construction space is too narrow in some areas, underground pipeline installation to avoid damage or displacement for adjacent residential buildings is not feasible everywhere. Blocking traffic to install pipe under the road would be extremely disruptive to the local community. These location features are basis for the assessment and mitigation measures described below.

100. The negative impacts can be mitigated by installing pipeline under existing roadways. However, it is difficult for construction because the narrow width (only 3-4 m wide) of road; excavation will interrupt completely traffic in the area. In many cases, maintaining roads not blocked to access to pipe installation works and transport equipment and construction materials will be necessary.

101. Installation of piping with size specified for the project will require a practical work zone width of up to 15 meters to get enough space for moving, digging tubing, and storing temporary material. However, this width is not available for pipeline with significant length where the distance between the road and the adjacent hillside or between the road and the houses and adjacent facilities is sometime less than 5 meters. Thus, digging and handling materials in particular, need to be properly managed to prevent the obstruction of road or aisles for people, or sillage pit blocked by excavated soil erosion, or nuisance caused by dust from the dry soil and trucks transporting soil movement.

102. Avoid using the same locations to contain excavated soil during a long period, and spoils should be watered regularly or defended by tarpaulin to prevent excessive dust.

103. Most of excavated material will be reused to fill the gully after installing the pipeline. Thus, large amount of excavated soil from the pipeline construction will not need to be discarded. In any case, the last area to dump surplus of excavated soil should be disposed properly so it does not create ant landslide or flood risks. If possible, the dumping area should be covered by topsoil and vegetation. Around there, sillage pit need to be fitted up. Excavated soil must be treated as a resource and used to its full potential - for example, the base material if appropriate will be used to raise the road surface in flooded areas, to fill the area being developed for immigration purposes, or to build or improve riparian protection embankments.

104. Bidding documents of pipeline construction should include provisions to prevent the unsuitable processing of excavated soil. The contractor should explain the excavation methods to be used and the measures for handling excavated soil. Before choosing areas as a temporary storage place or dumping excavated soil finally, contractors have to check the physical stability of the location and simultaneously evaluate advantages and inconvenient of each location. The rationality of the measures is part of the selection criteria for construction contracts award.

105. Due to the narrow width of road, and the crowded conditions at some sections of the pipeline route, the impact on local traffic can be significant since it will be impossible in the narrow passage to contain excavated soil on the road without obstructing traffic. To remediate the situation, the material will be transported to a designated storage place and moved back to the construction site when needed again. Therefore, there may be frequent movement of trucks to transport the excavated material along the way.

106. Because of the nearby residential areas, nuisance impacts from the operation of land transport by truck such as noise, fumes and dust need to be mitigated. Truck carrying excavated soil should be regularly cleaned, and the exhaust fumes of vehicles require to be tested in accordance with standards, especially small particles composition. During the dry season, the roads near residential areas should be sprayed with water to prevent excessive dust.

107. To minimize the overall impact of the construction, good construction plans is required and activities in rush hour near schools and markets need to be avoided as much as

possible. Transport and construction equipment to be used should be of appropriate size to fit the limited space of work. It is recommended to use wood or durable steel plates placed across the ditch or drain to create temporary path for pedestrian and motorcycle. Construction site and material storage area must be lighted enough at night. The open ditches should be fenced and clearly marked. The necessary sanitary facilities, portable toilets, for the workers are required to be in sufficient number. The Contractor shall avoid activities that generate noise and serious vibration if works construction at night is necessary.

108. For large extent, these protections are not unique to the project and are specified in the applicable governmental decrees and rules of practice during construction. Therefore, construction-bidding documents should require the close combination between protective measures according to current law and regulations and the terms required implement commitment of the contractor as penalty for violation.

109. Working in an urban environment also increases greatly the risk of digging through unrevealed and unknown potential historic and/or religious artefact or remains. But, the sites foreseen for the trenches and the construction site have, for most of them, been worked on before or are in low potential value for historical finds. Nonetheless, chance find could still be possible because the depth of the work to be done is lower than the previous work done. Therefore, if it does happen, work should be stopped at first sight and specialist should be contacted before work could be restarted. As such, no historic site will be destroyed or displaced by the construction of the different components of the projects.

110. It should be noted that the environmental impacts described above are temporary in nature, that is, during the two years of pipeline construction. The operation of the pipeline itself is not expected to produce adverse effects and in fact, the benefits of the pipeline corridor offer a good opportunity for the expansion of provincial roads in the future.

111. The construction of the raw water pipelines, the WTP and the distribution networks will have no significant impact to the flora and fauna. For component 1, the construction activities will take place in the current agriculture and settlement / urban areas. For component 2, the WTP and raw water pipeline will be located in areas covered with brush and trees used as fuel-wood. Distribution network will be in urban areas.

112. Layout of the water distribution network includes transmission pipelines from the WTP, the main pipeline to the service area or extended areas and branch pipes within the project, after that the pipes distribute and serve water to users. Layout of the supply network is in conformity with the overall plan for the development of Dien Ban / Nui Thanh district. The main and distribution pipelines from the WTP will be constructed along the routes (existing and planned), with distribution pipe under the sidewalk to minimize impact on traffic flow.

113. Same as raw water pipeline, the adverse effects related to the disruptions and nuisances on residential buildings and nearby commercial will be caused by construction activity.

114. The similar mitigation and protection measures as discussed earlier for the raw water pipeline construction should be applied to the development of the distribution network for both components, summarized below:

- Manage excavation and pipe installation operations to avoid unnecessary clogging the streets or walkways used for pedestrian and transportation;

- Avoid using temporary land to stock spoils materials for long period, and during the dry season; the spoils should be watered regularly or preferably covered by tarpaulin to avoid excessive dust.
- A large portion of the excavated material will be used to fill the trench for pipe installation, and therefore it will be dumped on the roadside until filling the ditch. The temporary spoils along the roads and sidewalks must be managed to avoid silting of drains / ditches or nuisance by dust. In construction areas near streams and ditches, silt traps should be used to prevent sewer blockages.
- The areas to dump excess rock excavation should be positioned suitably to avoid flooding or subsidence. If possible, the areas should be re-vegetated.
- Excavated soil can be viewed as a resource and its potential benefits maximized. Excavated material can be used for different purposes.
- Bidding documents of pipeline construction should include provisions to prevent the unsuitable excavation and processing excavated soil. The contractor should explain the excavation methods to be used and the measures for handling excavated soil. It is necessary to explain these methods. It will be part of the selection criteria for contracts award.
- Due to the narrow width of road, containing excavated soil on the road without obstructing traffic will be impossible in some areas. In these cases, material will be transported to the designated place of storage and moved back to the construction site for filling the trench. Therefore, nuisance impacts from the operation of land transport by truck as noise, fumes and dust need to be mitigated. Truck carrying excavated soil should be cleaned regularly, the trucks content should be covered during transport and the exhaust fumes of vehicles required to be tested in accordance with standards, especially small particles composition.
- Noise from the operation of the hammer, drill or concrete grind on roads / sidewalks asphalt will be inevitable despite of temporary nuisance. Daylight hours for this type of operation should be respected.
- To minimize the overall impact of the construction, good construction plans is required and activities in rush hour near schools, hospitals and markets need to be mitigated. Transport and construction equipment be used should be of appropriate size to fit the limited space of work. It is recommended to use wood or durable steel plates placed across the ditch or drain to create temporary path for pedestrian and motorcycle. Construction site must be illuminated enough at night. The open ditches should be fenced and clearly marked. The necessary mobile sanitary facilities, portable toilets, for the people at work are required to be sufficient.

115. In addition, the contractor should be required to comply with the guidelines and regulations of Vietnam for control of temporary nuisance impacts related to construction, as detailed in Table 7.

Table 7: The Vietnam Law and Standards to adjust the construction impacts

| Related aspects / impacts | Vietnam Guidelines and Standards |
|---|--|
| Dust dispersion | TCVN 5937:2005 |
| Air dispersion from construction equipment and vehicles | TCVN 5947-1; TCVN 6438; TCVN 5939; TCVN 5940 |

| | |
|--|--------------------------------|
| Noise | TCVN 5948:1998; TCVN 5949:1999 |
| Vibration | TCVN 7210:2002 |
| Traffic congestion | TCVN 4054:1998 |
| The excavated soil piles and areas containing them | TCVN 5299:1995 |
| The discharge / drainage standard | TCVN 6984:2001 |
| The harmful substances | TCVN 5938:2005 |

116. To minimize the water supply disruption during the renovation of existing connection, a detailed plan for gradual implementation will be built for the new water system during the detailed engineering design of the project.

F. Project Operation

117. For both components, raw water treatment process consists of two stages: (1) sedimentation, and (2) filtration and disinfection. The manifold clarifier is suggested to use for flock sedimentation. Following the sedimentation stage, a traditional rapid gravity filter will be used for the second stage with sand filtering background about 1 m in thickness and it is equipped with traditional wind-water filter washing system. In addition to the traditional treatment units (receiving and reactor tank, clarifier, filter and clean water tank), the other works such as the chemical building, chlorine building, generator house, warehouse, PSs and administrative office will be constructed.

118. Chemicals used frequently are poly-aluminium chloride (PAC) for the flocculation, soda for pH control, and chlorine for disinfection. Among these chemicals, chlorine is the most harmful if not handled properly. Because chlorine is an active and corrosive substance, it can cause severe reactions if workers are exposed to it. When exposed to water, chlorine can create a dangerous highly corrosive acid film. Thus, the process of storing and processing is crucial. During operation of the WTP, the chlorine storage, containers, and related handling equipment should be clearly labelled. Chlorine containers have to stay dry and stored separately from other chemical.

119. Workers need to wear personal protective equipment such as goggles, masks, gloves, protective clothing and footwear when handling chlorine. Workers should be trained in the principles of safe working and emergency steps when handling chemicals. The operating procedures of the plant should include the inspection and maintenance schedule for all chlorine storage and treatment equipment, these devices should be checked regularly for possible leaks.

120. In addition to potential hazards associated with the use of treatment chemicals. Sludge and wash water treatment from the treatment process is the most important aspect of the WTP operations since it can cause adverse effects on land and waterways. Mud is a product of sedimentation and filtration processes, including trace chemicals, fine particles and algae derived from tank that were removed from the raw water through flocculation process. This sludge also contains the aluminium coagulant that is not considered toxic but could have adverse effects on the environment.

121. Sediment (mass emitted from the operation of the plant) will have few beneficial potential uses if they are treated. There are two options for sludge treatment: (a) dehydration for easy handle and dispose as solid waste at DoNRE recognized waste disposal site, or (b) or overflow on vacant land with a temporary berm to avoid leakage in nearby ditch, ponds or streams.

122. There are two forms of dehydration: (a) mechanical force to concentrate sludge to cake sludge, or (b) deposition and dry naturally. For (a), sludge from filter is firstly transferred to separate concentrating vat, and from there it goes through a mechanic press (sheet) to remove water. Dewatering process transfers sludge into the form cake for easy transport to disposal site after that. Other forms, with (b), sludge and wash water will be directed to lagoon or tank for sedimentation operating alternately along with second tank for sedimentation and then removal for disposition. Concentrated sludge will be transferred from filter to the drying area, and then be taken to the landfill. The second way requires more space.

123. Mass sludge exhausted regularly from clarification process will usually hold up to 3% solids (by weight). After dewatering, solids content will rise to 25-30%, and sludge will condense into cake, easy to handle and transport to landfills.

124. Sludge is settled in two rotating tanks, and then concentrated sludge will be transferred away as prescribed (according to regulation of Environmental Protection Branch under DoNRE).

125. Table 8 shows the handling and disposal of other expected waste types during test operating/ testing and normal operation of the WTP.

Table 8: Reducing the waste WTP

| Phase | Waste source | Characteristics of waste | Handling / Disposal |
|---------------------------------------|--|---|--|
| During trial operating process | Water tested by Hydraulic | Normally, there are no contaminants | Discharged into nearby water flow |
| | Water for testing was handled during plant start-up and process adjustment | Water treated chlorinated exceed drinking water quality standards | Drain out to water flow after removal of chlorine if necessary |
| | Water is used for sterilizing tanks | High residual chlorine | Drain out to water flow after removal of chlorine if necessary |
| | Filter backwash water | Fine-grain of filtering environment | Decant and discharge into nearby water |
| During normal operation | Sludge after deposition | Mass discard regularly | Sludge is dehydrated through plate presses (described above), and eliminated at provided place |
| | Filter backwash water | Mass discard regularly; usually 300 mg/l solid content | Recycling |
| | Wash water from the sand filter | Biological substances such as algae | Move to clarifier, dry out and eliminate |
| | The overflow of handling process | May contain less residual chlorine and suspended solids cloudy | Drain out to water flow after removal of chlorine if necessary |
| | The chemical waste | Scum, washing, wash water escape through the sewers, overflows | Neutralize and keep to wipe out Oil will be sent for recycling |

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. The purpose of information disclosure, consultation and participation

126. Consultation is needed to identify the community's concerns about the project, especially those directly affected by the construction and implementation of the project. On this basis, these concerns can be properly resolved in the process of project formulation, solution selection, design and measures preparing to minimize the adverse impacts of the project on the environment, public health. Consultation and participation of the community include:

- Make sure that the ideas of local competent authorities as well as local representatives of the affected HHs will contribute to the planning process before competent authority makes its approval decision on the project.
- Share information on the expected impacts of the activities of the project to the future to stakeholders, especially the affected HH.
- Help organizations and individuals to be aware of the project necessity, on how the project will be implemented as well as the requirements and purposes of the environmental impact assessment for the said project.
- The dissemination activities, environmental and compensation policies consultation, clearance and other related activities will be carried out simultaneously.
- Listen to the community's ideas and their concerns to the project, especially to direct impacts on the lives of the community.
- Increase the participation of community to bring them opportunities to express and propose solutions for the people affected directly or indirectly by the project.
- The communities in the construction zones participated in the project development. Since then, the project have improved and resolve the civil conflicts, offer options for technology, reasonable mitigation measures, which contribute to addressing conflicts from the suggestions made by the community to the problems of environmental protection.
- Confirm the rationality and legitimacy of the government's decision to meet the legitimate demands of the people, to consider the recommendations of the community and local government.

B. Method of consultation and participation.

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

- In-depth interviews (live interview): organizing dialogues, meetings and discussions with the people and local government.
- Obtaining information on the questionnaire (indirect interview): Sent questionnaire to the people and local government
- According to the provision of Circular No. 05/2008/TT-BTNMT dated 8th of December, 2008 by the MoNRE on "Guidelines on strategic environmental

assessment, environmental impact assessment and environmental protection commitment", there are two entities who need to be consulted for the report preparation:

- (1) Commune and ward level People's Committees
- (2) Commune and ward level Fatherland Front Committee.

C. Consultation Process.

128. Two types of consultation were conducted: i) HH survey; ii) public meeting.

129. Investment & Construction PMU - Quang Nam Water Supply and Drainage JSC (on behalf of the investor) in collaboration with the local government held consultations and public information. These were conducted as part of the baseline survey on local environmental conditions along the pipeline corridor and the location of WTPs. The interviews were conducted using a survey questionnaire that also assessed the perceptions and concerns of the community about the proposed project.

130. The main content of the consultation meeting was to announce the basic content of the Vietnam Urban Water Supply Development, Construction of Dien Nam - Dien Ngoc and Tam Hiep, Quang Nam water supply system projects, the adverse environmental impacts, and mitigation measures to be applied in the process of construction and implementation as well as operation process of the project.

D. The result of information disclosure and public consultation for Component 1

131. The people who responded to the survey questions were informed about the purpose and the expected benefits of the survey, and the nature of the construction activities carried out in each area. In general, there is no arising opposition against the proposed project. However, the respondents and group discussions were mainly concerned about: (a) the traffic congestion during construction in the narrow aisles and the roads in the region, particularly where there are schools and the public markets; (b) the potential risk in terms of safety by speeding trucks and digging holes without roadblocks that are particularly dangerous for children and the elderly; (c) dust, exhaust fumes, noise, and dirt during the transport of excavated materials; (d) clogging of drains by construction waste, and (d) migrant workers flow and other unwanted behaviour such as gambling and disorder.

Table 9: Summary Matrix on Public Consultation

| Issues Raised | Project's Answers |
|--|---|
| a) Traffic congestion during construction; | The following measures will be undertaken: <ul style="list-style-type: none">– Schedule of construction adapted to traffic periods.– Traffic detours, and sufficient signage & warning lights at all construction locations. |
| b) Public safety due to fast moving trucks and pits without fences, danger to children and the elderly | <ul style="list-style-type: none">– Additional pedestrian crossings will be installed in dangerous locations.– Discussion with the community will be conducted to find on how to best co-exist with construction vehicles on their roads |
| c) Dust, smoke, noise, and soil on the streets in the transportation of pipeline excavating materials; | <ul style="list-style-type: none">– Regular watering and/or covered by tarpaulins;– All aggregate loads on trucks must be covered; |
| d) Waste from the construction and | <ul style="list-style-type: none">– Waste will be disposed in adapted and authorized location; |

| | |
|--|--|
| sewer blockages; | – Contractor will be responsible for any blockage of sewer; |
| e) Presence of outside workers and illegal behavior such as gambling and disorder conduct. | – Worker education and awareness seminars for behaviour with host communities; – Regular communication with local authorities |

132. Public meeting was held only for component 1 in Dien Thanh Trung commune on 20 August 2013. For component 2 due to the few numbers of affected persons through loss of assets (3), HH were met individually.

Figure 11: HH interview and Public Meetings



E. Consultation with Downstream Communities

133. The Government approval process for raw water intake will include public survey of downstream users. Results of the surveys will be documented and sent to ADB during detailed design.

F. Disclosure of Information

134. 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:

- **For component 1:** the eight communes in Dien Ban District: Dien Hoa, Northern Dien Thang, Southern Dien Thang, Central Dien Thang, Central Dien Nam, Northern Dien Nam, Southern Dien Nam and Dien Duong communes.
- **For component 2** Nui Thanh Town and neighbouring communes: Tam Hiep, Tam Nghia, Tam Giang, Quang Tam, Northern Tam Anh, Southern Tam Anh, Tam Xuan 1 and 2, Tam Hiep Industrial Zone, Tam Anh, Northern Chu Lai, non-tariff areas and Ky Ha port for the project component 1 and of the projects Component 2.

VII. GRIEVANCE REDRESS MECHANISM

135. 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.

136. 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. QNWDS.JSC will shoulder all administrative and legal fees that might be incurred in the resolution of such grievances and complaints.

137. 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.

138. 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.

139. 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.

140. 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.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional arrangements

141. The project will be carried out under the supervision of the PPC of Quang Nam province as the executing agency and QNWDS.JSC as project implementing agency. Project Management Unit (PMU) will be set up on behalf of QNWDS.JSC to oversee the implementation of capital investment in water-related projects. Project Management Unit's personnel will be provided from QNWDS.JSC and will be responsible for the daily activities of project implementation and quality supervision and control of EMP construction and implementation of the project.

142. The PMU will be responsible for completing environmental requirements of the project, especially the combination of mitigation and protection measures identified in this report for detailed engineering design of the pipeline, the WTPs and distribution networks, as well as the tender and construction contract record. The PMU will also be liable for testing samples of water and air quality, conduct investigations related to the environment that may arise during implementation (in collaboration with the Department of Environmental Protection), and resolve complaints relating to the environment or nuisance to residents or affected businesses by the project's works.

143. 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 CEMP² 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;

² Contractors Environmental Management Plan

- Include monthly contractor reports in quarterly status reports to QNWSD.JSC on status of EMP & environment safeguards, and public stakeholder issues during construction phase of subproject; and
- Prepare ToRs for the environment survey subcontracting company 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.

144. A group affiliated PMU will be designated to handle concerns about environment and public safety. The main tasks of the group are:

- Monitoring the implementation of the safeguards related to the handling of excavated soil, water quality protection, nuisance impacts to the community, UXO surveys, and public safety;
- Coordinate with the Environmental Protection Agency on regulatory compliance (for water quality in streams affected by drainage system for construction or erosion from excavated soil storage area, noise and vibration from construction sites, sanitation workers at camps, etc.);
- Checking the protection measures adequately addressed in the tender documents (instructions to bidders), and in the evaluation criteria for awarding the contract;
- Advise PMU Director of concerns related to the environment arising from project construction, and propose remedial measures;
- Disseminate the results of monitoring environmental quality and implement safeguard measures for stakeholders, particularly HHs, small businesses near the construction site;
- Monitoring the safeguards compliance in the construction phase - especially, the compliance with the safeguards set forth in the construction contract, as proposed in this report - will be combined in the tasks of construction supervision consultant hired by QNWSD.JSC and supervised by the PMU. The inspection and audit compliance will be gathered, documentation and the results as well as recommendations of remedy measure will be submitted to QNWSD.JSC. During the operational phase, QNWSD.JSC will be responsible for the protection and monitoring of discharge stream, and reports the results to the Province DoNRE.

145. A Detailed Design and Supervision Consultant³ (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).

146. An Environmental Monitoring Agency (EMA) 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.

147. Environmental Protection Agency under DoNRE will conduct extraordinary supervision and inspection environment before, during and after construction, as well as in

³ DDSC contract expected to include construction supervision.

emergencies. The Agency will also review the monitoring reports. If any abnormality is detected, the DoNRE may fine and issue notice of corrective requirements within specific period to responsibility unit. If there is a public official complaint through the CPC, the Environmental Protection Agency will conduct verification inspection, as described in the complaint resolution mechanism.

148. Within three months and no more than one year after completion of construction, an independent environmental agency with professional qualification will prepare an environmental monitoring report and audit on the completion of project components. This report will be reviewed and approved by the Province DoNRE and submitted to ADB.

149. The environmental monitoring, including monitoring of environmental benefits, will be included in the index of Project Performance Management System (PPMS) for this project. Being supported by a local environment expert, the PMU will be responsible for analysing and consolidating the data through their management information system. The PPMS will be designed with sufficient flexibility enough to implement remedial activities related to project design, implementation plans, activities, and development impacts. At the start of the project, the PMU and the consultants will develop comprehensive PPMS procedures to generate the input and output of the project components in a systematic form and unification of related environmental and socioeconomic indicators used to measure the impact of the project. The PMU will refine the PPMS framework, confirm the achieved objectives and strengthen the monitoring arrangement and recording, set up the systems and processes in less than 6 months after loan effectiveness.

Table 10: Summary of key Potential Impacts from IEE

| Construction Phase | |
|---------------------------|---|
| 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"> • Local residents could be cut off from the road due to the trench-building • Increased traffic of dump trucks carrying spoils to and from storage areas • Air pollution from excavation and transport equipment • Traffic hazard to pedestrians, especially school children and elderly |
| 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 |
| Operation Phase | |
| 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. |

B. Impacts and Mitigation/ Protection Measures supervised.

150. Table 11 below summarizes the negative environmental impacts during the project, mitigation measures, implementation plans, implementing agencies, monitoring agencies and implementation costs.

151. A special attention needs to be considered, as there are two (2) separate projects, they are more than 50 km apart, in the subproject. Therefore, the EMP need to be followed for both projects and separate reports should be mandatory.

Table 11: Environmental Mitigation Plan

| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|---|---|---|---|-------------------------------|--------------------------------------|-------------------------------|------------------------------|-------------------------|
| | | | | | | | Supervision | Implementation |
| Pre-construction Detailed Design Phase for both components | | | | | | | | |
| Confirmation of required resettlement and temporary relocations | No community impacts | 1. Affected persons well informed well ahead of project implementation. | At intake at Bau Sau River and Phu Ninh N2 channel, at WTP, at treated water pipeline, at PS & along distribution network | Before subproject implemented | See resettlement plan | See resettlement plan | QNWSD.JSC / PMU ⁴ | 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 ⁵ | QNWSD.JSC | 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 ⁶ | PMU |
| Detailed designs | Minimize negative environmental impacts | 4. Complete detailed designs of Component 1: 1) raw water intake, PS and pipeline from Phu Ninh to existing Tam Hiep WTP; 2) extension of existing Tam Hiep WTP; and 3) treated distribution network including BPS that incorporate the following: a) updated review of raw water sources at Phu Ninh reservoir 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 | 4. (a-e), Entire subproject area: 1) raw water intake, PS and pipeline route; 2) extension of existing Tam Hiep WTP; 3) BPS and pipeline corridor 4) and Treated water distribution network | Before construction initiated | Once with detailed designs documents | No marginal cost | QNWSD.JSC / DDSC | PMU |

⁴ Project Management Unit under QNWSD.JSC; identified as Project Management Board (PMB) in IEE

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

⁶ Detailed Design & Supervision Consultant

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|------------------|---|---|--|---|--|----------------------|------------------|----------------|
| | | | | | | | Supervision | Implementation |
| | | <p>e) Conduct survey with downstream users once approval of the raw water intake.</p> <p>5. Complete detailed designs of: 1) raw water intake and pipeline from Bau Sau river to Dien Nam - Dien Ngoc IZ WTP; 2) new Dien Nam - Dien Ngoc IZ WTP; and 3) treated distribution network that incorporate the following:</p> <p>a) updated review of raw water sources at Bau Sau 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;</p> <p>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;</p> <p>c) minimal acquisition of agricultural land</p> <p>d) no or minimal disruption to water supply, utilities, and electricity with contingency plans for unavoidable disruptions; and</p> <p>e) Conduct survey with downstream users once approval of the raw water intake.</p> | 5. (a-e), Entire subproject area Component 2: 1) raw water intake and pipeline route; 2) Dien Nam - Dien Ngoc IZ WTP; 3) and Treated water distribution network | | | | | |
| EMP | Minimize negative environmental impacts | <p>6. Include all mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs.</p> <p>7. Identify all potential impacts of project and include in EMP.</p> <p>8. Submit EMP with all potential impacts to ADB to review.</p> <p>9. For the 2 components of subproject develop individual environmental management sub-plans for: a) Securing GoV approvals; b) UXO survey & removal; c) Forest clearing, tree/ vegetation removal, & site restoration; d) Civil works; e) Cultural chance finds; f) Contaminated spoil identification & disposal; g) Construction materials acquisition, transport, & storage including borrow pit management; h) Erosion & river sedimentation control; i) Construction site drainage; j) Noise, dust & NOx, SOx, CO, CO₂ emissions; k) Worker camp operation; l) Solid and liquid waste disposal; m) Hazardous chemical & waste management; n) Construction & urban traffic; o) Utility and Power Disruption; p) Worker and public Safety; q) Raw water quantity & quality sustainability; r) Training & capacity development plan; s) WTP chemicals & sludge management; and t) Treated water quality</p> | Entire subproject | In parallel with completion of detailed designs | Once, as part of detailed design phase | No marginal cost | QNWSD.JSC / DDSC | PMU |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|--|--|---|----------------------------|-----------------------------------|-----------------------------|---------------------------|------------------|----------------------------|
| | | | | | | | Supervision | Implementation |
| | | management. | | | | | | |
| Develop bid documents | No negative environmental impact | 10. Ensure the EMP is included in contractor tender documents to enable contractors to develop their CEMP ⁷ , and that tender documents specify that implementation of CEMP must be included in cost estimates. 11. 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. 12. 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 | QNWSD.JSC / DDSC | PMU / DDSC |
| UXO survey | Injured worker or public | 13. 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 | 14. Develop and schedule training plan for QNWSD.JSC / PMU staff to be able to fully implement EMP, and manage implementation of mitigation measures by contractors. 15. 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 / QNWSD.JSC |
| Procurement of Contractor(s) | No negative environmental impact | 16. Ensure winning contractor bid(s) include a CEMP that addresses items 9 – 12 of the EMP ⁷ section above. | All project areas | Before contracts signed | Once | No marginal cost | QNWSD.JSC / DDSC | QNWSD.JSC / DDSC |
| Recruitment of workers | Community mischief, & sexually transmitted disease | 17. 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 | QNWSD.JSC / DDSC | Contractor's bid documents |
| Construction Phase – General Mitigations for all Components of Subproject | | | | | | | | |
| Initiate EMP & sub-plans, | Prevent or minimize impacts | 18. 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 | For all construction sites | Beginning of construction | Once | No marginal cost | QNWSD.JSC / DDSC | PMU & contractors |

⁷ Contractors Environmental Management Plan

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|---|--|---|---------------------------------|-------------------------------|------------------|----------------------|------------------|-------------------|
| | | | | | | | Supervision | Implementation |
| | | below. | | | | | | |
| Obtain & activate construction permits and licenses | Prevent or minimize impacts | 19. 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 | QNWSD.JSC / DDSC | PMU & contractors |
| Worker camp operation | Pollution and social problems | 20. Locate worker camps away from human settlements. 21. Ensure adequate housing and waste disposal facilities including pit latrines, garbage cans and recycling bins if services are available. 22. Exceeding prepared food should be offered to local charity (shelters/orphanage/food bank, temple). 23. A solid waste collection program must be established and implemented that maintains a clean worker camps 24. Locate separate pit latrines for male and female workers away from worker living and eating areas. 25. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 26. Worker camps must have adequate drainage. 27. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 28. Transient workers should not be allowed to interact with the local community. HIV Aids education should be given to workers. 29. Preservatives should be provided if such practice does not interfere with local belief or customs. 30. Camp areas must be restored to original condition after construction completed. | All worker camps | Throughout construction phase | Monthly | No marginal cost | DDSC & PMU | contractor |
| Training & capacity | Prevention of impacts through education | 31. Implement training and awareness plan for QNWSD.JSC / 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 | Damage or loss of trees, vegetation, and | 32. Restrict tree and vegetation removal to within designated RoWs. 33. Within RoWs minimize removals, and install protective | All construction sites. | Beginning and end of project | Monthly | No marginal cost | DDSC / PMU | contractor |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|---------------------------|--|---|------------------------|-------------------------------|-----------|----------------------|----------------|----------------|
| | | | | | | | Supervision | Implementation |
| site restoration sub-plan | erosion of landscape | physical barriers around trees that do not need to be removed. 34. All RoWs to be re-vegetated and landscaped after construction completed. Consult forestry department to determine the most successful restoration strategy and techniques. 35. Recuperate tree logs and make them available for local use. | | | | | | |
| Civil works | Degradation of terrestrial resources | 36. All construction sites should be located away forested, plantation, & agricultural areas as much as possible. 37. No unnecessary cutting of trees. 38. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas. 39. No waste of any kind is to be discarded on land or in forests/plantations. | All construction sites | Throughout construction phase | Monthly | No marginal cost | DDSC & PMU | contractor |
| Civil works | Degradation of water quality & aquatic resources | 40. Minimize earthworks & final area of foundation for intake in Bau Sau River and Phu ninh N2 canal. 41. Excavation spoils and reprofiling activities of the actual reservoir should be done so the excess water does no 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 Bau Sau river or river channel from Phu Ninh reservoir or from nearby lakes. | All construction sites | Throughout construction phase | Monthly | No marginal cost | DDSC & PMU | contractor |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|---|--|--|-----------------------------|--|-----------|----------------------|----------------|----------------|
| | | | | | | | Supervision | Implementation |
| | | 51. All existing irrigation ditches, canals and channels to be protected the same way as rivers and lakes. | | | | | | |
| 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 |
| 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. ⁸ | For all construction areas. | Throughout construction phase | Monthly | No marginal cost | DDSC / PMU | Contractor(s) |

⁸ 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

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|--------------------------------------|---|---|------------------------|-------------------------------|-----------|---|-------------------|--------------------------------|
| | | | | | | | Supervision | Implementation |
| | | <p>64. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting.</p> <p>65. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites.</p> <p>66. Define and schedule how fabricated materials such as steel, wood structures and scaffolding will be transported and handled.</p> <p>67. All aggregate loads on trucks must be covered.</p> <p>68. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non-traffic areas.</p> | | | | | | |
| Excavation spoil management sub-plan | Contamination of land and surface waters from excavated spoil | <p>69. Uncontaminated spoil to be disposed of in DoNRE-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> | All excavation areas | Throughout construction phase | Monthly | <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 | Flooding from | <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</p> | All areas with surface | Design & | | | | |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|--|--|---|---|-------------------------------|-----------|----------------------|--------------------|----------------|
| | | | | | | | Supervision | Implementation |
| Drainage sub-plan | loss of drainage & flood storage | <p>courses.</p> <p>78. Install temporary storm drains or ditches for construction sites.</p> <p>79. Ensure existing road & street drains do not become plugged with construction waste⁹.</p> <p>80. Protect surface waters from silt and eroded soil.</p> | waters | construction phases | Monthly | No marginal cost | DDSC & PMU | contractor |
| Solid and liquid construction waste sub-plan | Contamination of land and surface waters from construction waste | <p>81. Management of general solid and liquid residual matter of construction will follow GoV regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.</p> <p>82. Areas of disposal of solid and liquid residual matter to be determined by DoNRE.</p> <p>83. Disposed of residual matter should be catalogued for type, estimated weigh, and source.</p> <p>84. Construction sites should have large garbage bins.</p> <p>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.</p> <p>86. Solid residual matters should be separated and recyclables sold to buyers in community.</p> <p><u>Hazardous Waste</u></p> <p>87. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoV regulations.</p> <p>88. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents)</p> <p>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.</p> <p>90. All spills must be cleaned up completely with all contaminated soil removed and handled with by</p> | All construction sites and worker camps | Throughout construction phase | Monthly | No marginal cost | DDSC, PMU, & DoNRE | contractor |

⁹ 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.

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|---------------------------------------|---|---|-------------------------|-------------------------------|-----------|----------------------|-----------------------------|----------------|
| | | | | | | | Supervision | Implementation |
| | | contaminated spoil sub-plan. 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. | | | | | | |
| Noise and dust sub-plan | Dust Noise | 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. 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. | All construction sites. | Fulltime | Monthly | No marginal cost | DDSC & PMU | contractor |
| 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. | All construction sites | Throughout construction phase | Monthly | No marginal cost | DDSC & PMU | contractor |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|-----------------------------------|--------------------------------------|--|-------------------------|----------|-----------|----------------------|----------------|----------------|
| | | | | | | | Supervision | Implementation |
| | | 108. Re-vegetate all soil exposure areas ASAP. | | | | | | |
| Worker and public safety sub-plan | Public and worker injury, and health | 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. 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 |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|--|---|--|--|--------------------------|-----------------------|----------------------|------------------|-----------------------------|
| | | | | | | | Supervision | Implementation |
| 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 |
| Post-construction Operation of both Water Supply System | | | | | | | | |
| Treated water supply | Unsustainable quantity or quality of treated water | 128. 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 (m ³ /day) always meets WTP design specifications. Incorporate contingency and back-up plans for planned and unplanned system shutdowns. 129. 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). 130. 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 both WTP outlet and at select locations along their respective distribution network | Quarterly, and as needed | As needed | No marginal cost | QNWSD.JSC / DDSC | QNWSD.JSC TREC / DoH |
| Operation of raw & treated water pipelines | Local flooding from ruptures | 131. As part of implementation of O&M manual for entire WS system instate a regular inspection program of all pipeline networks starting at intakes in both locations 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 | QNWSD.JSC / DDSC | QNWSD.JSC |

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| Project Activity | Potential Impact | Proposed Mitigation Measure | Location | Timing | Reporting | Estimated Cost (USD) | Responsibility | |
|--------------------------------|---|--|---|--------------|-----------|----------------------|-------------------|----------------|
| | | | | | | | Supervision | Implementation |
| Operation of WTPs | Chemical spills, and pollution from solid and domestic waste | 132. 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 WTPs property, including spills action plan. 133. With O&M manual define and implement a formal solid and domestic waste collection and disposal protocol for all of each WTP activities. | At Tam Hiep and Dien Nam-Dien Ngoc WTPs | Continuously | As needed | No marginal cost | QNWSD.JSC | QNWSD.JSC |
| Production of WTPs sludge | Contamination of environment | 134. Review and clarify with DN DoNRE the appropriate landfill location to dispose of the planned dried sludge produced at the WTPs. 135. 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. 136. Ensure sludge is covered when transported to designated landfill. 137. Never dump or temporarily store sludge on lands outside landfill site, WTP property, or near water courses. 138. Develop and implement regular sludge quality monitoring to document sludge quality | At Tam Hiep and Dien Nam-Dien Ngoc WTPs | Continuously | As needed | No marginal cost | QNWSD.JSC / DoNRE | QNWSD.JSC |
| Production of treated water | Wastewater production too much for city wastewater management | 139. Review and clarify wastewater loads generated from treated water from Tam Hiep and Dien Nam-Dien Ngoc WTPs to assure that they can be handled by current and planned future capacity wastewater collection and treatment systems for both areas. | At Tam Hiep and Dien Nam-Dien Ngoc WTPs | Periodically | As needed | No marginal cost | QNWSD.JSC / DoNRE | QNWSD.JSC |
| Operation of entire WS system, | Worker and public injury | 140. Educate workers in workplace safety of WS system operation according to MoLISA regulations. Prevent public access to SP and WTP properties, both intake area, and all pipeline areas with fencing and appropriate signage. 141. Enforce WTP truck drivers to follow speed limits on roads and highways. Provide adequate signage informing public of WTPs truck traffic routes, and pipelines service routes. 142. Ensure all WS system vehicles in good working order. | WTP and all pipeline property WTPs area & roads to landfill site All facilities | Continuously | As needed | No marginal cost | QNWSD.JSC | QNWSD.JSC |

C. Environmental Monitoring Program

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

- Waste Monitoring: monitoring requirements for flow / total volume and typical pollution parameters under current standards and regulations of Vietnam with a frequency of at least once in 3 months, supervisory positions have to be explicitly shown in a diagram with annotation and coordinates system according to current standards;
- Monitoring the surrounding environment: only typical pollutants arising from the project construction is required to be monitored in accordance with existing standards and regulations of Vietnam with a frequency of at least once in 6 months, the supervisory positions will be expressed explicitly in a diagram with annotation and coordinates under current regulations; and
- Other supervision: only impacts supervisions are requested as erosion impact, landslide slip, subsidence, sediment, changes of surface water level, groundwater, salinization, and alkaline intrusiveness and impact on the socio-economic objects (if any) with a reasonable frequency to track the changes in time and space of these effects, the monitoring points will be clearly shown in a diagram with notes and the coordinates under the current regulations.

153. Environmental monitoring program will be implemented by the project owner or consultants hired by the project owner during the construction phase. On the other hand, during the operation, environmental monitoring program will be implemented by the project owner and the local authorities such as the DoNRE and Department of Health.

154. Table 11 below summarizes the environmental monitoring program prepared for the Project of Dien Nam - Dien Ngoc and Tam Hiep urban water supply systems - Quang Nam province.

Compliance Monitoring & Reporting

155. Regular reporting on the implementation of mitigation measures and on monitoring activities during construction phase of the project is required as indicated in Table 12.

156. 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.

157. 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).

158. A template for monitoring process is presented in Annex 4.

Table 12: Environmental Monitoring Plan Component 1

| Environmental Indicators | Location | Means of Monitoring | Frequency | Reporting | Responsibility | | Estimated ¹⁰ 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 intake at Phu Ninh N2 channel, PS, WTP, reservoir and pipeline construction and operation. Include aquatic resources of affected reaches of N2 channel as well. | All sites. | Review of existing data and information supplemented by original surveys as required. | Once | Once | DDSC & QNWSD.JSC & MB of BN-NR | EMA | 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 Phu Ninh N2 channel during PPTA & reported in IEE. Water quality data collected Phu Ninh N2 channel 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 | EMA | tbd. |
| Presence of UXO | Potentially located throughout project area | Military to survey and sweep affected areas of UXO | Once | Once | QNWSD.JSC | military | tbd |
| Construction of expansion of Tam Hiep WTP, 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 & fecal coliform, pH, DO, COD, BOD ₅ , temperature, NH ₃ , and other nutrient forms of N & P. | A – B): At water quality sites #1 - #4 sampled during PPTA and reported in IEE (Phu Ninh N2 channel) | 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 . | (A – B): Quarterly during construction periods | Quarterly | DDSC / PMU | EMA | A) & B) \$629 per sampling under ADB loan |
| C) Public comments and complaints D) Incidence of worker or public accident or injury | C): Using hotline number placed at construction areas D): At all construction | C) Information transferred by telephone hotline number D) regular reporting by contractors/PMU | C) Continuous public input D) Continuous | | PPC / QNWSD.JSC | PMU / contractor | C) & D) With (no marginal cost) |

¹⁰ Estimated costs to be updated at detailed design stage

Document : Initial Environmental Examination Report

MFF0054-VIE: PFR3 – Quang Nam Water Supply Subproject – Dien Nam – Dien Ngoc and Tam Hiep, Quang Nam province

| Environmental Indicators | Location areas | Means of Monitoring | Frequency | Reporting | Responsibility | | Estimated ¹⁰ 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 | QNWSD.JSC | EMA | To471\$ per survey under loan |
| Operation of WTPs & Pipeline Network | | | | | | | |
| 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 | | EMA | 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 | | QNWSD.JSC | No marginal cost |
| Treated water quality: total & faecal coliform, pH, DO, NH ₃ , NO ₃ , NO, chlorine, PAC, NaCl, and heavy metals (As, Cd, Pb,). | 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 Quang Nam (EPA) | Under EPA regular budget |
| WTP sludge quality: ToC, heavy metals (As, Cd, Pb,), 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 | | QNWSD.JSC | No marginal cost |
| Public complaints of operation of WTPs, drinking water availability & quality, and malfunctions with pipelines (e.g., leaks). | At all sites | Regular record keeping | Continuously | Biannually | | QNWSD.JSC | No marginal cost |

Table 13: Environmental Monitoring Plan Component 2

| Environmental Indicators | Location | Means of Monitoring | Frequency | Reporting | Responsibility | | Estimated ¹¹ 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 intake, PS, WTP, reservoir and pipeline construction and operation. Include aquatic resources of affected reaches of Bau Sau river. | All sites. | Review of existing data and information supplemented by original surveys as required. | Once | Once | DDSC & QNWSD.JSC & MB of BN-NR | EMA | 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 Bau Sau river during PPTA & reported in IEE. Water quality data collected in Bau Sau 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 | EMA | tbd. |
| Presence of UXO | Potentially located throughout project area | Military to survey and sweep affected areas of UXO | Once | Once | QNWSD.JSC | military | tbd |
| Construction of Dien Nam-Dien Ngoc WTP and 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 & fecal coliform, pH, DO, COD, BOD ₅ , temperature, NH ₃ , and other nutrient forms of N & P. C) Public comments and complaints D) Incidence of worker or public accident or injury | A – B): At water quality sites #1 - #4 sampled during PPTA and reported in IEE (Bau Sau 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 PPC / QNWSD.JSC | EMA PMU / contractor | A) & B) \$629 per sampling under ADB loan C) & D) With (no marginal cost) |

¹¹ Estimated costs to be updated at detailed design stage

Document : Initial Environmental Examination Report

MFF0054-VIE: PFR3 – Quang Nam Water Supply Subproject – Dien Nam – Dien Ngoc and Tam Hiep, Quang Nam province

| Environmental Indicators | Location | Means of Monitoring | Frequency | Reporting | Responsibility | | Estimated ¹¹ 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 | QNWSD.JSC | EMA | To471\$ per survey under loan |
| Operation of WTPs & Pipeline Network | | | | | | | |
| 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 | EMA | | 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 | QNWSD.JSC | | No marginal cost |
| Treated water quality: total & faecal coliform, pH, DO, NH ₃ , NO ₃ , NO, chlorine, PAC, NaCl, and heavy metals (As, Cd, Pb,). | 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 Quang Nam (EPA) | | Under EPA regular budget |
| WTP sludge quality: ToC, heavy metals (As, Cd, Pb,), 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 | QNWSD.JSC | | No marginal cost |
| Public complaints of operation of WTPs, drinking water availability & quality, and malfunctions with pipelines (e.g., leaks). | At all sites | Regular record keeping | Continuously | Biannually | QNWSD.JSC | | No marginal cost |

D. Budget

159. 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 Quang Nam 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

160. Monitoring budget is summarized below. It included: (a) the perception survey and subsequent consultation with local people. Being authorized by Project Management Board, the unit has conducted location / basic environment surveys and has facilitated community consultation for IEE; (b) monitoring the quality of surface water, groundwater and air during construction; (c) pipe line trench survey to check that no unexploded bombs could endanger construction workers; (d) local environmental experts support non-continuously for PMB (in preparing the terms of reference for the survey, assessment results, air and water quality sample testing, drafting safeguard clauses included in the bidding documents and construction contracts, preparation of reports for the Quang Nam PPC and the DoNRE); and (e) the cost of orientation and training for PMU staff and community leaders on managing the environmental impacts of the pipeline construction and the associated protective measures (be facilitated by environmental experts).

161. During operation of the new WTP, water quality monitoring of the drinking fountains at various locations in the service areas will be carried out regularly by the Environmental Protection Agency under DoNRE in accordance with the Vietnam regulation (with reference to the standards of drinking water quality under TCXDVN 33:2008/BXD) and using the budget of implementation agency.

Table 14: The budget for the EMP and monitors

| Items or activities | Frequency | Budget (VND) | Budget Source |
|--|--|--|---------------|
| Construction safeguards measures | During the construction process, including the trial run the WTP | To be included in the performance contract | Contractor |
| Quality control sampling of surface and ground water and ambient air along the pipeline corridor | 3 times/year during the 3 year construction period | 120.000.000 | Contractor |
| The consultation and subsequent awareness survey with local people | 3 times/year during the 3 year construction period | 90.000.000 | Loan |
| Local environment expert | Non-continuous input: 10 working months for 3 years | 80.000.000 | Loan |
| Training and orientation for the PMU leaders and community leaders | 1 time, prior to construction | 40.000.000 | Loan |
| Environmental Audit | 1 time, after project complementation | 40.000.000 | Loan |
| Contingency (in the case of construction delays) | | 40.000.000 | Loan |
| Total | | 410.000.000 | |

IX. COMMITMENT OF PROJECT OWNER

162. 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 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.

163. Commitment to achieving 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.

164. Commitment to undertaking 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.

X. CONCLUSIONS AND RECOMMENDATIONS

165. The proposed project will generate significant benefits for the people in the project area by allowing HHs currently not served to use safe tap water instead of well water (to be boiled or filtered) in particular.

166. The potential adverse impacts of the project on the environment are mainly resulted from the construction activities, particularly declining air quality the area near the pipeline corridor, and nuisance and safety risks for HHs and small businesses nearby. However, these effects are temporary and can be mitigated.

167. Project construction will not significantly affect the flora, fauna, such as pipeline and WTPs will be constructed in current urban/ resettlement, and agriculture areas. No historic or cultural relics will be affected by the construction of pipelines and WTPs.

168. Potential adverse impact of the sludge generated during operation of the project has been avoided by the combination of sludge dewatering in the design of the WTP.

169. During detailed design, an update of the EMP will be conducted.

170. 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: Public Consultation

Conduct meetings with Commune's People Committee with the participation of local organizations, unions and all households in the project area. Main content of the meetings is to inform the basic information of the project, the expected impact on environment, elimination solution applied during the implementation of the project.



Above are some photos of the public consultation.

| <p align="center">DANH SÁCH NGƯỜI THAM GIA HỌP Tại UBND xã Điện Thắng Trung, ngày 20/8/2013</p> | | | | | |
|--|------------------------|-----------------------|----------|---------|--------------|
| TT | HỌ VÀ TÊN | ĐƠN VỊ | CHỨC VỤ | SỐ TIỀN | CHỮ KÝ |
| 1 | Lê Văn Lân | Thị trấn Điện Thắng 2 | | 50.000 | Đoàn Văn Sơn |
| 2 | Thị trấn Điện | at | | 50.000 | Bê |
| 3 | Lê Văn Thanh | at | | 50.000 | Thị trấn |
| 4 | Phạm Thị Túy | at | | 50.000 | Thị trấn |
| 5 | Lý Văn Kiệt | at | | 50.000 | Nhà |
| 6 | Lê Văn Lân | at | | 50.000 | Thị trấn |
| 7 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 8 | Phạm Thị Chát | at | | 50.000 | Thị trấn |
| 9 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 10 | Thị trấn Điện | at | | 50.000 | Thị trấn |
| 11 | Đoàn Thị Lý | at | | 50.000 | Thị trấn |
| 12 | Thị trấn Điện | at | | 50.000 | Thị trấn |
| 13 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 14 | Lê Văn Sơn | at | | 50.000 | Thị trấn |
| 15 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 16 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 17 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 18 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 19 | Lê Văn Kiệt (Thị trấn) | at | Thị trấn | 50.000 | Thị trấn |
| 20 | Thị trấn Điện | at | | 50.000 | Thị trấn |
| 21 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 22 | Đoàn Thị Nga | at | | 50.000 | Thị trấn |
| 23 | Đoàn Thị Lý | at | | 50.000 | Thị trấn |
| 24 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 25 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 26 | Lý Văn Kiệt | at | | 50.000 | Thị trấn |
| 27 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |
| 28 | Lê Văn Kiệt | at | | 50.000 | Thị trấn |

Annex 2: Water quality results Bau Sau river result

C. TY CP CẤP THOÁT NƯỚC QUẢNG NAM CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
PHÒNG NƯỚC & MÔI TRƯỜNG
 SO PKN - N&MT
 Độc lập - Tự do - Hạnh phúc
 Quang Nam, ngày 02 tháng 06 năm 2014
PHIẾU KẾT QUẢ KIỂM NGHIỆM

Tên khách hàng: Xi nghiệp Cấp thoát nước Điện Bàn

Tên mẫu: Mẫu nước thô - Sông Bàu Sáu, xã Điện Hòa, huyện Điện Bàn, Quảng Nam

Mô tả mẫu: Mẫu đựng trong chai nhựa 1.5 lít và chai thủy tinh 0.5 lít

Ngày lấy mẫu: 28/05/2014/2014

Ngày tiến hành xét nghiệm: 29/05/2014

KẾT QUẢ KIỂM NGHIỆM

| TT | CHỈ TIÊU KIỂM TRA | ĐƠN VỊ | KẾT QUẢ | PHƯƠNG PHÁP |
|---|-------------------------------------|-----------------|---------------------|--------------------|
| I. CHỈ TIÊU CẢM QUAN VÀ THÀNH PHẦN VÔ CƠ | | | | |
| 1 | Màu sắc | TCU | 19 | (1) |
| 2 | Mùi, vị | - | Không | Cảm quan |
| 3 | Độ đục | NTU | 23 | (2) |
| 4 | pH | - | 6.9 | (3) |
| 5 | Hàm lượng clorua | mg/l | 6.8 | TCVN 6194-1996 |
| 6 | Độ cứng tính theo CaCO ₃ | mg/l | 18 | TCVN 6224-1996 |
| 7 | Hàm lượng Sắt tổng số | mg/l | 0.39 | (1) |
| 8 | Hàm lượng mangan tổng số | mg/l | 0.076 | (1) |
| 9 | Hàm lượng Nitrat | mg/l | 0.71 | (1) |
| 10 | Hàm lượng Nitrit | mg/l | 0.01 | (1) |
| 11 | Hàm lượng sunphat | mg/l | 4.52 | (1) |
| 12 | Chỉ số Pecmanganat (COD) | mg/l | 0.96 | TCVN 6186-1996 |
| II. VI SINH VẬT | | | | |
| 13 | Coliform tổng số | Vi khuẩn /100ml | 1.2x10 ² | TCVN 6187-1,2-1996 |
| 14 | Ecoli hoặc Coliform chịu nhiệt | Vi khuẩn /100ml | 0 | TCVN 6187-1,2-1996 |

(*) Áp dụng đối với vùng ven biển và vùng hải đảo

(1) Máy DR 3900

(2) Máy đo DR 890

(3) Máy đo pH

(4) Máy đo Clo dư

(5) Máy đo sensION EC5

- Kết quả này chỉ có giá trị đối với mẫu hàng kiểm tra, không có giá trị thay thế với những

Người phân tích

Trần Văn Cường

PHÒNG NƯỚC & MÔI TRƯỜNG

Trưởng phòng

Nhà Thảo

**Q.NAM WATER DRAINING SUPPLYING JSC
WATER AND ENVIRONMENT DIVISION**

**SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom – Happiness**

No: 12/PKN-QLCTN

Quang Nam, June 02nd 2014

NOTE OF EXPERIMENT CONTROL'S RESULT

Client's name: DIEN BAN WATER SUPPLY AND DRAINAGE ENTERPRISE

Sample's name: Raw water – Bau Sau River – Dien Hoa – Dien Ban – Quang Nam

Description: the sample is contained in a plastic bottle 1,5 liter and glass bottle 0,5 liter.

Date of receipt: 28/5/2014

Date of taking the experiment: 29/5/2014

Condition: sunny

EXPERIMENT CONTROL'S RESULT

| No | Criteria | Đơn vị | Result | Methods |
|---|--|----------------|--------------------------|----------------------|
| I. Sensing criteria and inorganic compound | | | | |
| 01 | Color | TCU | 19 | (1) |
| 02 | Smell, taste | - | No | Sensing |
| 03 | Opacity | NTU | 23 | (2) |
| 04 | pH | - | 6,9 | (3) |
| 05 | Chloride content | mg/l | 6,8 | TCVN 6124-1996 |
| 06 | Full hardness based on CaCO ₃ | mg/l | 18 | TCVN 6294-1996 |
| 07 | Total iron content | mg/l | 0,39 | (1) |
| 08 | Mangan content | mg/l | 0,076 | (1) |
| 09 | Nitrate content | mg/l | 0,71 | (1) |
| 10 | Nitrite content | mg/l | 0,01 | (1) |
| 11 | Sulphate content | mg/l | 4,52 | (1) |
| 12 | Pec-manganate indicator | mg/l | 0,96 | TCVN 6186-1996 |
| II. Microbiology | | | | |
| 13 | Total Coliform | Bacteria/100ml | 12x10² | TCVN 6187-1,2 - 1996 |
| 14 | Refractory E. Coli or coliform | Bacteria/100ml | 0 | TCVN 6187-1,2 - 1996 |

Notes: (*): applied for coastal areas and island;

(1): DR 3900 machine;

(2): DR 890 machine;

(3): pH analyzer

(4): Chlorine residual Meter;

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- This result is only valid for the tested sample and invalid for other water samples.

Analyzer

Vice Chief of the
Water and Environemt Division

Tran Van Cuc

Mai Thao

Phu Ninh Channel 2:

Trang: 1/2

SỞ Y TẾ QUẢNG NAM
TRUNG TÂM Y TẾ DỰ PHÒNG
129 Trưng Nữ Vương – TP Tam Kỳ

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

PHIẾU KẾT QUẢ KIỂM NGHIỆM

Số: 469/ NMN/13

Kết quả này không được sao chép từng phần, ngoại trừ toàn bộ, nếu không được sự đồng ý bằng văn bản của giám đốc

Tên khách hàng: CÔNG TY CẤP THOÁT NƯỚC QUẢNG NAM.

Địa chỉ: 86 – 88 Phan Bội Châu, Tam Kỳ, Quảng Nam.

Tên mẫu: Nước thô

Nơi lấy mẫu: Hồ chứa nước Phú Ninh - Xã Tam Xuân 1 - huyện Núi Thành

Số lượng: 3,0 lít

Mục đích xét nghiệm: Xét nghiệm theo yêu cầu khách hàng.

Mô tả mẫu: Mẫu đựng trong chai nhựa, đậy kín miệng. Mẫu do khách hàng tự mang đến.

Ngày nhận mẫu: 18/ 11/ 2013

Ngày tiến hành xét nghiệm: 18/ 11/ 2013

Thời gian lưu mẫu: 05 ngày kể từ ngày ban hành kết quả.

HẾT THỜI HẠN LƯU MẪU TRUNG TÂM Y TẾ DỰ PHÒNG QUẢNG NAM KHÔNG CHỊU TRÁCH NHIỆM VỀ VIỆC
KHIẾU NẠI KẾT QUẢ KIỂM NGHIỆM CỦA KHÁCH HÀNG

KẾT QUẢ KIỂM NGHIỆM

| TT | CHỈ TIÊU KIỂM NGHIỆM | KẾT QUẢ | PHƯƠNG PHÁP |
|----------------|-------------------------|---------------------------|--------------------|
| HÓA LÝ: | | | |
| 01 | Màu sắc, TCU | 9 | TCVN 6185-1996 |
| 02 | Mùi, vị | Không có mùi vị lạ | Cảm quan |
| 03 | pH | 6,91 | TCVN 6492:1999 (*) |
| 04 | Độ cứng toàn phần, mg/l | 14 | TCVN 6224- 1996(*) |
| 05 | Hàm lượng Clorua, mg/l | 7,1 | TCVN 6194-1996(*) |

| | | | |
|----|-----------------------------|------|-------------------|
| 06 | Chỉ số Pecmanganat, mg/l | 0,64 | TCVN 6186-1996(*) |
| 07 | Hàm lượng sắt tổng số, mg/l | 0,07 | TCVN 6177-1996(*) |
| 08 | Hàm lượng Amoni, mg/l | 0,18 | (1) |
| 09 | Hàm lượng Florua, mg/l | 0,65 | SMEWW 4500 - F |
| 10 | Độ đục, NTU | 1,21 | (2) |

(*) Phép thử đã được viện Pasteur Nha Trang cấp giấy chứng nhận đạt chuẩn.

(1): Thường qui Kỹ thuật Y học Lao Động & Vệ sinh Môi trường - Hà Nội 1994

(2): Máy phân tích nước U – 10

Ghi chú: - Kết quả này chỉ có giá trị trên mẫu xét nghiệm.

Quang Nam, ngày 21 tháng 11 năm 2013

Người phân tích

Dinh Văn Đồng

Trưởng khoa xét nghiệm

Lê Thị Hồng Cẩm

Giám đốc



**Q.NAM DEPARTMENT OF HEALTH
PREVENTIVE MEDICAL CENTER**

129 Trung Nu Vương – Tam Ky city

SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom - Happiness

NOTE OF EXPERIMENT CONTROL'S RESULT

No: 469/NMN/13

It is not allowed to copy this result partially, except for all, without the agreement in writing of the Director.

Customer's name: QUANG NAM WATER SUPPLY AND DRAINAGE JOINT STOCK COMPANY

Address: No. 86-88 Phan Boi Chau street – Tam Ky city – Quang Nam province

Sample's name: Raw Water

Place to take the sample: Phu Ninh Lake, Tam Xuan 1 commune, Nui Thanh, Quang Nam.

Quantity: 3,0 liters

Testing purpose: Pursuant to client's requirements

Description: the sample is contained in a plastic bottle with the lid sealed.

Date of receipt: 18/11/2013

Date of taking the experiment: 18/11/2013

Time of keeping the sample: 05 days from the date of issuing the result.

AFTER THE TIME OF KEEPING THE SAMPLE,
THE PREVENTIVE MEDICAL CENTER WILL NOT BE RESPONSIBLE
FOR ANY CLAIMS ABOUT THE RESULT OF EXPERIMENT CONTROL
OF TH CUSTOMER

**EXPERIMENT CONTROL'S RESULT
(QCVN 01:2009/BYT)**

| No | Criteria | Result | Methods |
|---------------------------|--------------------------|-----------------------------------|--------------------|
| PHYSICAL CHEMISTRY | | | |
| 01 | Color, TCU | 9 | TCVN 6185-1996 |
| 02 | Smell, taste | No strange smell and taste | Sensing |
| 03 | pH | 6,91 | TCVN 6492-1999 (*) |
| 04 | Full hardness, mg/l | 14 | TCVN 6224-1996 (*) |
| 05 | Chloride content, mg/l | 7,1 | TCVN 6194-1996 (*) |
| 06 | Pec-manganate indicator | 0,64 | TCVN 6186-1996 (*) |
| 07 | Total iron content, mg/l | 0,07 | TCVN 6177-1996 (*) |
| 08 | Ammonium content, mg/l | 0,18 | (1) |
| 09 | Fluoride content, mg/l | 0,65 | SMEWW 4500 - F |
| 10 | Opacity, NTU | 1,21 | (2) |

Notes: (*): Testing method certificated by the Nha Trang Pasteur Institute

(1): water analyzer U-10

(2): Water analyzer U-10

COMMENTS:

- This result is only valid for the tested sample and invalid for other water samples.

Analyzer

Chief of the
Testing department

Vice Director

Dinh Van Dong

Le Thi Hong Cam

Tran Van Hoan

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

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

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"> Job openings of the project should give priority to local communities. Recruitment of local laborers should be stipulated in the contract for construction | <ul style="list-style-type: none"> Field inspections and interviews with communities - DONE Note each complaint case in the field – 3 COMPLAINTS RECEIVED Set up grievance centre and report as part of monitoring action plan – NOT DONE | | |
| | | | |
| | | | |

b. Issues for Further Action

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

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 ¹² |
|--|-------------------------------------|---|---|
| Establishment of personnel in PMU/PIU | | | |
| Public consultation and socialization process | | Provide information on: <ul style="list-style-type: none"> • Public consultation, participation activities carried out • Inclusive dates of these activities 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"> • Number of AHs to be relocated as per agreed RP • Number of AHs already relocated • Number of houses built • Status of installation of community facilities to be provided as per agreed RP | |
| Compensation payments for affected assets is completed | | Please state: <ul style="list-style-type: none"> • Total Number of Eligible AHs and APs (as per agreed RP) • Number of AHs and APs compensated as of this monitoring period • Total Budget allocation as per agreed RP • Total budget disbursed to AHs as of this monitoring period | |
| Transport assistance for relocating affected HH | | As above | |
| Additional assistance to vulnerable affected household | | Please state: <ul style="list-style-type: none"> • Total Number of vulnerable AHs and APs (as per agreed RP) • Agreed forms of assistance as per RP • Number of AHs and APs assisted as of this monitoring period | |

¹² To be elaborated further in table 3.b (Issues for Further Action)

Document : Initial Environmental Examination Report

MFF0054-VIE: PFR3 – Quang Nam Water Supply Subproject – Dien Nam – Dien Ngoc and Tam Hiep, Quang Nam province

| | | | |
|---|--|--|--|
| 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"> • Total Number of AHs affected by temporary impacts as per agreed RP • 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) • Status of restoring affected property | |
| Capacity building activities | | | |
| | | | |

b. Issues for Further Action

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

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

a. OHS for worker

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

b. Public Safety

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

5. Information Disclosure and Socialization including Capability Building

- Field Visits (sites visited, dates, persons met)

Document : Initial Environmental Examination Report

MFF0054-VIE: PFR3 – Quang Nam Water Supply Subproject – Dien Nam – Dien Ngoc and Tam Hiep, Quang Nam province

- 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 |
|---|--|--|------------|
| Old Issues from Previous Reports | | | |
| | | | |
| | | | |
| | | | |
| New Issues from This Report | | | |
| | | | |
| | | | |
| | | | |

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

Annex 4: 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 | | | | 2017 | | | |
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| A | Project preparation phase | | | | | | | | | | | | | | | | | | | | |
| 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 Quang Nam PPC | | | | | | | | | | | | | | | | | | | | |
| 4 | Appraisal of VDB Bank | | | | | | | | | | | | | | | | | | | | |
| 5 | Negotiation Loan Agreement ADB and GoV | | | | | | | | | | | | | | | | | | | | |
| 6 | Establishment of PMU and preparation of project implementation plan | | | | | | | | | | | | | | | | | | | | |
| B | Project implementation phase | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | |